

**DEPARTMENT OF HEALTH DESIGNATED
ACADEMIC HEALTH SCIENCE CENTRE (AHSC)**

2015/16 ANNUAL REPORT

Note: Please note this form should be completed in font no smaller than 10-point Arial.

1. ACADEMIC HEALTH SCIENCE CENTRE DETAILS

Name of the Department of Health Academic Health Science Centre:

Imperial College Academic Health Sciences Centre

Contact details of the DH AHSC lead to whom any queries and feedback on this Annual Report will be referred:

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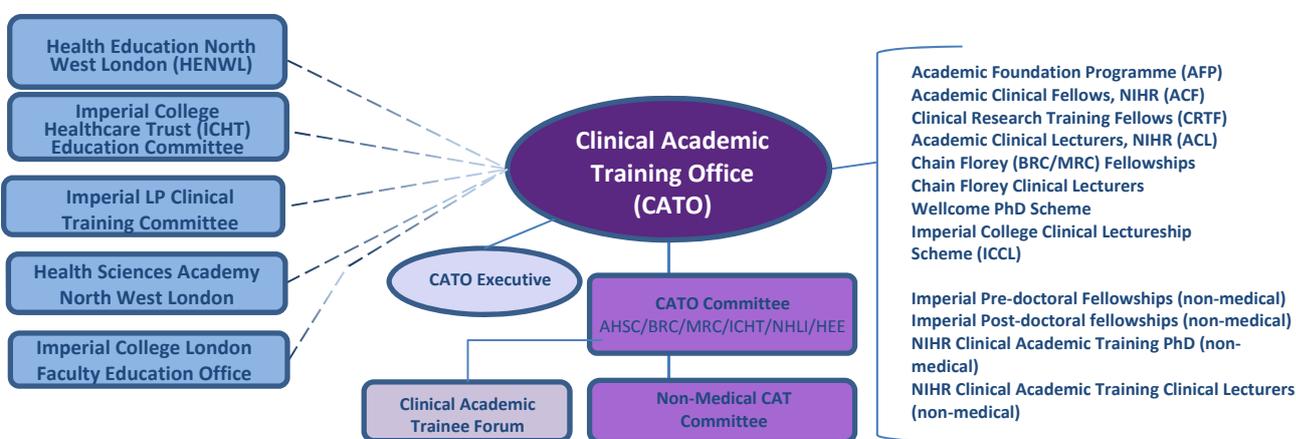
Signed : _____

Professor Jonathan Weber
AHSC Director and Vice Dean Faculty of Medicine, Imperial College

2. OVERVIEW OF ACTIVITIES (no more than 4 pages)

The Imperial AHSC's overarching strategy is to i) **integrate the research strengths** across all Imperial College (IC) faculties with the **critical mass** of Imperial College Healthcare NHS Trust (ICHT); ii) create powerful **interdisciplinary synergies** through translational science, bioengineering and informatics; iii) **train the next generation** of multidisciplinary clinical scientists and to iv) translate our research into **new healthcare practice, policy and wealth creation**. In 2015/16 the AHSC has continued to focus on 6 cross-cutting Priority Work Areas, with an emphasis on training and informatics. The Work Areas, overseen by the AHSC Joint Executive Group (JEG), demonstrate our progress in aligning the partner organisations' strategic objectives, provide added value and underpin delivery of our thematic areas. Key developments include:

1. Established the **Clinical Academic Training Office (CATO)** as the centralised pan-professional AHSC clinical academic training hub. CATO provides a single point of contact for advice and information on clinical academic careers, recruitment, training and funding and interfaces directly with the partner's educational committees, the Deanery, staff and trainees (see below). Its remit spans medical, nursing, midwifery and allied health professional academic training. CATO is also the vehicle to develop and implement new AHSC initiatives to support and increase research training and education opportunities.



CATO's achievements in its first year include:

- Comprehensive information to assist and support trainees including a website, annual conference and other awareness raising activities. The benefit of this centralised support and advice function was recognised in the 2015 trainees' survey.
- A richer training experience through the implementation of additional course requirements i.e. transferable skills (delivered by Imperial Graduate skills), modules from the new MSc in Genomic Medicine for ACFs and CLs plus oversight and promotion of mentoring and buddying support
- Success in attracting the second highest number of awards from NIHR for ACFs and CLs in 2016
- Led the development and launch of a new IC Clinical Lecturer appointments process
- Continued success and expansion of a non-medical pre-doctoral research programme (3 fold increase in trainees within 2 yrs.) with a focus on Antimicrobial Resistance (AMR) projects in 2015/16
- Development and launch of a new post-doctoral research fellowship to provide nurses and allied health professionals the support and time to strengthen applications for NIHR Clinical Lectureships.

2. Health informatics: ICHT implementation of Cerner is ongoing with appointments, results, EPR and full electronic prescribing achieved. The data warehouse at ICHT enables research access to this clinical resource, facilitated by an AHSC data sharing agreement and new AHSC Information Governance Director and administrator roles in 2015 to meet the growing demand for data-led research projects.

To further extend the utility and use-ability of the resource, the AHSC infrastructure is progressing towards ISO27001 compliance and capability to match ICHT clinical data with externally held clinical and research datasets (e.g. HSCIC; research cohorts and trials data) to provide a richer, precision medicine focussed resource. This new infrastructure is being developed in parallel to an ICHT-led initiative to develop a single electronic health care record for NW London. In aligning these initiatives, the AHSC aims to create a uniquely comprehensive, rich population data set for research, housed in a secure, managed access infrastructure architecture.

Supporting and facilitating use of the AHSC's e-health platform, the **Imperial Data Sciences Institute (DSI)** opened in 2015. It provides a single, multidisciplinary hub across IC with data management capability, analytical tools, training and education programmes. AHSC researchers can already access, via the DSI,

eTRIKs cloud-based informatics and pharma-endorsed tranSMART analytical software, which the DSI is developing further, to enable integration and analysis of imaging and other clinical datasets. In collaboration with Oxford AHSC, and following a bilateral meeting in September 2015, a common universal consent process is also being piloted across both AHSCs. Through the NIHR Health Informatics Collaboration, from which the ICHT data warehouse was established, the Imperial College BRC continues to play an active role in inter-organisational research projects, contributing to those in renal transplantation, viral hepatitis, ovarian cancer, acute coronary syndrome and critical care. In addition, the BRC (in collaboration with Royal Brompton BRUs & Royal Marsden BRC) is leading a new NHIC lung cancer project and contributing to four other new NHIC projects in 2016.

3. Antimicrobial resistance (AMR): IC launched the Antimicrobial Research Collaborative (ARC@Imperial) in June 2015, a multidisciplinary, cross-Faculty centre bringing together the world-class research expertise of >100 principal investigators and significant external funding around nine interdisciplinary themes; molecular biology; structural biology, pharmacology & therapeutic, prevention and management, diagnostic and innovation, intelligent use of data, environment and the microbiome, behavioural and social science and public health and policy. These research activities are fully integrated with ICHT epidemiology, antimicrobial prescribing and infectious disease surveillance facilitating timely translation into clinical practice.

4. Genomics: ICHT is the lead delivery partner for the **West London Genomic Medicine Centre (GMC)**, working in partnership with the Royal Marsden, Royal Brompton and Chelsea & Westminster NHS Trusts, and the AHSN. Recruitment into a wide array of rare diseases and cancers was initiated in 2015, with roll out to other NW London NHS partners planned as part of the ongoing clinical transformation. The project is supported by the AHSC informatics platforms. In parallel IC launched a new **MSc in Genomic Medicine** in 2015 and in 2016, CATO will also roll out a wider NW London genomics programme funded by Health Education England to support genomics education and training.

5. Public Health & Primary Care. The AHSC monitors local developments in public health and primary care services in order to ensure that opportunities for research and educational to improve health outcomes are realised. **Old Oak Common and Park Royal Development Corporation (OPDC)** is the largest housing and community regeneration project in the UK and sits adjacent to the Hammersmith Hospital campus. Opportunities presented by OPDC are being integrated into AHSC planning, including the prospect of novel intervention & evaluation studies, through cross representation on the OPDC Board and its Health & Wellbeing Group, both established in 2015. The AHSC JEG receives direct and regular reports on the OPDC. IC is also the UK lead site for the European Institute of Innovation and Technology Health (**EIT Health**) initiative, an academic-industry partnership focussed on innovation and entrepreneurship in healthy living and active ageing across Europe. The recently awarded **EPSRC Centre for Mathematics in Precision Healthcare** will develop novel mathematical and algorithmic techniques to inform clinical decision making and policy making from population healthcare data.

6. Redevelopment of the estate: Working within NW London and as part of the **Shaping a Healthier Future**, ICHT has established redevelopment committees for its St Mary's and Hammersmith hospitals with senior College representation. The St Mary's Committee is aligned to local redevelopment plans for Paddington. The Hammersmith Hospital Committee is cognisant of the OPDC plans.

Progress on short-term objectives, years 1-2:

- i) Leading AHSC for translational research - **largest national BRC**; the 2015 Rand analysis demonstrated that, in terms of highly cited publications, both IC and ICHT rank highly in all AHSC themes; the new creation of ITMAT, the DSI and the EPSRC Centre for Mathematics for Precision Health Care further enhance the analytical capability of the AHSC;
- ii) Leading hub for stratified medicine - the AHSC's metabonomics capability has been enhanced through partnership between the **MRC-NIHR National Phenome Centre** led by IC/Kings and the **Singapore Phenome Centre**; new strategic partnerships with Nestle and with Astra Zeneca have been developed;
- iii) Strategic appointments to link the AHSC and AHSN - Chair in Medical Informatics & Decision Making appointed in July 2015 plus new professorial and senior lecturer appointments made to underpin the expanded capacity of the AHSC Imperial Clinical Trials Unit (ICTU).

Progress on medium-term objectives, years 2-3:

- i) Become a leading centre for patient experience - the **Patient Experience Research Centre (PERC)**; Director, Prof Helen Ward) research programme is being implemented into clinical practice across the AHSC

to improve the collection and analysis of patient experience data and to support service improvement and redesign; ICHT has developed a PPI strategy with PERC; patient groups co-organised a BRC Research Open-Day in 2015 and ICHT is a member of the **Cancer Vanguard**, led by Royal Marsden Hospital, to deliver new models of care;

ii) Establish a centre for large-scale data analysis – the **DSI** opened in 2015, its multidisciplinary expertise, platform technologies and growing repertoire of analytical tools will be applied to data-driven improvements in patient care using the enriched e-health platform being developed across the AHSC;

iii) Develop modular educational programmes to facilitate new models of out-of-hospital care for chronic disease – **CATO** will launch a new Trust Open Online Courses for ICHT staff in 2016;

iv) Strengthen the AHSC's international network of education, research and service – the first cohort of IC/Nanyang Technological University Singapore, **Lee Kong Chian (LKC) medical students** graduate in 2018; we shall build new clinical academic training interactions with LKC/NTU.

Progress on long-term objectives, years 3-5:

i) Relocation of School of Public Health to Imperial West and other spatial synergies – Construction at **Imperial White City campus** is ongoing, with the Translation and Innovation Hub (RATH) ready in mid-2016 and the Molecular Science Research Hub in 2017

ii) Become a powerhouse of activity generating economic benefit with the creation on new links and partnerships industry – the 2015 RAND analysis confirms the strength of AHSC's impact; IC is ranked **1st in Europe for Innovation** (Reuters, 2015) and **1st nationally for research impact** in clinical medicine (HEFCE Research Excellence Framework, 2014); the AHSC has grown commercial trials income by 35% since 2013 and its growing portfolio of academic corporate partnerships will catalyse and ensure exploitation of commercialisable research outputs from our translational pipeline. Spatial co-location opportunities with industry will be available at Imperial White City from summer 2016.

Progress within the themes

Our themes are aligned with domains that reflect the translational pipeline of our BRC, and into each public health and primary care have been integrated as a cross-cutting discipline to facilitate the pull through and reach of our pipeline into patients, populations, healthcare policy and practice. Underpinning the AHSC's research activities, and as per plan, the **Institute for Translational Medicine and Therapeutics (ITMAT)** opened in 2015 providing, in a singly managed resource, expertise and staffed facilities for molecular phenotyping, bio-banking, imaging (all modalities), informatics, genotyping, and phase I/II clinical trials.

Our pipeline has been enhanced by the Imperial **Joint Translation Fund** which supports translational health research projects arising from across all of the faculties at IC (Medicine, Engineering, Natural Sciences and Business School) and the ICHT Divisions. There are annual calls for proposals and in 2015 the call was focussed on promoting ITMAT capabilities with 20 new projects funded (>£1.3m). To further expand and strengthen the portfolio, Imperial College has also created a new **Translator-in-Residence** post. Together with input from our peer-to-peer translators, all of whom have extensive biotech and pharma translational experience, the Translator-in Residence will ensure that the full potential of our research activities is managed across the AHSC towards health and wealth benefit. Exemplars of the quality of our activities and its pull-through to patients and populations in 15/16 are:

Theme	Progress around translating into practice for the benefit of patients
Surgery & Technology	2016 NHSE Innovation Challenge Prize winner for " <i>gripAble</i> ", a low cost neuroprosthetic device for rehabilitation after stroke;
Brain Sciences	Established a multidisciplinary resource with the DSI exploiting 'omics data capture, epidemiological and imaging data to drive forward stratified disease approaches to diagnosis and treatment of brain diseases.
Infection	Demonstrated improved diagnosis and management of TB in HIV children (Lancet HIV 2015); Awarded EU funding to lead European AIDS vaccine Initiative (EAVI2020), a Europe-wide consortium focussed on novel candidate HIV vaccines.
Immunology & Inflammation	Pioneered transcript analysis for renal transplant rejection now proposed as a biomarker in international guidelines. AHSC patients will be some of the first in the UK to access this enhanced modality.
Metabolic Medicine, Diabetes & Obesity	First babies born after successful kisspeptin treatment (JCEM 2015); Development and evaluation of the insulin propionate ester as a food ingredient is in Phase 2 studies.

Cancer	Developed a breath test and subsequently demonstrated its proof-of-efficacy for diagnosis of oesophageal cancer.
Cardiovascular	iFR (Instantaneous Wave-free Ratio) to assess coronary artery disease severity was incorporated into 2015 international guidelines, following initial development and evaluation through Imperial BRC funding and subsequent commercialisation by Phillips. Genome analysis of a NWL South Asian population identified novel disease biomarkers
Reproductive & Early Life Health	New national Early Miscarriage Centre awarded to IC in collaboration with Birmingham and Warwick; AHSC research into the epidemiology of miscarriage and subsequent evaluation of new clinical guidelines (BMJ 2015) is changing practice worldwide.

Development and delivery of an appropriate e-Health informatics platform

The AHSC's 15/16 progress has been summarised under priority work programme 2 above. Strategic and operational alignment of the programme is managed by an AHSC Research Informatics Subcommittee which brings together clinical leaders, researcher, informatics and information governance leaders from across the partnership. The AHSC, with Med City and the other AHSCs and AHSNs in London are also part of the **DigitalHealth.London** initiative, launched in Feb 2016.

Contribution to economic growth and the economy

Institutional partnerships, in addition to researcher-led collaborations, developed in 15/16 include:

Industry/Corporate Partner	2015/16 Progress
Nestle	CHF10m, 5 yr. collaboration programme on nutrition & health
Apollo Therapeutics Fund AZ, GSK & J&J	£40m fund to translate promising IP from Imperial, UCL and Cambridge into commercialisable outputs
EDRF	Initiative led by MedCity to stimulate collaboration between SMEs and AHSCs in the London and greater South-East region
AZ	Matched funding towards joint PhD fellowships with the Imperial Institute of Chemical Biology.
EMINENT network GSK	£16m collaboration with Universities of Cambridge, Glasgow, Newcastle and UCL to investigate mechanisms of inflammatory disease

AHSC IP metrics for 2015-16: 124 invention disclosures received, **19** new patent applications filed, **16** deals executed (includes licenses, option agreements and revenue share agreements) and **2** spinouts formed.

Imperial Innovations Highlights
Orthonika: Spinout developing the Total Meniscus Replacement, a unique, anatomical knee implant
Therapeutic Frontiers: Spinout offering an alternative approach to clinical trials in asthma and COPD
Google DeepMind collaboration with Surgery & Technology theme to develop, and scale up, across the NHS - Hark an app to help healthcare professionals manage and prioritise daily clinical tasks

Significant Developments

During 2015, operational arrangements remained largely unchanged with the Joint Executive Group (JEG) remaining the key operational body ensuring strategic alignment of research (via the AHSC Research Committee) and education (via CATO) activities. JEG, in turn, is overseen by the Strategic Partnership Board. During 2015-16, the partners revised and restated their Joint Working Agreement (JWA) and re-launched the AHSC website (<http://www.ahsc.org.uk/>). Professor Desmond Johnston became Vice-Dean for Education in the Faculty of Medicine at IC and Dr Julian Redhead became ICHT Medical Director.

During the last year, the AHSC has strengthened linkages with other academic specialist NHS Centres in North West London. Invitations to join the Imperial College AHSC have been extended to the Royal Brompton & Harefield and Royal Marsden NHS Foundation Trusts, and have been warmly received by both Trust Boards. A first expanded JEG meeting including the new organisations was held in April 2016. Although subject to final execution of a revised JWA, expansion of the Imperial College AHSC would, for the first time, provide a unifying governance structure to allow all four partner organisations to align strategically around their service, education and research missions. An expanded Imperial College AHSC, incorporating the world class research and care services of the Royal Brompton and Royal Marsden Trusts together with the established excellence of the founding partners has the potential to transform the capability of the Imperial College AHSC to improve patient outcomes across NW London and beyond, especially in oncology and cardiorespiratory medicine.

This form must be submitted, by e-mail, no later than **1pm Friday 6 May 2016** to Jasmine Parkinson (jasmine.parkinson@nih.ac.uk). Please feel free to provide any other information you wish (in a separate annex) that demonstrates the progress made with your AHSC in 2015/16.

The Annual Report aims to capture progress against the stated objectives, specific themes and work programmes as set out in your application, in order for the Department of Health to be able to understand the overall progress of the AHSCs. However, please note that we will not be providing feedback on the AHSC Annual Reports.

A signed copy of this report should be sent no later than **13 May 2016**, to:

Dr Jasmine Parkinson
NIHR Central Commissioning Facility
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Twickenham TW1 3NL