Institution: University College London

Unit of Assessment: 2 (Public Health, Health Services, and Primary Care)

a. Overview

This submission presents research in public health, health services and primary care from 181 staff working in the Faculty of Population Health Sciences (FPHS) at UCL. The FPHS (**Hart**, Dean) was established in 2011 in fulfilment of our strategy of integrating population health into the broader research and teaching of the *UCL School of Life and Medical Sciences*, working with the other three Faculties (Brain Sciences, Life Sciences, and Medical Sciences) on cross-cutting research domains including cancer, cardiometabolic science, infection, neuroscience, population health and reproduction and development. The FPHS has a close working relationship with *UCL Partners*, one of five accredited Academic Health Science Systems in the UK, and is central to the recently funded *Collaborations for Leadership in Applied Health Research and Care* (CLAHRC London: North Thames). Our work encompasses basic, clinical and translational research, innovations in behaviour change, clinical trials and health improvement studies in the UK and globally.

- Since 2008, our grant income has totalled more than £104 million, and increased by 20% between 2008/9 and 2012/13. External research income per FTE staff member averages over £130K per annum.
- More than 8,000 papers have been published over the census period by staff in the Unit. The citations in the past five years of the 10 most highly cited researchers exceeded 180,000.
- The 586 outputs submitted include 88 papers in the *New Engl J Med, Science, Lancet,* and *JAMA,* and 88 papers in the *BMJ, PNAS, PLoS Med*, and other prestigious journals.
- 20% of the staff submitted are early career researchers, testifying to the vitality of the Unit.
- We have created 30 new academic posts, 18 of which have been filled by staff previously on short-term research contracts.
- 120 PhDs have been awarded over the census period.

This submission involves four of the six FPHS Institutes: 1) The *Institute of Epidemiology and Health Care*, comprising the Research Departments of Epidemiology and Public Health, Infection and Population Health, Primary Care and Population Health, and Applied Health Research, and the newly integrated MRC Unit for Lifelong Health and Ageing: 2) the *Centre for Paediatric Epidemiology and Biostatistics* at the Institute of Child Health, incorporating the MRC Centre of Epidemiology for Child Health; 3) the *Institute for Global Health*; and 4) the newly formed *Institute for Clinical Trials and Methodology*, created when the MRC Clinical Trials Unit transferred into UCL in 2013. In addition, the submission includes members of the Department of Statistical Science and the *Clinical Operational Research Unit* (Department of Mathematics), since these groups work closely with population health to provide crucial underpinning in mathematical modelling and biostatistics.

b. Research Strategy

The research strategy of this UoA is directed towards improving the health of the population both nationally and globally across the life course through a programme of innovative work that addresses the following themes:

- the *longitudinal and life course* approach to understanding the development of disease and functional ageing, taking advantage of the extensive portfolio of population cohorts at UCL spanning the prenatal/neonatal stages to old age;
- the spectrum of research from *aetiology to implementation* viewed within the translational framework, ranging from genetic, biological and psychosocial studies of the origins of disease, through surveillance studies of health and health-related behaviour, the development of innovative methods of intervention and prevention, clinical trials of pharmacotherapy, behaviour change and complex interventions, to policy analysis and implementation work.
- *methodological innovations* such as the development of new statistical techniques, novel trial methodologies, the use of electronic health informatics, the study of complex phenotypes in cohorts, and the integration of laboratory and population science.

The vitality of research within the UoA is being continually refreshed through new studies and collaborations, the adoption of new methodologies and technologies, the strategic appointment of new research and academic staff with expertise in innovative fields, and a flexible approach to research group configuration that promotes optimal effectiveness. The research strategy is based around strong research groups led by outstanding individuals with an emphasis on interdisciplinarity and national and international collaboration. The process is managed through iterative exchanges between the individual research departments and the Institutes, overseen by the Faculty Executive Committee.

Research themes and progress over the past 5 years

The strategic aims for research outlined in RAE2008 were formulated by senior academic committees in different parts of UCL, since the sections now contributing to UoA2 were returned to three different UoAs. We outlined plans to increase engagement with translational and policy research, to enhance work on global health, increase research on life course epidemiology and cohort studies with a particular emphasis on ageing, strengthen health behaviour research, establish genetic epidemiology, and create a more integrated approach to infection research. We committed ourselves to extending clinical record research, the management of HIV and sexually transmitted infection (STI), and to expand research in child health policy and epidemiology. Here we detail progress towards these broad aims, highlighting the close links between research findings and non-academic impact. *Impact case studies are cited by their identifier.*

1. Increasing engagement with translational and policy research for patient and population benefit

Our commitment to the translational and policy research agenda led to the establishment in 2012 of the *Research Department of Applied Health Research* directed by **Raine**, with senior appointments to lead groups in health economics (**Morris S, Conti**) and health care organisation and management (**Fulop**), social inequalities (**Bajekal**) and evaluation (**Pashayan**). The Research Department has attracted large-scale funding from NIHR and EU FP7. Engagement with policy research has been further enhanced by participation in the NIHR Schools of Public Health Research and Primary Care Research, and will be central to the new CLAHRC detailed on page 5. Our work on health policy at the national and international levels was also advanced by the creation of the *Institute of Health Equity* (**Marmot**), building on the Strategic Review of Health Inequalities in England, and by the funding in 2010 of the Department of Health *Children, Young People and Families Policy Research Unit* (**Law**, **Gilbert, Morris S**). Achievements over this period include influential impacts on policies concerning social determinants of health (*Impact case UCL02-MAR*), studies of socioeconomic variation in stroke survival (Raine), modelling of population trends in cardiovascular mortality (*Impact case UCL02-RAI*) and evaluations of changes in physician practice (Fulop).

2. Increasing activity in global health

The *Institute for Global Health* (directed by **Costello**) was transformed from a cross-UCL virtual organisation to fully functioning Institute in 2012, with substantial funding from the Big Lottery Fund and Wellcome Trust. The Institute was central to the 2009 UCL-Lancet Commission on Managing the Health Effects of Climate Change, and the Lancet-UCL Healthy Cities Commission (**Osrin**). The *Leonard Cheshire Disability and Inclusive Development Centre* (led by **Groce**) was established in 2008 with the remit of promoting research on disability worldwide and providing expertise for policy makers, and has a cross-cutting portfolio of studies of disability in Asia and India. Global health is further highlighted by the *Central and Eastern European Research Group* (**Bobak**, **Pikhart**) with Wellcome Trust funding for the Health, Alcohol and Psychosocial factors in Eastern Europe (HAPIEE) study, and by research on HIV and sexual health in Zimbabwe (**Cowan**), and the Africa Centre for Health and Population Studies in KwaZulu-Natal. Our global health work has resulted in major clinical and public health trials that are changing practice internationally (*Impact cases UCL02-COS, UCL02-NUN, and UCL02-GIB*), including studies of women's groups and birth outcomes in Bangladesh (Costello), women's groups and maternal depression in India (Prost), community mobilization in Mumbai slums to improve perinatal care (Orsin), conditional cash transfers and child health in Zimbabwe (Sherr), home visits and neonatal

mortality in Ghana (Hill), treatment of acute malnutrition in Malawi (Kerac), herpes simplex suppression and HIV incidence in Tanzania (Tanton), and many others.

3. Life course epidemiology and cohort studies

UCL houses unrivalled resources in population and clinical cohorts across the life course. The *MRC Unit for Lifelong Health and Ageing* (directed by **Kuh**) was established in 2008 as the home of the National Survey of Health and Development (1946 British birth cohort study), and has continued to be attached to UCL over this period. It was strengthened by the promotion of **Richards** and **Hardy** to professorships and **Stafford** to a readership, and has developed particular expertise in physical capability and musculoskeletal ageing, mental ageing and trajectories of body size and cardiovascular function. ESRC funding of the *International Centre for Life Course Studies in Society and Health* (**Sacker**, **Kelly**, **McMunn**) was renewed in 2013 with a strong remit for training quantitative social scientists as well as studying population cohorts. Other work on population cohorts is carried out in the *Health and Social Surveys Group* (**Mindell**, **Shelton, Stamatakis**) which is involved in the Health Survey for England and other studies (*Impact case UCL02-MIN*), and has been enhanced by the transfer of the Centre for Longitudinal Study Information and User Support (CeLSIUS) group to UCL in 2012.

The ageing theme is a feature of several cohorts, including the *Whitehall II study*, which continues to be funded by the MRC, British Heart Foundation (BHF) and the National Institutes of Health. It is now led by **Kivimäki** in collaboration with **Singh-Manoux**, **Brunner**, **Shipley** and **Head**. Linked with Whitehall is the *Psychobiology Group* (**Steptoe**, **Hamer, Carvalho**) supported by the BHF and working on behavioural and psychosocial factors contributing to cardiovascular risk and mortality. The *British Regional Heart Study* (**Morris R, Wannamethee, Jefferis**) recently completed the 30 year re-examination of the cohort together with an objective physical activity assessment. The English Longitudinal Study of Ageing (**Steptoe, Batty**, **Zaninotto**) carried out data sweeps in 2010 and 2012 with funding from the US National Institute on Aging and UK Government Departments. The study is used extensively by government in relation to pension and social care policy and was enhanced in 2012 by ESRC funding of a genome-wide association study (GWAS) of the cohort (**Kumari**). At the clinical level, the *Centre for Ageing Population Studies* (**Iliffe**) is focused on the management of dementia in primary care.

Our research in this field over the past five years has provided substantial new evidence for the impact of early life experience on later health and biological function (Batty, Conti, Power, Sacker); greater understanding of the menopausal transition (Kuh) and the relationship between physical capability and mortality (Cooper); and modelling of lifetime blood pressure trajectories (Hardy). We have also provided fresh evidence for the role of work stress in coronary disease (Kivimäki), demonstrated the importance of prediabetes (Tabak) and the value of the metabolic syndrome in predicting cardiovascular disease (Wannamethee). We have identified the roles of positive wellbeing and social isolation in survival at older ages (Steptoe, Demakakos); and have increased understanding of the experience of carers for people with dementia (Iliffe).

4. Genetic epidemiology

One of our commitments in 2008 was to appoint a professor of genetic epidemiology to help structure the growth in genetic research. The *Genetic Epidemiology Group* was formed with the appointment of **Hingorani** as professor, leading a group working collaboratively with the UCL Genetics Institute, the Institute of Cardiovascular Science (both entered in UoA1) and the London School of Hygiene and Tropical Medicine (LSHTM). Genetic epidemiology has been enthusiastically developed by several sections contributing to this UoA. Our work in this field takes many forms, including whole genome sequencing (Walker); studies on polymorphisms related to disease and physiological processes (eg Ke); Mendelian randomisation studies (eg Brunner, Casas); GWAS studies of eye diseases, insulin resistance and vitamin D insufficiency (Cumberland, Rahi, Langenberg, Hypponen); the use of genetically-informed designs to investigate drug metabolism (Casas); and twin studies to study behavioural phenotypes in children (Fisher, Llewellyn).

5. Health behaviour research

Research on health behaviour has thrived over this period, with the establishment of the *Health Behaviour Research Centre* (directed by **Wardle**) with programmatic funding from Cancer

Research UK. Other groups have also contributed to health behaviour research, including the *E-health group* (**Murray**), evaluating new communication technologies for the management of risk behaviours, and the *MRC Centre of Epidemiology for Child Health* (**Dezateux**). Notable achievements during this period include the discovery of novel methods of supporting smoking cessation (West, Griffin); establishing links between health behaviour, socioeconomic status, and health outcomes (Sabia, Singh-Manoux); showing that flexible sigmoidoscopy is an effective screening method for colorectal cancer (*Impact case UCL02-WAR*); documenting the socioeconomic gradient in participation in colorectal cancer screening (von Wagner); and demonstrating the importance of sedentary behaviour for health in adults and children (Dezateux, Hamer, Stamatakis).

6. Integrated research on infectious disease and sexual behaviour

Our international reputation for infectious disease epidemiology has been maintained through greater integration of clinical and population cohort research with clinical trials. The *Centre for Sexual Health and HIV Research* (**Johnson, Hart, Mercer, Gilson**) and the *HIV Epidemiology and Biostatistics Group* (**Phillips A, Sabin, Mocroft**) have both received substantial funding for disease and health behaviour surveillance research, modelling and intervention studies (*Impact case UCL02-PHI*). We house the National Survey of Sexual Attitudes and Lifestyle (*Impact case UCL02-JOH*), which is mapping changes in sexual behaviour and health over 60 years, providing critical data on STI transmission and control, examining the relationship between physical and sexual health, and exploring the nature, frequency and correlates of sexual violence (Johnson, Mercer, Field, Sonnenberg). Our intervention research on improving sexual health and preventing and managing HIV links closely with Public Health England (PHE, formerly the Health Protection Agency) and the MRC Clinical Trials Unit (see below). Our work on tuberculosis has been enhanced by the appointment of **Abubakar** to a chair and the growth of the *Centre for Infectious Disease Epidemiology* (**Hayward, Johnson**). This group has championed research on tuberculosis in the UK (*Impact case UCL02-HAY2*), and influenza through MRC/Wellcome Fluwatch, and has also established the multidisciplinary UK Infectious Disease Research Network (*Impact case UCL02-HAY1*). Research highlights over the census period include novel work on life expectancy in HIV and the timing of antiretroviral therapy (Lampe, Johnson, Phillips A, Porter); new insights into links between infectious illness and cardiovascular risk (Hayward, Sabin); studies of influenza A H1NI infection in England (Hardelid); important clinical trials and studies of HIV treatments (Babiker, Goodall, Thorne), and sex education (Stephenson); and pioneering work on the management of tuberculosis (Abubakar), and chlamydia screening (*Impact case UCL02-STE*).

7. Clinical record and health informatics research

UCL has become a leading centre for clinical record and health informatics research, and this has culminated in the award from MRC of one of the four E-Health Informatics Research Centres detailed on page 6. The *Clinical Epidemiology Group* (**Hemingway**) is funded by MRC, Wellcome and NIHR to research the translational pathways for improving understanding of the occurrence and management of cardiovascular diseases using novel clinical cohorts and linked electronic health records (*Impact case UCL02-HEM*). The *Primary Care Methodology Research Group* (**Freemantle**) is a centre of expertise in the use of primary care databases, particularly The Health Improvement Network (THIN) database (**Petersen**, **Nazareth**), while the *Centre for Paediatric Epidemiology and Biostatistics* has pioneered electronic health records research in children. Notable achievements since 2008 include modelling the quality and cost effectiveness of biomarker assessments in cardiovascular risk (Hemingway), studies of survival in dementia (Rait) and the prediction of major depression in primary care (Nazareth), understanding the impact of social deprivation on the benefits of cardiac surgery (Freemantle), and identifying the suicide risk associated with glucocorticoid therapy (Nazareth).

8. Clinical trials

A cross-cutting theme of much of our research is the evaluation of novel interventions in clinical trials. The *MRC Clinical Trials Unit* (directed by **Parmar** since 2010), affiliated with UCL for more than 15 years, has recently been incorporated into the new *Institute for Clinical Trials and Methodology* (see below). Parmar and other senior staff (**Babiker, Dunn, Gibb, Nunn, Porter, Royston, Stenning**, and **Walker**) hold senior academic posts at UCL. The Unit moved into new

premises in 2011, and is internationally renowned for its work on clinical trials, meta-analyses and cohort studies, focusing on cancer and infectious diseases both in the UK and globally, as well as on clinical trial methodology. Our commitment to intervention research in mental health and primary care is evident in the *PRIMENT clinical trials unit* (**Nazareth**) which is responsible for 34 current trials in primary care (in addition to 14 completed) working mainly on mental health and health behaviour change (*Impact case UCL02-NAZ*). Several influential achievements over the past 5 years have been described in earlier sections, but other important work includes evaluations of treatments for advanced colorectal and prostate cancer (Kaplan, Langley, Sydes), pulmonary tuberculosis and endometrial cancer (Nunn, Parmar), relapsed ovarian cancer (Parmar), Alzheimer Disease (Phillips P), chemotherapy for bladder cancer (*Impact case UCL02-TIE*), and trials of surgery for abdominal aortic aneurysm (Brown).

9. Paediatric epidemiology

The *Centre for Paediatric Epidemiology and Biostatistics* (directed by **Law**) incorporates the *MRC Centre of Epidemiology for Child Health* (**Dezateux**) which was established in 2007 at Institute of Child Health. Its work ranges from cohort studies, work on uncommon infections and inherited or developmental conditions, to policy research, and is supported by a methodology core group that is involved in statistical innovation. The DH Policy Research Unit on the health of children and young people (see page 2) is a substantial initiative that is delivered jointly with the ICH General and adolescent Paediatric Unit, the Social Care Institute for Excellence, and others. Key research themes include inherited and developmental conditions and uncommon infections such as HIV, toxoplasmosis, hepatitis C, and congenital cataract (**Peckham, Tookey, Thorne, Cortina-Borja, Townsend**), child maltreatment, how early lives affect future wellbeing and life chances (**Power, Cole, Law**), statistical methodologies (**Cole, Li,** *Impact case UCL02-COL*), and policy research (**Law, Gilbert, Bedford**). Important outputs include work on international policy on child maltreatment (Gilbert), the management of visual impairment in childhood (*Impact case UCL02-RAH*), maternal health behaviours in migrant mothers (Law), and the international health, life course, genetic and infection studies detailed in sections 2, 3, 4 and 6 (above).

Strategy for the next five years

Our research policy includes continuing strategic support for existing successful programmes of work through new staff appointments and resource allocation, while enhancing the vitality and sustainability of our research through a number of notable innovations that map on to the themes outlined earlier. These developments align with the structures that support UCL Partners (UCLP), with an emphasis over the next five years on lifelong health and population health:

- *Health services and applied health research* will be strengthened by the CLAHRC London: North Thames, funded by the NIHR from 2014 with £9 million. This is being matched by over £35 million (including 'in kind' staff time/ resources, grants, PhD studentships and committed posts) from 51 contributing institutions (HEIs, trusts, clinical commissioning groups, UCL Partners, local authorities, industries and charities). The CLAHRC is led by **Raine**, and other academics from UCL are leading programmes of work or otherwise contributing (including **Fulop, Morris R, Utley, Crowe, Freemantle, Gilbert, Hayward, Hemingway, Murray, Nazareth, Pagel, Rait,** and **Shahmanesh**). The focus will be on child and adolescent health, innovations in models and systems for health, methodological innovation, empowering mental health service users and families, and optimising behaviour and engagement with care. The aims are to establish an enduring and comprehensive academic-NHS-Local Authority-patient-public-industry partnership and infrastructure for world leading research, shaped locally and of relevance nationally and globally. We will also design and evaluate chronic disease and public health interventions prioritised by stakeholders which are feasible for widespread implementation and which are likely to have a substantial impact on improving health care quality and health outcomes. UCL also plans to grow its already substantial NIHR research portfolio, and we will build on our involvement in the Schools for Public Health Research and Primary Care Research.
- *Global health* will be strengthened through consolidation of the new Institute for Global Health, which will develop four strategic themes: women's and children's health and disability, equity and society, health systems, and environment, nutrition and sustainability. The fourth theme is supported by a new joint appointment with the UCL Institute for Risk and Disaster Reduction.

The Institute also hosts the secretariat of the *Global Alliance for Chronic Diseases*, an initiative that brings together six leading health agencies that collectively manage 80% of all public health research worldwide (including the National Institutes of Health, MRC, and organisations in Australia, South Africa, India and China) to collaborate in tackling non-communicable disease. The recent appointment of **Chaturvedi** will bring metabolic epidemiology in Pakistan, Egypt, Barbados and India to UCL, together with the tri-ethnic Southall And Brent Revisited (SABRE) cohort which is centred on ethnic differences in cardiometabolic disease.

- The *life course epidemiology theme* will be refreshed with the *MRC Unit for Lifelong Health and Ageing* which made the transition to a University Unit in August 2013. This will permit greater collaboration with existing ageing cohorts (Whitehall, the English Longitudinal Study of Ageing, British Regional Heart Study) and with other groupings at UCL, including the Dementia Research Centre in the Faculty of Brain Sciences (directed by Fox) and the Institute of Healthy Ageing in the Faculty of Life Sciences (directed by Partridge). The core MRC investment is £9.3 million from 2013-18, and UCL has committed additional resource, including the creation of a professorial clinical unit of healthy ageing in conjunction with UCLH. UCL has also established close links with the Institute of Education, providing the opportunity for stronger collaboration with the *Centre for Longitudinal Studies (CLS)*. CLS houses three of the UK birth cohort studies (the 1958, 1970 and Millennium studies), and also manages the ESRC/MRC Cohort & Longitudinal Studies Enhancement Resources (CLOSER) consortium with which several UCL researchers are involved (**Dezateux, Kuh, Sacker**). UCL is already working on the biomedical and health aspects of the CLS birth cohort studies, and the conjunction of these groups will create the largest centre for birth cohort studies in the world, ranging from the newest cohort (the LIFE Study) to the oldest (the MRC National Survey of Health and Development), including all intermediate cohorts. This concentration of methodological expertise will benefit both these and other cohort studies at UCL.
- Our efforts to increase *integration in research on infectious disease* will be strengthened with the formation of the *Bloomsbury Research Institute*, bringing together expertise from population sciences with basic science from the Division of Infection and Immunity (Faculty of Medical Sciences), the LSHTM, and the MRC Centre for Molecular Virology. The Institute will house more than 50 principal investigators working on HIV, TB and malaria, and will extend opportunities for innovative translational research into the control of infectious disease both in the UK and globally.
- *Clinical record and health informatics* research will become a key theme through the recently established *Farr Institute for Health Informatics Research* (directed by **Hemingway**). The core of the Institute is the **Centre for Health service and Academic Partnership in Translational E-Health Research (CHAPTER),** funded by the MRC (£4.3 million) in partnership with Arthritis Research UK, BHF, Cancer Research UK, ESRC, EPSRC, Wellcome Trust and others. It will harness health records from across the NHS (including primary care, hospitals and other sources) to carry out research that benefits patients and the public. We will discover more about why diseases occur and progresses, trial new interventions to improve health outcomes, understand quality of care and outcomes, and inform public health policy. The Institute has cross-UCL support and funding, notably from the Department of Computer Science. The new Institute will also play a crucial role in the newly funded ESRC Administrative Data Research Centre for England (of which **Gilbert** is Deputy Director), designed to facilitate research on linked and routine administrative data.
- The *Institute for Clinical Trials and Methodology* has been established in the Faculty of Population Health Sciences in conjunction with the transfer of the MRC Clinical Trials Unit into UCL in August 2013. This provides opportunity to create one of the leading clinical trials groups in Europe, bringing together cross-Faculty expertise (including PRIMENT from the Department of Primary Care and Population Health, the Cancer Research UK Clinical Trials Centre and the UCLH Clinical Trials Unit), and strengthening methodological underpinning of the field.
- Our work in *paediatric epidemiology* will be invigorated by the *Life Study,* a new UK birth cohort study directed by **Dezateux** in the MRC Centre of Epidemiology for Child Health with more than £38 million funding from the MRC and ESRC. An additional Wellcome Trust Strategic Award has been granted for a pilot enhancement study on infection and immunity. The Life Study will gather data on 90,000 babies born in the UK beginning in 2014, including representation of the main UK ethnic minority groups. The study will address several themes

including social inequality and the parental life course, parental employment and the economic security of families, maternal and paternal health and wellbeing, child health, development and educational trajectories, childhood neuropsychiatric, developmental and neurological disorders, growth in infancy, childhood obesity, nutrition and physical activity, and environment and health. It will be the first birth cohort study to collect extensive prenatal and perinatal data, and provides an important opportunity to advance understanding of the early origins of illness.

- *Francis Crick Institute.* This £700M Institute will open in 2015 with 1,250 researchers, and UCL was chosen as the founding academic partner for the Crick because of its research excellence in Life and Medical Sciences. In the next 5 years we will invest in collaborations with the Crick strengthening translational science, 'reverse translation', genetic analyses of cohorts, and other issues at the basic science – clinical interface.

c. People, including:

I. Staffing strategy and staff development

UCL has an absolute commitment to the career development of academic and research staff. The School of Life and Medical Sciences has an Academic Careers Office dedicated to promoting and supporting academic and clinical academic careers. Our staffing strategy is tailored towards underpinning the sustainability of diverse research groups within UCL and the themes that contribute to the overall research goals outlined earlier. We support the promotion of junior academics and appoint research staff to permanent posts where appropriate, ensuring that staffing policies are directed towards sustaining a vigorous academic culture. Around one third of the staff included in the UoA return are employed on research contracts, and they are supported by larger numbers of junior research staff. Our strategy is fully in accord with the *Concordat to support the career development of researchers*. Specifically:

- We have made strategic academic appointments to ensure succession planning and the sustainability of research groups that rely primarily on the grant income of senior staff, and to ensure that teaching needs are satisfied. Since 2008 we have created chairs in health economics (**Morris R**), health care organisation and management (**Fulop**), improvement science (**Marshall**), life course studies (**Sacker**), life course epidemiology (**Kelly**), and infectious disease epidemiology (**Abubakar**), a readership in global health (**Hawkes**), 13 senior lectureships, and 11 lectureships.
- While we encourage recruitment of new blood to create a vibrant and innovative research environment, we also aim to promote job security for highly achieving research staff. This is evident in the number of staff who have moved from short-term research contracts to academic or tenured posts since 2008: **Casas Romero, Colbourn, Cozzi Lepri, Fottrell, Hypponen, Jefferis, Li, Llewellyn, McMunn, Mercer, Pagel, Petersen, Rait, Shelton, Smith, Thorne**, **von Wagner**, and **Zaninotto**.
- The vitality of the research environment in UoA2 is further evidenced by the inclusion of 32 early career researchers in our REF return.
- The Faculty of Population Health Sciences has a robust set of processes for the promotion of academic and research staff, with clear criteria for promotion that are addressed through the annual appraisal system. Promotions are not contingent on the availability of funds within grants, but are based on ability and achievement. Since 2008, 11 staff have been promoted to professorships, 10 to readerships or principal research associate status, and 4 to senior lecturer.
- We ensure flexibility in contracts to ensure that work patterns are suited to the personal as well as career development of staff. Of the 181 returned in UoA2, 27 are working on part-time contracts, usually because of family commitments.
- We are committed to continuing professional development for academic and research staff at all levels. UCL provides a large variety of short courses ranging from presentation skills for junior personnel to leadership development for senior staff. CPD multi-professional and on-site taught modules and the UCL Professional Development Programme for Researchers are widely accessed. Staff are encouraged to use the Researcher Development Framework professional development tool to enhance the knowledge, attributes and skills required for success as researchers. Funds are available through UCL Graduate School for conferences, and there are regular exchanges with other academic institutions. Since 2008, staff have

worked for time periods between two weeks and three months at institutions such as Harvard, Yale, Cambridge University, Northwest University in South Africa, the Chinese University Hong Kong, VU University Amsterdam, and the Universities of Sydney, Florence, Melbourne, Osaka, Toronto and Victoria.

- We have successful mentoring systems both for academic and research staff. Mentors are more experienced staff working in a similar area as the mentee but without direct management involvement. Prospective mentors are provided with training through the on line mentoring platform (uMentor). We also participate in the School of Life and Medical Science's 'Future Fifty' mentors scheme for future academic and clinical leaders at UCL. A new 'Future Leaders' programme in the School has been developed by the Dean of FPHS (Hart), and its first intake of mid-career academic staff started the course in October 2013. Many UCL staff are involved in the Academy of Medical Sciences mentoring programme.
- Staff on short-term research contracts are given preferential access to continued employment through the UCL redeployment scheme. Senior staff making new appointments are required to consult the register for individuals whose contracts are coming to an end, and ensure that they are considered before any post is advertised externally.
- We are monitoring and delivering improvements in the equalities profile at all levels. The introduction of a more inclusive promotions process, the award of contributions points, applications for Athena Swan (November 2013) and annual professorial pay evaluations support this process. UCL has established a new Dignity at Work Advisory system which is designed to support staff in relation to issues such as gender equality, sexual orientation and bullying. In 2013 UCL became a Stonewall Top 100 Employer for LGBT staff.
- Objectives are being agreed to deliver improved ethnic balance at the higher levels in the longer term, with training and panel reviews to ensure that unconscious bias and discrimination are eliminated over time. In this UoA, the proportion of female staff eligible was 60%, while 10% were from black and ethnic minority groups; there was no difference in the proportions of eligible staff actually selected on the basis of gender or ethnicity.
- We also encourage equality and diversity by providing additional support where necessary. For example, payment for the assistant of one visually impaired professor is supported by UCL over and above the funds from 'Access to Work' provided by the government.
- We encourage staff to apply for prestigious and competitive personal research fellowships in open competition in order to enhance their personal development and the vitality of their research groups. Since 2008, successes include **Kivimäki** (ESRC research professorship), **Abubakar** (NIHR professorship), **Osrin** (Wellcome Trust Senior Research Fellowship), and **McMunn** and **Britton** (ERC starting grants), with continuing research professorships during this period including **Marmot** (MRC), **Cole** (MRC), **Steptoe** (BHF), **Wardle** and **West** (Cancer Research UK). At the intermediate and junior level, personal fellowships obtained include several MRC Clinical Research Training Fellowships (**Byrne, Haddow, Price, Shallcross, Warren-Gash**), Wellcome Trust Research Training fellowships (**Aldridge, Devakumar, Hall, Thorne**), NIHR Academic Clinical Fellowships (**Fakoya, Hudson, Hutson, Wang**), NIHR Clinical Academic Lectureships (**Bailey, Bhattacharyya, Hamilton, Walters, Wong**) and post-doctoral Fellowships (**Ishola**), Cancer Research UK post-doctoral fellowships (**Marlow, Robb, Whitaker**), MRC Biostatistical Career Development Award (**Li**), MRC Population Health Scientist Fellowships (**Holmes, Pearce**), and a Health Foundation Improvement Science Fellowship (**Crowe**).
- There is very effective integration of clinical and non-clinical researchers. Several research groups are led by clinicians but include non-clinical staff, and vice versa and research facilities are co-located with clinical services where appropriate. Careful attention is paid in employment contracts and annual monitoring schemes to ensure that clinicians have sufficient time for scholarly work, and that there is an appropriate balance of duties. The sections of UCL submitted to this UoA are located on two sites geographically (the Bloomsbury and Royal Free campuses), but cohesion is enhanced by effective IT support and by regular meetings and social exchanges.
- We have a vigorous programme of international visitors and sabbatical fellows, supported by the UCL Affiliate Academic Scheme. Over the census period, senior and junior academics from more than 20 countries have stayed at UCL for one to 12 months, collaborating and acquiring new research skills.

c. II. Research students

Postgraduate training is a key component of our research and scholarly activity. Since 2008, PhDs have been awarded to 120 students in the sections contributing to this UoA, and there are currently 148 MPhil/PhD students registered. Our commitment to doctoral research training is evident in initiatives on recruitment, development of doctoral training programmes, and the research culture.

i. Recruitment

Recruitment to PhD training in the sections of UCL entered in UoA2 has been strong, thanks to the good reputation of UCL coupled with the active engagement of staff with other HEIs, third sector organisations and industry.

- We have been successful in obtaining consistent funding of studentships through MRC and ESRC DTA systems. The Institute of Epidemiology and Health Care has been awarded two studentships annually from both Research Councils with an additional eight ESRC studentships for the International Centre for Longitudinal Studies, while the Centre of Epidemiology for Child Health was awarded four MRC studentships. The NIHR Schools of Primary Care and Public Health Research funds up to five studentships per year. We have also been successful in obtaining competitive studentships from other funders, including Cancer Research UK, the BHF, Wellcome Trust, the BBSRC and the Health Foundation.
- UCL has introduced two PhD studentship programmes to enhance capacity. *Impact studentships* involve collaborations with industry or third sector organisations, with UCL providing 50% of the funding from internal resources. The *Grand Challenge studentships* are cofunded by UCL and the NIHR Biomedical Research Centres at UCLH, Moorfields and Great Ormond St Hospitals. More than 10 PhD students have been funded through these schemes, involving collaborations with third sector organisations such as Alcohol Research UK, Weight Concern, the International Longevity Centre, Target Ovarian Cancer, and Valid International. Another pan-UCL scheme was sponsored by the CRUCIBLE Centre for Lifelong Health and Wellbeing, offering 4-year studentships for interdisciplinary research on ageing.
- A new doctoral training programme in health informatics as a translational discipline has been established through the Academy of Translational Health Informatics Research, set up by CHAPTER in collaboration with the LSHTM, Queen Mary UL and PHE; 18 studentships funded by MRC and UCL will begin in 2013.
- We have obtained several CASE awards in collaboration with industry, including MRC/Cedigem (Nazareth), BBSRC/Unilever (Steptoe), MRC/AMES Grid Services (Castillo), MRC/Danone Baby Nutrition (Wardle), and MRC/AstraZeneca (Hemingway). Other collaborative studentships with industry involve Servier (Hemingway), AmGen (Copas) and Unilever (Hamer).
- Recruitment of students is carried out with strict adherence to equal opportunities issues. All interviewers have completed the UCL interview skills training programme, and most have attended the Unconscious Bias training course.
- UCL is a global university, with post-graduate students from around 150 countries. We therefore have a Cultural Consultation Service which supports students facing cross-cultural and social difficulties through consultation, workshops, advice and referral to specialist services where appropriate.

ii. Sustainable doctoral training programmes

A number of processes are in place to ensure that our doctoral training is effective and sustainable, and that students are supported throughout their training.

- Each of the sections of UCL in this submission has a Graduate Tutor or Tutors who have the responsibility of ensuring fair and equitable student recruitment, appropriate supervision and progress from MPhil to PhD registration and thesis submission. The Graduate Tutors also advise students about how to access additional resources that may be necessary to their work, and provide support when they are in difficulties.
- All students are allocated to an experienced principal supervisor. The secondary supervisor role has been superseded by subsidiary supervisor teams that may include two or more academics and researchers with specific expertise in parts of the research being undertaken.

Academic and research staff are required to attend a course on PhD supervision before being permitted to supervise, and must first act as a subsidiary supervisor being allowed to become a primary supervisor. A *Handbook for PhD Supervisors* has been written specially for supervisors in the population health area, containing details of expectations and responsibilities and supervisions schedules.

- We have made active efforts to increase the involvement of academic staff in PhD supervision. In the Institute of Epidemiology and Health Care, the number of research students per full-time HEFCE academic staff member has increased from 1.52 in 2008/9 to 2.20 in 2012/13, with similar increases in other sections included in this submission.
- Students are given a detailed Code of Practice for Research Degrees on arrival, and attend induction sessions from the Graduate School. Progress is monitored using the *on-line Research Student Log*. This documents academic progression and skills development training, and reflects a dialogue between students and principal and subsidiary supervisors. This records review meetings (including important milestones such as the MPhil to PhD upgrade) and discussions on discipline-specific, generic and transferable skills training.
- All students are expected to take advantage of the *Graduate School Skills Development Programme*, and participate in this programme and/or appropriate departmental courses for a period equivalent to two weeks per year. Training courses and activities have been assigned a point value, and students are expected to accumulate 60 training points over 3 years, or 80 points over 4 years. They are encouraged to take a broad range of courses across all the domains of UCL's Researcher Development Framework. There are currently 220 different courses delivered by academics, professional staff and external consultants.
- We carefully monitor time to completion, with regular postings of progress from supervisors to Graduate Tutors. Over the census period, more than 70% of students have completed within a year of the end of their funding.
- Special systems have been established to support part-time PhD students, many of whom are either clinicians or research assistants. Work plans are scrutinised by graduate tutors to ensure that candidates are given adequate time and facilities for their doctoral studies so that they are not disadvantaged by competing responsibilities.
- Some sections of UCL provide specific training resources. For example, in the Institute of Epidemiology and Health Care, PhD students hold weekly research seminars at which they hone their public speaking skills. In the Centre for Paediatric Epidemiology and Biostatistics PhD students are involved in regular junior researcher and statistician group meetings.

iii. Integration into research culture

Doctoral students are an integral element of our research activity. The majority of students are involved in collaborative, often interdisciplinary, projects rather than stand-alone studies, and all are affiliated with specific research groups within the research departments and sections contributing to this UoA. They therefore participate actively in the research of these groups, attending research planning meetings, writing and contributing to articles, and giving presentations of their work in the same way as other junior research staff. In addition, specific mechanisms are in place to ensure effective integration of students into the research culture and to prepare them for scholarly careers.

- A three day residential retreat is held at Cumberland Lodge every year. The programme of the retreat is organised by the PhD students themselves, and senior academic staff are invited, providing an opportunity for intensive exchange with experienced researchers.
- Many of the sections in the UoA are involved in capacity building and training of other junior researchers apart from doctoral students. For example, the MRC Unit for Lifelong Health and Ageing have trained 18 clinical and nonclinical researchers in life course epidemiology, some of whom were funded through a National Institute on Aging (NIH) life course fellowship programme. The statisticians in UoA2 provide regular training in advanced techniques to researchers from other Departments and institutions.
- PhD students are encouraged to give presentations at national and international research conferences, as well as in their own Departments. Typically, students present at one or two national and one overseas conference during their training, supported by funds from the Graduate School and individual research groups.

- Placements in other Universities or with industry and Government Departments are also encouraged. Since 2008, PhD students have spent periods of two weeks to three months at Harvard, the Universities of Chicago and Kurume (Japan), the Academy of Medical Sciences, Google, Unilever, and DFID. These placements help broaden students' research experience and provide a valuable commercial and policy context for their research.

d. Income, infrastructure and facilities

Our research is underpinned by infrastructures relevant to population and clinical cohort research, clinical trials, behaviour change, and policy research. Physically, the sections of UCL contributing to this UoA are located in a number of buildings in the Bloomsbury and Royal Free campuses. The developments detailed in Section b will promote more effective interdisciplinary co-location in the future. A space strategy is in place to ensure that researchers have close access to appropriate laboratory and computing facilities and teaching rooms.

d.1. Income

Strategies for generating research income

Strategies for generating research income operate at several levels. The Office of the Vice-Provost for Research has research coordinators embedded within the School of Life and Medical Sciences who alert researchers to new funding strands and coordinate complex bids. The FPHS administrative team provides further support, while the European Research and Development Office gives advice about EU programmes. Several senior academics at UCL are involved at a high level in funding schemes at the MRC, ESRC, Wellcome, and NIHR (as detailed in section f), and circulate information informally to colleagues. Funding possibilities are discussed at Departmental academic and management committees to ensure that proposals are consistent with the overall research strategy.

Evidence of successful generation of grant income

Between 2008/9 and 2012/13, the annual research income from the sections submitted to UoA2 increased by 20%. These figures do not include the funding of the former MRC units (Clinical Trials and Lifelong Health and Ageing), the Life Study, the NIHR Schools or grants on which staff members are co-applicants. This funding includes several research investments of more than £2 million, including funding for international studies of women and children's health (Wellcome, £5.71m; Big Lottery Fund, £4.69m; DFID £5.4m); the third national survey of sexual attitudes and lifestyles (MRC £5.26, Wellcome £2m); the Whitehall II study (MRC £5.42m); English Longitudinal Study of Ageing (National Institutes of Health, $7.8m; central government departments, £4.35m); International Centre for Life Course Studies (ESRC £5.39m); Fluwatch phase III (MRC £2.48m); CHAPTER (MRC £3.78m); the Health Behaviour Research Centre (Cancer Research UK, £4.4m); Psychophysiology of coronary heart disease (BHF, £2.17m); PREDICT study on latent tuberculosis (NIHR, £2.6m); the TB REACH programme (NIHR £2m); Start2quit trial (NIHR £2.19m); and the SABRE study (Wellcome Trust/BHF £2.7m).

d.2. Infrastructure and facilities

Cohort and panel study infrastructure

The sections of UCL contributing to this UoA are responsible for a number of cross-sectional and longitudinal cohort and panel studies. These include the new Life birth cohort and the earliest (NSHD 1946) national birth cohort, Whitehall II, the British Regional Heart Study, the National Surveys of Sexual Attitudes and Lifestyle, the English Longitudinal Study of Ageing, the HAPIEE study, the SABRE cohort, the Gemini study, medical aspects of the Health Surveys for England and Scotland, and the clinical cohorts in cardiovascular prognosis, genetics, HIV and TB outlined in *section b*. Many of these studies are collaborations with other HEIs and survey agencies, and have specific operational procedures. At the same time, they share important infrastructure requirements, including:

- *Statistical and bioinformatics support*. There are strong infrastructures in place to support the statistical analysis of our cohort and panel studies, with specialist senior statisticians and methodologists involved in the investigation of infectious disease (**Phillips, Sabin, Copas**), cardiovascular health (**Head, Shipley**), ageing (**Hardy, Stafford, Zaninotto, Muniz Terrera**), primary care (**Freemantle, Omar, Petersen**), developmental sciences (**Wade, Cortina-Borja,**

Cumberland, Geraci), clinical trials (**Parmar, Royston, Dunn, Freemantle, Omar**), and genetic studies (**Casas**). These groups are at the cutting edge of innovative statistical research on longitudinal analysis, data imputation, risk modelling, clustering effects within trials and other topics, and also provide statistical advice and consultation, running a range of statistics training courses and clinics for research and clinical staff. The Faculty has begun a series of staff development and support meetings specifically for statisticians in recognition of their key role in our research.

- *Data management and biobanking*. The Centre for Paediatric Epidemiology and Biostatistics has established a dedicated information laboratory (epiLab) to develop innovative data management systems such as the Shared-Services Health Applications & Resources Environment (SHARE) project and the Secure Epidemiology Research Platform (SERPent). It also provides a secure data processing service, compliant to information security management standard ISO/IEC 27001:2005, one of only two UK University-based research computing service to obtain this standard. The service also holds NHS IG Toolkit approval. Other cohort and panel studies have different arrangements to ensure secure maintenance of biological samples and freezer storage. UCL's large scale computational infrastructure, including the 6,000 core supercomputer facility (Legion), is available to researchers on a free at the point of use basis.
- *Data linkage*. Our population and clinical cohort studies and clinical trials benefit greatly from linkage with other records such as hospital episode statistics, the clinical practice research datalink, cancer registry data, and in some cases national insurance, pension and benefit records. There are complex practical, ethical and security issues surrounding different types of linkage. The newly established Farr Electronic Health Informatics Research Institute will pool expertise in these issues and facilitate prompt and efficient linkage in the future.
- *Collaboration and harmonisation*. UCL has been at the forefront of a range of research collaborations and partnerships involving population and clinical datasets, as outlined below in *section e*. Such collaborations bring with them the need for specialised statistical techniques and big data analytic challenges that are being shared at UCL, and often involve data harmonisation issues in which we have considerable expertise.
- *New data resources*. Researchers at UCL have been instrumental in collecting new data to enhance existing population surveys that are archived to be accessible to researchers from other institutions. For example, accelerometry data were collected from nearly 7,000 7-year old children in the Millennium Cohort Study for the objective assessment of physical activity (**Dezateux, Griffiths, Geraci**), oral fluids were analysed from more than 10,000 3-year olds in the same study to investigate patterns of immunity (**Dezateux**), and a GWAS is being carried out in the English Longitudinal Study of Ageing. All these data are (or will be) available from the UK Data Service.
- *Data sharing and curation*. All the research groups are committed to the implementation of effective data management and curation to enable re-use of preserved data, and to the MRC, ESRC and Wellcome Trust data sharing policies. For example, the MRC National Survey of Health and Development and Whitehall II studies are two of the four case studies within the MRC Research Data Gateway, while the English Longitudinal Study of Ageing is part of the Rand Survey Meta Data Repository.
- *The ESRC/MRC Cohort & Longitudinal Studies Enhancement Resources (CLOSER) consortium* will have a seminal impact on cohort research infrastructure in the next few years, since it has specific remits for data harmonisation and linkage, developing new search platforms and for training and capacity building. The MRC National Survey of Health and Development and Life study are two of the core studies in CLOSER, but it is likely that other studies at UCL will join in the near future.

Clinical trials infrastructure

Methodological support and expertise in the design, management, analysis, publication and exploitation of clinical trials will be greatly facilitated by the new Institute for Clinical Trials and Methodology established in 2013. This will provide operational infrastructure in terms of trial management, data management and study administration to assist the smooth running of randomised controlled trials (RCTs). The ideas stimulating RCTs are often generated by a small

group of lead researchers, in some instances based in another institution, but require operationalization through the Institute's expert group.

UCL researchers have made important contributions to the regulatory framework for clinical trials that benefit our research and the field more broadly. The transposition of the EU Clinical Trials Directive (2001/20/EC) into UK law in 2004 transformed the environment for clinical trials. A working group, co-led by staff from Medicines and Healthcare Products Regulatory agency (MHRA) and the MRC Clinical Trials Unit (**Meredith**), developed a new risk-stratification framework for clinical trials, together with guidance as to how the level and type of risk may be used to inform risk-proportionate approaches to trial management. The resulting guidance was published in 2011 and is recommended by both organisations to be followed in all UK clinical trials. The risk-stratification framework that we developed for the UK formed the basis of the Organisation for Economic Co-operation and Development (OECD) resolution on the Governance of Clinical Trials in 2012.

Publication policy

Since 2009, it has been UCL policy that all publications are deposited in the UCL repository in Open Access. UCL has a Publication Fund to meet article processing charges when necessary.

Research Governance

UCL has a set of research governance policies that underpin expectations about the conduct of research. The Joint Research Office is a partnership between UCL, UCLH and the Royal Free Foundation Trust, and supports our clinical research portfolio by providing timely, proportional yet safe research governance. There is a clear structure embodied in the R&D Operational Capability Statement, and standard operating procedures to guide both investigators and sponsors. The senior biostatisticians working within Joint Research Office (**Omar, Ambler, Bailey**) are members of UCL's Department of Statistical Science, but are being returned in this UoA. A central issue in clinical research is confidentiality and security in the use of patient data. The School of Life and Medical Sciences has set up an Identifiable Data Handling Solution (IDHS) Project to develop appropriate methods of storing identifiable patient data for research purposes. **Gilson** is on the project board and is chair of the IDHS user group, and other staff returned to UoA are also involved in this activity. The Faculty also plays a key role in the School's Information Governance Committee: **Hart** is Chair, and Senior Information Risk Owner (SIRO).

Research facilitators

The School of Life and Medical Sciences has a team of four research facilitators who support academics in funding applications and in relationships with funders. They provide personalised support helping both experienced and early career researchers with advice about suitability of schemes, information about funding calls with which they are not familiar, bespoke help in the form of interview training, and other resources.

Research networks and UCL Partners

Researchers in this UoA are also closely involved in *UCL Partners*, one of five accredited academic health science systems in the UK, incorporating 10 other HEIs, 24 acute, community and mental health providers and 19 Clinical Commissioning Groups, serving a population of around 6 million (11% of the population of England). **Raine** is population health lead and **Stephenson** is lead for women's health, while other programme leaders and Academic Health Science Centre leaders are being submitted to other UoAs by UCL. The aim of the UCLP research sub-board is to develop and deliver an aligned research strategy (from experimental through to applied research) in pursuit of health gain and wealth creation that is fully informed by patient and population need, and to foster a collaborative and entrepreneurial culture and to increase capacity and career development. It has already had a marked impact on the clinical and population research carried out by staff returned to UoA2, and will be increasingly important following our successful bid for a CLAHRC (see section b). We are also closely allied with *Improvement Science London*, a social enterprise set up by the Academic Health Sciences Centres of UCL, Kings and Imperial charged with improving the organisation and delivery of healthcare. An additional way that research impact has been facilitated at UCL is through *research networks*. UCL has contributed substantially to the development and growth of the NIHR Primary Care Research Network (**Nazareth, Rait**), the NIHR

Public Health Research Network (**Johnson**), the Mental Health Research Network (**Buszewicz** is primary care lead), the Dementia and Neurodegenerative Diseases Research Network (DeNDRoN, **Iliffe** is associate director for primary care) and the Comprehensive Local Research Networks (**Buszewicz** is co-director of the north central / north east London network). **Chaturvedi** is associate director of the UK Diabetes Research Network, with particular responsibility for links with industry.

Health economics infrastructure

We have invested substantially in health economics both in the Research Department of Applied Health Research (**Morris S, Conti**) and the Institute for Global Health (**Skordis-Worrall**). These groups support UCL research and provide cost and cost effectiveness analyses of health care interventions and public health programmes both nationally and in global health trials. They also investigate resource allocation in health care and public health, and inform understanding of the affordability, scalability and sustainability of effective local and global health interventions.

e. Collaboration and contribution to the discipline or research base

The sections of UCL contributing to this UoA have developed an extensive set of research collaborations supported by the research strategy of the FPHS. These include collaborations that are led by UCL, partnerships in which UCL plays a participatory role, collaborations in which UCL contributes specialist expertise (such as clinical trials), and direct bilateral collaborations with research groups in other HEIs. UCL staff also play leadership roles in journals, funding bodies, learned societies, and other structures that strengthen the population health disciplinary and research base.

Collaborations and partnerships

UCL staff are involved in collaborations that take many forms:

- *Collaborations and partnerships are led or administered from UCL.* The MRC Unit for Lifelong Health and Ageing (**Kuh**) is responsible for the HALCyon network, a collaboration of nine UK cohort studies designed to understand aspects of healthy ageing, and the FALCon project, a collaboration with Cambridge, Bristol, Southampton and Glasgow focused on the measurement and modelling of function across the life course. The Life Study Scientific Research Investigator Network (led by **Dezateux**) is an interdisciplinary network established as part of the successful bid to lead the new birth cohort which involves 28 coinvestigators from 19 UK universities. The network aims to bring new theoretical and interdisciplinary perspectives to a life course approach within the Life Study. The UCL-LSHTM-Edinburgh-Bristol (UCLEB) cardiovascular genomics consortium is led by **Hingorani** and involves **Casas, Hyppönen**, and **Power**. **Kivimäki** is responsible for the IPD-Work Consortium, a collaboration involving 12 independent European studies of work stress and health. **Hemingway** and **Hingorani** help direct the MRC-funded PROGgnosis RESearch Strategy (PROGRESS) partnership in the cardiovascular field in collaboration with the LSHTM, Birmingham, Keele, Oxford and Queen Mary UL. The Academy of Translational Health Informatics Research, established by CHAPTER, brings together strengths in training at UCL, the LSHTM, Queen Mary UL and PHE. The **EuroCoord** network, a consortium of European HIV cohorts, is lead from UCL (**Porter, Phillips, Sabin, Gibb, Thorne**). The **HIV Epidemiology and Biostatistics Group** leads the UK Collaborative HIV Cohort (UK CHIC) Study monitoring the clinical care of adults with HIV. In parallel, the National Study of HIV in Pregnancy and Childhood, a national surveillance network, is led from the MRC Centre of Epidemiology for Child Health (**Tookey, Cortina-Borja**). **Hayward** and **Johnson** are principal investigators of the Infectious Disease Research Network, promoting multi-disciplinary collaborations and increasing the capacity of infectious disease research in the UK. **Johnson** also leads the National Survey of Sexual Attitudes and Lifestyle, a collaboration with the LSHTM, PHE, NatCen Social Research and the University of Manchester. **Costello** directs the Population Science of Maternal and Child Survival project (Wellcome Trust) which unites UCL and five organisations in Malawi, Bangladesh, India and Nepal to form a global network of linked surveillance sites that study maternal and child health and survival. Some studies are run jointly by UCL staff and researchers in other HEIs. For example, the British Regional Heart Study (**Wannamethee, Morris R**) is run jointly with St.

George's UL; the English Longitudinal Study of Ageing (**Steptoe, Marmot, Batty**) is conducted jointly with the Institute for Fiscal Studies and the University of Manchester.

- *Participation in wider research consortia*. The British Regional Heart Study and the Whitehall Study contribute to the Emerging Risk Factors Collaboration, and these and the English Longitudinal Study of Ageing to the Wellcome Trust Case Control Consortium. The Epigenomics and Social Adversity Consortium (**Power**) involves collaborators from Montreal, Vancouver and Bristol, while the EArly Genetics and Life-course Epidemiology (EAGLE) consortium of pregnancy and birth cohorts (**Hyppönen, Power**) investigates the genetic basis of phenotypes in antenatal and early childhood. D-CarDia (**Hyppönen**) is a large-scale collaboration of epidemiological studies aiming to establish the causal role of vitamin D on cardiovascular disease and related traits using genetic proxy markers. The MRC Unit for Lifelong Health and Ageing is part of the Integrative Analysis of Longitudinal Studies of Aging (IALSA) network of 25 longitudinal ageing studies that has recently been funded by the National Institute on Aging (NIH) with **Kuh** as co-director; **Rahi, Hysi** and **Cumberland** collaborate with the Consortium for Refractive Error And Myopia (CREAM), conducting meta-analyses of genome-wide association studies of refractive error in different populations throughout the world. **Cortina-Borja** participates in the Epistasis Project, one of the largest cohorts of Alzheimer's disease cases worldwide, involving researchers in Oxford, Nottingham, Bristol, Stockholm, and Santander, analysing the role of critical epistasis in Alzheimer's disease risk. **Hart, Johnson, Copas** and **Mercer** are co-applicants on the BALLSEYE programme led from Queen Mary UL aiming to improve the sexual health of young men in the UK. **Phillips, Sabin, Mocroft** and others contribute to the EuroSIDA cohort study of HIV-infected people in Europe, to the Data Collection on Adverse events of Anti-HIV Drugs (D:A:D) multicohort European study, to the Collaboration of observational HIV Epidemiological Research Europe (COHERE), and to other national and international collaborations. **Skordis-Worrall** leads UCL participation in project DIFFER, an consortium involving the Universities of Ghent and the Witwatersrand, and partners in Mozambique, Kenya and India, with the objective of improving access to sexual and reproductive health services for vulnerable groups.
- The work of the MRC Clinical Trials Units is heavily collaborative. Key collaborators include Imperial College London (*HIV prevention and treatment trials*); INSERM SC10, HIV Trial Centre, Paris; NIH INSIGHT network *(HIV treatment trials, TB)*; Paediatric European Network for Treatment of AIDS (PENTA); LSHTM *(HIV, TB, Medical Statistics)*; European Organisation for Research and Treatment of Cancer (*Intergroup cancer trials collaborations)*; Centre for Statistics in Medicine, Oxford; MRC Biostatistics Unit, Cambridge; Institute for Medical Biometry and Medical Informatics, University of Freiburg, Germany; the Gynaecological Cancer Intergroup (GCIG) comprising organisations in Austria, Germany, Australia, New Zealand, Netherlands, France, Spain, Japan, Korea, Italy and Canada *(intergroup collaborations in gynaecological cancers)*; the European and American Osteosarcoma Study Group, and the MRC Network for Clinical Trial Methodology Research.
- The PRIMENT CTU is a UCL cross-faculty collaboration involving the Faculties of Population Health Sciences, Brain Sciences, and Mathematics and Physical Sciences with strong collaborations with HEIs in the UK and abroad. Researchers from other sections of the UoA also lead international trials. For example, **Prost** leads the CARING cluster-RCT which is testing the impact of a community intervention to improve the growth of children in rural India (funding from Wellcome, DFID, and the MRC). **Hill** directs InScale, a malaria consortium project funded by the Gates Foundation in Mozambique and Uganda. **Osrin** leads a Wellcome-funded cluster RCT of community resource centres to improve the health of women and children in Mumbai slums. **Saville** directs the Low Birth Weight South Asia Trial (DFID-funded), a cluster-RCT in Nepal comparing the cost-effectiveness of increasing birth weight through women's groups only or in combination with either cash or food transfers, in collaboration with Save the Children and the World Food Programme. **Costello** is responsible for Evidence for Action, a programme working with six other UK Universities promoting the uptake of evidence into policy activities to reduce maternal mortality in six African countries.
- *NIHR Schools*. Our collaborations with the 7 other university centres in the NIHR School for Public Health Research and the 7 other universities in NIHR School for Primary Care Research have stimulated collaborative primary care research between UCL and other HEIs (**Nazareth, Murray, Buszewicz, Walters, Petersen, R. Morris R, Wanamathee**) and between population

health researchers and other disciplines within UCL such as the Bartlett Faculty for the Built Environment (**Johnson, Raine, Wardle, Stephenson, Michie, Freemantle, Walters**).

- Researchers at UCL work closely with *PHE,* particularly with the Centre for Infectious Disease Surveillance and Control in Colindale, to undertake studies of national and international significance across a range of infectious diseases. This collaboration is supported by a number of senior joint appointments and honorary contracts; thus PHE part funds a substantive chair in infectious disease epidemiology (**Abubakar**) within the Institute of Epidemiology and Health Care, and there are six honorary UCL professors holding senior appointments within PHE including the Director of Health Improvement, Head of Influenza and the Director of the National Mycobacterial Reference Laboratory, together with several honorary senior lecturers. **Watson** (formerly head of Respiratory Diseases) has recently been appointed deputy Chief Medical Officer at the Department of Health, but will continue his honorary Chair at UCL. **Abubakar** heads the tuberculosis section of PHE, and examples of key externally funded projects include the PREDICT study on latent tuberculosis, the MRC-funded Flu Watch Study, and the TB REACH programme.
- Finally, there is a wide range of *direct collaborations* between UCL researchers and colleagues in other parts of UCL, other UK HEIs and organisations around the world. Examples include Whitehall's close links with the GAZEL cohort in France and the German Diabetes Centre in Dusseldorf; the English Longitudinal Study of Ageing collaborates with ageing panel studies in Brazil, Canada, China, India, Japan, the USA, and continental Europe; the Psychobiology Group collaborates with the Sukhothai Thammathirat Open University (Thailand); the Institute for Global Health has close ties with universities in Nepal and Malawi; the MRC Unit for Lifelong Health and Ageing has a substantial collaboration with the newly funded Leonard Wolfson Experimental Neurology Centre at UCL for neuroimaging of 1946 NSHD study members, while the Whitehall study group has a neuroimaging collaboration the Oxford Centre for Functional MRI of the Brain.

Contribution to the discipline

Journal editing

Editors-in Chief: Bobak (*J Epidemiol Commun Health*); West (*Addiction*); Sabin (*HIV Clinical Trials*); Miller (*British Journal of Hospital Medicine and Sexually Transmitted Infections*); Scambler (*Sociology of Health and Illness*); Scherr (*AIDS Care*); Mindell (*Journal of Transport and Health*); Utley (*Operations Research for Health Care*).

Associate and assistant editors: Chaturvedi (*Int J Epidemiol*), Osrin (*PLoS Med, Int J Epidemiol, BMC Pregnancy Childbirth*), Sabin (*Int J STD AIDS*); Williams (*HIV Medicine*); Mercer (*Sexually Transmitted Infections*); Sacker (*J Longit Lifecourse Studies*); Demakakos, Holmes, Singh-Manoux (*J Epidemiol Commun Health*); Wardle (*Obesity Facts*); Nunn (*Int J Tuberc Lung D*); Walker (*J Infect Dis*); Thorne (*PLoS One*); Pikhart, Porter (*BMC Public Health*).

Statistical editors: Cole, Wade (*BMJ*), Copas (*Sexually Transmitted Infections*), Cortina-Borja (*The Psychiatrist*), Wade (*J Clin Pathology*).

UCL staff are also on the editorial boards of more than 30 international peer-review journals, and the majority of staff have been involved in reviewing journal submissions.

Membership of Research Council or similar national and international committees over the period

MRC boards and panels: Dezateux – Council and Strategy Board; Johnson – Chair, Population Health Sciences Group and member, Strategy Board; Law, Hart - Population Health Sciences Group; Hart - Chair, MRC/ESRC Postgraduate Studentship and Fellowship Panel, and member, Audit Committee; Sabin – Infection and Immunity Board; Steptoe – Population and Systems Medicine Board, Population Health Strategy Group; Raine - Health Services and Public Health Research Board; Meredith – Methodology Research Programme Panel; Power - MRC/ESRC Postgraduate Studentship and Fellowship Panel; Rahi – Clinical Training and Career Development Panel; Director, MRC General Practice Research Framework – Nazareth.

NIHR: Law – Strategy Board member; Ford, Rahi, Raine – Programme Grants for Applied Health Research panels; Hart, Nazareth, Sonnenberg – Fellowship Board; Nazareth – HTA Commissioning Board, and Clinical Academic Training Fellowship Panel; Fulop, Hemingway - Research for Patient Benefit Committees; Stafford, Wardle – Public Health Research Programme Funding Board; Walters – HTA Commissioning Panel for Primary Care;

Wellcome: Johnson - Strategic Awards Committee; Chaturvedi – Chair, Populations and Public Health Panel, Investigator Award Selection Committee; Hawkes – Ethics and Society Committee; Nazareth – DBT India Alliance Fellowship Committee.

Other *UK*: Chaturvedi –UK Biobank Outcomes Working Group; Dezateux – National Information Governance Board, Council, Academy of Medical Sciences, ESRC Biosocial Research Advisory Committee; Ford, Hayward – Health Protection Agency Strategic R&D Research Board; Fulop - Health Foundation Improvement Science Development Group, and Marie Curie Cancer Care Research Programme Funding Committee; Gilbert - MHRA: Paediatric Medicines Expert Advisory Group; Phillips – Government Expert Advisory Group on AIDS (EAGA); Shelton – Chair, Geography of Health Research Group, Royal Geographical Society; Sydes – Cancer Research UK Clinical Trials Advisory and Awards Committee; Utley – DH Policy Research Programme Board.

International: Marmot - National Academies of Sciences (NAS, USA) Panel on Understanding Divergent Trends in Longevity in High-Income Countries; Sacker – NAS Panel on Measuring Subjective Well-Being in a Policy Relevant Framework; Brunner – Eire Health Research Board Funding Committee; Singh-Manoux – Horizon 2020 Board; Steptoe - Mid-Life in the United States (MIDUS) External Board, Survey of Health, Ageing and Retirement in Europe (SHARE) Scientific Monitoring Board; Hawkes – Expert Group on Sexual Health, WHO; Hamer – European Space Agency life sciences committee. Burns – Co-Chair, African HIV Research Forum; Pikhart – International Commission on Occupational Health committee on cardiology

Election to membership or fellowship of learned societies during census period:
Dame Commander of the Order of the British Empire – Johnson; British Academy – Wardle; Academy of Medical Sciences – Costello, Hart, Newell, Phillips, Steptoe, Wardle; Academia Europaea - Kivimäki, Singh-Manoux; NIHR Senior Investigators: Hart, Johnson, Law; Royal College of General Practitioners – Murray; Royal College of Physicians – Mindell; Royal Society of Public Health – Ishola; Faculty of Public Health – Hayward, Ishola, Pashayan; Society of Biology – Ford, Hayward, Miller.

Leadership roles
Marmot - President of the British Medical Association (2011-2012); Johnson – Governor of the Wellcome Trust; Hart – Chair, DH Policy Research Programme Board, and of the Wellcome Trust Africa Centre Scientific Advisory Board; Law – Chair, NICE Public Health Intervention Advisory Committee; Programme Director and Chair of Boards, NIHR Public Health Research Programme; Hart – Chair, NIHR Programme Grants for Applied Health Research sub-panel; Chair, International Scientific Advisory Board, Africa Centre for Health & Population Studies, Kwa-Zulu Natal; Chaturvedi - British Heart Foundation Trustee and Council member; Williams – Chair, British HIV Association; Parmar – Associate Director, National Cancer Research Network; Raine – Chair, UK Heads of Academic Departments of Public Health; Chair of UKCRN NIHR Health Services Research (HSR) Speciality Group. Kuh – Chair, Society for Social Medicine; Wardle – Chair, Working Group on Communication, International Agency for Research on Cancer.

Conference activities
More than 50 UCL staff have chaired conference programmes, helped organise, or have been involved in scientific programme committees during this period for various national and international organisations in countries such as Botswana, Brazil, Canada, China, Croatia, Cyprus, Finland, Hungary, India, Japan, Mexico, the Netherlands, Sweden, Spain, Turkey, and the USA. Around 40% of staff included in this return have given keynotes at conferences in 32 countries.

Examination of doctorates
More than 70 UCL staff have been examiners of PhDs in Universities in the UK and in more than 15 other countries.