



Department
of Health &
Social Care

DEPARTMENT OF HEALTH & SOCIAL CARE DESIGNATED ACADEMIC HEALTH SCIENCE CENTRE (AHSC)

2017/18 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 & Social Care Academic Health Science Centre:

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

Name: Sir John Bell

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

Further aligning the strategic objectives of the NHS provider(s) and university(ies) in order to harness and integrate world-class research, excellence in health education and excellence in patient care; Oxford AHSC was established with six themes to address healthcare challenges; the themes have support groups bringing all four partners together. The groups' membership has developed to reflect the evolving Oxford landscape. The AHSC oversight group has actively coordinated partnership activities; e.g. funding & applications to ensure that maximum benefit of the partnership. Plans are in place for a single committee to oversee research and innovation across the partnership. In Sept. 2017, the Oxford Academic Health Partners (OAHP) was established, a charitable incorporated organisation (charity # 11747250); a research and education funding charity to provide the partners with a vehicle to act for them collectively. An Away Day was held in Feb. 2018 to review the partnership to date & to explore models for the next five years. Individuals from across the partnership attended and highlighted the desire to build on our work to date and to further integrate plans and investments for patient benefit.

Summary of the progress Theme 1: Big Data and Clinical Informatics. Oxford named as one of six sites to receive funding to transform health through data science as part of the MRC HDR which will further promote the BDI as a centre for collaborations across the UK and internationally. In addition the partnership received support through the MRC Pathfinder initiative to pump prime new research into treatment in mental health. The OxU Big Data Institute's work not only links locally for clinical partnerships but engages globally for the development, evaluation and deployment of efficient methods for acquiring and analysing information for large clinical research studies. Fields of research include malaria, where the BDI has led a project using large data sets to demonstrate that malaria prevention technologies such as bed nets, have reduced the infection prevalence in children by 50%. The partners continue to work closely with PHR applying big data techniques and genomics to investigate antimicrobial resistance. The Oxford AHSC has expanded its role in the NIHR Health Informatics Collaborative (HIC): a group of NIHR BRCs working together to facilitate the re-use of routinely-collected data to increase the impact of translational research. The Big Data Institute hosts the Coordinating Centre for the NIHR HIC, now working with the whole network of 20 BRCs across England. Oxford Health BRC has joined Oxford BRC in the Collaborative, and the two trusts are working together to demonstrate effective informatics integration and re-use. **Theme 2: Building NHS, university and industry relationships.** Construction of the BioEscalator will be completed over the summer and occupancy by the first tranche of companies is expected in Sept. '18. A Management Board has been established and a Business Manager will be appointed. In 17/18 a collaboration with Barco NV was set up to support optimisation of processes across clinical pathways in oncology. The innovative Therapeutics for Ageing consortium (iTAc), which is a national public-private partnership to accelerate the discovery and development of therapeutics for ageing, started this year. The consortium will provide industry with a pipeline of novel clinically de-risked drug targets and assets, in a large and rapidly growing area of therapeutic need (age related morbidities). Expertise across 5 major complementary UK centres has been pooled to form the core of this initiative: The Francis Crick Institute, OxU (and partners Oxford AHSC, Oxford AHSN & Oxford BRC), University of Dundee, University of Birmingham and Birmingham Health Partners, and the Medicines Discovery Catapult. CCF funding with OxU (lead), Birmingham and Dundee – UK SPINE KE: is an award of £4.820m to support an open innovation approach across universities, NHS & business, to advance clinical research and medical innovation focused on improving health in old age. UK SPINE KE will also facilitate and form the core of a larger collaboration for therapeutic discovery for ageing. Theme 2 also supports the Sir David Cooksey Translational Research Fellowships. Fellows Dr Meinert (EM) and Dr Velthoven (MVV), are focusing on digital tools in healthcare and are working closely with OUH on a project to look at how the Internet of Things can/will impact on models of care. EM is working with ForwardApp who are creating medical messaging app and who won a local innovation competition. EM will support development and undertake a parallel evaluation study to look at barriers to adoption. MVV will assist through her work on regulation & standards as part of the translation pathway. MVV is also working with an international device company to test a wearable device for routine MEWS. The work of both will not only benefit patients and the companies themselves but will support the overarching aim of Theme two by identifying a more efficient route for collaboration with SMEs leading to clinical uptake. **Theme 3: Modulating the Immune Response for Patient Benefit:** Work within this theme integrates cutting edge multi-disciplinary basic science with first rate clinical research. The close physical and intellectual collaboration between clinical and academic researchers provides an innovative, fast-paced, evolving approach to translational medicine that results in significant advances in patient treatment and care. Over the past year there has been a major focus on developing the Oxford Immunology Network, a Medical Sciences Division initiative to support immunology and infection researchers. The Immunology Network is overseen by a large, cross-Department committee and is managed by Georgina Kerr. (see in Appendix 1) It has the following strategic objectives: a) Maintain world-class immunology, infection and inflammation research at Oxford by facilitating successful funding applications which will attract and retain the best academics and clinicians; b) Foster collaborations locally, nationally and internationally and identify innovative areas of research and strategic partnerships that align with local and global aims; c) Highlight the impact of immunology, infection and inflammation research at Oxford through increased knowledge exchange and engagement with policy makers; and d) Establish efficient communication routes to facilitate the sharing of resources and expertise and to promote our achievements To work towards these objectives the Immunology Network has instigated resources to bring together the vast immunology community at Oxford. A dedicated immunology website (www.immunology.ox.ac.uk) is constantly evolving to include all research groups with an interest in immunology, and currently stands at 152 groups with additional groups regularly being added. The Immunology Network has developed a bid with the Immunity and Infection Cluster to the NIHR OUH BRC RCF to instigate a Human Immune Discovery Initiative (HIDI). The award of

£597,859.43 will support the development of HIDI, an initiative that aims to improve accessibility to immunological assays and expertise for all researchers across the University (and beyond). HIDI will act as a gateway to immunological resources by sponsoring 4 Discovery Platforms within the Medical Sciences Division. These Platforms, led by experienced researchers and include Deep immune phenotyping, Immune pathology, Genomics and metagenomics and Proteomics. Close links with OUH and OUI will allow the identification and rapid translation of research for patient benefit. Following the HIDI model, Dr Ryan, an NIHR academic clinical lecturer at the TGU, has driven the development of a Human Iron Research at Oxford (HIRO) group, alongside Profs Travis and Klenerman and with £500k financial support from Vifor. HIRO will provide funds to support a post-doctoral position to work with Dr Ryan and Prof Drakesmith, integrating the clinical and academic research strands, and will provide a network for all researchers interested in iron research. The Immunology Network has been valuable in capitalising on the recent Berlin-Oxford Initiative, a wide-ranging partnership between OxU and the four universities in Berlin. The Network participated in the inaugural Berlin-Oxford meeting at St Hugh's College in January to identify common areas of research interest and formulate a plan for future collaborations. An outcome was a follow-up visit to Berlin by Dr Issa, Dr Hester and Professor Wood of NDS to cement two grant applications with Berlin collaborators. **Theme 4: Managing the Epidemic of Chronic Disease.** All partners are coming together to build on the OX4 initiative established by Prof. Debra Jackson, initially focused on nursing research at the Oxford Institute for Nursing, Midwifery and Allied Health Research. This is now providing a real world, pragmatic research environment to study long term conditions and care in Oxford. OX4 will: generate a strong baseline of data and 'knowledge' of this community to encompass, current burden of disease, current burden of deprivation and its relationship to health outcomes and community asset analyses and community needs assessments. Moreover, OX4 provides a real-life and socially diverse community within which to develop, trial and evaluate novel health and social care interventions, particularly around chronic disease management, delivery of community-based and primary health care, enhancement of care transition between hospital and home and care of older people in all settings. This theme has also been undertaking the SUPPORT-HF study measure the impact of the remote clinical management intervention with support for heart failure patients and general practitioners. For each participant, an individualised plan for treatment of heart failure and major co-morbidities was developed before randomization. Initial results have shown that central provision of tailored specialist management using commercially available low-cost monitoring and computing devices, enhanced by customised applications, is feasible and in addition, the team is currently in the final stages of licensing the IP generated from this study to a commercial partner, with further plans for national scale-up as part of routine care.

Theme 5: Emerging Infections: The European and global impact of Theme 5 continues to grow. The pan-European study of the pathogenesis of ARI led by Oxford under the Platform for European Preparedness Against (Re)emerging Epidemics (PREPARE) has now recruited over 1000 patients in 37 sites across Europe, whilst the arbovirus study has enrolled over 400 patients in 20 sites across eight Balkan countries. To ensure sustainability and growth of the PREPARE initiative, an infrastructure development grant of €3m is being sought from the EU to develop a business plan for a European wide sustainable clinical research network for infectious diseases, with a focus on both antimicrobial resistance and epidemic infectious diseases. This submission is in response to the EU call SC1-HCO-08-2018: Creation of a European wide sustainable clinical research network for infectious diseases.

Oxford led a successful application to the European Developing Countries Clinical Trials Partnership (EDCTP) for a €10 m grant to establish a clinical research network for epidemic infectious diseases in sub-Saharan Africa. The African coalition for Epidemic Research, Response and Training (ALERT) was launched in March 2018. It is coordinated from Oxford as a partnership of 21 institutions from 13 countries. Oxford members of the UK Public Health Rapid Support Team were deployed to the pulmonary plague outbreak in Madagascar and the Lassa fever outbreak in Nigeria. Research has arisen from these outbreaks and clinical studies are being implemented for Lassa fever in Sierra Leone, and a clinical trial in plague is being planned in Madagascar. The Jenner Institute is using replication-deficient viral vectors to develop vaccines against multiple emerging pathogens. A First in Human Trial of a new MERS vaccine developed in Oxford is underway and will be followed by a further Phase I trial in Saudi Arabia. Vaccines against Rift Valley Fever virus (RVF) and Chikungunya have been manufactured and are in the final stages of testing prior to initiating First in Human studies in Oxford. A vaccine against Zika is being manufactured in readiness for clinical studies. Vaccines against Lassa fever, Nipah and Crimean Congo Haemorrhagic Fever have all demonstrated protective efficacy in preclinical studies and funding is now being sought to move these into clinical studies. The RVF programme will move into clinical studies in Uganda and is also being tested in livestock. Further work in collaboration with the Pirbright Institute will do studies to define the optimum dose to use in livestock, as well as extended safety testing which is required for the vaccine to be licensed for use in livestock, thereby reducing the risk of zoonotic infections. The Nipah vaccine is also being tested by the Pirbright Institute in pigs, which will provide important efficacy data in a species which acts as a reservoir for the Nipah virus leading to human infections.

Theme 6: Cognitive Health. Oxford AHSC has built a comprehensive and fully integrated mental health research infrastructure locally and increasingly nationally and internationally. Combining this infrastructure with the clinical service and research provides the power to deliver major advances for patients. Oxford pioneers the development and national implementation of scalable psychological therapies innovations; e.g. *Immersive virtual reality to transform the lives of patients with psychosis* is a £4 million project funded by the NIHR i4i programme which aims to deliver access to state-of-the-art psychological therapy for severe mental health problems. For the first time, automated psychological therapy delivered using powerful immersive virtual reality (VR) will be tested and implemented in the NHS. The AHSC brings cutting edge methodology to bear on the most preoccupying and fundamental clinical uncertainties. For example, the study Comparative efficacy and acceptability of 21 antidepressant drugs for the acute

treatment of adults with major depressive disorder: a systematic review and network meta-analysis published in The Lancet, 21 February 2018 shows how innovation in evidence synthesis can give robust, reliable evidence to guide patients and clinicians in the choice of treatment options. It further demonstrates that when media relations are planned carefully and co-ordinated across key stakeholders: NIHR Oxford Health BRC, University, The Lancet, Science Media Centre – the results can be powerful, and positive impacts can be made with the public. The integrated infrastructure enables us to combine routine clinical data with epidemiological and laboratory science, 'Genetic and real-world clinical data, combined with empirical validation, nominate JAK-STAT signalling as a target for Alzheimer's Disease therapeutic development' (bioRxiv August 2017) is an example of how the use of real-world observational data can support drug development.

AHSC's contribution to economic growth and the economy.

Spin-out activity continues to be strong as set out below.

Year	No of spin-outs		Total Raised
2014	5	NightstaRx, Genomics, Oxsonics, Deontics, OxSyBio	£68M
2015	5	iOx, Xerion Healthcare, OxEML, Orbit Discovery, Oxford Endovascular	£6M
2016	15	Zegami, Vaccitech, OMass, Oxstem, Oxford Nanolmaging, EvOx, Argonaut, OcuLab, Oxford Impedance Diagnostics (+6)	£47M
2017	6	ProMAPP, Scenic Biotech, SpyBiotech, Ultromics, BreatheOx, Theolytics	£13M
2018		Peggen	

A number of companies secured additional funding including Vaccitech (£20m), OxSyBio (£10m) and Oxford Vacmedix (£20m). Oxford Nanopore, already one of the UK's few billion-dollar unicorn start-ups has raised a further £100m for its DNA sequencing technology. The company is now valued at £1.5 billion. Adaptimmune, a cell therapy company, has a market capitalisation of \$1.3 billion and Immunocore has a valuation in excess of £1 billion.

Development and delivery of an appropriate e-Health informatics platform: Partners are engaged in a number of projects/initiatives supporting the LHCRE for TV and Surrey (TVS) building on ICSs and GDEs and outstanding research capacity and capability including 2 BRCs, the Big Data Institute, work in UK-CRIS and other initiatives. Examples of partner engagement include TrueColours, a mobile and web App developed by OxU & OH and the latter is developing Blue Ice Self Harm App with young people. OUH is central to records sharing through Oxfordshire Care Summary (integrates with primary and secondary operational workflows) and contributes to population health management and the establishment of advanced disease registers. Oxford University is partners with OUH and OH in the two NIHR BRCs which have significant research interests in Big Data, informatics and e-Health platforms across the care boundaries. OH and University of Oxford work on UK-CRIS aiming to development the clinical record into a data asset and research tool for mental health and particularly dementia. OxUni leads IMI-European Medical Information Framework, a €50m public-private partnership. The Big Data Institute (OxU) partners with both NHS Trusts in its work and research focusing on the analysis of large, complex heterogeneous data sets for research into the causes and consequences, prevention and treatment of disease. Oxford is one of six substantive sites for a Health Data Research Centre, building on its track record with funding from HDRUK. Delivery of Local Digital Roadmaps focuses on records sharing and transfers of care information; patient/citizen facing technology; whole system intelligence, infrastructure and network connectivity and strong information governance. TVS will join up records-sharing; consistency of digital services, Apps and coordinated connection; provide access to large scale population health management capabilities and support leading-edge research. Specific clinical pathways have been chosen relating to Cancer, Maternity and EIP. All partners also working jointly and individual on data/informatics projects with the AHSN including the Hill to be based at the OUH. **Leadership, strategy and governance arrangements** One change of note in governance is the appointment of Prof. Gavin Screaton as Head of the Medical Sciences Division of OxU and he represents the University on the AHSC Board and brings previous experience of working within an AHSC at Imperial College. The proposed single committee within the AHSC to oversee R & D and Innovation has been mentioned above.

This form must be submitted, by e-mail, no later than **1pm Thursday 17 May 2018** to Dr Caterina Lombardo (Caterina.Lombardo@nhr.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 2017/18.

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 **24 May 2018**, to:

Dr Caterina Lombardo
NIHR Central Commissioning Facility
Grange House
15 Church Street
Twickenham TW1 3NL

Note: OBU Oxford Brookes University
OH Oxford Health NHS Foundation Trust
OxU University of Oxford
OUH Oxford University Hospitals NHS FT
OUI Oxford University Innovation

Appendix 1. Theme 3: Modulating the Immune Response for Patient Benefit

Work within this theme integrates cutting edge, multi-disciplinary basic science with first rate clinical research. The close physical and intellectual collaboration between clinical and academic researchers provides an innovative, fast-paced, evolving approach to translational medicine that results in significant advances in patient treatment and care.

Over the past 12 months, there has been a major focus on the development of the Oxford Immunology Network, a Medical Sciences Division initiative to support immunology and infection researchers. The Immunology Network is overseen by a large, cross-Department committee including Prof Paul Klenerman (Chair, NDM), Katja Simon (NDORMS), Mark Middleton (Oncology), Alison Banham (RDM), Susie Dunachie (NDM), Adrian Smith (Zoology), Quentin Sattentau (Dunn School), Georg Hollander (Paediatrics), Joanna Hester (NDS), Jon Austyn (NDS), Mike Dustin (NDORMS), Paul Bowness (NDORMS), Paul Fairchild (Dunn School) and is managed by Georgina Kerr. The Immunology Network has the following strategic objectives:

- Maintain world-class immunology, infection and inflammation research at Oxford by facilitating successful funding applications which will attract and retain the best academics and clinicians
- Foster collaborations locally, nationally and internationally and identify innovative areas of research and strategic partnerships that align with local and global aims
- Highlight the impact of immunology, infection and inflammation research at Oxford through increased knowledge exchange and engagement with policy makers
- Establish efficient communication routes to facilitate the sharing of resources and expertise and to promote our achievements

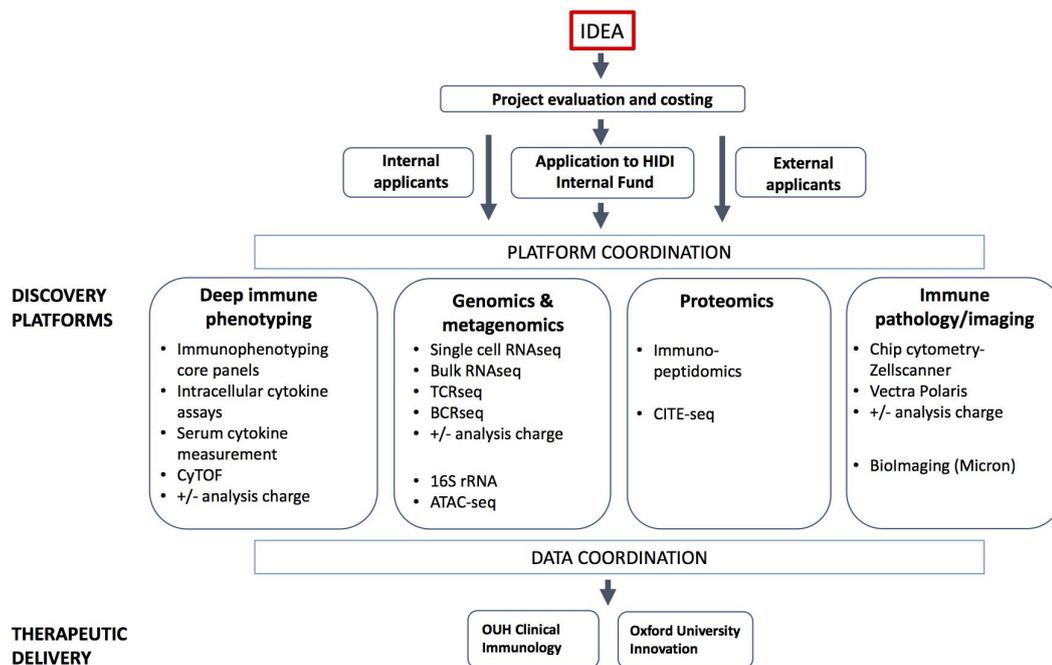
To work towards these objectives the Immunology Network has instigated a number of resources to bring together the vast immunology community at Oxford. A dedicated immunology website (www.immunology.ox.ac.uk) is constantly evolving to include all research groups with an interest in immunology, and currently stands at 152 groups with additional groups regularly being added. The research groups span multiple departments within the MSD (NDM, NDORMS, Oncology, Biochemistry, Dunn School of Pathology, RDM, Paediatrics, Women's and Reproductive Health, NDCN, DPAG and NDS) and also reaches out to the MPLS Division (Maths, Zoology, Computer Science, Statistics). Additionally, close links with the OUH Trust are maintained via numerous clinician scientists working within these departments. The website acts as a source of information for researchers with an interest in immunology, advertising upcoming events, recent publications, and funding opportunities. Alongside the website, the establishment of an immunology mailing list (currently with 264 subscribers) has proved a useful mechanism to regularly disseminate information to the Immunology Network regarding University-wide immunology-related seminars, networking opportunities, funding opportunities and more.

The Immunology Network is also committed to organising regular scientific events where researchers can assemble to share their recent findings and interact with colleagues. These events are intended to generate new collaborations and facilitate the sharing of ideas and expertise. A Neuroinflammation event in October 2017 and a Microbiome event in January 2018 were both highly successful and well attended. In April 2018, the Immunology Network worked with the Oxford Immunology Group (a student and post-doc run group) to organise a two day showcase of immunology research at Oxford. With over 250 registrants, including representatives from the MRC, Wellcome and numerous commercial partners, and a diverse programme of speakers from multiple departments, the event was a huge success.

To further enhance immunology research at Oxford, the Immunology Network was instrumental in developing a bid with the Immunity and Infection Cluster to the NIHR Oxford BRC RCF to instigate a Human Immune Discovery Initiative (HIDI). The award of £597,859.43 will support the development of HIDI, an initiative that aims to improve accessibility to immunological assays and expertise for all researchers across the University (and beyond). HIDI will act as a gateway to immunological resources by sponsoring 4 Discovery Platforms within the Medical Sciences Division. These Platforms are led by experienced researchers and include;

- Deep immune phenotyping
- Immune pathology
- Genomics and metagenomics
- Proteomics

As well as providing technical expertise, each Platform will offer advice on proposed projects where appropriate. It is anticipated that HIDI will benefit a range of disciplines, including but not limited to immunology, oncology, infection, neuroscience, metabolism, and others. Close links with OUH and OUI will allow the identification and rapid translation of research for patient benefit, if desired. An outline of HIDI is shown below:



Recruitment into each of the Discovery Platforms is underway and we expect posts to be filled during summer 2018. Regular HIDI team meetings will ensure that the portfolio of projects is discussed and that the requirements of individual projects are defined and have the appropriate support. The OUH Clinical Immunology team, in particular Dr Ross Sadler, will be an integral part of the HIDI Management Committee. Data integration and coordination will be an important aspect of HIDI and will be supported by the Infection and Immunity Cluster bioinformatician, as well as the individual Platform staff.

To encourage use of HIDI and promote the opportunities for immunological analysis available to the University, we will run an HIDI internal funding stream (~ £270,000 total fund) to support projects that meet the remit and scope of this Initiative. There will be two funding rounds throughout the year (June and January), aiming to support a range of projects from across the University. We expect to support approximately 10 projects per year. The cost of individual projects will be in the order of £5-40k. Applications for the higher amount will need to show a clear requirement for HIDI support, for example a project where the immunological data that access to HIDI will provide will give significant insight. Match funding will be encouraged. Proposals will need to show a clear focus on research that can lead to a benefit to human health. Projects can aim to generate preliminary data or build on existing research. A potential translational outcome would be particularly welcomed. The Management Committee, comprising members of the Discovery Platforms, Immunology Network, MSD, the NHS and OUI, will be responsible for allocating the funding. Projects are expected to be between 6 and 12 months in duration, allowing rapid assessment of the benefit of HIDI that will aid future sustainability approaches.

Our aim is to promote and increase the use of each Discovery Platform to contribute to the sustainability and retention of the HIDI staff posts. Potential sources of funding for future sustainability include the MRC Partnership Grant and the Wellcome Collaborative Grant and Multi-User Equipment Grant. The Immunology Network will take the lead on the organisation and preparation of future proposals.

Following the HIDI model, Dr John Ryan, an NIHR academic clinical lecturer at the TGU, has driven the development of a Human Iron Research at Oxford (HIRO) group, alongside Professors Simon Travis and Paul Klenerman and with £500,000 financial support from Vifor. HIRO will provide funds to support a post-doctoral position to work with Dr Ryan and Prof Hal Drakesmith, integrating the clinical and academic research strands, and will provide a network for all researchers interested in iron research.

The Immunology Network has been valuable in capitalising on the recent Berlin-Oxford Initiative, a wide-ranging partnership between the University of Oxford and the four universities in Berlin. The Network was invited to participate in the inaugural Berlin-Oxford meeting at St Hugh's College in January to identify common areas of research interest and formulate a plan for future collaborations. An outcome of this meeting was a follow-up visit to Berlin by Dr Fadi Issa, Dr Joanna Hester and Professor Kathryn Wood of NDS to cement two grant applications with Berlin collaborators. Future meetings are planned within an infection theme and will be coordinated by Georgina Kerr.