Department of Health

ACADEMIC HEALTH SCIENCE CENTRES
SPECIFIC THEME / WORK PROGRAMME

1. DETAILS OF THE PROPOSED ACADEMIC HEALTH SCIENCE CENTRE (AHSC)

Name of the English NHS Provider/University Partnership:
Cambridge University Health Partners

2. THEME / WORK PROGRAMME

2.1 Name of the theme/work programme.

Theme 4: Supporting Translational Research

2.2 Aims and objective of the theme/work programme.

Translational research connects the laboratory to the bedside, turning discoveries into new health products by attracting interest, investment and development by the health, pharma or biotechnology industries; proven innovations then require adoption and spread to improve health and wellbeing. As outlined in the main application, CUHP biomedical and health research is strong; national metrics consistently rank the institutions in the top one or two; there are major investments from MRC, the Wellcome Trust and other charities; and excellent links with industry. The success of the NIHR Cambridge Biomedical Research Centre (BRC) was recognised in 2012 with greatly increased funding to £110m for 2012-2017 and a new dementia Biomedical Research Unit. The BRC themes in brain repair; cancer; cardiovascular; infection, immunity & inflammation; mental health; metabolism, endocrinology & bone; transplantation & regeneration; and women's health encompass research across CUHP, supported by cross-cutting themes on genomics; imaging; population health and evaluation & implementation, together with a focus on capacity development. This CUHP work programme aims not to perturb existing research, but to improve support for dynamic interactions between institutions and researchers throughout the translational spectrum. The CUHP Translational Research Board (TRB) oversees implementation and strategy development for translational health research on behalf of the main Board. Each NHS Trust leads the TRB on an annual basis to negate difficulties that may arise at institutional boundaries. We address Cooksey's translational gaps, referred to as T1 (bench to bedside) and T2 (research campus to community). Our five aims are:

Aim 1. To undertake health research amongst CUHP members and related organisations within a simple, streamlined and efficient research process that supports researchers and brings maximum benefit to patients and the public. The objectives are:

•Progressive harmonisation and streamlining of the research processes across the health research system comprising CUHP. We have already established a joint Research Office between CUHFT and CPFT, allowing oversight by a single, senior research manager with harmonised governance procedures across NHS trusts relying on the same quality control and providing assurance to both CEOs regardless of the origin of an application or sponsoring organisation. This office is adjacent to the CUHP clinical trials unit (CTU), the University of Cambridge Research Office and to the School of Clinical Medicine research governance officer. The PHFT Research Office has research management and governance (RM&G) expertise concerning medical devices and cardio-pulmonary health research, as well as providing general RM&G support to NHS and University staff on the Papworth site and to a number of other trusts in the East of England. The imminent move of PHFT to the Biomedical Campus provides the opportunity for harmonisation and specialisation within the emerging CUHP RM&G system.

•Developing a virtual, one-stop shop for researchers and promoting customer service. Coordination between the RM&G functions will facilitate the use of a single CUHP R&D address (research@CUHP.org), with decisions made by the office and not by the researcher-customer on where, within the RM&G system an enquiry or request should be directed. Learning from experience will be achieved through regular surveying of views of researchers on RM&G within CUHP, and "case conferences" on particular difficulties as well as incidents where complex problems were handled expeditiously.

Deliverables: 1-2 years: TRB reporting dashboard and RM&G targets; two CUHP-wide customer surveys

(incl. industry); map current RM&G processes and make available throughout CUHP; establish single portal for RM&G & sponsorship. **2-3 years:** Agreed MO for working with new NIHR local clinical network; agreed improvement met in RM&G targets and in survey responses (customers see one-stop-shop); plan for single site RM&G consequent on future PHFT move to CBC; support draft plan for BRC renewal; Translational Research Office established. **4-5 years:** Effective, single process RM&G across CUHP supporting external partners (including industry); BRC renewal.

Aim 2. To maximise the potential for effective working with industry and other partners, and the exploitation of translational research funding streams. The objectives are:

•To ensure the continuing development of strong relationships with industry. For instance, the GSK Clinical Unit has been directed (2008-13) by a University professor and CPFT honorary consultant seconded to GSK (Bullmore); the NIHR BRC has established a Steering Committee with GSK to foster interactions in immuno-therapeutics; the Pfizer-Cambridge Centre for Cardiovascular Genomics was established in 2012 with support and leadership from Pfizer, BHF, the MRC and the BRC in order to identify and validate potential therapeutic targets for cardiovascular disease. As described in in the main application, AstraZeneca will establish a new global R&D centre and corporate HQ on the Cambridge Biomedical Campus by 2016, an investment of some £330m. This will require close coordination with AZ and other companies as the impact of the relocation is felt within the CUHP and on campus.

•To increase the number and quality of industrial collaborations, including both large companies and small and medium sized enterprises (SMEs), and collaboration in partnerships for application for translational funding streams from NIHR, MRC and other sources.

•To increase the number of patents, licenses and spin-out companies arising from CUHP research.

•To maximize translation of research over the T1 and T2 boundaries. The NIHR BRC and BRU investments have facilitated a wide-reaching research infrastructure that includes the Core Biomedical Assay Laboratory, Cambridge NIHR Genomics Core Lab, the GMP Resource for Stem Cells and Regenerative Medicine, Haematology Translational Research Laboratory, the Herchel Smith Building for Brain and Mind Sciences, MRI core facilities, PET/CT, the Human Tissue Bank, the Cambridge BioResource and the Addenbrooke's Clinical Research Centre comprising the Wellcome Trust Clinical Research Facility and the Clinical Investigation Ward and providing a 3T MR scanner dedicated to MRS, an appetite laboratory and nutrition resource, a research endoscopy suite and dedicated space for intravenous treatment including cancer chemotherapies. Collaborations include leadership for the NIHR BioResource and, with the Newcastle BRC, the NIHR Translational Research Centre in Rare Diseases; the BRC is a partner in the NIHR Translational Research Partnership in Joint and Inflammatory Disorders and the NIHR Health Technology Collaborative. The NIHR Cambridge Healthcare Technology Co-operative in Brain Injury and the NIHR Cambridge Experimental Cancer Medicine Centre were established in 2013.

•Alignment of our research strategies for T2 translation led to the award of a successful NIHR CLAHRC that has recently been renewed for five years with a remit for the East of England, including NHS, voluntary sector, local authority and industry partners; its strategy includes a comprehensive plan to drive NIHR's Cambridge investments from T1 translation, through T2 and into policy and practice. CUHP led the establishment of the Eastern Academic Health Sciences Network (see main application) that will facilitate adoption, diffusion and spread of innovations in health care and liaison with industry.

Deliverables: 1-2 years: Recruitment of three new Translational Research Officers (TROs; currently one in post) to support links between CUHP investigators and industry partners, two at T1, one at T2; TRB agrees TRO success criteria; renewed programme for industry liaison including Academic Business Clinical (ABC) events; survey of industry requirements from CUHP (see above); development of assessment process for T1↔T2 alignment opportunities in BRC & CLAHRC; map likely industry investments on campus post AZ decision; successful CUHP-industry bid to Wellcome Trust re immune-therapeutics. **2-3 years:** measured success of TRO scheme – expand or contract, accordingly; consultation and plans with new campus partners with CUHP Campus Associate status and campus governance established; further CUHP-industry-charity/Research Council partnership bids either new or succession from current activity; effective integration of CUHP, AHSN, Cambridge Enterprise and Small Business Research Initiative regarding campus and links with SMEs; established route for CUHP spinouts regarding incubator/early accommodation and coordinated VC opportunities; industry satisfied with RM&G; new five year plan. **4-5 years:** Trebling CUHP-industry partnerships; doubling renewal of current successful awards; doubling of patents, licenses and spin-out companies; implementation of new five year plan.

Aim 3. To optimise the use of routinely collected and other patient data for research leading to improved health outcomes. The objectives that link closely with our Medical Informatics Theme are:

•To support the implementation of e-Hospital programme by CUHFT and PHFT in partnership with EPIC and Hewlett Packard. Continuing participation in the NIHR Health Informatics Collaboration (NHIC) and maximising the potential for using routinely collected clinical data offered by the Clinical Record Interactive Search (CRIS) system developed within the SLAM NIHR BRC and currently being implemented within CPFT amongst other AHSC mental health trusts giving the potential to create a R&D consortium (CUHP, Oxford, KHP & UCLP); creation of a cross-cutting NIHR BRC theme in informatics encompassing clinical

informatics, bioinformatics and biostatistics, and involving close working with the University in terms of creation of related academic posts; establishing a culture that maximises exploitation of clinical information systems that rewards those inputting data, those using data on a routine basis for clinical decisions and management and translational health researchers.
•Increasing the coverage of patient advanced consent to be contacted about research opportunities.
Deliverables: 1-2 years: e-Hospital implementation as planned; CRIS operational in CPFT; pilot advanced consent completed in memory clinic for dementia BRU. **2-3 years:** e-Hospital operational in 50% clinical areas; CRIS piloted in e-Hospital environment; successful NIHR project exploiting CRIS in multiple AHSC; advanced consent routine in four service settings; academic posts and education programme in clinical and bio-informatics, supporting BRC initiative. **4-5 years:** e-Hospital fully implemented; CRIS operational throughout CUHP; advanced consent routine throughout CUHP (see 5).

Aim 4. Designing clinical pathways and services within, between and involving partner NHS organisations so as to support more effective R&D, and improve patient experience and outcomes.
•CUHP has many examples where translational research and clinical services exist synergistically so as to improve patient experience and improve patient experience. The impetus for these developments comes from everyday collaboration between clinicians, researchers and educators. Furthermore, we have links through the CLAHRC with the University's Engineering Design Centre for the application of appropriate design principles when planning service developments within CUHP. We shall continue the principle of co-design of new services by clinicians, patients and researchers; for example:
•Services for neurodegenerative disorders are increasingly integrated across CUHFT and CPFT, with shared university accommodation and clinical facilities. Translation between human and animal research has been supported by the local development of identical cognitive tests in mice and human patients. This coordination between laboratory and clinic allows the application of findings from murine genetic knock-outs to clinical risk stratification, and the rapid translation of drugs proven to be disease modifying in animal models. CPFT's specialist early intervention service provides care for young people with psychotic disorders (www.cameo.nhs.uk). It combines high quality clinical care, excellent patient experience (Hospital Doctor Psychiatry Team of the Year 2008) and a wide range of embedded clinical research; over 90% of patients take part in research; prediction tools of psychosis incidence to support commissioners, nationally and in Europe (www.psymaptic.org). The translational research programme to develop the artificial pancreas has reached the stage of trials of prototype closed-loop (real-time glucometry and insulin delivery) devices in the domestic setting in adults and children. Further work is under way relying on major industrial partners such as Abbot to move this forward into a clinically usable device. Similarly, research on cortical bone density mapping, with the Department of Engineering has moved into imaging trials with industry that could provide a step change in the assessment and management of fracture risk (Poole). There is a strong interface between the BRC research in transplantation and the clinical abdominal organ transplant service at CUHFT, and the PHFT thoracic organ transplant programme, strengthened by the planned relocation.
Deliverables: 1-2 years: CUHP service-development protocol to include divisional research lead, consideration of implications for CUHP, acknowledgement of commissioner R&D role, PPI input; decision by CPFT on potential move to Biomedical Campus; identification of CUHP basic biomedical (including animal) and physical sciences (e.g. physics, maths) linking to clinical domains (ie map); metrics on patient participation in R&D by service. **2-3 years:** Integration of new NIHR local clinical research network (LCRN) processes into service design and existing services to maximise income; all local innovations (e.g. artificial pancreas) moving into production integrated into local services; routine quarterly meetings between NHS trusts regarding service developments; annual meeting of researchers, service managers and clinicians with PPI for knowledge exchange; 20% increase in patients participating in research. **4-5 years:** Clinical pathways routinely support effective R&D; PPI central to both guiding strategy and designing process; clear routes of exchange between basic research and clinical application; 50% increase in patient participation in research.

Aim 5. To build human capacity for translational health research. Through the NIHR BRC we have a strong programme for building capacity including the development of translational health researchers, supporting women's careers, increasing patient and public involvement (PPI) in health research, and improving access for patients wishing to volunteer for health research. This programme includes approaches to attract non-medical graduates including mathematics, chemistry, engineering and management graduates to address biomedical challenges and provides post-graduate education programmes. The University has established senior academic posts but the intermediate career opportunities are limited, and we are addressing this. The training programmes rely on excellent links across CUHP and the exceptional environment for multi-disciplinary training in experimental and translational medicine through the NIHR BRC and its allied research institutes aligning University and NHS partners. For medical graduates the Clinical Academic Training Office (CATO) provides core administrative support to a number of collaborative programmes including clinicians, being responsible for the day-to-day administration of nine major programmes, over £20M in funding and looking after over 380 trainees/students. CATO has been instrumental in increasing student numbers both within the Clinical

Academic arena and the Graduate Degree programmes. CUHP is committed to patient and public involvement (PPI) in health research. The NIHR BRC has invested in a programme of PPI support, with a PPI lead working across themes; the NIHR CLAHRC EoE will have a new research domain regarding how best to incorporate PPI in health research. CUHP is a strong supporter of NIHR's "OK to Ask" campaign, piloting advance consent for patients to be asked whether they wish to take part in clinical research at first registration; a pilot undertaken with people attending for memory assessment for possible dementia is linked with the development of a county-wide, population-based dementia registry (see 3). CUHP will continue to support these key activities in the BRC and CATO; it will develop a career structure for those without a health background, educated in the non-clinical programmes, and will develop capacity and careers for nurses and allied health professions (AHPs).
Deliverables: 1-2 years: Consultation and planning for intermediate career structure for post-doctoral scientists from non-medical graduates (e.g. maths, physics); continued delivery of BRC and CATO structures supported by CUHP and developed as appropriate with external support; plan for nursing and AHP capacity building developed with newly appointed Professor of Nursing and through CLAHRC. **2-3 years:** Funding secured for posts within career structures, as above, from external funders (e.g. Research Councils, Wellcome Trust); first appointees; succession planning BRC schemes. **4-5 years:** National / international leadership in career pathways for non-medical / clinical health researchers.

2.3 Description of how the proposed theme or work programme will contribute to the EAHSN and AHSC aims.

Effective translation of health research is fundamental to improving the health and wealth of the nation, and to the aims of the EAHSN and CUHP. Effective translation of health research depends upon the engagement and coordination of multiple organisations and stakeholders. These go beyond the academic disciplines and health services represented in the four organisations comprising CUHP; these include global industry, small and medium sized enterprises (SMEs), the voluntary sector, the public, patients, research funders, Government and policy makers. CUHP will continue to work closely with the EAHSN and other partners to achieve its ambitions for adoption, diffusion and spread of innovations that are of proven value.

2.4 Description of how the proposed theme or work programme will contribute to the further integration of research, health education and/or patient care and how this will lead to improvements in patient care.

Supporting effective translation of health research relies on the effective integration of research, health education and patient care. This is set out in the main application and in the five aims included in Section 2.2. Specific examples of how effective research translation integrates the tripartite mission are many. Cambridge examples include improving the outlook for people with MS though effective treatment with alemtuzumab, recently licensed by Sanofi as Lemtrada. This was based on a long pathway beginning with the invention of Campath1H in a research laboratory followed by many years of careful clinical investigation with extensive patient involvement. Another example is the use of next generation genome sequencing to investigate a neonatal MRSA outbreak (Köser et al, NEJM 2012) in order to map in real time the spread and evolution of MRSA both within and outside of hospitals. More recently, whole-genome sequencing identified transmission of Mycobacterium abscesses between patients with cystic fibrosis, possibly through indirect routes, suggesting the need to review patient pathways and service configuration in order to negate this source of morbidity and mortality in the disorder (Bryant et al, Lancet 2013).

2.5 Description of how the theme/work programme will involve and enhance multi-disciplinary and multi-professional working.

Effective translation of health research relies on and promotes multi-disciplinary and multi-professional working. CUHP sees translational research as, fundamentally, a multidisciplinary and multi-professional endeavour in terms of the execution of research and the effective implementation of new knowledge as innovations in health care. Thus, the work programme will directly enhance multi-professional working.

2.6 Description of leadership and key individual and organisational contributors with responsibility for delivering the theme/work programme.

This work programme requires broad and distributed leadership, with commitment from the Board and a wide range of staff and professions throughout the organisation; public and patient engagement is also crucial. Within CUHP, key individuals are: CEO, Director, COO and assistant director, R&D lead, BRC Director & Scientific Director, Trust R&D Directors; University of Cambridge Research Office Director; BRC & BRU theme leads; medical & clinical directors; all professional theme leads. Beyond CUHP, our campus affiliates and their leadership teams all have a part to play in achieving the CUHP ambition in this domain.