Devices for Dignity
Healthcare Technology
Co-operative

NHS
National Institute for
Health Research

Annual Report 2016/17

Improving outcomes and quality of life for people of all ages with long-term health conditions

Our Partners

NHS Partners

Sheffield Teaching Hospitals NHS Foundation Trust
Barnsley Hospital NHS Foundation Trust
North Bristol NHS Trust
The Leeds Teaching Hospitals NHS Trust
Sheffield Children's NHS Foundation Trust
The Newcastle upon Tyne Hospitals NHS Foundation Trust
Manchester University NHS Foundation Trust

Partners in the Technology Innovation Transforming Child Health (TITCH) Network

Alder Hey Children's NHS Foundation Trust
Birmingham Children's Hospital NHS Foundation Trust
Manchester University NHS Foundation Trust
City Hospitals Sunderland NHS Foundation Trust
Great Ormond Street Hospital for Children NHS Trust
Guy's and St Thomas' NHS Foundation Trust
Medilink
mHabitat
Sheffield Children's NHS Foundation Trust
Sheffield Hallam University
The Newcastle upon Tyne Hospitals NHS Foundation Trust
Trustech
University Hospitals of Leicester NHS Trust
Yorkshire Ambulance Service NHS Trust

University Partners

The University of Sheffield
Sheffield Hallam University
University of Cambridge
Coventry University

D4D's extended national networks include 29 NHS Trusts, 22 Universities, 170 Businesses and 35 Charities. Our networks are constantly growing.

Front cover: The far left image illustrates the AntiSuperbugs project (page 10). The adjacent image shows a photograph taken at a Child Prosthetics event (Starworks; pages 8-9), and the image below shows the Quanta Dialysis Technologies SC+ dialysis machine (page 15). The top image shows a graphic scribe output of a Public and Patient Involvement event as part of the NIV project (page 11). The image below shows the Head Up collar (page 14). The image on the right shows the Ampcare ESP equipment (page 16).

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An overview of 2016/17

Clinical Director's comments

This year brings good news for D4D's future, as we can announce that our 10 years of successfully bringing innovative technologies into the NHS has been rewarded with a further five years of portfolio funding.

Our core funding for 2018-2022 will again be provided by the National Institute for Health Research and from 2018 we will be known as NIHR Devices for Dignity MedTech Co-operative.

Our focus for the coming years is "Living my life well for longer", which reflects our long-standing focus on dignity and independence, whilst specifically also recognising that an estimated 2.9million people in England live with multiple long-term conditions. Our purpose is to help ensure that people can enjoy the best quality of life possible, for as long as possible.

This good news for the coming years builds upon the track record that we have established since 2008. We have continued to build the D4D brand, including updating our messaging and launching our re-designed website, with the objective of being more clearly visible as the national expert group in dignity-related technology development. Our status is reflected in our support of Arthritis UK in the delivery of two national technology competitions, and our work on incontinence priorities with a range of charities and the James Lind Alliance. This increasing recognition of our purpose has allowed us to widen our influence as evidenced by the number of projects, committees, and national initiatives we are invited to join.

We continue to develop our programme such that we are strategically aligned with National Health Initiatives as demonstrated by our collaboration with NICE to develop a new evidence tool for Medtech product developers (the Medtech Early Technical Assessment (META) tool - more information on page 12).

We also continue our close relationship with the NHS England Sheffield City Region Test Bed. New strategic partners and collaborations over the past year include the Insigneo Institute for *in silico* Medicine in Sheffield and the Translate Medical Technologies Group in the Leeds City Region.

D4D's approach to long-term sustainability is through securing publicly funded infrastructure grants to support our team, publicly funded grants to support projects and posts, and seeking opportunities to deliver national innovation initiatives. This year we focussed on securing the essential NIHR infrastructure funding, collaborated on 27 research grants and supported three national innovation initiatives, resulting in a total value of £6.8 million invested into new technology innovations.

National Initiatives 2016/17

NIHR Child Prosthetics Research Collaboration

Small Business Research Initiative (SBRI)
Self-care and independence in children with long-term conditions

Academic Health Science Network (AHSN)
Commercialisation Support

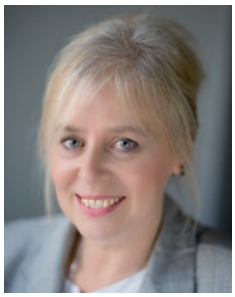
A key highlight of this year was the success of our proposal for a national Small Business Research Initiative (SBRI), in partnership with the Yorkshire and Humber Academic Health Science Network (YH AHSN). We developed the competition brief based on the output of national workshops held by our TITCH network (Technology Innovations Transforming Child Health); you can read more about the £5M 'Self-care and independence in children with long-term conditions' competition on page 17.

Following the announcement by the Health Secretary of the investment of £1.5M into better prosthetic limbs for children, we were delighted to be invited to lead the research arm of this important national initiative on behalf of the NIHR HTCs. The Child Prosthetics Research Collaboration is described in greater detail on page 8.

This has been an important year for one of our key projects, Head Up, as it moves from a successful and well-received clinical trial to commercialisation. We look forward to collars being made available to patients in 2018. You can read about Head Up on page 14.

Great progress is also being made by our partners in taking exciting technologies to the market; Quanta Dialysis Technologies have now unveiled the SC+ dialysis system (more information on page 15), currently scheduled for market launch in 2018.

As always, we extend our thanks to everyone that we have worked with over the year - our continuing success is the product of the consistent hard work of many people. We go into 2018 with a strong team, a strong portfolio of projects and activities, and a solid reputation for successfully developing and translating technologies. With our new funding we will continue to be leaders in patient-driven innovation, enabling people to live their lives well for longer.



Professor Wendy Tindale OBE

Clinical Director, NIHR Devices for Dignity HTC

Consultant Clinical Scientist

Scientific and Innovation Director,
Sheffield Teaching Hospitals NHS Foundation Trust

Healthcare Scientist of the Year 2016

How are we performing?

During 2016/17:

We leveraged **£6.8M** of additional funding to support our pipeline of technology projects

We worked on **48** projects

We received **63** enquiries for new product development

We started **10** new projects

Since 2008:

90 projects

£29.2M income leveraged to support technology development

350 project enquiries

329 companies engaged

Are we meeting our targets?

D4D originally began in 2008, and our current NIHR funding started in 2013.

In the last four years:

New project enquiries

Proof of concept projects started

Technology under clinical evaluation

Companies with products on or close to market

New technologies in the pipeline

Who are partners in innovation?

Effective innovation doesn't rely solely on great ideas or excellent inventions in isolation, it requires a close alignment of purpose and a great deal of determination from a large range of people, professions, and organisations. D4D's purpose is to bring together these groups, navigate and influence the perpetually-changing health and political landscape, and to guide technology development through to adoption into healthcare practice.

Our work is guided by the principle of bringing benefit to patients, and as such, all of our projects include public and patient involvement. During 2016/17 we appointed a Patient Partnership Lead to oversee and strengthen our programme-wide PPI activities.

We lead many public-facing events, the majority of which bring patients, healthcare professionals and technology developers together to enable productive and creative conversations, some of which will eventually lead to innovative new technologies. We work closely with other clinical, academic and patient networks for many of these events, especially our partner networks, the EPSRC Incontinence Management and PRevention through Engineering and ScienceS (IMPRESS) and Medical Devices and Vulnerable Skin (MDVS) networks.

Our experience is that projects are more likely to be successful where industry partners influence technology developments from early project stages. This relationship has developed further this year, particularly in the renal area as we are developing a Renal Forum with multiple business partners, and which we envisage will enable industry players to engage more efficiently with clinicians, and be more responsive to clinical needs.

Innovation doesn't end with the production of a new technology; the technology must be accepted and adopted into healthcare practice for it to be of benefit to patients. We continue to work with healthcare professionals and health economists, and are increasingly working with commissioners and policy makers across a range of settings to ensure the technologies we invest our time and expertise into are likely to become sustainable parts of healthcare practices.

Introducing Starworks - the NIHR Research Collaboration in Child Prosthetics (CPRC)

The collaboration will increase research across the healthcare system in order to accelerate the translation of new inventions and developments in child prosthetics into everyday use. This initiative will be centred on the needs of children and their families as well as the NHS, and will ensure there is the ideal balance of 'clinical pull' and 'technical push' to create an energetic environment in which to innovate and to partner with industry.

In 2016, the Department of Health announced a £1.5m investment into improving prosthetics provision for children. Half was to provide sports prostheses and the other £750k in NIHR funding was to address current problems with paediatric prosthetics.

In February 2017, D4D received this funding to form the CPRC. It brings together leading national research centres with key experts from the NHS, industry, clinical academia and importantly, children and their families, together with key opinion leaders from the four key areas with expertise and capabilities in child prosthetics.

The first phase of this project was to establish the current needs within the system and identify the best advances in research across four key stakeholder groups (Children and families, NHS, Industry and academia). This was undertaken in collaboration with our partners in this project and includes the TITCH network and key childhood prosthetics charities, including Limb Power, Steps Charity, Trustech, NIHR Brain Injury Healthcare Technology Cooperative, NIHR Trauma Management Healthcare Technology Cooperative and Sheffield Hallam University.

Starworks sought to engage with the key stakeholder groups through imaginative and creative means. The children and families were invited to a number of focus groups and offered an interactive survey to tell us about their needs and desires for new applications in child prosthetics. The analysis from these events and surveys led to the prioritisation of the needs, and identified areas of excellence and barriers to implementation of potential solutions. The priority needs are focused on:

- **Socket Interface**
- **Upper Limb Personalisation and Adaption**
- **Lower Limb Personalisation**
- **Adaption and Service Journeys**

We hosted sandpit events in Salford, Bristol, London and Sheffield to highlight these needs and brought creative innovators together to propose new solutions. Following an open competition call, we are now preparing to allocate proof-of-concept funding to groups who are co-designing solutions to address the priorities that the collaboration has identified.

Who is influencing Starworks?

Children and Families

Children and families are central to this whole process. By working with charities and limb centres, we undertook focus groups with younger children, older children, and parents/carers. We wanted to understand how children and parents live day-to-day with prostheses, and find out further details around their use of NHS services and experiences of different limbs.

Academia

We are identifying areas of outstanding research and development in child prosthetics by engaging with the academic community and identifying new advances in military provision.

Clinical Professionals

We are engaging with clinical teams who work with children and parents to understand what works and what doesn't so that we can identify barriers to activity limb provision, and highlight key priorities for research and development for effective prosthetics.

Industry

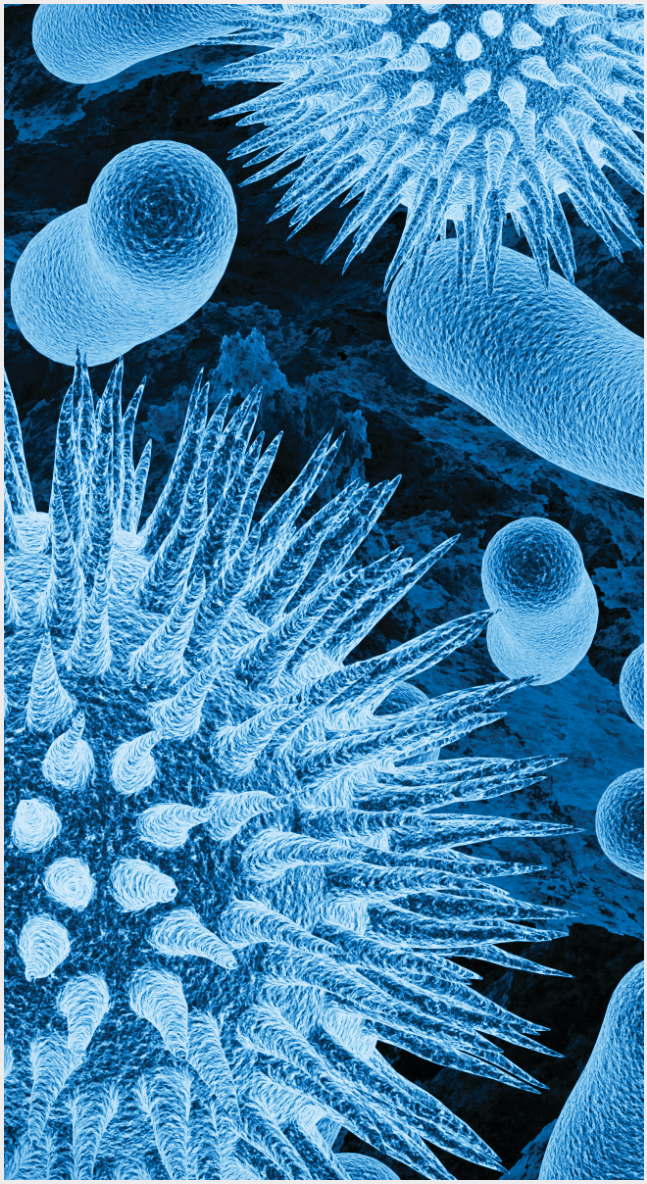
We are working with industry partners to identify and explore areas of excellence, and barriers to new developments of prosthetics limbs. We are also working to identify current and future industry needs and requirements.

Innovative NHS-led procurement - the AntiSuperbugs project

In September 2016 D4D joined a collaboration of European healthcare providers, co-ordinated by AQuAS in Barcelona, for the H2020 funded AntiSuperbugs project. This project will set priorities for unmet clinical needs in infection detection that are common to hospitals across the project member states of the UK, Spain, Germany and Italy. The project will include making €4M of funding available to companies to bid for to buy their research and development services to drive proof-of-concept technology development. By taking this approach, technologies will be developed more rapidly to fit the needs and constraints identified by healthcare providers - normally when hospitals purchase such technologies these would be chosen 'off the shelf' or developed/adapted in house.

Trustech, which provides innovation services to NHS organisations in the North of England, will also join the AntiSuperbugs consortium. Our joint involvement in the project as NHS partners builds on the collaborative working our organisations have established around the TITCH network and through our Starworks child prosthetics activities. By working together in the AntiSuperbugs project we will broaden our experience and increase engagement opportunities for UK companies.

The project aims to improve the quality of care processes in hospitals and the reduction of both the effects and costs of multi-drug resistant organisms and other organisms that cause healthcare associated infections. It will do so by developing and testing prototypes of devices that can test non-invasively for these organisms, and alert healthcare professionals to their presence. We are working closely with a range of healthcare professionals, managers, and other service-supporting departments to ensure the technologies are developed in a way that ensures they will be welcomed by clinicians, acceptable to patients, and can be integrated into existing healthcare services.



More information is available through the project website www.antisuperbugs.eu

This Pre-Commercial Procurement (PCP) project receives funding from the European Commission Horizon 2020 Research and Innovation Programme, Grant Agreement No. 688878.

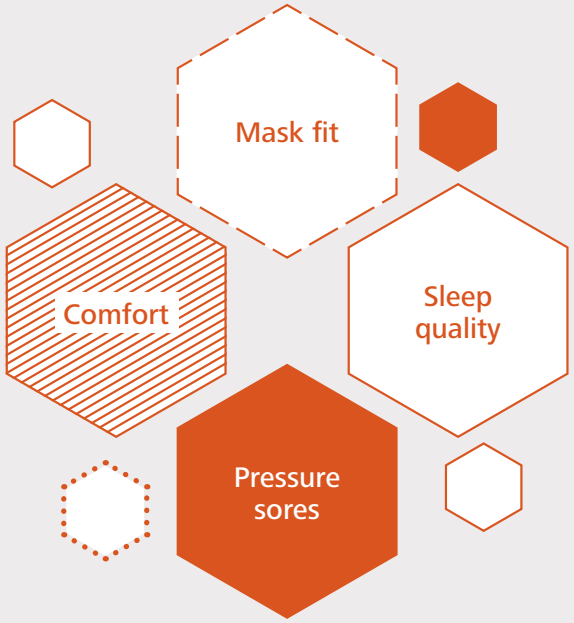
Innovations in custom technologies and service delivery - the NIV project

Improving ventilation therapies for children - the development of non-invasive interfaces.

Non-Invasive Ventilation (NIV) is the delivery of breathing support via a facemask. It is used to treat ineffective breathing and evidence shows that it improves quality of life and life expectancy. Ventilation is delivered through a mask covering the nose, or nose and mouth. A good fit is needed to deliver the treatment effectively. Without ventilation, these patients will suffer chronic hypoxia that can result in pulmonary hypertension, cor pulmonale (changes to the heart) and premature death. In some cases, clinicians have to resort to a tracheostomy in order to secure long term ventilation.

Mass-produced masks are available for the adult market but in young children and infants it is often difficult to find a mask that fits adequately. A particularly disadvantaged group is children with facial deformities and facial asymmetry in whom NIV may not be possible due to unavailability of an adequate mask.

What would children, parents and clinicians like to see improvement to?



The solution

D4D are collaborators in this project, led by Professor Heather Elphick at Sheffield Children's NHS Foundation Trust, exploring the use of innovative 3D assessment and manufacturing technologies to deliver novel mask-face interfaces to optimise mask fit to the needs of individual patients.

The opinions and suggestions of patients and parents of children that use NIV are fundamental to the project design and are integral to the success of the project. As part of the project business models are being explored to find the most commercially viable and clinically practical, and that offer the potential to scale up the use of this intervention on a national/international scale.

What are the potential benefits of custom-fit masks?

- Improved treatment compliance
- Improved patient experience
- Improved patient outcomes
- Reduced skin damage
- Potential cost saving to NHS of £5M per year
- Potential use in adult services

The following partner organisations are involved in this project:

- Sheffield Children's NHS Foundation Trust
- Devices for Dignity
- Sheffield Teaching Hospitals NHS Foundation Trust
- Sheffield Hallam University
- Materialise UK Ltd
- The University of Sheffield

This project, II-LB-0914-20004, is in receipt of NIHR Invention for Innovation Stage 2 funding (Long-term Conditions in Children and Young People Themed Call, 2014).

Innovating with Industry

D4D's experience is that involving industrial partners early in projects helps to build commitment to the resulting products, as well as bringing an understanding of the practicalities of manufacturing and marketing to the project. D4D continues to work closely with industry partners, both by bringing partners into projects, and through contract delivery of D4D's expertise to support specific business needs.

During 2016/17 D4D have engaged with over 120 companies, primarily medtech device or digital technology companies, as well as some biotech, pharma and in vitro diagnostic businesses.

D4D engaged with **82** SMEs during 2016/17, including significant activity with **47** across our themes.

D4D signed **17** NDAs with companies.

Our activities are not restricted to directly working with industry. During 2016/17 we have been exploring additional ways to help industry to be responsive to new healthcare practice and needs:

We have been collaborating with National Institute for Health and Care Excellence (NICE) and the Greater Manchester AHSN in trialling and refining NICE's new Medtech Early Technical Assessment (META) Tool. The META Tool will help technology developers review the evidence they have - and be guided in planning what they will need in the future - both to submit their technologies to NICE's Medical Technologies Evaluation Programme for assessment, and eventual inclusion in relevant NICE guidelines; and to make a convincing case for adoption by NHS (and other) customers.

We started to work closely with a renal project (the Health Foundation-funded SHAREHD project, which is developing step-wise approaches to more widely applicable self-management of haemodialysis) to develop an Industrial Forum: in particular, this is focusing on the lessons arising from the SHAREHD project, approaches to communicate the value of the renal Shared Care model inside the haemodialysis community, and ways that technology improvements could support the delivery of improved outcomes for patients.

www.shareddialysis-care.org.uk

The renal Small Business Research Initiative (SBRI) activity that D4D has undertaken since 2014 in association with the Department of Health has proven highly successful. D4D's clear brief and selection process led to a balanced portfolio of technology projects from strong company-led teams. Our processes in managing these projects included mentoring support for the project teams, and the facilitation of both clinical and user input to the projects. The result of this SBRI activity, which concluded during 2016/17, is 6 novel products likely to come to market in the next 2-3 years, with a total estimated business potential of £300m.

Nonwovens Innovation and Research Institute (NIRI) is a spin out company from the University of Leeds with expertise in novel ways to use nonwoven fabrics. They made a successful proposal to the SBRI Kidney Care competition to develop an active filter to remove antibodies which would otherwise inhibit the successful transplant of unmatched kidneys. This approach is less inconvenient to patients and significantly less costly than existing treatments. The project completed during 2016, with a ready-to-go exploitation route which is due to deliver final products to market soon. Through D4D's wider network, further unmet needs were revealed which were amenable to similar approaches, and some of these have already resulted in new grant applications. www.nonwovens-innovation.com

Patientrack is an award winning, always-on, active safety and communication system that calculates the risk of patients developing acute kidney injury, and alerts the clinical teams.

ww.patientrack.com

MicroBioSensors™ will alert peritoneal dialysis patients and/or physicians to an escalating infection via a visible colour change in the device and help target appropriate intervention in a more timely and effective manner than is currently possible.

"D4D were key to the success of the project." Gordon Barker, Chief Executive MicroBioSensor.

www.microbiosensor.co.uk

I.F.Sensing are developing a low-cost, novel, self-administered test to monitor renal function.

"Our device will open up a whole new paradigm of kidney care, from monitoring kidney transplant patients to wider population screening. The safe, pain free and simple nature of the device will transform how clinicians and patients monitor kidney function."

www.ifsensing.com.

Atlantis Healthcare designs, develops and delivers patient support solutions focused on improving an individual's quality of life.

Their expertise in self-management, behavioural science and technology, enables them to deliver improved health outcomes and value-based care; for the SBRI Kidney Care competition their focus was on supporting people who are diagnosed with chronic kidney disease.

www.atlantishealthcare.com

365response have developed a transport booking system for dialysis patients, who have particular transport needs. "Our digital technology is built for regulated sectors as it is not only a complete transport and flow system, but it also ensures fully auditable compliance. As 365 SmartPlatform is cloud-based and scalable, our clients find that it easily meets their specific requirements." - Brendan Fatchett, Chief Executive 365response.

www.365response.org

Trialling innovation in clinical practice - the Head Up collar

The development of a novel cervical orthosis to support neck weakness due to neurological disease.

Many people with neurological conditions develop neck muscle weakness, leading to pain and restricted movement, as well as problems with swallowing, breathing and communication. During 2016/17 we completed a clinical trial of the Head Up collar with over 150 participants. This novel neck support collar, co-designed with patients and clinicians, has been shown to be very effective, and popular with patients and clinicians.

A number of benefits of the new collar have been highlighted through the trial;

- pain reduction
- improved quality-of-life
- better ability to participate in everyday tasks such as reading, driving, communicating and watching television
- increased self-confidence

The collar was initially developed for people with motor neurone disease. We have now been able to demonstrate its potential benefits for a much wider range of patients, with a number of participants entering the study with other neurological conditions such as Muscular Dystrophy, Multiple Sclerosis, Supra Nuclear Palsy and Post Radiation Myopathy.

The potential for this medical device could be 130,000 collars/year in the UK and as many as 10 million per year globally. Following the signing of a license agreement with a UK company, TalarMade, we are close to being able to make the collar commercially available, so that patients will be able to access it during 2018.

The Head Up Collar was designed, developed and produced by a project team from D4D, the University of Sheffield, Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield Hallam University, Barnsley Hospital NHS Foundation Trust, and the Motor Neurone Disease Association (MNDA), with industry support. Funding has been provided through the NIHR i4i funding programme, MNDA and NIHR Devices for Dignity HTC, totalling £465,000.

> "No comparison to other collars - it works"

> "This collar gives support but also freedom of movement - I can wear it to drive."

> "My head is better positioned therefore do not feel as tired as before having the head resting on my chest."

Trialling Innovation in Clinical Practice - Quanta SC+

A high performance, compact, easy-to-use haemodialysis system designed to improve the lives of patients and carers both in the clinic and the home.

SC+ is a high performance, compact haemodialysis system that has been trialled during 2016/17 and that supports patients across the continuum of care, from the clinic to the home, by making it possible for patients to operate the device and manage their therapy themselves. SC+ offers clinical efficacy comparable to conventional devices and is compatible with traditional treatment regimens used in dialysis centres.

Based on clinical experience obtained during Quanta's extensive pilot studies, which included over 1,100 successful patient treatments at four NHS Trusts across the UK, the Company has optimised SC+ for commercial launch, which is anticipated for 2018. D4D Renal Theme Leads Dr Elizabeth Lindley and Dr Sandip Mitra have provided long-term support to Quanta during the development of this life-changing dialysis technology.

SC+ was designed and developed by Quanta with investment from the NIHR i4i funding programme, NBGI Ventures, Wellington Partners, Seroba, b-to-v Partners, ALIAD, Seventure Partners, Kuwait Life Sciences Company and IMI plc. A total of £45 million has been raised to develop SC+ through regulatory approval and launch.

"The number of patients with chronic kidney disease requiring dialysis is going to increase in the coming years, and we currently have a system where the majority are not offered a real choice or flexibility around how they dialyse, leaving them with very little control over their treatment. Patients very quickly become institutionalised, with most believing they have no other treatment options and resigning themselves to a lack of freedom and normality. The whole concept of dialysis, being totally dependent on a machine to keep you alive, can be daunting and overwhelming; physicians need to help give kidney patients confidence that they can take ownership of their treatment and in doing so can greatly improve their quality of life.

I am extremely passionate about home dialysis and truly believe it is the best form of treatment for many kidney patients, and that is why I'm so excited by the potential of SC+ as it empowers patients with the freedom and flexibility to take back control."

-Maddy Warren, Patient Advocate

Introducing innovation to clinical practice - Ampcare ESP

A new treatment that combines electrical stimulation with specially selected resistance exercises to help rehabilitate swallow function to help patients swallow safely.

Many patients have swallowing difficulties (dysphagia), for example as a result of cancer, dementia or progressive neurological disease; up to 78% of patients are affected post-stroke. These difficulties can result in patients being at risk of choking, chest infections and pneumonia due to penetration of food and/or drink into their airway when they try to swallow. These complications lead to increased mortality, longer hospital stays, and significant NHS costs. In addition to medical factors, dysphagia impacts on a person's quality of life and psychological wellbeing. Social activities and daily routines can become disrupted, resulting in feelings of isolation and social exclusion.

Ampcare Effective Swallowing Protocol (ESP) is a new treatment protocol, developed in the US which incorporates transcutaneous electrical stimulation with specialised throat exercises, performed against the resistance of a specially designed neck brace.

The Speech and Language Therapy (SLT) team in Sheffield Teaching Hospitals (STH) NHS Foundation Trust were interested in evaluating this new treatment approach to see whether it might be helpful to patients in the UK via adoption by the NHS. As there was at that point insufficient research evidence about its efficacy, further research was called for by NICE and the Royal College of Speech and Language Therapists. D4D were able to facilitate the evaluation of this device through STH's Medical Physics and Clinical Engineering department, including supporting all the regulatory requirements. Funding was secured in order to undertake a pilot study comparing the Ampcare ESP against usual dysphagia treatment for 30 stroke patients.

At follow up, one month after the end of treatment, 100% of the Ampcare ESP patients reported improved swallow-related quality of life, compared to 42% of the patients who had received usual dysphagia care.

As a result of the evidence from the pilot trial, SLT professionals are keen to have Ampcare ESP as a treatment option. We are therefore working with the device manufacturer to support uptake of this technology:

- We are delivering training for clinicians in the use of this therapy
- SLTs who have been trained are collaborating in an audit of the intervention, using a specially developed NICE Audit Tool, in order to influence professional practice guidelines, and
- D4D helped Ampcare identify potential UK distributors.

Following a training day in October 2016 we are pleased to announce that the technology is now launched in the UK, and is being made available initially across seven NHS Trusts. We will continue to monitor patient outcomes as the technology is adopted more widely, and Sheffield Teaching Hospitals NHS FT have secured funding to appoint an SLT to support this.

Patients who received the new treatment were very positive about it:

> "I feel better at swallowing - no problems swallowing at all now"

> "I thought the treatment was very good and I would recommend it to anybody"

We gratefully acknowledge funding for the pilot study from: Sheffield Teaching Hospitals NHS Foundation Trust; Ampcare LLC; NIHR Devices for Dignity HTC; Collaboration for Leadership in Applied Health Research (South Yorkshire) and Royal College of Nursing (Lady Foley Award)

Innovative proof of concepts - Pitch to TITCH

TITCH is a national network, managed by Devices for Dignity, which seeks to address the problems associated with the niche - and often neglected - market for technology in the field of child health.

In 2016 our TITCH (Technology Innovation Transforming Child Health) workshops helped guide the priorities that the 'Pitch to TITCH' proof of concept competition initially sought to address, with funding provided by the Greater Manchester AHSN and Central Manchester University Hospitals NHS Foundation Trust (CMFT), and managed by Trustech.

The funding has been used to drive forward the development of two technologies:

A virtual guide to reduce anxiety for children visiting hospital

When Corporation Pop's Managing Director Dom Raban's 13-year-old daughter was diagnosed with cancer he was disappointed by the level of information she received about her treatment. This meant that, like many other children and young people, she found visiting hospital deeply traumatic. Corporation Pop was awarded £19,500 to develop a prototype of a patient virtual guide (PVG). Following this proof of concept work, Corporation Pop have been given funding from the Nominet Trust.

"The most important aspect of PVG is putting information in the hands of children, I want them to feel engaged, empowered and informed - and have fun at the same time."

Dom Raban, Managing Director Corporation Pop

Users create and customise an avatar guide to accompany them through the virtual hospital. Once 'inside', kids can explore hospital environments in 3D augmented reality and 'play' with often frightening technologies such as MRI scanners and heart-rate monitors.

The guide can answer their questions and encourage them to discover the role of the doctors, nurses and equipment they'll encounter in the real world. By creating a safe space, it gives children the chance to confront their fears while getting credible child-friendly information.

A new device aimed at improving diagnosis and treatment for children suffering from faecal incontinence.

Faecal incontinence is often a symptom of debilitating paediatric conditions that can progress into severe gastric consequences. Despite the fact that many of the underlying conditions can be treated, limited diagnostic tools and care pathways available to clinicians can lead to significant under-reporting.

Lucid Group Limited were awarded £14,700 to finance a paediatric faecal incontinence diagnostic feasibility investigation. Lucid have also successfully secured SBRI Healthcare Stage 2 funding for a similar device in the elderly population. The funding is being used to create an integrated device and app, designed to fit existing healthcare protocols and enable more accessible interventions at significantly lower cost. The two funding streams are enabling development, prototyping, extensive clinical input and trials at two NHS Trusts. The aim is to have a CE marked product, with associated app, available in 2018.

"Pitch to TITCH backing for An-i-sys will better focus the innovation on the needs of patients and clinicians - and the challenges that our NHS faces. We'll be involving surgeons, continence specialist and clinical physiologists in co-creation. Joining up design with ongoing user input will help us develop a more effective and accessible connected diagnostic device and app. Clinical involvement really improves our compliance, adoption and business case. We believe TITCH will accelerate delivery of benefits to patients."

Alistair Williamson, Managing Director of Lucid Group, who are developing An-i-sys.

The D4D team

Core Team

Professor Wendy Tindale
Clinical Director

Dr Nicola Heron
Programme Director

Oliver Wells
Commercial Director

David Coyle
Patient Partnership Lead

Dr Katherine Jeays-Ward
NHS Innovation Manager

Dr Angel Jimenez-Aranda
NHS Innovation Manager

Kirsty Kassim
Programme Administrator

Dr Avril McCarthy
Medical Technologies Lead

Nathaniel Mills
NHS Innovation Manager

Liz Pryde
NHS Innovation Manager

Dr Martin Slovak
Theme Research Associate

Lise Sproson
Theme Research Associate

Clinical Leads and Advisors

Professor Paul Dimitri
Theme Lead

Professor Mark Hawley
Theme Lead

Simon Judge
Theme Research Associate

Dr David Keane
Theme Research Associate

Dr Joseph Langley
Engineering Design Research Fellow

Dr Elizabeth Lindley
Theme Lead

Dr Avril McCarthy
Medical Technologies Lead

Professor Sue Mawson
Advisor

Dr Sandip Mitra
Theme Lead

Dr Nicos Mitsides
Nephrology Innovation Research Fellow

Professor Rory O'Connor
Theme Lead

Professor Sue Pownall
Clinical Advisor

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Activity highlights of 2016/17

- **D4D Patient Event**
  September 2016
- **Visit by Sir Malcolm Grant**, Chairman of NHS England, and colleagues, to the Perfect Patient Pathway Test Bed
  October 2016
- **Professor Wendy Tindale joined EPSRC's Healthcare Technologies Strategic Advisory Team**
  October 2016
- Professor Wendy Tindale's **presentation to the Institute of Physics, Liverpool**
  November 2016
- **Oliver Wells joined the Apeldoorn British Dutch Dialogue on ageing**
  November 2016
- Working with a consortium of charities to **discuss common needs and priorities around incontinence**
  December 2016
- **Visit by Dr Fiona Carragher**
  Deputy Chief Scientific Officer, to D4D in March 2017
- **Renal theme article** on the cover of Renal and Urology news, March 2017

Our activities and publications 2016/17

We organised or took part in 13 national workshops:

- SHAMROK antimicrobial resistance workshop, April 2016
- Dr Moon's Inventing Room, Leeds, June 2016
- Potential project mapping workshop, June 2016
- The University of Sheffield and Engineering & Physical Sciences Research Council joint meeting and workshop, June 2016
- Hackathon in Care Homes, July 2016
- NICE META Tool development workshop, September 2016
- ERA/EDTA Management of fluid overload in dialysis patients, Warsaw, October 2016
- Ampcare ESP UK product launch and training, October 2016
- Oral Health & Aspiration Workshops, May and November 2016
- D4D/CORNN research validation panels July and November 2016, March 2017

1 New look website

17 new case studies

Participated in **36** events

26 oral presentations at national or international conferences

23 poster presentations at national or international conferences

Published **12** newsletters

Increased Twitter followers by **30%**

1. Jayanti A, Foden P, Wearden A, Mitra S. Illness Beliefs in End Stage Renal Disease and Associations with Self-Care Modality Choice. PLoS One. 2016; 11(7):e0154299.
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15. Davies SJ, Caskey FJ, Coyle D, Lindley E, Macdonald J, Mitra S, Wilkie M, Davenport A, Farrington K, Dasgupta I, Ormandy P, Andronis L, Solis-Trapala I, Sim J. Rationale and design of BISTRO: a randomized controlled trial to determine whether bioimpedance spectroscopy guided fluid management maintains residual kidney function in incident haemodialysis patients. BMC Nephrology. 2017; 18:138.Evidence. Blood Purif. 2016; 41(4):324-31

"D4D's understanding of the NHS landscape and the regulatory requirements of medical devices has been extremely beneficial and invaluable in the early stages of the development process. Their vast network has opened up a number of opportunities and enabled us to improve our chances of product adoption and success, without which we probably would still be fumbling in the dark"

GSPK Design - Emego Project

"D4D offers wide ranging knowledge of the healthcare market and a good understanding of the unmet medical needs we are trying to address". Microbiosensor Ltd"

Microbiosensor - SBRI Kidney Care Competition

"It's been a fantastic experience for us. We are a small firm driven for patient improvement and the experience of working with D4D has been fantastic. We've used all of the experiences of the whole panel, they've advised us, coached us and supported us, and it's been a highly recommended experience."

365 Response - SBRI Kidney Care Competition

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