Institution: King's College London

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

A. Overview

Unit of Assessment 2 (UoA2) at King's College London comprises the Division of Health and Social Care Research and the Medical Research Council-Public Health England (MRC-PHE) Centre for Environment and Health. We represent a highly productive body of some 26 principal researchers, who have brought in over £34 million of research income since 2008, with nearly £1.5 million in research income per full-time investigator. We are based in South London in an urban environment, with significant social and material deprivation, and an ethnically diverse population. This urban context provides an important motivation for our research strategy. Locally determined priorities are also important global health problems, including atmospheric pollution, haemoglobin disorders, stroke, diabetes and other long-term conditions. King's UoA2 research has addressed these priorities, focusing strategically on two main aspects of the translational research pathway: early translation, the use of population sciences to promote the movement of research from bench to bedside; and later translation, the development and application of research for the benefit of communities, locally, nationally and internationally.

King's College London is a multi-faculty research-led institution, one of the *top 20* universities in the World. King's was *The Sunday Times* 'University of the Year' in 2010/11. King's is ranked in the top seven UK universities for research earnings and has an overall annual income of £524 million. It has more than 24,500 students, of whom some 10,000 are postgraduates, with more than 6,100 employees. King's is a member of the Russell Group, a coalition of the UK's top research-based universities; it is a partner in the *Francis Crick Institute*, a world-leading scientific research institution in central London focusing on understanding the underlying causes of health and disease and accelerating discoveries from the laboratory into the clinic. King's is home to three *National Institute for Health Research (NIHR) Biomedical Research Centres/Units* attracting a total of £113 million over 5 years. As a *multi-faculty university*, King's brings to the applied health research agenda a wide breadth of academic disciplines across the Schools of Social Sciences and Public Policy, Medicine, Nursing, Dentistry and Psychiatry. King's UoA2 provides an important link between biomedical researchers in the Schools of Medicine and Biomedical Sciences (in relation to early translational research), and researchers in social sciences and the humanities in the wider College (in relation to health services and public health research).

King's is the academic and research partner, with local NHS Trusts, in *King's Health Partners,* one of five *Academic Health Sciences Centres* accredited by the Department of Health in England. King's Health Partners aims to facilitate the rapid transfer of new knowledge towards clinical practice, service delivery and health policy. The Academic Health Sciences Centre at King's has identified four 'grand research challenges', two of which, public health and informatics, are directly led and supported by King's UoA2, while a supporting contribution is made to a third in stratified medicine.

Within King's, the Division of Health and Social Care Research and the MRC-PHE Centre for Environment and Health work closely together. The *Division of Health and Social Care Research* is one of the most productive research and teaching Divisions within the School of Medicine. The Division comprises a multi-disciplinary team of researchers who are committed to developing the translational and applied research agenda, both at King's and through local, national and international collaboration. The *MRC-PHE Centre for Environment and Health* was established in 2009, in partnership with Imperial College London. The award of the Centre recognises the excellence of environmental research at King's and acknowledges the need for the UK to improve understanding of environmental influences on health. The MRC-PHE Centre has considerable research expertise, including monitoring networks, dispersion modelling, toxicology, environmental epidemiology and air quality policy.

B. Research strategy

We aim to improve public and environmental health, and the organisation and delivery of primary care, through translational research. Our approach to research emphasises methodological rigour and multi-disciplinary working. We facilitate early translation through our leadership role in the Population Science Cluster of the NIHR Biomedical Research Centre at Guy's and St Thomas'

Hospital Foundation Trust (GSTT). We have strengths in later stage translational research through community and population-based research. Our research strategy is informed by active programmes of patient involvement and community engagement. During the assessment period, we have responded to national and international priorities in translational research, research design, stroke services, electronic health records research, rapid trials, obesity and surgical services among others.

Methodological skills and translational research
King's is committed to developing and maintaining a *highly multidisciplinary team of researchers* with methodological skills in epidemiology, environmental exposure measurement, statistics, health informatics, sociology, anthropology, health psychology and health economics. Most research is implemented by teams with multi-disciplinary methodological expertise, with academic staff working flexibly across research groupings with special interests. King's deploys these methodological skills to promote translational research through leadership of the *Population Science Cluster*, one of three research clusters, of the *NIHR Comprehensive Biomedical Research Centre (BRC) at Guy's and St Thomas'.* The *Population Sciences Cluster* provides interdisciplinary methodological skills in population and social sciences, as well as subject-specific expertise in environmental health, diabetes, cancer, transplantation, infection and stroke. These contribute to optimising the focus, effectiveness and impact of translational research in the BRC. Our *Statistics Group* is actively engaged in the linkage of bench-to-bedside research in the Biomedical Research Centre clusters, providing statistical leadership on six NIHR Efficacy and Mechanism Evaluation grants awarded since September 2011 (£7.6 million); leading and overseeing the statistical work on multiple early phase trials, often with adaptive trial designs, in biomarkers or experimental medicines with funding from MRC, charities and commercial sources. The Statistics Group also engages in methodological research in outcomes modelling, trials, meta-analysis and adverse events detection, subjects which are directly relevant to our translational research agenda. Social scientists from the Population Cluster have used the BRC as a platform to develop research into the *social science of translational research* including the understanding meaning of 'translation'; investigating how the translational pipeline can be made more efficient; and evaluating how the BRC can engage and access populations more effectively.

Digital Infrastructure and Electronic Health Records Research
Research informatics, and epidemiological research using electronic health records, represent a major focus of research in the Population Cluster. Our current research is active in linking and analysing large datasets from electronic records, as well as developing their application to clinical and community trials. We lead a large European Union FP7 Integrated project (*TRANSFoRm*, Delaney), that includes Imperial College, University of Dundee and CPRD (Clinical Practice Research Datalink) amongst its 21 partners. TRANSFoRm is developing an informatics infrastructure for phenotype-genotype studies, randomised controlled trials and diagnostic decision support, all built into primary care electronic health record systems. We have significant in-house developments in mental health (CRIS) and oncology (ORIS) electronic health records, with the establishment of data integration, archiving, search and retrieval tools for both structured/coded data and text. King's has been successful in an award of £3m from the Technology Strategy Board and industry partners to develop ORIS with University of Manchester, IDBS (the ORIS developer), Quantix (the hardware host).

Our group is using electronic health records to develop stratified medicine applications. King's is maximising its strengths in key areas of biomarker development including genomics, imaging and proteomics. Through the Population Cluster of the BRC, our research is exploring the potential population impacts of stratified medicine interventions. The primary area of focus is on drug safety (Molokhia) including development and evaluation of methods for adverse drug reaction signal detection and causality assessment using population based electronic health records. Molokhia is the PI for *EUDRAGENE* and collaborator for FP7 European Union projects concerning drug safety (*EU-ADR* and *ARITMO*). With support from the British Heart Foundation, we are evaluating novel approaches to stroke prevention based on genetic markers (Wolfe, Gulliford, Markus).

We are developing the use of electronic health records in intervention studies with support from the

Wellcome Trust and Research Councils' Joint Initiative in Electronic Patient Records and Databases in Research. We led the successful implementation of the first *cluster randomised trial* to be conducted exclusively using electronic health records in the Clinical Practice Research Datalink (CPRD), with more than 600,000 participants randomised (Gulliford). We are also working with CPRD to implement individually randomised *pragmatic trials* using electronic health records (Delaney, Gulliford). King's attracted funding for a further EHR-based trial of enhanced invitation methods from the NIHR Health Technology Assessment Programme (Gulliford). The group is developing the use of CPRD data in health economic modelling through projects supported by the National Prevention Research Initiative and the NIHR Health Services and Delivery Programme (Gulliford). We are also developing data linkages that will facilitate environmental health research.

Air quality research

King's leads a programme of research to understand the *impact of atmospheric pollution on health* and to evaluate intervention measures (Kelly). King's *London Air Quality Network*, Europe's largest and most sophisticated regional monitoring network, comprises over 120 monitoring sites across the city, providing a key resource for this research. Measurements from the network are used to analyse the sources of atmospheric pollution and to estimate the health implications of individual pollutants. These data are also key to investigating the impacts of policies to improve air quality, such as the London Low Emission Zone. Road traffic emissions represent a major contributor to poor air quality in urban areas and, depending on location, large spatio-temporal gradients in concentration can occur. In a successful multi-university research bid under the MRC/NERC/DH funded Environment & Health program (Kelly), we are investigating how vehicle pollution affects health. We are also investigating the impact of air pollution on the respiratory health of children, working with *25 schools in East London*. A primary and on-going objective of this research is to provide scientifically-based policy support for the Greater London Authority, the UK Government and the World Health Organisation. The team have also played a leading role in a national air quality measurement project (NERC-ClearFlo) by providing enhanced in-vitro measurements of air quality toxicity and are partners in the new London NERC Doctoral Training Partnership. To help improve public understanding of the health risks associated with air pollution we have developed effective data dissemination systems. The *London Air Quality Network website* received awards in 2009 and 2011 reflecting its innovative dissemination systems such as King's mobile web site and smartphone apps, which enabled the distribution of 400,000 pollution notifications during the Easter 2011 pollution episode. Building upon their expertise in Environmental Health, King's (Kelly & Phillips) have reached Stage 2 of the NIHR Health Protection Research Unit competition. They are bidding for the Unit "Health Impact of Environmental Hazards" jointly with Imperial, which is the only University to also reach Stage 2 for this Unit. Our research has had a substantial impact in London through the Mayor's air quality strategy, the London Congestion Charging scheme and the London Low Emission Zone. These intervention measures to improve air quality are now being evaluated and applied internationally.

Public health and community engagement

A major challenge for King's is to engage with and improve the health of its local populations, particularly in local, deprived, urban communities. Within King's Academic Health Sciences Centre, we lead on developing a Strategy for Public Health. Working in collaboration with the Directors of Public Health of the three inner London boroughs, we have established a *Public Health Collaborative* that will focus on urban public health (Littlejohns, Wolfe, Gulliford, McKevitt, Prevost). The Collaborative aims to explore health problems in local communities to identify health needs, understand their determinants, develop and test interventions and implement these, all in the context of a local community with very significant health disparities and needs. Funding has been obtained to develop this initiative. By making a difference locally, we aim to influence policy and practice nationally and internationally. Our research has informed national policy, service delivery and clinical practice in the areas of stroke, long-term conditions, haemoglobin disorders, air quality, health inequalities, medical diagnosis and clinical research informatics, as outlined in our submission on Research Impact.

We engage with and involve patients and carers in King's UoA2 research. The King's *Stroke Research Patients and Family Group* was established in 2005 (McKevitt). This brings together

stroke researchers from King's College London and people who have had a stroke and their family members. We collaborate with the voluntary sector organisations. This has identified novel research questions (e.g. patient reported unmet needs); new methods of third sector service delivery (e.g. peer-support for long-term stroke); or collaborative development and dissemination of lay versions of guidelines, audits and research results.The Unit's social scientists are developing methods and evaluating ways of engaging with local people in health systems, clinical research and implementation (McKevitt). Funding for this research has come from the Stanley Thomas Johnson Foundation, the European Union and the NIHR Biomedical Research Centre at Guy's and St Thomas' NHS Foundation Trust and King's College London.

South London Stroke Register

Stroke research is a key exemplar of how locally based research can have significant international impact. The *Stroke Research Team* is a multidisciplinary group drawing on expertise from a range of research and health-related disciplines including epidemiologists, stroke physicians, general practitioners, social scientists, statisticians and health economists. In the assessment period, the group has secured grants worth £6.5million, including an NIHR Programme Grant and an EU Framework 7 Programme grant, published 70 papers and had 9 PhDs awarded. Central to our internationally recognised stroke programme is the *South London Stroke Register*. The South London Stroke Register is an on-going, prospective, population-based stroke register set up in January 1995. It is the longest-running, population-based stroke register in the world. It records all first-ever strokes in patients of all ages living in inner city South London. During the assessment period, we have co-ordinated a programme of *EU-funded research* that has enabled reporting of pan-European comparative data for *stroke incidence*, as well as developing internationally standardised measures of *stroke care* and *stroke outcomes*. We have reported on *trends in stroke incidence* since 1995, with a focus on ethnic variations in risk. Our research showed that stroke risk and stroke sub-types vary substantially between ethnic groups, with a large proportion of strokes observed in people with *untreated risk factors*, with no improvement in risk detection observed over time; between 20% and 30% of survivors have a poor range of *functional outcomes* up to ten years after stroke; over half of all stroke patients have *depression*; stroke has a substantial long-term impact through *cognitive impairment*. Our research showed that stroke unit care, followed by early supported discharge, is an effective and *cost-effective strategy* with important gains in years of life saved. Over the next five years, we aim to integrate the South London Stroke Register with primary and secondary care electronic health records, as well as research data resources including the London air quality database. We aim to create a virtual patient record with tools that define standards of care, prescribing and alerts for clinical management; develop, test and implement novel system-wide approaches to identifying, targeting and managing people with stroke who have multiple morbidities and stroke.

Dissemination and Implementation

We promote active dissemination of research findings to academic audiences through scientific meetings and peer-review publications and to wider public audiences through interactions with new media, facilitated by King's Press Office. We also encourage engagement with stakeholders, and users of research, in order to promote implementation as detailed in our submission on Research Impact. We have contributed at the national level, for example, through leadership of *national stroke guidelines*, chairmanship of the Department of Health *Committee on the Medical Effects of Air Pollution*, and at the international level through the World Health Organisation *guidelines on air quality*. We are promote innovation locally through leadership and partnership working within the Academic Health Sciences Centre and associated Network.

C. People, including: i) Staffing strategy and staff development

The Unit of Assessment comprises approximately 26 (23.5 fte) academic staff, including 11 professors, two readers, five senior lecturers and four lecturers, and approximately 110 research, scientific and administrative staff. King's promotes the *Principles of the Concordat to Support the Career Development of Researchers* through an *implementation action plan*; King's commitment has been recognised through an *HR Excellence in Research Award from the European Commission.* During the review period new members of research staff were recruited in primary care, epidemiology, health economics, psychology and decision making and informatics. A strategic investment in six new academic staff has been made in Medical Statistics. As part of

King's commitment to growth in its environment and health research, four new academic appointments were also made in the MRC Centre. New appointments are in process including Senior Lecturer Posts in General Practice, a Chair and Senior Lecturer posts in Public Health and a Chair in Medical Sociology.

All King's academic, research and administrative staff benefit from the King's-wide staff development programme, with annual *performance and development reviews* that play an important role in individual career development. We regard this as particularly important for *Early Career Researchers*, who have regular access to a mentor for wider personal and professional development purposes. Researchers are encouraged to apply for research grants from diverse sources. Most studies are developed and implemented by *multi-disciplinary teams*; both internal and external collaborations are encouraged. All submissions are constructively *peer-reviewed* with additional advice provided through the *Research Design Service for London.* We encourage staff, at all stages of their career, to develop their knowledge and skills, and gain increasing breadth and depth of experience. King's organises an extensive programme of professional development activities and participation in external courses and conferences is encouraged. All members of staff have access to research training courses and to the wider *King's Organisational & Staff Development Programme.* This Programme offers a wide range of opportunities including Leadership and Management, a full *Graduate Researcher Development Programme*, language and information technology courses. The *Researcher Development Unit* (RDU) in the Graduate School has responsibility for the provision of central training and development for post-doctoral research staff, postgraduate research students and PhD supervisors. Within King's, we hold weekly staff development activities, with seminars, meetings and workshops. These include Seminar Programmes and regular meetings of special interest groups in stroke research, informatics and statistics. Our *Masters' programme*, the largest in the School of Medicine, provides top-up training for research staff. All researchers are encouraged to attend training courses and present at national and international conferences.

Currently, the Unit has 11 *clinical research staff*. Clinical academics are equal members, with NHS-employed clinical researchers, of the *Clinical Academic Group* (CAG) in Medicine at King's Academic Health Sciences Centre. This facilitates professional development and appraisal leading to revalidation. We collaborate with the London Deanery and Local Education and Training Boards to deliver postgraduate medical training in public health and primary care. We host Academic Clinical Fellows in public health and primary care with support from the NIHR Integrated Academic Training (IAT) programme. Senior members of staff provide clinical research supervision, as well as fulfilling educational supervisor roles.

King's promotes *equality and diversity* in all aspects of recruitment and career management of researchers. We follow key principles of promoting equality of opportunity in all areas of work; developing the diversity of skills and talent within our community; ensuring that all present and prospective members of staff are treated solely on the basis of merit, ability and potential without any discrimination related to age, disability, gender, marital status, pregnancy, maternity, race, religion, sexual orientation; providing and promoting a positive working, learning, and social environment free from prejudice, discrimination, harassment, bullying or victimisation; and promoting good relations between individuals from different groups. These principles are followed in all areas of work including recruitment, grading of posts, promotions, appointments to positions of responsibility. Recruitment and other panels are chosen to reflect diversity in experience and expertise. King's provides a wide range of strategic programmes and networks across the College to promote equality of opportunity and achievement. These include the *Women's Network*, the *Lesbian Gay Bisexual and Transgender (LGBT) Network*, the *B-MEntor* scheme for Black and Minority Ethnic group staff, *Peer Group Mentoring for Women Researchers*, *Springboard Women's Development Programme* for Research staff, and the *Career Break Fund* for academic staff returning from a career break (for maternity, paternity or adoption leave). The career progression and retention of *female scientists and researchers* and the adoption of Athena Swan principles are a particular priority that we are proactively promoting through a series of measures. These start at the time of recruitment where we ensure that interview panels have appropriate female membership. Each researcher is assigned an individual mentor who meets regularly with them,

provides independent career guidance, is a point of contact for other personal development issues, and encourages them to take responsibility for their own careers. There is a significant emphasis on a family-friendly work environment. We believe that visible female role models are very important in inspiring and guiding younger female researchers. Within the School of Medicine, both the Head of School and the Research Dean are women; within the unit of assessment two professors, one reader and two senior lecturers are women.

ii. Research students: Our graduate research students are part of a thriving academic environment with local national and international links. Research students are funded from a wide range of sources including DTA Research Council awards (MRC, ESRC, NERC); UK charities (Wellcome Trust, Dunhill Medical Trust etc); international charities (Stanley Thomas Johnson Foundation); the European Union; NIHR programme grant awards and the NIHR Biomedical Research Centre at Guy's and St Thomas'; overseas funding agencies (Governments of Saudi Arabia, Malaysia and Greece; the Crown Prince International Scholarship Programme of Bahrain); and industry (Glaxo Smith Kline). We had 26 students completing their research degree during the assessment period, with 23 students in progress in 2013. Our results are consistent with the four-year submission rate of 95% for the School of Medicine. Scores in the Postgraduate Research Experience Survey indicated overall 88% satisfaction score in 2011 up 4.4 percentage points from 2008.

Personal, professional and career development is embedded in the *PhD programme*. Academic supervision is provided by two supervisors. Joint supervision involving staff with different disciplinary bases is promoted wherever appropriate. This enables students to draw on complementary perspectives and reinforces multidisciplinary links. Students participate our monthly *PhD Writing Seminar* and *PhD Student Seminar* programme. Within the Unit of Assessment, and in Research Centres across the College, there are a number of seminar series in which graduate student participation is encouraged. Graduate research student progress and well-being is overseen by a *Divisional Research Student Coordinator.* In the MRC-PHE centre, research students are provided with bespoke training by the *Training Programme Committee* (TPC), comprising young lecturers from different disciplines across the Centre. All student projects are matched to the MRC Strategic Skill Priorities, particularly in the areas of Population Health Sciences and Public Health, Toxicology, and Systems Medicine. We run a *Centre Researchers' Society* as a forum for *early career researchers* to meet, organize and participate in Centre-oriented events.

We provide leadership (McKevitt) for the *Health Practices and Understandings* theme of the *King's Interdisciplinary Social Sciences Doctoral Training Centre* (KISS-DTC). Funded by the Economic and Social Research Council as part of its national network of doctoral training centres, the KISS-DTC is based in the Graduate School and provides studentships, training, and other support for doctoral research in the social sciences at King's. The DTC is organized around 15 cross-cutting research themes in the broad domains of health, regulation and public services, social change, and security. Drawing together the very considerable methodological expertise distributed across the College, KISS has developed an extensive programme of advanced methods short courses and reading groups open to all graduate research students in the College. The DTC offers a number of Summer School courses providing advanced methods training.

King's Graduate School, established in 2005, provides an innovative Graduate Skills Development Programme and additional funding is available to support the acquisition of transferable skills for postgraduate students and early stage researchers. Students have access to a very wide range of training provided by the *King's Researcher Development Programme*. King's ensures that there is compulsory training for new supervisors delivered by the Graduate School. King's Graduate School also offers continuing development programmes for supervisors. There is a cross-School Supervisory Excellence Award to identify and reward excellent supervision, with the award based on completion rates, career outcomes, student nominations, a reflective personal statement and evidence of activities designed to support excellent career outcomes for their students.

d. Income, infrastructure and facilities

Research income: King's UoA2 has attracted more than £34 million in research income during the assessment period. The average annual research income of the Unit has increased from £5.2 million in 2008/9 to £8.0 million in 2012/13. The major source of income for the unit is from UK government and NIHR (72% approximately), followed by Charities (10%), Research Councils (7%), European Union (6%), Industry (4%) and other sources (1%). An increase in research income has been observed across all sources of income. NIHR funding has been particularly significant in strengthening the methodological basis for applied research both within King's, across King's Health Partners (Guy's and St Thomas' NIHR BRC), and in London (NIHR Research Design Service London). This has enabled us to provide increased methodological support for translational and applied research at King's and across the wider health research community as outlined below. The NIHR Biomedical Research Centre supports one senior lecturer, three lecturers and four research fellows; NIHR support to RDS London, directed by Wolfe, supports a multidisciplinary team of research advisers. We have also been awarded research funds from NIHR Programme Grants for Applied Research to Wolfe; NIHR Efficacy and Mechanism Evaluation (Peacock, Prevost, Douiri, Wang); the NIHR Health Technology Assessment (Peacock, Gulliford); the NIHR HS&DR programme (Wolfe, Gulliford); NIHR Research for Patient Benefit awards (McKevitt).

Research infrastructure and facilities: During the assessment period, we have worked to develop the methodology infrastructure for applied health research in South London. We led the *Primary Care Research Network Hub for Greater London* (Delaney), co-located with the Guy's and St Thomas' NIHR Biomedical Research Centre. King's also leads (Wolfe) the *NIHR Research Design Service (RDS) for London* with a budget for 2008-13 of £5.5 million. RDS London is a collaborative effort between King's, Imperial, University College and Queen Mary College London, providing methodological advice and expertise to inform research grant applications across London. During the period 2008-2013, RDS London responded to 1,736 requests for support, resulting in 580 submissions and 188 successful applications, leading to the award of £100 million of research funding. King's (Kelly) contributes to leadership of the *MRC-NIHR Phenome Centre* that is delivering broad access to a world-class capability in metabolic phenotyping. Developed from testing facilities established for London 2012**,** the analytical capability of the new Centre will benefit the whole UK translational medicine community. *King's Statistics Group* (Peacock, Prevost) leads on consultancy and training within the *NIHR Biomedical Research Centre,* as well as leading on 'non-mental health' statistics for the *King's Clinical Trials Unit*. The Statistics Group engages in the national statistics agenda, establishing and leading the *NIHR Statistics Group* which is providing a forum for sharing and developing excellent practice in translational research nationwide (Peacock). We are partners in the *South London Collaboration for Leadership in Applied Health Research and Care (*CLAHRC), newly awarded in 2013, in which we lead themes in public health, stroke and multi-morbidity, as well as providing the Deputy Director (Littlejohns).

As a leading Russell-group university, King's offers excellent infrastructure and support services for research including high quality library and information technology provision with physical libraries on all six campuses and web access to a large collection of electronic journals, books and other e-resources both on and off campus. The *library collections* are extensive and include over 1.25 million books, thousands of electronic journals, over 280,000 ebooks, over 600 databases and other online resources. Researchers in the Unit of Assessment are supported by a dedicated administrative team, as well as by the King's Research Grants and Contracts Office and Human Resources Department. The *King's Commercialisation Institute* supports the commercialisation of research assets associated with intellectual property generated by researchers within King's.

King's has standard *research governance* procedures to ensure that all sponsored research has necessary arrangements in place to safeguard the ethical and scientific integrity of research at King's; to protect participants in research and research staff; and to ensure adherence to information governance regulations. King's promotes the code of practice developed by the UK Research Integrity Office. The Unit of Assessment works closely with the NHS Research and Development offices in South London. Wolfe has been Director of Research and Development for Guy's and St Thomas' Foundation NHS Trust throughout the assessment period. This has enabled

to Unit to develop close working links with NHS R&D colleagues in order to address research governance and funding issues at the service interface.

E. Collaboration or contribution to the discipline or research base.

During the assessment period, King's UoA2 researchers made numerous contributions to scientific citizenship, developing and leading their scientific disciplines and fields of research. Examples include: ***Leadership of research funding programmes*** Armstrong: National Director, Research for Patient Benefit, RfPB (2009-); Chair, MRC Health Services and Public Health Research Board (2003-08); Member of Council, MRC (2003-08); Deputy Chair, NIHR Methodology Panel (2007-08); Chair, Cross Research Council Lifelong Health and Ageing Initiative (2007-); Chair, Great Ormond Street Hospital Charity's Research Advisory Panel (2010-); Vice-Chair, ESRC/MRC Birth Cohort Study Governing Board (2011-). Wolfe: Chair RfPB London (2006-11); Chair, Northern Ireland Chest Heart and Stroke Association (1998-13); Chair Irish Health Services Research Board (2010-). ***Membership of research funding Boards and Panels*** Gulliford, member MRC Methodology Research Panel and Advisory Group (2011-); Irish Health Research Board, population panel (2013). Kelly: MRC Molecular and Cellular Medicine Research Board (2009-14); MRC Cross Panel Cohort Advisory Group (2011-14). McKevitt, member Stroke Association Research Awards Committee (2009-12). Peacock, NIHR Clinician Scientist Panel (2010-); Wolfe, member medical board Stanley Thomas Johnson Foundation (2002-13). ***Editorial roles in scientific journals and textbooks,*** Delaney, Editor, Family Practice (2004-10); Flohr, Associate Editor, Journal of Investigative Dermatology; Gulliford, Co-Editor, Oxford Textbook of Public Health fifth (2009) and sixth (2014) editions; McKevitt, Applied Anthropology editorial board (2007-); Stroke Research and Treatment editorial board (2012-); Peacock, Statistics Editor BMJ (2010-); Wolfe, Stroke editorial board (2006-12); Chen, Editorial Board, Journal of Disease Prevention and Control China (2007-), Associate Editor, BMC Public Health (2011-). ***Scientific bodies:*** Peacock, member of Council of Royal Statistical Society (2005-9); Wolfe, NIHR Senior Investigator (2008-). ***Organising scientific meetings,*** Delaney: Co-chair, Annual Scientific Meeting Society for Medical Decision Making, 2009. ***Research Fellowships,*** were awarded from the MRC (Schofield), Stroke Association (Sadler); Flohr was the first UK dermatologist ever awarded a NIHR Clinician Scientist Fellowship (2009-14), he has now been awarded the first NIHR Clinical Trials Fellowship in Dermatology. ***Research oversight groups****,* Flohr, chairs the Data Monitoring Committee of the British Association of Dermatologists national Biologics Registry (BADBIR). We have ***extensive collaborations*** within the UK with *Imperial College* (MRC-PHE Centre, RDS London), *University College London* (stroke research, RDS), *London School of Economics* (health economics research), *Queen Mary's* (air quality and health, RDS), *St George's University of London* (stroke research), *CPRD/MHRA* (CPRD research, intervention studies), *University of Cambridge* (stroke research), *University of Southampton* (electronic health records research). ***International collaborations*** include *Delaney*: Scientific Director and Co-ordinator for TRANSFoRm project with 21 partners; *Peacock:* Vising Professor Dartmouth College US (2007-). *Wolfe*: Lead EU FP7 European Implementation Score; 7 countries and 11 national stroke registers 2009-12; *Chen*: long-term collaboration with Anhui Medical University in China as visiting professor, further collaboration with five Chinese universities (Shanghai, Guangzhou, Harbin, Hubei, Xinjiang) on a large-scale population-based study of dementia and other long-term conditions in older adults. We also engage in activities that contribute to public policy, public understanding and implementation leading to societal impacts from our research as outlined in our submission on Research Impact. Examples include: ***Expert scientific advice*** National Institute for Health and Care Excellence (NICE) Medical Technology Assessment Centre: King's Imaging Technology Evaluation Centre (2012-) (Wolfe, Peacock); Prevost, member NICE Public Health Interventions Advisory Committee. Gulliford, MHRA Independent Scientific Advisory Committee for Database Research (2006-). ***National and international scientific panels*** including: the UN Economic Commission for Europe Convention on Long Range Trans-boundary Air Pollution (Williams, 2008-15), the Department of Health expert advisory Committee on the Medical Effects of Air Pollutants (COMEAP) (Chair, Kelly 2012-15; member, Anderson, 2006-14) and the Department for Food Environment and Rural Affairs Air Quality Expert Group (AQEG) (Williams). ***Authorship of Government reports*** on short term climate forcing (Williams), emissions inventory and dispersion model development (Beevers), and research into exposure science (Kelly).