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| Institution: University of Liverpool |
| Unit of Assessment: 2 - Public Health, Health Services and Primary Care |
| <p>a. Overview</p> <p>A new Faculty of Health and Life Sciences (FHLS) was formed in 2009, bringing all biomedical and clinical research and teaching activities under one structure. The subsequent Faculty restructuring (2010) has broken down traditional disciplinary boundaries aligning staff based on related research interests and allowing co-location and integration of both basic and clinical researchers in each of our five Research Institutes.</p> <p>The two institutes contributing to this UoA2 submission are:</p> <ul style="list-style-type: none"> • The Institute of Psychology, Health and Society (IPHS) <p>With new external income since 2008 of £35M, 20 professors and 30 full-time academic non-professorial staff, IPHS supports three multi-disciplinary research groups: i) social determinants and health inequalities; ii) systematic reviews of healthcare effectiveness, and iii) mental and behavioural health sciences group. (<i>Psychological research within the IPHS is returned in UoA4</i>).</p> <ul style="list-style-type: none"> • Institute of Translational Medicine (ITM) <p>The largest institute, with 50 professors and 233 academic-related research staff and securing £117M of research income since 2008. Three research groups within ITM are being returned with UoA2 focused on health services research: i) Women's and children's health; ii) epilepsy; and iii) trials methodology research.</p> |
| <p>b. Research strategy</p> <p>Strategic planning is led by the Faculty of Health & Life Sciences with detailed planning at Institute level aiming to:</p> <ul style="list-style-type: none"> • Identify and support areas of international excellence • Align basic and clinical researchers within our structures • Develop local and wider partnerships • Invest in externally recognised centres to ensure their vitality and growth • Expand research in emerging areas to develop them into new externally funded centres • Retain high quality researchers and recruit internationally-recognised researchers to posts in identified areas of excellence • Provide a supportive environment for PGR students and for the development of early career researchers <p>Examples of how these aims have been applied for each of the 6 key research areas outlined in section a are given below. This focus ensures that we maintain critical mass and continue to achieve impact within inter-disciplinary and international collaborations. Our objectives include growing research income from NIHR, MRC & EU, maximising representation on national & international policy committees, targeted support for our rising stars and recruitment of new research staff to build on our strengths. Our success is indicated by a doubling of new external awards in the period compared to RAE2008.</p> <p>INSTITUTE OF PSYCHOLOGY, HEALTH AND SOCIETY (IPHS)</p> <ul style="list-style-type: none"> ➤ Social determinants and health inequalities: (New search awards since 2008: £7.3M) <p>This group is led by <i>Whitehead, Capewell & Bruce</i>. Our research strategy is focused on: understanding pathways to inequalities in health; evaluating policies and complex interventions to tackle the wider social determinants of health; and identifying, assessing and improving effective prevention policies and treatment services. Since 2005, this research group has been designated as a WHO Collaborating Centre for Policy Research on Social Determinants of Health.</p> <p><u>Main achievements against strategy in the REF period</u></p> <ul style="list-style-type: none"> • Pathways to inequalities: Our longitudinal UK studies of children with cystic fibrosis found that <u>social deprivation is associated with worse growth and lung function</u>, but happily discovered a pro-poor treatment bias (Taylor-Robinson #1). We have identified the <u>differential socioeconomic consequences of having epilepsy</u>, the experiences of stigma and discrimination in different cultures, and the processes underpinning resilience in the face of epilepsy (Jacoby #1, #2). Our studies of the <u>health impact of government responses to recession</u> demonstrated 1000 excess UK suicides since the 2008 recession, with 40% attributed to rising unemployment (Barr #1). • Intervention studies: Our household energy risk-assessments led to innovative research on the |

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health co-benefits of climate change mitigation (Bruce #3). Our exposure and risk estimates on household air pollution for the 2010 *Global Burden of Disease project*, are significantly impacting on public health and health system policy & planning at UK and international levels (Bruce #2). The first ever randomised study on decreasing household air pollution with improved cook stoves (RESPIRE) showed substantially reduced severe pneumonia and burns in young Guatemalan children, exposure-response relationships providing important evidence for WHO Guidelines and new international standards for household energy technologies (Bruce #1).

A series of systematic reviews examined the effects of different types of return-to-work policies for disabled people, questioned assumptions about the incentive effects on employment of reducing disability benefit levels and eligibility (Barr, *J Epidemiol Community Health*. 2010, 64:1106-14), found mixed results for government initiatives aimed at changing employers behaviour; and strengthening the skills of potential employees (Whitehead, *Eur J Public Health* 2012, 22:434-9; *BMC Public Health* 2011, 11:170).

• **Assessing prevention policies:** Our research has demonstrated that population-wide prevention policies on cardiovascular disease can be powerful, rapid, equitable and cost- saving (Capewell #3; O'Flaherty #2). This led directly into NICE Guidance (PH25). Innovative policy modelling work has helped explain trends in cardiovascular mortality in the USA, Europe & Asia, informing UK and international policies & strategies (Capewell #1, #2). We published the first studies to warn about the recent plateauing of previously falling CHD mortality rates in young people in the USA, UK, and beyond (O'Flaherty #3). Innovative analyses of health-care, survival, and patients' perspectives have informed cardiovascular strategies in the UK and beyond (Capewell, *Circulation* 2009, 120:1181-8; *Palliat Med*. 2008, 22:744-9).

➤ **Systematic reviews of healthcare effectiveness & cost-effectiveness (£12.3M awards)**

The well-established Liverpool Reviews and Implementation Group (LRiG) led by *Dickson, Bagust & Walley* conducts research which directly impacts on national health policy directions through clinical and economic evaluations commissioned by NICE, National Cancer Equality Initiative and HTA Programmes. Results thus directly inform policy decisions in NICE and HTA Programmes.

Main achievements against strategy in the REF period

• **NICE Appraisal programme:** A well-developed research portfolio in the area of lung cancer has led to NICE guidance for first- and second- line treatment as well as maintenance treatment for these patients. (Bagust #3; Dickson #4).

• **HTA:** Two recent extensive reviews on prevention of violent behaviour and the assessment of risk of violence are being used to develop implementation programmes (Whittington #4).

➤ **Mental and Behavioural Health Science (£2.7M awards)**

Dowrick, Gabbay et al investigate the family, social, cultural and psychological processes underpinning mental ill-health and patient-practitioner interactions from infancy to old age.

Main achievements against strategy in the REF period

• We demonstrated that the offer of antidepressant medication is effective and cost effective for patients with mild to moderate depression in primary care, and identified key factors predictive of sustained recovery (Dowrick #2; Gabbay #3).

• We discovered inconsistent performance using depression severity measures in routine clinical practice that may threaten the doctor-patient relationship and found that nurse-led self help is of limited benefit for primary care patients with chronic fatigue (Dowrick #1)

• Our team found major discrepancies between GPs' and patients' in views on depression and demonstrated how these impact on effective management (Dowrick #3, #4)

• The development of brief screening tool (BEDS) by *Lloyd-Williams & Dowrick* has been recommended as optimum screening tool for depression in advanced cancer by the Scottish Office.

Future Strategic Plans

• North West Coast **CLAHRC** (*Gabbay et al* 2013-18) has secured £9M NIHR funding to lead a collaboration including 3 Universities, 20 trusts & Commissioning Groups and 7 local authorities contributing an additional £12M matched funding, and supported by the NWC Evidence Synthesis Collaboration incorporating 12 externally funded evidence review units (*Dickson &*

Walley). With two overarching themes: Health Inequalities & Evidence Synthesis, our strategy is to identify innovative approaches to public health and managing complex care, with comprehensive stakeholder engagement in all projects (health, local government, patient, community and industry) and novel approaches to evidence synthesis and implementation. This major, multidisciplinary programme of patient-focussed applied health and translational research will strengthen the integration of researchers within all six UoA2 research groups linking them with research users from 30 partner organisations within North West Coast.

- *Whitehead, Capewell & Bruce* will extend the evidence base on actions to reduce inequalities in health and health care. NIHR SPHR funding of £2.5m for LiLaC (Liverpool & Lancaster Universities Collaboration for Public Health Research, 2012-2017) will support applied public health research on health inequalities of use to public health practitioners in LAs across England.
- Substantial MRC/NIHR funding for HeRC collaboration with Manchester, Lancaster & York, 2013-2018, (Total £4.9m) to build capacity in health informatics applied to public health research;
- £3m NIH & BHF funding (2013-2018): modelling future food policies in UK, USA & internationally.
- *Dowrick & Gabbay* will clarify predictors of response to antidepressant medication in primary care (NIHR Programme 2012-2017); provide new knowledge on the implementation of best practice to support communication in cross-cultural primary care consultations (EU FP7 Grant 2010-2014).
- *Dickson, Bagust & Walley* are funded to undertake further policy-driven systematic reviews for NICE, collaborate with Cochrane review groups and develop new economic modelling methods.

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➤ **Women's and Children's Health Group (£11.3M awards).**

Neilson, Alfirevic, Weeks, Greer, Williamson & Gladstone focus on clinical trials and evidence synthesis of global impact, with the Cochrane Pregnancy and Childbirth Group, the NIHR Medicines for Children Research Network (MCRN) Co-ordinating Centre and WHO Collaborative Centre for Research & Research Synthesis in Reproductive Health.

Main achievements against strategy in the REF period

- Cochrane Pregnancy & Childbirth Group have the consistently highest output of all Cochrane groups world-wide (204 reviews & 346 updates since 2008; 54 by *Alfirevic, Neilson & Weeks*).
- Our WHO funded RCT provided definitive evidence of the lack of effectiveness of intra-umbilical oxytocin from the management of retained placenta (*Weeks, Alfirevic, Lancet, 2010, 375:141-7*) led to revised national guidelines and an HTA call for evaluation of new treatment strategies (nitric oxide donors).
- *Weeks & Alfirevic* have pioneered clinical research into the efficacy and correct use misoprostol, widely used off-label in reproductive health. They initiated an international expert conference (funded by Rockefeller) to develop a consensus about the appropriate misoprostol dosage for the 9 different reproductive health indications. Now adopted by WHO and FIGO (Obstet Gynecol. 2009, 113:374-83).
- *Weeks* has designed a neonatal resuscitation trolley that is now marketed as LifeStart by Inditherm Ltd. He has designed 3 other medical devices which have since been patented. One has received £350k funding from NIHR i4i and another now sold to a venture capitalist group.
- *Neilson* definitively demonstrated that routine administration of antibiotics should be abandoned as a preterm birth prevention strategy in high risk Sub-Saharan populations (*Neilson #1*).
- Malawi Developmental Assessment Tool (MDAT) introduced in diverse African settings, endorsed by WHO as a global method for assessing child development (*Gladstone #1, #2*).
- Our research synthesis used to create major guidelines for thrombotic and haemorrhagic complications in pregnancy: world-wide impact on clinical practice (*Greer #2, #3*).

➤ **Epilepsy (£4M awards)**

This group led by *Marson, Baker, Jacoby, Tudur-Smith & Williamson* focuses upon assessing:

- i) the effectiveness of healthcare interventions in epilepsy, ii) psychosocial outcomes, iii) clinical & psychosocial determinants of outcome, iv) cognitive outcome in children exposed to antiepileptic drugs in utero, & iv) assessment of both clinical and genetic determinants of treatment outcome.

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Main achievements against strategy in the REF period

- MRC Multicentre Study of Early Epilepsy and Single Seizures (MESS) data have been modelled to identify conditional recurrence risks. Modelling of MRC Antiepileptic Drug Withdrawal Study data underpins UK and EU regulations for driving following antiepileptic drug withdrawals.
- SANAD RCT and Cochrane Epilepsy Group review results underpin NICE guidelines (updated in 2012), and informed a survival analysis workshop with NICE guideline developers.
- Longitudinal Quality of life assessments in SANAD and MESS have allowed assessment of the quality of life trajectories of patients, and the factors associated with resilience in patients.
- The Liverpool QOL battery has been modelled to develop an epilepsy specific utility tool for health economic analyses (existing generic tools e.g. EQ5D have poor face validity in epilepsy).
- The Liverpool group have undertaken a series of collaborative projects assessing cognitive development in children exposed to antiepileptic drugs in utero. Their findings have resulted in changes in prescribing practice globally and informed NICE guidelines and FDA warning.
- The Liverpool led National Audit of Seizure Management informed NICE quality standards and is included in the CQC quality measures for NHS Trusts.
- Founding members of three international consortia: NIH centre without walls (EPI4K) to identify genetic predisposition to epilepsy and treatment response, EU funded Pharmacogenetics consortium (EPIPGX) and the International League Against Epilepsy genetics consortium.

➤ **Trials research methodology group (£12.5M awards)**

Led by *Williamson, Gamble, Tudur-Smith, Marson, Young, Kolamunnage-Dona, Dodd, Kirkham*. The MRC North West Hub for Trials Methodology Research (NWHTMR) has developed a successful model for using MRC funding to leverage investment for international excellence in trials methodology research including medicines for children, epilepsy, and women's health

Main achievements against strategy in the REF period

- The COMET (Core Outcome Measures in Effectiveness Trials) Initiative directly impacted on the NICE Epilepsy Guideline, the NICE Guideline Manual and the NIHR HTA funding application process. Our www.comet-initiative.org website visited by 10,000+ individuals from 108 countries.
- Innovative design and analysis advice provided by Hub members has led to funding awards, including a novel optimal dosing regimen in TAILoR trial (NIHR), novel methods to integrate health professional & patient views about important treatment outcomes in MOMENT study (NIHR HTA) and improved interpretation of HTA-funded MAGNETIC trial results after adjusting for dropout.
- NICE commissioned a workshop on appraising trials with time to event outcomes (2011)
- Research into the recruitment of children to trials informed the report by the Royal College of Paediatrics and Child Health Commission on Child Health Research (2012)
- Our work on outcome reporting bias ORB is referenced in the Cochrane handbook and our methods for identifying and adjusting for outcome reporting has informed the development of a new Cochrane Risk of Bias tool for non-randomised studies.

Future Strategic Plans

- *Alfirevic, Neilson & Weeks* have established a new Centre for Women's Health Research (2013) which will be a focus for new investment by the Faculty. It will provide strategic oversight of research activities within the Cochrane Pregnancy and Childbirth Group and WHO Collaborating Centre for Research and Research Synthesis in Reproductive Health and align them with those of MRC North West Hub for Trials Methodology Research (COMET initiative) and Liverpool Reviews and Implementation Group (CLAHRC Evidence Synthesis Theme). We have already secured funding to identify the most cost-effective method for induction of labour globally (HTA network meta-analysis 2013-14); Cochrane programme grant (2014-16); MRC Global Health Trials Programme (2013-6) and cost-effective methods for prevention and treatment of post-partum haemorrhage in low-resource settings (HTA Innovation & WHO). We will continue to align our research strategy with UN Millennium Development Goal 5A – to reduce the maternal mortality ratio by $\frac{3}{4}$, and those of key funders in the field (NIHR HTA, Gates Foundation, EU and MRC/DfID).
- The epilepsy group will assess the clinical and cost effectiveness of levetiracetam, zonisamide,

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lamotrigine and valproate as first line treatments in epilepsy, NIHR HTA SANAD II (2012-2018) and will evaluate the clinical effectiveness of drug and surgical interventions for epilepsy in the NHS, (NIHR Cochrane Programme Grant); assess the implementation of epilepsy services through the National Audit of Seizure Management in Hospitals. Complex disorders research by the NW CLAHRC will prioritise epilepsy & chronic conditions (see above).

- Epilepsy trials portfolio will be further expanded, including assessment of the ketogenic diet in refractory epilepsy (Liverpool lead) and pre-operatively in children (coordinating this international EC funded trial) and assessment of multiparametric MRI prior to epilepsy surgery (HTA).
- We have, together with 2 other leading epilepsy surgery centres (UCL and Kings) established a collaboration with the strategic aim to expand the portfolio of clinical trials to other neurological conditions including multiple sclerosis, spinal surgery and brain tumours.
- The MRC North West Hub for Trials Methodology Research (**NWHTMR**) will continue to contribute to the MRC HTMR Network (MRC 2013-2018); provide a world-class environment for conducting methodological research, and increase the quality of clinical trials (MRC Grant 2013-2018);
- *Williamson* MRC/NIHR HeRC funding (*described above*) to build capacity in eHealth & health informatics. Will focus on trials methodology research, recruitment feasibility assessments, using electronic patient records (EPR) for trial data collection, & capture of patient reported outcomes.
- *Williamson* will continue to develop the resource base for and promote the COMET Initiative (MRC Grant 2012-2014, EU FP7 Grant 2012-2014) and develop core outcome sets for cleft palate (HTA Project Grant) and MPS (Shire Educational Grant); *Gamble & Williamson* will identify, develop and evaluate interventions to improve retention in clinical trials (MRC Grant 2013-2015)
- We will exploit local and international Cochrane expertise to improve the integration between trials and systematic reviews in relation to trial design, reporting and training programmes.

c. People, including:

i. Staffing strategy and staff development

IPHS's and ITM's staffing strategy has been to secure the next generation of future research leaders and to recognise current research leaders through promotion to ensure their retention. The *Social determinants and health inequalities group* has been consolidated by promotions: *Bruce* to personal chair (Environmental epidemiology and public health), the promotion of *Pope* (Social epidemiology) and *Kierans* (Anthropology) to Senior lecturer, and recruitment to 2 newly created senior lecturer posts for *Barr* (Applied Public Health Research) & *O'Flaherty* (Epidemiology/Public Health). The *Systematic reviews of healthcare effectiveness group* has been consolidated by the promotion of *Dickson* to personal chair and *Boland* to Senior Research Fellow, plus two new Senior Research Fellows. Further expansion is expected as *Dickson* leads a theme in the newly awarded CLAHRC. The *Mental and Behavioural Health Science Group* is developing the next generation of research leaders in primary care with support for *Reeve* (NIHR Clinical Scientist) and *Irving* (NIHR Doctoral Training Fellow).

Women's & Children Health group encourages and promoted exceptional clinical researchers. The team has been strengthened by promoting *Weeks* to personal Chair with a professorial package that pump-primed establishment of Sanyu International Research Unit for Maternal Global Health in 2012, specifically aiming to foster research in low cost interventions in low resource settings. This initiative has been complemented by supporting *Gladstone* through her Academy Medical Sciences and Wellcome Trust Strategic Fund grants to complete her Academic Clinical Lecturers post. In November 2013 she was appointed to a Clinical Senior Lectureship in Neurodevelopmental Paediatrics and International Child Health.

Trials Methodology Research – *Gamble* has been promoted to Chair, *Kolamunnage-Dona* and *Kirkham* to lectureships. In order to ensure a critical mass of high calibre methodological researchers we have made a strategic decision to change the funding structure for *Tudur-Smith's* post - initially funded by MRC Hub, it is now fully funded by University. Succession planning and recruitment strategy has been strengthened with 4 fellowship programs. *Donegan* completed her PhD, and was then awarded an MRC Methodology Research Fellowship in Biostatistics. In addition we have 3 NIHR fellowships, two focused on evidence synthesis linked to Cochrane Pregnancy and Childbirth group (IPD and network meta-analysis) and one in Health Informatics. Furthermore, to address the shortage of trained biostatisticians a new biostatistics fellowship and associated masters-level training programme is planned to start in 2014.

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There is an active policy of supporting all Early Career Researchers (ECRs) through mentoring, prioritisation for internal finds and internal review of research grant applications. This is facilitated further by the Wellcome Trust's award of £750,000 per annum to the University as an Institutional Strategic Support Fund (ISSF) to support our Biomedical Research strategy. We aimed to address the need for research training for clinical lecturers to allow them to prepare for independence which we have done through the award of short term fellowships (6-12 months). *Gladstone* has been a direct beneficiary with a fellowship for her Care for Development project in Malawi. This approach has been incorporated in a joint strategy with the Mersey Deanery towards academic clinical training within *Modernising Medical Careers*; all appointments to Clinical Lecturer posts must already hold a higher degree. From such a clinical lectureship post, Taylor-Robinson was supported to gain a MRC Population Health Scientist Fellowship, and then his current MRC Centenary Award. Barr, a further NHS public health trainee, was supported to apply for a NIHR Doctoral Fellowship, following a successful academic placement. He was recently appointed (April 2013) to a Clinical Senior Lectureship post in Applied Public Health in IPHS. This demonstrates a continued commitment by both IPHS and ITM to nurture rising stars, especially those with potential to develop internal & external collaborations.

Implementation of Concordat to Support the Career Development of Researchers

The University of Liverpool is a signatory to this Concordat and our commitment was recognised by the award of the European Commission's 'HR excellence in research' badge in 2011. The University participates in both the CROS and PIRLS surveys and analysis of the outcomes informs the action plan associated with the HR Excellence Badge.

Evidence of how the submitting unit supports equalities and diversity

All university staff can access a range of family friendly options, notably maternity, paternity and adoption leave; parental, compassionate, domestic and personal leave. The University's flexible working policy allows individuals to vary or adjust their pattern of work based on their personal circumstances. Specifically, ITM has restructured its finances to provide for maternity/paternity leave (bearing the costs when other forms of funding are not available). Our 'return to work' rate after maternity leave is high. Many staff return to an agreed amended contract with reduced hours enabling satisfactory work-life balance. To further improve ease and success of academic staff returning to work, following maternity/paternity leave £5K of flexible funds is available on application to support their research. We have actively encouraged female colleagues to take visible and key roles within all 6 research groups and the wider university. Effective strategies have included all leadership roles being subject to open competition, with detailed job descriptions and person specifications by internal advert and the desirability to see female colleagues applying for senior roles is emphasised. Within IPHS, two new roles have been established within the Institute Management Team; a representative of academic staff below the grade of professor and a role for contract researchers. These roles have full participatory status on the management team, and are nominated by the staff groups involved and in both cases, female staff has been appointed. The ITM has the bimonthly Institute Management and Finance Committees, attended by the Heads and Deputy Heads of Departments. There is now 50% representation of females on this key committee with a designated place for an Athena Swan representative. The University gained an **Athena Swan** Bronze Award in 2009. Both IPHS and ITM are developing strategies to achieve Silver Awards in the next REF period; 65% of IPHS staff are now female with Professors acting as exemplars/ mentors including *Whitehead, Jacoby & Lloyd Williams*.

Effective integration of clinical academics and NHS-employed researchers is facilitated through the University led **Liverpool Health Partners**. This company limited by guarantee was established in 2012 to enhance service delivery, research, education and training across the University and 6 local NHS Trusts. The Partnership promotes translational research (including Health Inequalities, Aging & Chronic Conditions, Women & Children) focussed on providing benefits to all patients.

ii. Research students

Our strategy for building effective and sustainable doctoral research training has several interlinking strands. **1)** We have been pro-active in the identification of promising candidates for

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doctoral fellowships and studentships in national competitions and the provision of intensive support in making applications to the relevant external funding bodies. Successes in attracting these prestigious awards in the REF period have included 5 doctoral fellowships from NIHR as well as 4 studentships from the ESRC North West Doctoral training programme (in partnership with Manchester and Lancaster). We have also hosted 3 MRC Centenary Awards. **2)** We have developed an active internal programme of investment and pump-priming >200k annually to create a **vibrant Postgraduate research (PGR) community in both IPHS and ITM**. The continuing PGR investment is based on the principle of matched funding to lever additional support, thus allowing increases in the number of both UK based and overseas PGR studentships - 28 PhD and 13 MPhil studentships have been awarded since 2011 and 50 PhD, 20 MPhil and 30 MRes studentships have been created. Matched funding has come from NHS Trust partners, MRC, BBSRC, industry and health charities. Furthermore, from 2012 the Faculty has provided additional funding to preferentially boost international PhD recruitment (£70k pa). Both Institutes have benefited from schemes such as Science without Borders (Brazil) and the UHS (Lahore Pakistan) where the University contributes towards the tuition fees for the students, enabling a larger student population to access our postgraduate research programmes. All PGR students are fully integrated into research groups and participate in active seminar programmes, with support to present at conferences (£300 for international and £200 for national). All PGR students have two appointed supervisors which enables formal collaborations between different areas of research expertise.

PhD students benefit from a Graduate School Skills Programme (**GSSP**) providing six weeks of developmental activity over the PhD lifecycle. The programme's interdisciplinary teamwork approach encourages the formation of PGR communities within and across subject boundaries throughout the university. The Skills Team offer first year PGRs a choice of fifteen intensive three-day themed skills workshops. The UoA2 provides strong support for health professionals studying for doctorates on a part-time basis. Over half of the doctorates were awarded to part-time students, and over 95% of these completed within 7 years (average 5.2 years, with an equivalent time for full-time students of 3.9 years).

d. Income, infrastructure and facilities**Income**

Our **UoA2 submission** comprises 33 academic research staff with combined Funders' contribution of research awards of £46.9 M in the period 2008-2013 more than a **doubling** of new awards compared to £19.38M for the RAE2008 period (2001-2007). Highlights include £9M to *Gabbay et al* for NW CLAHRC, 6.2M for NIHR Medicines for Children Network and Clinical Trials Unit, 5.1M to *Dickson et al* for HTA Technology Assessment Reviews, 3.2M to *Williamson et al* for NW Hub for Trial Methodology Research, 2.9M to *Jacoby* from DoH for Understanding and improving the outcome of viral encephalitis, 2.1M for SANAD II, and 1.2M to *Gabbay et al* from DoH for R&D programme to increase equity of access to high quality mental health services in primary care.

Provision of core infrastructure facilities

HSR has been supported by considerable investment in our research facilities since 2008 including £11M refurbishment of the grade II listed Waterhouse Buildings on the main University campus that has consolidated IPHS research into one location, including additional space for PGR students. A planned £4M refurbishment of the grade II listed Waterhouse Building Block F (UoL and MRC funding) to start in 2014 will provide a Clinical Trials Research Centre - a Centre of Excellence in clinical trial design, management and analysis, and one of the few units in the UK awarded Full Clinical Research Collaboration registration status. A further £2.5M with further 1.5 mil from the Liverpool Women's NHS Trust has been invested in the new *Centre for Women's Health Research* (2013) that includes the *WHO Collaborating Centre for Research and Research Synthesis in Reproductive Health* and *Cochrane Pregnancy and Childbirth* Groups, providing extensive new office and lab space for clinical and basic researchers and brings them to close proximity of patients. Similarly, European Regional Development Funding of £4M has been approved (2013) to complement investment of £2.5M from UoL and £5.5M for Alder Hey NHS Trust to include a state-of-art Research Institute at the new Alder Hey hospital site which will increase the capacity for multidisciplinary health services research in children health.

HSR researchers benefit from the second largest collection of electronic books in the Russell

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Group. We are one of few Russell Group members who subscribe to *all* the national NESLi2 “big deal” site licences for journals, conferring particular advantages on researchers in medicine and science. We are also supported since 2008 by the web-based virtual research environment (VOCAL) to enable researchers to securely share data, documentation and have discussions.

Research Governance

The University has established robust ethics and governance procedures, closely aligned with those of the NHS and NIHR. Approval response times have been progressively reduced since 2008, now averaging <2 weeks. This includes a Joint Research Office (JRO) that covers all research active NHS trusts and is building robust relationships with the research active CCGs. The University was successfully inspected by the MHRA in 2012.

e. Collaboration and contribution to the discipline or research base***Indicators of wider influence or contribution to the discipline or research base***

Members of all 6 research groups have intensely engaged with HSR and have been recognised for their expertise in the UK and abroad.

- We have been particularly visible by our contribution to **NIHR**. Walley CBE, is Director, NIHR Evaluation, Trials & Studies and UK Director of HTA Programme; Neilson is the NIHR Dean for Faculty Trainees and Member NIHR Strategy Board and oversees NIHR-funded Personal Fellowship awards. Dowrick is member of NIHR Panels for Doctoral Training Fellowships and Integrated Academic Training; Dowrick and Neilson are also NIHR Senior Investigators. Alfirevic is member of the NIHR HTA Commissioning Board, NIHR Programme Grants for Applied Research Board (PGfAR) and also Co-Director of Cheshire & Merseyside CLRN. Whitehead is Member of NIHR Public Health Research Programme Funding Board. Marson was a member of the NIHR Programme Grants Board (2007-2011); Williamson is a member of the NIHR Registered CTU Network Working Group and also a member of the NIHR CRN Portfolio Eligibility Criteria Review Group. Tudur-Smith is Sub-Panel member for NIHR Programme Grants for Applied Research Selection Panel. Dickson contributed to module design and delivery in the Ulysses HTA Masters Programme, and to the development and delivery of first two HTA Fellowship Programmes held in India 2012-13. Gabbay is Clinical Lead of NIHR North West Primary care Research Network and Associate Director of the NIHR North West Research Development Service. He is also Director of NW Coast CLAHRC and primary care lead for the NIHR Mersey & Cheshire CLRN & NIHR Mental Health Research Network hub.

- Our research strategy has involved continuous engagement with WHO and alignment with **WHO** priorities, resulting in our shaping WHO policies at various levels. Whitehead is Head of WHO Collaborating Centre for Policy Research on Social Determinants of Health, Weeks is Head of WHO Collaborating Centre for Research & Research Synthesis in Reproductive Health and Harris is Co-Director of WHO Collaborating Centre for Research in Oral Health of Deprived Communities. Whitehead was European representative on the Scientific Advisory Board of the Global WHO Centre for Health Development, Kobe, Japan(2009- 2012); Senior Advisor on the Board of WHO European Review of Social Determinants of Health and the Health Divide (Marmot European Review; 2011-2013). Gladstone is a member of the WHO UNICEF steering committee on Interventions for Early Child Development, a member of two WHO Working groups (Early Child Development and also Autism Spectrum Disorders and Developmental Disorders). Scott-Samuel was member of WHO Scientific Resource Group on Equity Analysis and Research 2009-10. Pope & Bruce are members of the WHO Comparative Risk Assessment expert group for household air pollution (HAP). Bruce is leading on development of the latest WHO Air Quality Guidelines. O’Flaherty & Capewell led EU & WHO modelling workshops in the UK, Europe, US & Middle East.

- Throughout the REF period, our staff have been encouraged to contribute to the workings of **Academic Colleges, NHS Research and Development and Governmental agencies**. Whitehead is a member of the Technical Advisory Group (TAG) of the DH Advisory Committee on Resource Allocation (ACRA). Scott-Samuel was Advisor to House of Commons Health Select Committee on public health in 2011; Greer was Chair, National Advisory Committee for Enquiries into Maternal Health in the UK, reporting to National Patient Safety Agency. Williamson & Marson are members of the Secretary of State for Transport’s Honorary Medical Advisory Panel and Marson is a topic expert in the NICE Public Health Reviews group. Alfirevic is elected Chair of the Academic Board of the *Royal College of Obstetricians and Gynaecologists* and was member of

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NICE Guideline Development Group and Quality Standards Committee for induction of labour.

- We have encouraged participation as assessors on major grant awarding bodies (Research Councils) and members of key scientific advisory committees nationally and internationally. Greer chairs the **MRC** Regenerative Medicine Committee, and Chairs the UK Regenerative Medicine Platform (MRC, BBSRC, EPSRC) Programme Board. Williamson is a member of the **MRC** Methodology Research Panel. Whitehead was member of **ESRC** Research Committee (2008-12) and Canadian Institutes for Health Research Institute for Population and Public Health International Advisory Board (2006-12). Pope is a member of the **National Institute for Health's** Household Air Pollution and pregnancy and neonatal sub-committee, informing the Global Alliance of Clean Cookstoves in relation to the Millennium Development Goals, and advised the German Federal Ministry of Education & Research on its HSR strategy. Lloyd-Williams was a member of UKHEAC (2007-2012) and member of European Association of palliative care research advisory committee. Alfirevic is Chair of the Scientific Committee of *European Association of Perinatal Medicine*.
- We have been particularly visible within **Cochrane Collaboration**, a strategy that has led to major infrastructure and programme grants funding to support 3 Cochrane Editorial teams within our group, namely Pregnancy and Childbirth (Neilson & Alfirevic are joint co-ordinating editors), Epilepsy and Cystic Fibrosis (Marson is co-ordinating Editor, Tudur-Smith is Statistical Editor Cochrane Epilepsy Group) and Genetic Disorders Group (see section 4b). In addition, Whitehead is an associate editor of *Cochrane Public Health Review Group*.
- Other significant **Editorial Work** includes: Dowrick - editor of *Chronic Illness*; Alfirevic - Editor of *Ultrasound in Obstetrics and Gynecology*, Pope - statistical editor of *Surgical Oncology* and *Scientific World Journal*; O'Flaherty & Pope - associate editors of *BMC Public Health* and Whittington - associate editor, *J of Forensic Psychiatry & Psychology*
- Further evidence of international recognition and impact comes from **Professorial Research Fellowships, visiting Professorships and prestigious awards** e.g. Dowrick - Professorial Research Fellowship with the University of Melbourne (2007-18), Capewell - the Fellowship of the European Society of Cardiology (2009), Whitehead - Visiting Professor at Karolinska Institute, Sweden (2013-), Whittington - Visiting Professor, Norwegian University of Science & Technology, Trondheim, Scott-Samuel - Honorary Professor, Durham University from 2013, Alfirevic - Visiting Professor, Medical Faculty Zagreb, Croatia (2008-), Weeks - visiting Professor at Busitema University, Mbale, Uganda from 2013. Jacoby was awarded the 2010 Lord Hastings Award by the British Epilepsy Association (BEA).

Effective mechanisms to promote collaborative research and to promote collaboration at national and international level

Our IPHS Research Support Funds, flexible study leave and sabbatical arrangements enable conference participation and other networking opportunities (£250k since 2008). The exchange of IPHS research fellows include national and overseas placements (e.g. Institute of Child Health, UCL; Karolinska Institute, WHO Copenhagen, WHO Venice and WHO Geneva). Postdoctoral fellows visiting Liverpool from Brazil, Argentina, Mexico, and Poland.

We encourage research sabbaticals and visiting appointments (e.g. Scott-Samuel visiting professorship to Durham University, Whitehead's visiting professorship to Karolinska Institute), and longer-term secondments (e.g. Bruce 3 years at WHO Geneva to develop the WHO global policy response to indoor air pollution).

Gabbay is champion for University-wide research theme on Changing Cultures – allocating pump-priming funding, facilitating networking events and facilitating cross-Faculty social science research on culture of health – relevant to community health and the culture of health professions.

External visibility is demonstrated with designations as the NIHR Medicines for Children Research Network (MCRN) Co-ordinating Centre and MCRN Clinical Trials Unit (MRC & NIHR funded), North West Hub for Trials Methodology Research (Williamson, Gamble, Tudur-Smith) and WHO Collaborating Centre for Research and Research Synthesis in Reproductive Health (Weeks, Alfirevic, Neilson). The ITM team provides editorial support (co-ordinating editors, managing editors, editors and editorial staff) for 3 NIHR HTA funded Cochrane Groups – Pregnancy & Childbirth (Neilson, Alfirevic), Cystic Fibrosis & Genetic Disorders (Southern), & Epilepsy (Marson).