NHS
National Institute for Health Research

COLLABORATIONS FOR LEADERSHIP IN APPLIED HEALTH RESEARCH AND CARE

APPLICATION FORM

Note: The accompanying *"Collaborations for Leadership in Applied Health Research and Care Invitation to Submit Application"* contains essential guidance on the information you need to provide when completing this form.

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

Please adhere to the page limits stated within each box. Please do not adjust the page margins. Only information submitted up to this page limit can be assessed.

Please insert your unique reference code (as provided when the forms were downloaded) into the Footer space provided.

- DETAILS OF THE PROPOSED COLLABORATION

1. Host Organisation

Name and address of the proposed Host Organisation (NHS Trust or Provider of NHS services):

NHS Liverpool Clinical Commissioning Group
1 Arthouse Square
61-69 Seel Street
Liverpool L1 4AZ
Liverpool

(referred to as "Liverpool CCG" or "Liverpool Clinical Commissioning Group" in this application)

Name, job title, address, email and telephone number of the Host Organisation lead for this application:

Prof Mark B Gabbay
Professor of General Practice and HoD Health Services Research
University of Liverpool
Waterhouse Building, Block B
1-5 Brownlow St.
Liverpool L69 3GL

0151 794 7388
mbg@liv.ac.uk

Name, job title and address of the individual who is authorising this application on behalf of the Host Organisation (e.g. NHS Trust Chief Executive):

Katherine Sheerin
Chief Officer
NHS Liverpool Clinical Commissioning Group
3rd Floor, 1 Arthouse Square

61-69 Seel Street
Liverpool **L1 4AZ**

Direct Dial: 0151 296 7581
PA (Carol Hughes) 0151 296 7619
Fax: 0151 285 4602
katherine.sheerin@liverpoolccg.nhs.uk

Proposed Director

Prof Mark B Gabbay MD FRCGP
Professor of General Practice and HoD Health Services Research
University of Liverpool
Waterhouse Building, Block B
1-5 Brownlow St.
Liverpool L69 3GL

0151 794 7388
mbg@liv.ac.uk

Organisations within the proposed NIHR CLAHRC

Liverpool CCG (host)
West Cheshire CCG
Royal Liverpool Broadgreen University Hospital Trust
Aintree University Hospitals NHS Foundation Trust
Warrington & Halton Hospitals NHS Foundation Trust
Mersey Care NHST
The Walton Centre NHST
University Hospitals Morecambe Bay NHSFT
Liverpool Community Health NHST
Lancashire Teaching NHST
Alder Hey Children's NHSFT
Liverpool Women's NHSFT
5 Boroughs Partnership NHSFT
Liverpool Heart and Chest NHST
Wirral University Teaching Hosp NHSFT
Clatterbridge Cancer Centre NHST
University of Liverpool
Lancaster University
University of Central Lancashire
Liverpool Health Partners
Lancashire County Council
Blackpool Council
Blackburn with Darwen Borough Council
Sefton Council
Knowsley Council
Cheshire West and Chester Council
Liverpool City Council

ABSTRACT

NWC CLAHRC will tackle health inequalities through improvements in public health and chronic disease interventions. We will facilitate seamless interaction between NHS organisations commissioning and delivering care, local authorities, PPI and industry collaborating in excellent applied research and implementation to enhance quality of health, care, patient experience and outcomes. Using robust research, knowledge exchange and implementation methods to integrate academics, service providers, commissioners, managers, public and service users; we will maximise the potential for applied research within partner organisations to improve care and reduce inequalities.

We have six themes: 2 overarching- Evidence Syntheses and Implementation; Engagement, Exchange and Effective Implementation plus: Improving Public Health and Reducing Health Inequalities; Improving Mental Health; Managing Complex Needs; Delivering Personalised Health Care. We propose a balanced and complementary portfolio of projects. We will closely align with NWC AHSN as our implementation partner, and collaborate with neighbouring CLAHRCs to co-ordinate research and implementation projects. We will exploit existing NHS/academic partnerships, strengthened further by the new AHSN and commissioning structures, that have a proven track record of using research. We will build on our multidisciplinary approach, stakeholder integration and engagements with industry to accelerate the translation of research findings into service improvements and to generate wealth.

THEMES

Theme	Theme Leader
1. Evidence Synthesis and Implementation	Prof Rumona Dickson
2. Public & Stakeholder **E**ngagement, Knowledge **E**xchange & **I**mplementation	Prof Michael Pearson
3. Improving Public Health and Reducing Health Inequalities	Prof Jennie Popay
4. Improving Mental Health	Prof Richard Bentall
5. Managing Complex Needs	Prof Tony Marson
6. Delivering Personalised Health Care	Prof Munir Pirmohamed

4.

OVERVIEW

4.1 Overview of Applied Health Research Conducted by NWC CLAHRC Members

NWC CLAHRC brings together a rich resource of multidisciplinary researchers, across 3 Universities. The participating clinicians cover Primary and Specialist Care covering most chronic diseases, as well as Public Health and Allied Health Professionals, Engineers and Social Scientists from a range of theoretical backgrounds in psychology, health economics, sociology, anthropology and philosophy. The methodological expertise spans systematic reviews and cost effectiveness evaluations, through to qualitative and mixed evidence synthesis, meta-analysis, realist synthesis, trial design, longitudinal surveys, implementation, biomarkers, clinical pharmacology and drug safety plus a range of qualitative methods. The evidence of excellence is clear from the submitted publications and grants supporting our case for funding.

Theme 1: The Evidence Synthesis and Implementation group brings together 10 collaborations actively engaged in this work, with external competitive funds, producing Cochrane reviews, technology appraisals for NICE and developing new methods, and includes the NIHR Pancreas BRU in Liverpool. In addition to the evidence provided on the theme form, for example LRiG has recently renewed its contract with NICE to undertake technology reviews to inform guideline groups.

Theme 2: Since 2009 Prof Pearson's team have been analysing the Hospital Episode Statistics (HES) in projects commissioned from the NHS information Centre, and the Dept of Health. These data have been used in many public health papers and form the basis of the publications from Dr Foster and others.

Theme 3: Popay, Whitehead, Capewell and colleagues have an outstanding record on research into health inequalities, as evidence of this, Liverpool department of public health and policy is a WHO collaborating Centre. For example Capewell's IMPACT programme examining the dramatic falls in cardiovascular disease (CVD) mortality rates in the UK, the USA and other high income countries and conversely, the rapidly *increasing* CVD mortality rates in China, the Middle East and many other low and middle income countries, suggests the changes are due to population-wide risk factor improvements rather than modern treatments. Gabbay led an NPRI MRC study (inc Capewell) on the impact of lay health trainers to improve diet among deprived patients at risk of heart disease, which was cost effective- Barton et al J Eval Clin Pract 2012.

Theme 4: Bentall's group have recently shown that childhood traumas such as sexual abuse are potent risk factors for psychosis (Varese et al. Schizophrenia Bulletin, 38, 661-671, 2012).

Theme 5: Gabbay and colleagues have recently undertaken the national Fit Note evaluation for the DWP, from 67 practices covering a population in excess of 0.5M. This 1 year database records all sickness certificates issued by these practices, and will be significantly larger than any existing general-practice based study internationally into this topic, and provide robust data on trends of absenteeism and risk factors for prolonged absence. His smaller study in 2002 has been cited 90 times (Shiels & Gabbay BJGP '04). Within epilepsy the groups have undertaken prognostic modelling (NIHR programme grant: Marson) of trials and epidemiological studies to stratify prognosis and treatment outcomes. Results from modelling of data from the multicentre study of early epilepsy and single seizures underpins legislations across the EU and now implemented in the UK (2013). Similarly result from modelling data from the MRC antiepileptic drug withdrawal study along with a systematic review underpins UK legislation for driving and drug withdrawal. Modelling of data from the NIHR HTA SANAD study allows stratification for treatment outcome in newly diagnosed epilepsy. A recent NIH-funded study assessed the cognitive development in children exposed to antiepileptic drugs in utero. This identified significant cognitive deficits associated with sodium valproate, resulting in a change in drug labelling and underpinning advice in the recent NICE guidelines update. This work has influenced prescribing worldwide.

Theme 6: Pirmohamed's group recently, we identified a new biomarker (HLA-A*31:01) which predisposes to carbamazepine hypersensitivity in Caucasians (*N Engl J Med*. 2011 Mar 24;364(12):1134-43). The association between CBZ hypersensitivity and HLA-A*31:01 has been included in the Summary of Product Characteristic in the EU, and in the US FDA drug label.

4.2 Track Record of Implementing Health Research to Improve Health Outcomes

Popay's research helped shape the PPI Forums established by CPPIH in every NHS trust in the UK. Subsequently she conducted a systematic review of evidence on the health impact of community engagement in policy, which informed NICE guidance on community engagement in public health interventions. Her research on lay knowledge has also informed NICE guidance public health behaviour change interventions.

Pirmohamed's work has shown that ADRs cause 6.5% of all admissions to adult hospitals (Pirmohamed et al, BMJ 2004 Jul 3;329(7456):15-9), and occur in 15% of inpatients (Davies et al, PLoS One. 2009;4(2):e4439). In children, the corresponding figures are 2.9% (Gallagher et al, PLoS One. 2012;7(12):e50127). Studies to implement ADR education for doctors are now included in this CLAHRC bid.

A model of care nurses to manage alcohol misuse, particularly alcohol dependency has been shown to prevent admissions and reduce relapse to alcohol drinking (Cobain et al, Alcohol Alcohol, 2011;46:434-40). Our current work aims to determine how we can reduce alcohol consumption, and maintain abstinence, in alcohol-

dependent patients, which represent 5% of the population. This has led to a RFPB funded randomised controlled trial which has assessed the efficacy of extended brief interventions in reducing various measures of alcohol dependency (ADPAC; Owens et al; BMC Public Health. 2011 Jul 4;11:528)
Marson and Pearson are leading the national audit of seizure management, engaging over 125 A&E departments, which demonstrates significant problems with the delivery and coordination of care, leading to a number of locally implemented service changes.
Dowrick, et al (inc Gabbay) recently completed an NIHR programme grant exploring ways to enhance access to effective care for hard to reach groups, focusing on older adults and ethnic minority communities with mental health problems. This used a variety of innovative community interventions to raise awareness, linked to education packages for practices Dowrick et al PGfAR 11/77/15 in press.

4.3 Examples of Effective Translation

4.3.1: Bentall has conducted several large scale randomized controlled trials of cognitive-behaviour therapy for acute psychosis (Tarrier et al., British Journal of Psychiatry, 184, 231-239, 2004; cited 167 times), bipolar disorder (Scott et al. British Journal of Psychiatry, 188, 313-320, 2006; cited 249 times) and for people at ultra-high risk of mental illness (Morrison et al. British Journal of Psychiatry, 185, 291-297, cited 402 times; Morrison et al. British Medical Journal, 344, e3333, 2012). This work has had impact both at home and abroad, for example, influencing the NICE guidelines for the treatment of schizophrenia and the similar NIMH PORT guidelines in the USA. In the UK these guidelines have led to the development of psychologically informed early intervention services, and to the greater availability of psychological treatments for patients who were previously treated exclusively with psychiatric drugs.

4.3.2 Warfarin is used by 1% of the UK population, and is among the top 3 drugs causing admission to hospitals because of ADRs. We cannot predict the individual dose requirements for warfarin. Our studies on drug interactions with warfarin which modulate daily dose requirements have been translated into warfarin prescribing instructions. We have also undertaken primary studies (Jorgensen et al, Pharmacogenet Genomics. 2009 Oct;19(10):800-12) and a systematic review and meta-analysis (Jorgensen et al, PLoS One. 2012;7(8):e44064) which have shown that genetic factors combined with age and BMI account for about 60% of the variation in individual daily dose requirements for warfarin. Working together with 21 groups around the world, we have developed a warfarin dosing algorithm which uses both genetic and clinical factors to predict individual daily dose (IWPC, N Engl J Med. 2009 Feb 19;360(8):753-64) . This algorithm has been tested in a randomised controlled trial of genotype-guided prescribing vs. Standard clinical care (EU-PACT; Pharmacogenomics. 2009 Oct;10(10):1687-95)

4.3.3 NIHR Liverpool Pancreas BRU PIs have translated advances in the management of pancreatic digestive disease through applied health research that have contributed to UK, European and International guidelines, changing global practice in the field. Over the last decade NIHR Pancreas BRU PIs have tested and validated safer approaches to debridement of infected pancreatic necrosis using interventional radiology, endoscopy and minimal access surgery (Ann Surg 2010; 251: 787-793), now adopted in revised International Association of Pancreatology guidelines and critical to our emerging model of pancreatic services in the NW Coast AHSN footprint. The NIHR Pancreas BRU has improved the selection of and surgical techniques for appropriate patients for surgery to treat painful chronic pancreatitis (Lancet 2011; 377: 1514-1522), ensuring a more favourable long-term outcome, incorporated into recent European guidelines. Optimising management of rare GI disease has featured in the largest European database of patients with hereditary pancreatitis and familial pancreas cancer (EUROPAC, led by Liverpool), the major problem being the life time risk of pancreatic cancer for which secondary screening is now widely available (Gastroentererology 2005; 128: 2124-2130, Gut 2010; 59: 357-363, Nat Genet 2012; 44: 1349-1354). Prolonging high quality life for years in patients who have undergone surgical resection for pancreatic and peri-ampullary cancer has been a long-term aim, achieved by adjuvant chemotherapy (New Engl J Med 2004; 350: 1200-1210, JAMA 2010; 304: 1073-1081 and 2012; 308: 147-156), confirmed in our meta-analyses (Br J Cancer 2005; 92: 1372-1381, 2007; 96: 1183-1190, 2008; 99: 6-13, 2009; 100: 246-250, 2011; 104: 1440-1451, J Clin Oncol 2007; 25: 2607-2615, 2009; 27: 5513-5518) and adopted as well as disseminated internationally

4.3.4: A non-contact tonometer using new technology developed by Elshiek's (NIHR HTD 2009 £840k) monitors corneal deformation under the effect of air pressure using a single light sensor. The device has been successful in reducing errors in intraocular pressure measurement from up to 6-8 mmHg down to 1-2 mmHg. The device is currently at the final stages of its clinical trials at Moorfields Eye Hospital.

4.3.5: Dowrick and Gabbay and colleagues undertook the recent HTA trial of SSRIs to treat mild to moderate depression in Primary Care- one of a handful of robust studies of antidepressants in that environment, despite it being a common clinical presentation (Kendrick et al THREAD HTA 2009 13:29) . We found a significant improvement in time to recovery compared to usual care, included in revised NICE guidance on managing depression.
Gabbay worked on the Counselling and CBT trial of depression (Ward et al & Bower et al BMJ 2000, King et al HTA 2000), cited 514 times between the 3 papers.

STRATEGY

5.1 Strategic Summary and Introduction to the Themes

The principal challenge facing the North West Coast health economy is tackling health inequalities, whilst facing increasing overall needs and demands for health and social care. The North West Coast (NWC) region includes parts of Cheshire, all of Merseyside and Lancashire and South Cumbria. It is home to a diverse population of 3.6m people with post-industrial urban centres and sparse rural agricultural communities. It has some of the most striking variations in health and wellbeing in England leading to high levels of health inequalities. We have had some of the best and poorest performing PCTs in the North West Coast in terms of outcomes and the region includes some of the most socially deprived wards in the country, with over 80% of the region's boroughs having below average life expectancy. This has led the NWC AHSN to adopt the following objectives.

- Reducing health inequalities;
- Ensuring equity of provision of excellent healthcare;
- Working towards meaningful service user engagement;
- Promoting integrated cross-sector working;
- Minimising environmental impact of healthcare and associated activities.

Following consultation with various stakeholders the NWC CLAHRC proposes to build upon these objectives by harnessing the region's applied research capabilities to develop and support the implementation of a number of themed interventions. A critically important common principle running through the CLAHRC is to ensure that it reduces inequalities. We will continually apply an "equity lens" to consider how proposed interventions will impact upon all communities and also to closely monitor the consistency and effectiveness of service delivery and consequent outcomes.

We have two overarching themes, one based around the NWC CLAHRC Evidence Synthesis and Implementation Collaboration will ensure we make the best use of available evidence to meet the needs of the themes and our members. The final theme concentrates on maximising the engagement of, and Knowledge Exchange with our stakeholders to drive our programme of research and implementation to effect real step changes in health and care. Theme 3 will develop and evaluate the equity lens tool. Working with Local Authorities and neighbourhoods, this theme will also develop and study local authority led public health systems to address the wider social determinants of ill health and health inequalities by integrating health and health equity goals into non-health policies/actions. Theme 2 is concerned with reducing the burden of mental ill health by effective interventions involving the NHS, local authorities and the third sector. Theme 3 is about enhancing the ability of primary and secondary health care providers to address the complex needs of people with chronic conditions. Theme 4 is concerned with delivering personalised health and care interventions meeting the challenge of individual variability through innovation.

The delivery strategy of the CLAHRC is to (i) utilise both the region's HEIs, PPI resources and primary, secondary and public health sectors in applied research; (ii) to mobilise NHS and local authority care providers service users and the public in implementation; (iii) to engage the HEI sector to develop CPD and capacity building; and (iv) fulfil the opportunities to marshal these combined resources to effectively engage the private and third sectors for sustainable wealth creation and service improvements.

5.2 Objectives

Our objectives have been co-determined, evaluated and refined with our collaborators within a regular cycle of review and reflection, focusing on relevance and strategic fit, robustness of design and delivery. We will continue to work in this way throughout the life of the CLAHRC to ensure responsiveness to NHS needs.

As a new CLAHRC the first year will involve a degree of capacity building as we put in place the teams and systems to deliver the programmes against our six themes.

Short-term Objectives (1-2 years):

- Led through Theme 2 (Stakeholder support & KE) with Directors of Engagement & Capacity Building
    - Widen external and stakeholder engagement in strategic structures, processes, project commissioning, oversight and management systems
    - Support and integrate stakeholder engagement with theme activities
    - Establish systems for capacity building - CPD courses, Postgraduate research studentships and fellowships linked to theme projects - this will start as soon as funding is confirmed.
    - Engage implementation leads with NWC AHSN across NHS and LA collaborators
- Steering Board to approve 1st wave of theme projects in month 1 to coincide with project set-up phase
- Set project milestones and measurable outcomes of process and impact, produce quarterly reports
- Identify our partner research neighbourhoods and develop relationships and networks within them, to support their participation in the 2 themes- Improving Mental Health and Improving Public Health
- Month 3: Initiate minimum of 2 projects within each theme by: 2 evidence syntheses plus those for Public and Mental Health themes. Build on findings month 6 onwards to develop substantive

programmes as detailed in themes. ADR, Fitnote and AMP implementations started.

- Establish data collection systems within collaborating organisations to evaluate impact and processes, annual reports to report evidence of impacts on quality of care, service design and commissioning
- Encourage new inter-theme projects and collaborations as initial work settles in
- 3, 12, 18 months: recruitment waves to CPD; PGR and knowledge mobilisations bursaries
- Months 6, 12 and 18: Evaluate evidence of impacts: buy-in from partner organisations' workforce; project appraisals- progress against plans; dissemination activities; stakeholder engagement. Disseminate findings of preliminary projects through annual report and event.
- Month 4 onwards Rolling portfolio of Implementation projects with AHSN(s), commissions through KE and Implementation theme and DALLAS/MI initiative.
- Month 12: publication cycle of evidence syntheses and project results established
- Build relationships with neighbouring CLAHRCs around joint activities- confirm 2-way agreements with GManc CLAHRC and AHSN if all funded to support wider implementation programmes of our work.

Medium-term Objectives (2-3 years):

- Ensure through KE theme regular flow of project proposals to Project Panel.
- All themes to have progressed against targets set by Theme Strategy Committee for phase 2 projects, ad actively planning next cycle. First wave of research projects expected to be prepared for implementation within 2 years or submitted for external funding.
- By month 24 active outreach work with AHSN implementations and dissemination of NWC CLACHRC portfolio findings as demonstration project
- Increased stakeholder expertise in synthesis and implementation to have achieved step change in using research to inform commissioning and cycles of service development and evaluation.
- Collate evaluations of NWC CLAHRC activity to inform strategic review at end of year 2. Criteria include: stakeholder & neighbourhood engagement; capacity building; impacts on commissioning, service design, delivery, quality of care, health; development of IP
    - Review implementation project evaluations
    - Review research projects – evaluate external funding successes from pilots
- Explore engagement of NWC CLAHRC with other R&D activity and structures within HEIs, potential to engage with other HEIs, and across health, social and life-sciences economy.

Longer-term Objectives (4-5 years):

- Repeat medium-term reviews at end of year 4
- Plan for sustainability of activity and collaborations post–NWC CLAHRC grant period from mid-year 3 onwards: external grant support, increasing partnerships with life-sciences, health economy, step-change in collaborations and involvement and engagement with stakeholders
- Continue cycles of project reviews and developments, linking findings of syntheses, new research and implementation evaluations to inform ongoing theme activity and strategic development.
- Evaluate measures of Health Inequalities and compare longitudinal change in NWC CLAHRC areas
- At least 1 peer review and professional publication from each project
- Evidence of take up of NWC CLAHRC innovations from themes in Trusts, Local Authorities, CCGs

5.3 Strategy for Undertaking and Translating Applied Research

The core strategy of the NWC CLAHRC is to use its Themes to integrate and coordinate work by the CLAHRC and its partners to reduce health inequalities in the region. We will do this by using the auspices of the NWC CLAHRC to bring together key stakeholders to undertake the applied research programmes proposed in our Themes and drawing upon the complementary strengths of members. Programme design will always take into account the need to implement the research findings to equitably reduce health care and health outcome inequalities. Our activities will integrate closely with those of the NWC AHSN and we will collaborate closely to drive implementation.

Project priorities have been chosen and will continue to be chosen based on opportunities to use the region's capabilities to improve chronic health inequalities within our region. Our choices of applied research projects will be based (i) on evidence of health care improvements identified by our stakeholders (healthcare providers, patients, industry, local authority wellbeing boards), (ii) evidence reviews identifying the needs for new applied research and (iii) the commitment of stakeholder to implementing applied research outcomes. We have two cross-cutting Themes that are of great importance, Theme 1 Evidence Synthesis and Implementation and Theme 2 Public and Stakeholder Engagement, Knowledge Exchange and Implementation. Between them they provide the core information that is needed, the KE mechanisms and organisational structures to ensure that the applied research outcomes are implemented, and the means to maximise collaborator engagement and strategic influence, linked to our capacity building programme.

If we identify a synthesis gap in that falls within the NWC CLAHRC programme, a synthesis proposal will be outlined and prioritised in collaboration with stakeholders and will be undertaken in Theme 1. If relevant evidence isn't available, an applied research proposal will be developed with stakeholders and prioritised for

inclusion in the relevant NWC CLAHRC theme, supported if necessary through theme 2.

5.3.1 Integrated Engagement to Plan and Deliver Applied Research

NWC CLAHRC brings together academic leaders, commissioners of health and social care and clinical managers with their respective expertise and networks (academic, clinical, front-line healthcare providers, service users, patient and public representatives) which in turn are linked to regional R&D and NIHR structures and industry. All of these NWC CLAHRC stakeholders will be supported to engage as full collaborators in research and implementation projects. We will develop applied research and knowledge exchange skills in our stakeholder groups to act as knowledge brokers and 'product champions', facilitating dialogues between researchers, practitioners, patients and commissioners. This interactive approach to knowledge exchange will inter-digitate with the NWC AHSN implementation programmes, identifying barriers to implementation and suggesting solutions to overcome them. Their involvement will influence the design, delivery and interpretation and implementation of our research, suggest new problems for secondary or primary research, and support relevant evaluation data collection to monitor impact and outcomes from implementation. We will build upon the NIHR Research Design Service's and Networks' patient and public involvement structures such as the North West People in Research Forum (NWPiRF), and existing academic/NHS networks (e.g. Liverpool Health Partners (LHP), NWC AHSN). Knowledge implementation requires transformation by the end-user, not just transfer and so we place much emphasis on the involvement of patients and the public. Thus our planned approach to ensuring the link between our applied research through to diffusing innovation will encourage the local experimentation and analysis of our findings, to promote generative learning and adaptation including 're-invention' to suit local environments and aspirations. Our approach will principally support an 'Organisational Excellence' model among our stakeholders, but will adapt to research-based practice and embedded research models where these are more appropriate.

5.3.2 Our Approach to Implementation

It is essential that our project teams engage with our stakeholders in order to achieve a step change in the quality of care and public health initiatives that will tackle health inequalities. Achieving this step change also needs to consider organisational and structural factors. Commissioning, service design and delivery will be tested against the best available evidence, contextualised for the local environment, priorities and needs. Through CPD opportunities, and in collaboration with the CLAHRC team and Evidence Synthesis group, our stakeholders will be equipped to seek existing evidence and appraise it for their setting and needs. Where evidence summaries exist, these will be tested for local relevance, applicability, and suitability for implementation projects to be planned in partnership with NWC AHSN. Implementation projects will apply research findings in patient care and evaluate their impact on service quality. We will advise partner organisations on what data to collect to evaluate the impact of implementation.

We will co-develop a NW Coast Implementation Strategy informed by theory and research into knowledge exchange, the effective use of evidence and harnessing of the public and private sectors. Our approach with stakeholder integrations across projects should support the 'high evidence' goal as one of the core 3 aims within the PARiHS framework (Kitson et al, Implementation Science, 2008), by improving quality and relevance of evidence to clinicians in participating organisations. We propose a range of Implementation Project models in themes 1 and 2, all of which are grounded in the evidence on effective implementation to sustain change.

Our Theme 2 Public and Stakeholder Engagement, Knowledge Exchange and Implementation will facilitate parallel activities within and between Themes, by promoting dialogue, challenge and the generation of new ideas. Theme leads will meet at bi-monthly project development and theme progress meetings. These will stimulate academic discussions and debate, identify solutions to shared problems and barriers, and identify opportunities for new collaborations.

As a research-active CCG, the host organisation is well placed to enhance opportunities for dialogue between commissioners, local authority public health teams and NHS providers. This focus ensures that our Themes engage closely with the commissioning of care and public health programmes, focusing on uncertainties and challenges facing CCGs and Health and Wellbeing Boards in deciding on priorities for investment and change. Effective, well-informed commissioning is the key to better patient outcomes and experience, linking services, providing cost-effective care and enhancing access with services sensitive and responsive to patient need.

5.4 Working in Partnership

Our focus on Tackling Health Inequalities emphasises the opportunities the NWC CLAHRC brings to explore new approaches to collaborative work between agencies and elements of health-related care, test innovation and identify effective ways to test impact to reduce unacceptable gaps in life expectancy, quality of life and access to care and public health interventions.

Our emphasis on stakeholder engagement and integration reflects our conviction that using evidence more effectively to enhance the quality of care and improve health is a complex, diffuse, spiral and organisation process. To engage with commissioners, practitioners and service users effectively, the CLAHRC and AHSN will co-ordinate their resources and networks of stakeholders to ensure they are complementary and synergistic. Regular updates on our theme programmes and findings will be shared between the management and activity leads in both organisations to facilitate joint planning and strategic collaboration. This will ensure

that our programmes continue to reflect and complement each other. Our engagement and implementation complementarity will also ensure that organisations linked with us will recognise us as different but co-ordinated elements of the research and implementation infrastructure in the region.

5.5 Evaluation

Evaluation will take place at three levels; individual projects, Themes and the CLAHRC as a whole. Each project will have a clear project plan with time-bound milestones and patient health outcome measures. All projects will be reviewed quarterly for progress against targets by the project evaluation subcommittee. The Theme and project leads will provide quarterly reports on their programme under the following headings: progress against targets, findings, dissemination, knowledge exchange activities, implementation project plans, delivery and evidence of impact. A system of quantitative metrics will also be established and will include the number of high impact publications arising from each theme, the number of care intervention programmes implements, the number of care practitioners who have received training or CPD, the number of health care practitioners/managers engaged in applied research projects, quantitative public and patient interactions measure (e.g. number of panel members, number of website hits, number of media references to CVLAHRC projects) and the number of businesses engaged with the CLAHRC. In addition to the financial measures monitoring expenditure and match funding against plan, we will set targets for grant income.

Each implementation project will establish clear measures to monitor their impact in terms of healthcare outcomes. There will be ongoing examination of data on relevant parameters of health inequalities from public health datasets, evidence of service re-design, changes in commissioning and implementation of findings relating to the NWC CLAHRC programme. This will include both NHS members and Local Authority activity relating to public health. Theme evaluations will include measures of implementation across the region. For example, the proportion of patients in the region receiving appropriate treatment as determined by the applied research undertaken by the CLAHRC. We will also evaluate our capacity building programme, stakeholder engagement and support, and the effectiveness of our systems to integrate PPI in our work at all levels.

5.6 Dissemination and Communication Plans

It is vitally important to disseminate our findings to stakeholder organisations engaged in public health. These include NHS organisations, local authority Health and Wellbeing Boards and industry and well as informing patients and the public. We will equip partner organisations with the knowledge and skills needed to adopt the outcomes from our applied research, taking care to gain senior level commitment to the benefits and programmes as well as delivering training to practitioners. We will also engage with the region's medical schools and healthcare training infrastructure to explore how their courses can incorporate the findings of our work. It is also vital that the applied research findings of our work can benefit patients and the public across the UK and internationally. We recognise that there are potential wealth creation opportunities and that involvement of the private sector may accelerate translation. Communication and dissemination is a core activity for the NWC CLAHRC. The Director and each Theme Leader are accountable to the Board for dissemination and communication within their Theme and for the CLAHRC as a whole.

The elements of our dissemination and communication strategy, which will be guided by PPI representation, are: stakeholder engagement; publication for professional and lay audiences; events for healthcare professionals, public sector and industry; AHSNs and CLAHRCs; training and CPD. It is important to stress that communication is a two-way process so that the strengths and capability of the applied research organisations can be applied as a national resource. We will employ a communications lead.

We will publish regularly updated newsletters for professional and lay audiences and maintain an informative website, and social media will publicise our current and impending activity and summarise our findings. They will explain how the public, health care workers and public health organisations can engage with us. There will be public engagement portals so that views can be expressed on any relevant topic as well as to provide routes to participate in programmes. There will be an emphasis on demonstrating how NWC CLAHRC activities are improving public health outcomes and reducing inequalities. We will use it gather information and patient opinions. Patient and public representatives from our PPI work will guide the design and assist with editorial strategy. Our social media presence will attract visit to the website, provide update prompts and publicise web based tools that are developed during the applied research projects.

The event programme will be developed to promote the activities of each theme, in collaboration with the AHNS, LHP and other partners where appropriate. It will be marketed within the NWC region and nationally and be designed to showcase not only the applied research outcomes but how they can be used to demonstrably reduce health inequalities. We will use case studies to illustrate the journey from identifying an opportunity to improve health, evidence synthesis, applied research, translation and improved health outcomes.

Senior level participation in the national community of AHSNs and CLAHRCs is particularly important to us. Not only will we contribute our findings but we will actively seek collaborations to pool resources and leverage expertise. This will increase our effectiveness for the benefit of NWC patients and population, and also accelerate access to our findings by the rest of the country. Our methodological developments will be offered to other CLAHRCs and AHSNs as resources that they can draw upon to accelerate their applied research, either by undertaking commissioned project work or through disseminating our innovative approaches.

SPECIFIC THEMES

6. Applicants should propose a minimum of three Themes.

Applicants will need to complete the relevant sections of the *Specific Theme CLAHRC 2013.doc* document for each Theme, downloaded from the National Institute for Health Research Central Commissioning Facility (NIHR CCF) website.

Please refer to the *NIHR CLAHRCs 2013 Invitation to submit application* document for more details.

STRATEGIC PARTNERSHIPS

7.1 Evidence of Collaborations Between HEIs

Formal links between Universities of Liverpool and Lancaster have existed since 2006 through the joint Medical School. Longer-standing collaborations to build health research infrastructure have included the NIHR North West Research Design Service (a collaboration extending back nearly 15 years as HR&DNoW); ESRC Centre for Evidence-Based Public Health Policy; MRC North West Hub for Trials Methodology Research. Most recently we are partners in the new ESRC North West Doctoral Research Training Centre (with Manchester University), and shared resourcing of posts in Health Economics at Lancaster. We contribute complementary methodological expertise across the social sciences and medicine, with particular strengths in evaluating differential impact. This partnership is exemplified in LiLaC (Liverpool and Lancaster Universities Collaboration for Public Health Research). Examples of our collaborations and how these would contribute to the NWC CLAHRC are described below.

The NWC evidence synthesis collaboration brings together the world-leading expertise across the 3 HEIs and trust partners in systematic reviews and evidence synthesis (theme 1). This collaboration, independent of the CHLAHRC facilitates methodological advancement and pooling of expertise, 3 **Cochrane Review groups**, 2 **Cochrane Collaborations** and the **NIHR Liverpool Pancreas BRU**. The MRC funded **North West Hub for Trials Methodology Research** is hosted by the University of Liverpool (Williamson) and includes the Universities of Lancaster, Manchester and Bangor. Particularly pertinent to Theme 1 (Evidence Reviews) is the opportunity to link with methodological developments in outcome measures through the COMET (Core Outcome Measures in Effectiveness Trials) Initiative. Funded through the NWHTMR the COMET Initiative aims to bring together agreed standardised sets of outcomes. The **North West Clinical Trials Collaborative** brings together trials units at Liverpool, Manchester and Lancaster and includes an NIHR CTU at Alder Hey and CRUK CTU at the University of Liverpool.

Theme 3 of the NWC CLAHRC will be led by one of the co-Directors of **LiLac** (Liverpool Lancaster Public Health Collaborations). LiLac is one of 8 members of the **NIHR School for Public Health**. Public health research and knowledge exchange in the NWC CLAHRC will be led by LiLaC, working with the University of Central Lancashire and the local public health services in the NHS and local authorities. University of Liverpool is a member of the **UK Public Health Research Consortium** (PHRC, Popay and Whitehead), funded by the DH PRP since 2005, involving 11 academic institutions undertaking evaluations and evidence syntheses.

7.2 Collaborations with the NHS

The **Lancashire and Cumbria Clinical Research Hub** (The Hub) is a formal strategic partnership to stimulate, promote and support collaboration in research and innovation between Lancaster University, the 4 acute and 2 mental health trusts with Industry and other health-related organisations. Similarly, **Liverpool Health Partners** (LHP) is a formal and strategic partnership between 8 acute and specialist trusts and University, to translate biomedical research to direct clinical benefits for patients. Both the Hub and LHP will facilitate the activities in the CLAHRC by acting as a focal point for governance and delivery of joint projects with each of the partner NHS Trusts and Universities. Primary Care engagement is informally strong, but formal engagement has been delayed by the disestablishment of the PCTs, but is now moving ahead with Liverpool CCG.
The Hub provides a framework that supports and enables cross-sectoral collaboration in research and innovation. The aim is to enable the growth of high quality research within the local NHS sector in parallel with the growth of NHS and Industry collaborations across all faculties at Lancaster University.

The **Centre for Drug Safety Science** (CDSS, Pirmohammed) undertakes translational research and implementation. It includes the University of Liverpool, NHS Trusts (e.g. RLBUHT and Aintree UHFT), Clinical Research Networks (e.g. Medicines for Children Research Network (MCRN) and Merseyside and Cheshire CLRN) and research facilities (Wolfson Centre for Personalised Medicine, Liverpool Clinical Trials Centre, the Liverpool Experimental Cancer Medicine Centre and the Manchester Wellcome Trust Clinical Research Facility). Industry collaboration plays a significant role in the CDSS including joint research and industrial placements for PhD students. The work focuses on the development and post-marketing phases of new and established medicines for the benefit of patients, regulators and industry.

The **Centre for Better Births** a project led by the University of Liverpool, in partnership with Liverpool Women's NHS Foundation Trust was opened in April 2013 after a successful appeal for philanthropic donations launched in 2009. The Centre, part of UoL's new Centre for Women's Health Research, aims to improve understanding of the problems experienced in childbirth and labour, such as premature labour; stillborn babies; emergency caesareans; infertility; and miscarriage and a hub for training the next generation of scientists to continue the advance in knowledge to prevent problems in pregnancy and labour for women and families. The

Centre is linked to the Cochrane Pregnancy and Childbirth Group (Theme 1).

7.3 Partnerships with Local Public Agencies
The **Liverpool Public Health Observatory** (since 1990) inspired the subsequent network of regional public health observatories. With DH funding, **IMPACT** – the International Health Impact Assessment Consortium - develops capacity in research, education, and training in Health Impact Assessment (HIA), working with local authorities and the NHS across England; work in Theme 3 is a logical extension of this collaborative work. In Cumbria and Lancashire (C&L) joint Lancaster University/NHS co-ordination of the C&L Public Health Specialty Group provides links to the national network of **NIHR CLRN PH** specialty groups, and there is a public health focused Health Education and Innovation Cluster (HEIC). In the 1990s, Popay established the **Public Health Research and Resource Centre**, funded by NHS agencies and LAs in Greater Manchester and involving 'innovation in knowledge exchange' that resulted in re-investment of more than £2m in preventive services. ESRC funding (2011-12) has supported further work with Exeter and Cardiff universities to refine this approach to 'knowledge spaces'. In 2008, a £2m grant from Liverpool PCT established the **Liverpool Health Inequalities Research Institute** (Gabbay and Capewell) at the University of Liverpool; our experience with this collaboration has informed our approach to Theme 2 (Knowledge exchange and responsive funding).

7.4 Third Sector, Private and Public Partnerships
Since 2004, University of Liverpool has coordinated the **Heart of Mersey** research programme (Capewell), England's largest regional cardiovascular health charity, producing evidence on interventions to promote healthy food and smoke-free environments. The **National Public Health Observatory for Learning Disabilities** (Jones) at Lancaster University works with the DH and NGOs including Mencap and the Learning Disability Coalition. Lancaster's **Centre for Ageing Research** works with third sector stakeholders (e.g. AgeUK and the Alzheimer's Trust), public sector bodies (e.g. Lancashire Care Trust) and private sector agencies (e.g. Housing and Dementia Research Consortium). Lancaster's **International Observatory on End of Life Care** works with a network of service providers and for the past five years Payne has directed the **NCRI funded Cancer Experiences Collaborative** bringing together 5 universities including Lancaster, Liverpool and Manchester, service users and clinical organisations. Lancaster's **Centre for Organizational Health and Wellbeing** was formed in 2008 with core funding from private and public sector agencies. It conducts evaluative research on action to improve health and wellbeing in organizational settings e.g. increasing workplace physical activity at Nestle.

7.5 Partnerships with international agencies:
UoL's Public Health department is a **WHO Collaborating Centre**, leading on methods for evaluating universal policies. Whitehead (Snr Advisor) and Popay (Task Group Chair) serve on the **WHO EURO Review of Social Determinants of Health.** They provide strategic advice to the **DH Policy Research Programme**.

7.6 Evidence of track record in joint delivery of training and capacity building
The **North West Doctoral Training Centre** (NW DTC 2011-16) is a formal collaboration between the Universities of Lancaster, Liverpool and Manchester funded by the Economic and Social Research Council (ESRC). The Universities of Liverpool, Lancaster and Central Lancashire toegether with the University of Cumbria collaborate in a **Medical and Dental Consortium** established in 2006.

7.7 Commitment and Future Plans and Respective Roles
The above examples provide evidence of widespread and diverse partnerships, many of which relate directly to those in this proposal. Joint working is already facilitated, and strong networks and mechanisms for collaboration are already well established. Shared vision is demonstrated by the richness of these partnerships around grants, developing methodologies, co-ordinated research planning and delivery and mature mechanisms for implementation and facilitating innovation and joint-working. We anticipate these, together with our well-developed inter-university and NHS relationships, and close working with Local Authorities will facilitate early wins for the CLAHRC. The diversity and level of investment in our proposal is a strong endorsement of, and commitment to, extending these partnerships. LHP and L&CCRH demonstrate commitment and engagement, as does the LivHIR Institute with a unanimous endorsement from the advisory board for investment of the budget balance in NWC CLAHRC, which is considered to be its logical legacy. LivHIR is currently engaged in 2 key projects that demonstrate the strength of our future relationships- an action leaning project with the CCG to develop their Health Inequalities Strategy, and a critical realism informed study of the development of the Liverpool Health and Wellbeing Board. Building on the mature relationships we plan that stakeholders from our partners will actively engage in all of our projects, instigating and leading many of them, and through the management structures have robust mechanisms to influence and guide strategy and portfolios of activity.

LEADERSHIP

NWC CLAHRC Lead Director: Prof Mark Gabbay

Dr Mark Gabbay is Professor of General Practice and Head of Department of Health Services Research at the University of Liverpool. He is a part-time GP at Brownlow Health in Liverpool, and academic lead of the RCGP Substance Misuse and Associated Health group. He is Director of the £2M-funded (PCT) Liverpool Health Inequalities Research Institute. His extensive NIHR roles ensures he has a high profile in R&D across the North West. These include: clinical lead of the NW Primary Care Research Network, Associate Director of the NIHR North West Research Design Service, primary care lead and executive member of the NW hub of the Mental Health Research, and Cheshire and Mersey Comprehensive Local Research Networks, as well as being on the advisory groups of the NW Stroke, MCRN and DeNDRoN networks. He has 90 peer reviewed publications (with 996 citations) and has been a PI or Co-I on 30 competitive research and infrastructure grants amounting to nearly £26M in total since 2002. The internationally renowned work on sickness certification has influenced a number of current welfare reforms relating to work and health, such as the introduction of the Fitnote and an emphasis on active engagement to reduce the risk of long-term sickness absence. He has worked with a number of the leading trials and studies on managing depression and anxiety in Primary care which have modified NICE guidance.

Through his strategic and leadership engagement with a wide variety of NIHR research networks and support structures, he has strong links with many of the collaborators, as well as the participating HEIs, theme and project leaders. As a senior advisor with RDS, and an established health services researcher with a track record of using mixed methods, he is well-placed to co-ordinate the breadth of research and implementation activity of and demands within a CLAHRC. A graduate of the NIHR Ashridge Developing Leaders course, he has nearly a decade's experience as a departmental head, line managing around 100 staff, with budgetary responsibility for multiple research teams. He is also an experienced educationalist at both undergraduate and postgraduate level, with a track record of PGR supervision and CPD course development. Through the RDS in particular he has been engaged in strategic and leadership of PPI systems and engagement in research across the North West, and with Jacoby and Litva held an ESRC grant exploring lay views of service user engagement in governance systems. His own grants always include strong PPI engagement and robust implementation plans.

Theme 1: Evidence Synthesis and Implementation – Prof Rumona Dickson

Professor Dickson is an internationally respected expert with over 15 years' experience of conducting systematic reviews of clinical evidence. Over the past eight years she has consistently contributed as a methodology expert to two Masters programmes (Ulysses HTA masters programmes run in Montreal, Toronto, Rome and Barcelona; Royal Tropical Institute International Masters Programme, Amsterdam) as a fellow of the Joanna Briggs Institute in Adelaide Australia, as a consultant to Athabasca University Alberta, Canada and most recently assisting in the development and delivery of the initial two HTA Fellowship programmes held in India. Her research has been funded through three successive multi million pound five year research grants from the NIHR HTA programme and is responsible for providing critical evidence used by NICE in the establishment of national guidance to the NHS (areas include cardiac disease, breast and lung cancer, melanoma and others).

An experienced collaborator, she has worked with all three Cochrane Review Groups included in the proposed NWC Synthesis Collaboration. Her team hosts at least three national and international researchers each year as they come to work with the LRiG team. Most recently she has expanded her collaborative efforts to include the broader topic of evidence synthesis including meta and narrative synthesis as well as realist evaluation.

Theme 2 Professor Michael Pearson

Professor Michael Pearson spent a decade leading the production of NICE guidelines and establishing and overseeing a series of national audits while at the Royal College of Physicians. Each project required setting up effective partnerships of clinicians, patients and commissioners/managers, and each was successful. The outputs from the early starters (MINAP - myocardial infarction, Sentinal Audit of Stroke) have led to demonstrable improvements in both organisation of care and patient outcome and of the more recent ones - COPD has strongly influenced the national COPD strategy; the national Hip fracture audit has become embedded into the quality measurement now that it supplies the data for the best practice tariff. The National Audit of Seizures just about to start its second round of data collection. The collaborative work to analyse the Hospital Episode Statistics is now generating data that is being used by the relevant national clinical directors and the planners in the Dept of health. The analysis is different to that which has gone before - it is based on defining the clinical syndromes with specialists and patient organisations, then ensuring that we have controlled for expected confounding, and finally testing the outputs on clinicians to ensure there is both face validity as well as producing figures that make sense and thus can be used to plan change. Professor Pearson works with key clinicians whose work has influenced gastroenterology (Dr Keith Bodger), respiratory disease (Dr Paul

Walker) and renal care (Dr Abraham Abraham). Thus the primary skill offered is to oversee and supervise a series of projects with the ability to ensure they run to time and that they remain focussed on practical aspects of care that can be implemented. He has over 50 peer reviewed papers. Whilst at the RCP, he grew his unit's funding from £0.25m to £2.25m pa.

Theme 3: Improving Public Health Systems - Prof Jennie Popay
Professor Jennie Popay heads the Centre for Health Equity Research and Knowledge Exchange at Lancaster University. She is currently Deputy Director of the NIHR School for Public Health Research and founded the NIHR funded Research Design Service in the NW. Her research focuses on identifying effective ways of involving patients and the public in policy-making and research, evaluating policies/actions aimed at improving the social determinants of health and developing methods for the systematic review of diverse evidence. Her work on age related visual disability and mental health resulted in investment in preventative services. She has pioneered the use of lay knowledge, patient experience and public involvement in research and practice leading to major implementation projects. She has introduced evidence based approaches to develop social capital in low income areas, shaped PPI Forums established in every NHS Trust and informed NICE guidelines on community engagement in public health interventions. Her work is international, working on South Australian Health in all Policies initiative. She has 157 publications and has been Co-I or PI on £34m grants.

Theme 4: : Improving Mental Health – Prof Richard Bentall
Dr Richard Bentall is Professor of Clinical Psychology at the University of Liverpool and has been researching the causes and treatment of mental illness for nearly thirty years, during which time he has published > 200 peer-review academic papers, 5 books, 4 edited books and >40 contributions to books, (h index =45). He holds honorary/visiting chairs at the Universities of Bangor, Durham and Manchester and has been PI or Co-PI on grants from an NIHR (P-PG-0606-1086; programme grant with collaborators in Manchester to develop patient-defined outcome measures of mental illness, and to test interventions to enhance subjective recovery), HTA, MRC, ESRC and Wellcome. His research ranges from epidemiology, through cognitive testing and physiological methods (fMRI, EEG) to randomized controlled trials. He pioneered the development of psychological interventions for people with psychosis and has carried out RCTs of CBT for patients with early schizophrenia (Tarrier et al. 2004; MRC funded), patients with bipolar disorder (Scott et al. 2006; MRC funded) and patients with an at-risk mental state for psychosis (Morrison et al. 2012; MRC-funded). This work has influenced NICE guidelines and abroad (e.g. Schizophrenia Treatment Recommendations of the US DoH), promoting more psychologically-orientated services for severely ill psychiatric patients who, in the past, would have been exclusively managed with pharmacotherapy.

Theme 5: Managing Complex Needs – Prof Tony Marson
Dr Tony Marson is Professor of Neurology at the University of Liverpool and Honorary Consultant Neurologist at the Walton Centre, a leading specialist neurology centre. Marson's contribution to improving outcomes in chronic disease has focussed upon epilepsy, the most common serious neurological disorder. He led the largest randomised controlled trials in epilepsy to date the results of which underpin guidance and public policy. He is Coordinating Editor of the Cochrane Epilepsy group which undertakes systematic reviews, results of which inform guidance. He leads the National Audit of Seizure Management in Hospital which provides nationwide data about epilepsy care. His work has strongly influenced underpins NICE guidance on epilepsy care and also changes in UK and EU motoring legislation

Theme 6: Delivering Personalised Health Care – Prof Munir Pirmohamed
Professor Munir Pirmohamed is a practising physician at RLBUHT. He is also Professor of Clinical Pharmacology at the University of Liverpool, and holds the NHS Chair of Pharmacogenetics. He is Director of the Wolfson Centre for Personalised Medicine and Deputy Director of the MRC Centre for Drug Safety Sciences in Liverpool. He leads the Drugs Theme for Liverpool Health Partners, and is Commissioner on Human Medicines and chairs its Pharmacovigilance Expert Advisory Group. The Wolfson Centre is now the global co-ordinating centre for the International Consortium on Drug Hypersensitivity. Liverpool's Pharmacology and Drug Safety Science has significantly impacted on drug licensing, drug development, better use of existing drugs and led to industrial collaborations involving research on new drug candidates. The MRC and Wolfson Centres are collaborating with the present Pancreas NIHR BRU. Prof Pirmohamed has raised over £45m in grant funding, has an H-index of 54 (Web of Science) and has over 300 publications. He became NIHR Senior Investigator in 2008, and was re-appointed in 2013. He has also become a Fellow of the Academy of Medical Sciences in 2013, and was awarded the William Withering Medal by the Royal College of Physicians in 2011. An example of how his work has translated from the lab to benefiting patients in less than five years is given by the HLA-B*5701 gene. This was identified as a pre-disposing factor for hypersensitivity towards an HIV drug, abacavir. Prescribing an alternative drug following a positive genetic test for HLA-B*5701 has been shown to be a cost effective use of resources.

DEPLOYMENT OF RESOURCES

9.1 Justification of Resources

We have assigned resources to the Themes, rather than individual projects, in order to provide the Steering Board with the flexibility to adjust allocations over the life of the grant. Detailed costings have been prepared for identified projects. We have used these for budgeting: to determine the affordability of proposals made to the bid team, the sustainability of our proposed theme portfolio, and relative apportionment of resources against salaries, direct costs, non-staff costs and additional treatment costs within them. We have sought the advice of the CLRNs in calculating additional treatment costs, but many of our project leads have posts within networks and are familiar with the costing templates when drawing up their project proposals and budgets.

We have apportioned non-core team resources equally across the Themes, but have the capacity to adjust the apportionment between and within Themes according to the recommendations and project approvals determined by the Steering Board in collaboration with the Management Group. Costs have been prepared in a way that is compliant with the Funding section of the NIHR's Invitation to Submit Application document.

To reduce administrative costs we have aligned our structures with the AHSN and existing partnerships between the Universities and NHS (LHP, LCCRH) to reduce bureaucracy and administrative complexity and duplication. The Universities have also covered the time contributions of the Directors and theme leads, and made substantial contributions to the postgraduate bursaries and other academic costs.

Reflecting our emphasis on partnership working, we are investing in staff to provide for robust engagement systems and also a range of significant CPD and training opportunities to build capacity in applied research and implementation among the NHS and Local Authority teams. Our investment in 3 directors reflects the importance of driving these ambitions, as does the proposed PPI facilitator and Research and Knowledge Exchange Fellows to support implementation and stakeholder-led projects.

9.2 Financial Contributions from Members

The host trust, Liverpool CCG is providing £3m to the CLAHRC, of which 50% is cash, around 25% of the total matched funding is cash (LHP and the LivHIR Institute are providing cash as well), the rest, almost £7m is 'in kind' donations of staff time to be used by the NWC CLARHC Director. Liverpool University is providing £2.1m and the other two universities £1.1m between them as matched funding in the form of staff FTEs, studentships and PGR bursaries, and the balance of the Liverpool Health Inequalities Research Institute account. The Advisory board of the Institute agreed unanimously that the NWC CLAHRC was an excellent legacy opportunity and provided a real opportunity to realise the maximum benefit to tackling health inequalities through research activity.

We have a breadth of investments from NHS trusts, but this is all in kind rather than cash, and ranges from £967,500 (with an indication of potential to increase depending on future alignment against R&D priorities within the trust) to £21,5k from a District General Hospital Trust. All of those providing matched funding are giving at least 0.1FTE of staff time to be used by NWC CLAHRC. A significant proportion of the Local Authorities in our area are contributing matched funding, ranging from 0.8FTE to 0.1FTE. The contributions are set out in the table.

Organisation	Total	Annual	Notes
Liverpool CCG	[redacted]	[redacted]	[redacted]
West Cheshire CCG	[redacted]	[redacted]	[redacted]
Royal Liverpool Broadgreen UH T	[redacted]	[redacted]	[redacted]
Aintree University Hospitals NHS FT	[redacted]	[redacted]	[redacted]
Liverpool Health Partners	[redacted]	[redacted]	[redacted]
Liverpool Women's NHSFT	[redacted]	[redacted]	[redacted]
Alder Hey Children's NHSFT	[redacted]	[redacted]	[redacted]
Warrington & Halton Hospitals NHSFT	[redacted]	[redacted]	[redacted]
Mersey Care NHST	[redacted]	[redacted]	[redacted]
Univ Hospitals Morecambe Bay NHSFT	[redacted]	[redacted]	[redacted]
5 Boroughs Partnership NHST	[redacted]	[redacted]	[redacted]
The Walton Centre NHSFT	[redacted]	[redacted]	[redacted]
Liverpool Heart and Chest NHST	[redacted]	[redacted]	[redacted]
Clatterbridge Cancer Centre NHST	[redacted]	[redacted]	[redacted]
Lancashire Teaching NHST	[redacted]	[redacted]	[redacted]
Liverpool Community Health NHST	[redacted]	[redacted]	[redacted]
University of Liverpool	[redacted]	[redacted]	[redacted]
Wirral Univ Teaching NHSFT	[redacted]	[redacted]	[redacted]
Lancaster University	[redacted]	[redacted]	[redacted]

University of Central Lancashire	[redacted]	[redacted]	[redacted]
Lancashire County Council	[redacted]	[redacted]	[redacted]
Blackburn with Darwen Borough Couns	[redacted]	[redacted]	[redacted]
Blackpool Council	[redacted]	[redacted]	[redacted]
Sefton Council	[redacted]	[redacted]	[redacted]
Knowsley Council	[redacted]	[redacted]	[redacted]
Liverpool City Council	[redacted]	[redacted]	[redacted]
Cheshire West and Chester Council	[redacted]	[redacted]	[redacted]
Total	**£11,568,258**		

9.3 Linkage to other NIHR and DH Funding

We have a range of existing investments from the NIHR within the NWC CLAHRC partnership, and these are contributing in a range of ways to our proposed portfolio and collaborations. There are projects from the NIHR Pancreas BRU (Sutton) within the NWC CLAHRC projects, and the NWC CLAHRC Evidence Synthesis Collaboration includes a number of NIHR and MRC-funded units and close links to the NIHR, CRUK & MRC Clinical Trials Units, ensuring we effectively draw upon their expertise within our evidence syntheses, research and implementation projects. Our PPI programme aligns closely with the NIHR RDS. We have excellent links with the NIHR research networks. Many of the key personnel engaged with the NWC CLAHRC are NIHR investigators and Senior Investigators, and other project leaders are current or recent NIHR fellowship award-holders. Many of our collaborating trusts currently host both networks and NIHR grants, and have well-developed R&D and governance structures. Examples are set out in sections 7 and 13.5 of this proposal.

The NWC AHSN is of paramount importance to the CLAHRC and we have strongly aligned our structures and services with theirs. This will be achieved through cross-representation at Board level, industry engagement, use of common PPI initiatives and strong collaboration between themes in the two programmes, particularly personalised medicine and care.

9.4 Variation in Grant Award and Programme Priorities

In the event that the award was increased by 10% of the funding applied for, we are confident that we will be able to obtain the necessary additional match funding from the NWC CLAHRC's partners. This would provide an additional £200k in the first year and £400k in subsequent years. We would use some of this funding to support two FTE Applied Research and Knowledge Exchange Fellows. Their roles would be to work on relatively short stakeholder-led projects associated with chronic conditions that do not fall within the scope of the existing Themes, We would invest in additional Knowledge Mobilisation bursaries to enable longer secondments through that scheme within the NWC CLAHRC. We would also expand out dissemination and implementation activities by appointing a Dissemination Manager to accelerate implementation across the NWC region by pro-actively contacting and supporting those NHS Trusts, CCGs and Local Authorities who have not joined CLAHRC to extend the impact of our results.

If the funding was 10% less than that sought we would retain all Themes but scale back their activity. We would seek potential collaborative opportunities with other CLAHRCs, and work with the AHSN and trusts to enhance trust contribution to implementation projects through staff resources. We would seek to relatively protect capacity building support, and investment in stakeholder engagement.

A 50% cut in NIHR grant would require full scale review of our plans. We would have a relatively larger proportion of our workforce 'in kind' which would limit the extent to which we could undertake some of our proposals. Those requiring significant investment in new researchers would be reduced in scope, scaled back or withdrawn. For example we would be likely to concentrate on relatively more implementation than applied research projects, and encourage theme leads to work with RDS to prepare pilot or feasibility trials for RfPB competitions. One possible but drastic approach would be incorporating Evidence Synthesis and Implementation with Knowledge Exchange as over-arching approaches and support across all themes, plus merging Personalised Health & Care with Managing Complex Needs, and the Public Health with Mental Health themes to maximise synergies and reduce management costs. However we would retain the emphasis on capacity building, stakeholder engagement and multidisciplinary research in innovative settings and approaches.

9.5 Matched Funding

Our matched funding resources will sustain the engagement of Partners and management structures. Their contribution will drive implementation through their direct contributions. They will also act as Research and Implementation Champions, promote and sustain Knowledge Exchange through their role as Knowledge Brokers. These activities will initiate, build and sustain communities of practice. A parallel process will be enabled through our partners in Local Authorities and CCGs. Matched funding also will be used to fund all implementation-related activity, stakeholder engagement and the balance used to fund research activity. This is set out in the finance tables.

EXTERNAL GRANT FUNDING

10. On the *NIHR CLAHRC 2013 Supporting Information sheet,* which can be downloaded from the NIHR CCF website, please submit details of the external research funding awarded to organisations within the proposed NIHR CLAHRC since 1 January 2007, for applied health research (and directly related, relevant research). Each award should correspond to a proposed and named Theme.

Please also provide the total value of external funding awarded for research corresponding to the proposed Theme (s), since 1 January 2007.

1. Evidence Synthesis and Implementation	52,966,398
2. Public & Stakeholder Engagement, Knowledge Exchange & Implementation	2,726,589
3. Improving Public Health and Reducing Health Inequalities	10,831,908
4. Improving Mental Health	25,435,576
5. Managing Complex Needs	28,490,780
6. Delivering Personalised Health and Care	47,606,262
Total all themes	168,057,513

RESEARCH PUBLICATIONS

11. On the *NIHR CLAHRC 2013 Supporting Information sheet,* which can be downloaded from the NIHR CCF website, please provide a list of peer reviewed publications authored by researchers affiliated (defined as substantive or honorary/visiting appointment) with an organisation named within the proposed NIHR CLAHRC which you believe best demonstrates the quality and impact of your applied health research directly related to and relevant to the Themes of the proposed NIHR CLAHRC.

Please refer to the *NIHR CLAHRCs 2013 Invitation to submit application* document for more details.

LEADERSHIP AND MANAGEMENT ARRANGEMENTS

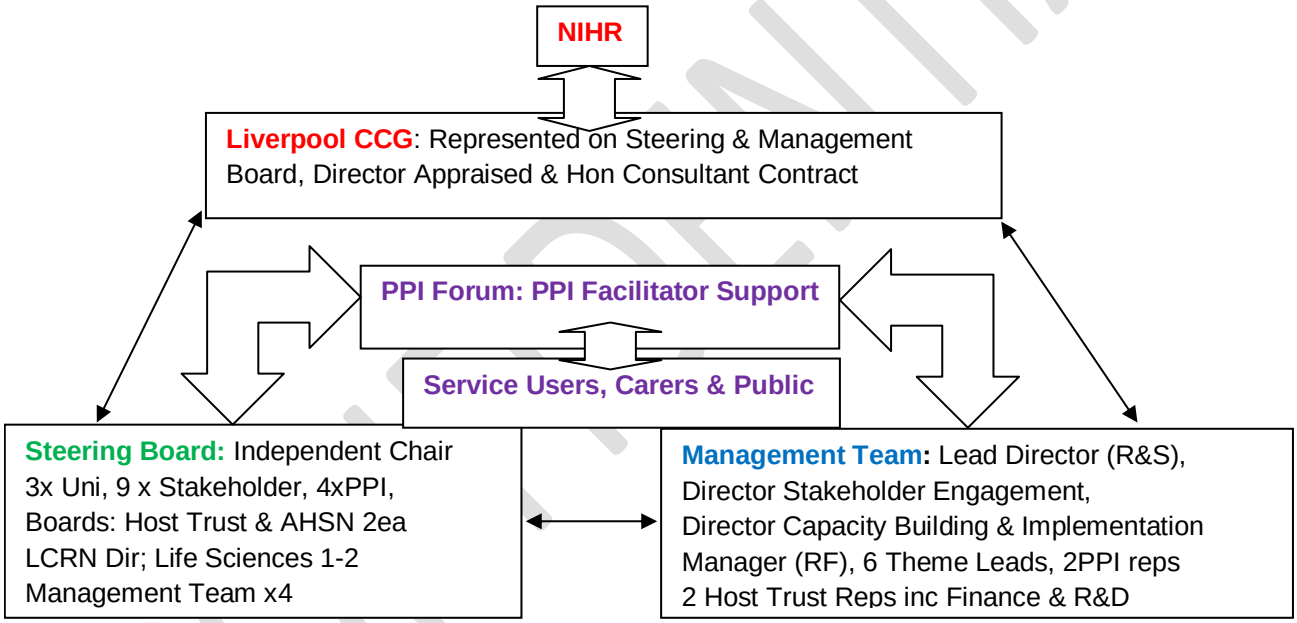
We are determined that NWC CLAHRC is a genuine partnership with extensive and integrated joint working and strategic management between the members. Although it is accommodated within the Liverpool CCG, we propose a stakeholder led governance model supported by external scrutiny and peer review to ensure that the work is of a high quality and focussed on the region's chronic health inequalities. Stakeholders will be integrated into NWC CLAHRC at all levels to enhance the relevance of the programmes and Theme activities, have the potential to influence commissioning, service design and delivery and thus quality of care. This will align strategies, create common interests and contribute significantly to realising the CLAHRC's aims.

12.1 Membership Structure

The NWC CLAHRC will operate a membership structure with including partners investing matched funding, patient and public engagement organisations, and associate organisations, who whilst enthusiastic in their support, are unable currently to contribute matched funding, but will engage with the NWC CLAHRC programme. NWC CLAHRC members include NHS trusts, CCGS, Local Authorities, Health and Wellbeing Boards and Industrial collaborators.

12.2 Organisation Structure

The proposed structure has been designed to ensure that the strategy, research, implementation, capacity building, stakeholder engagement, value for money and impact on quality of care are all subject to regular, robust scrutiny.



Liverpool CCG will be the host organisation for NWC CLAHRC. Liverpool CCG will establish a NWC CLAHRC Steering Board (see figure) with responsibility for the NWC CLAHRC and ultimately accountable to the NIHR for its performance and delivery of the contract with NIHR. It will oversee the allocation of resources to the Themes, be responsible for strategic direction and governance, monitor the health inequality outcomes of the CLAHRC and establish a scorecard of performance measures.

Members of the Steering Board will include 2 members of the AHSN executive board, 2 members of the Host Trust Executive, 4 PPI and Service User representatives, the NIHR Local CRN Director, 3 University Representatives, 9 representatives of our collaborating organisations including at least 2 each of: CCG or community health trusts, acute or mental health trusts, local authorities, 1 life-sciences organisation, with the management team directors and manager as invitees. The Board will have an external independent chair. It will meet bi-monthly for the first 18 months, then quarterly. We will appoint an External Advisory panel to work alongside the R&D Committee. The Panel will meet with the Board and management team annually, face to face, but with regular email meetings and input before Board meetings. All projects will have external academic review and stakeholder peer review, submitted to and reviewed by the R&D Development Committee, which will approve all commissioned projects informed by these reports.

The Board will be assisted in its duties by three committees. The R&D Committee will be drawn from stakeholder representatives including PPI, managers, commissioners and practitioners and academics. They

will review all project proposals and their external peer reviews and assess whether they represent value for money and align with NWC CLAHRC objectives. It will initially meet quarterly and between meetings undertake its work by phone and email. An External Advisory Panel will be appointed to work alongside the R&D committee. It will meet annually with the Board and management team to provide external scrutiny and ensure that the NWC CLAHRC is adopting best practices. Finally, there will be many strategic matters where we wish to consult with patients, service users and members of the public so we will form a Patient and Public Involvement Panel. Its work is described in section 14 below.

The Director will be responsible for NWC CLAHRC operations, including control of matched funding, and will be accountable through the Board to the CCG CEO for CLAHRC strategy, performance and finance.

The NWC CLAHRC Management Team will be led by the Lead Director (Research and Strategy) supported by the Director of Stakeholder Engagement, and the Director of Capacity Building and Implementation. Other members include the NWC CLAHRC Asst Director (Research Fellow), the six Theme leaders, a senior representative of the host trust, and its finance manager, and two representatives of the PPI Panel. The Director of Capacity Building and Implementation will be responsible for implementation and capacity building; the Director of Stakeholder Engagement will lead on stakeholder and public/service user involvement along with communication, dissemination and industry engagement. A small Project Oversight Group will receive and review regular, timetabled project and theme 'progress against objectives' reports from theme leaders, and oversee governance. They will work with the Core team to troubleshoot barriers and offer solutions, and report on progress to the Management Team and Steering Board meetings. Regular seminars will present findings, and encourage collaborations between project and theme leads, discussions with stakeholders and generate innovation and new projects.

Each Theme will have a Theme Strategy Committee (TSC) chaired by the Theme Leader and comprising of the Theme's project managers, participating stakeholder representatives including a commissioner, a practitioner two PPI representatives, and a life science industry representative. The TSC will work closely with the Directorship to drive the development and delivery of stakeholder engagement, capacity building, implementation and research. The leaders of each project within the Theme will report to the TSC quarterly. An external academic adviser will also join to provide objective challenge. The TSC will manage the portfolio of projects within the Theme and be accountable to the Director for accomplishing the objectives for that Theme and management of the financial resources allocated to it. It will be responsible for approving project objectives and milestones, monitoring progress and very importantly assessing the impact of the projects on health inequalities and patient outcomes. In the event that a project is not making sufficient progress, the Director and Theme Lead will provide support to turn the project round, but if this is proving ineffective, will wind up that project and reallocate resources.

12.3 Linkages to the NWC AHSN

The proponents of this CLAHRC were also among the leading instigators of the NWC AHSN and are represented on its Board. There will be strong cross-linkages with the NWC AHSN as its CEO will be a member of the NWC CLAHRC steering Board. Further, it has been agreed that the NWC CLAHRC will take a seat on the AHSN Board. There will also be extensive collaboration between the AHSN and NWC CLAHRC Themes (e.g. Theme 5 Delivering Personalised Health Care has extensive links to the AHSN's Theme 3 on Personalised Medicine; the dissemination and communication activity can be integrated into AHSN Themes 5 and 6 on Education and Training and Patients and Public).

12.4 Other Operating Partnerships

There are two further collaborative structures bringing the NHS and HEIs together in our region, Liverpool Health Partners (LHP) and the Lancashire and Cumbria Clinical Research Hub (LCCRH) which were both founded in 2011. These bring together acute and mental health with the local HEIs to collaborate on research programmes and develop joint research governance structures to underpin activity.

There are three Universities collaborating in NWC CLAHRC, Liverpool, Lancaster and University of Central Lancashire, There are a number of close collaborations (including shared academic posts) between the health faculties at Lancaster and Liverpool. All 3 are partners in the NIHR RDS grant, and LiLaC brings together Liverpool and Lancaster as part of the NIHR School of Public Health.

Linkages with other NIHR structures are described in section 13.5.

WORKING WITH INDUSTRY AND THE NIHR

13.1 Ambition for Industrial Engagement

The NWC CLAHRC considers industrial and 3rd sector engagement to be essential to reducing health inequalities and improving outcomes; they are partners and collaborators, particularly for implementing and exploiting applied research outcomes to accelerate their translation into health care services. We fully recognise the importance of wealth creation and our partner organisations have well developed processes.

13.2 Track Record of Industrial Engagement

The business schools at Lancaster and Liverpool have strong reputations and excellent links with Industry, for example Lancaster has assisted more than 5000 regional SMEs, in addition to a number of EU, International and national collaborative grants supporting business development and innovation.

The NWC is one of the UK's top three biomedical clusters based on a major pharmaceutical presence, a rapidly expanding biotechnology community, many healthcare technology companies and a strong analytical and clinical supply presence. Its HEIs, local authorities, NHS, Local Economic Partnerships and industry have a long history of cooperation to develop infrastructure and promote the healthcare and bioscience economies. The North West was the most successful region in attracting biomedical inward investment in 2008-9 and 2009-10; there was an 85% increase in core companies in the period 2002-12 with an average growth rate of 8.5% (source: BioNow, 2012). Life sciences in the Liverpool City Region alone employ 5,000 people and contribute £1 billion to the economy, not including the universities themselves. Notable firms include Novartis and Eli Lilly. There are major business locations for bioscience at the BioCampus in Liverpool, The Heath Technology Park in Runcorn, Liverpool Science Park and the Daresbury Innovation Centre.

The determination of Liverpool City Council, RLBUHT and the Knowledge Quarter Partners (including Members of this proposed CLAHRC) to engage with business is demonstrated by the way Redx Pharma has been attracted to invest in the region. It entered the MerseyBio Incubator in 2007 and has built a strong patent portfolio around new pharmaceutical products in 11 therapeutic areas. To facilitate its development the University of Liverpool and RLBUHT are providing 20,000 sq ft of laboratory space in the University's Duncan Building immediately adjacent to the hospital. It is creating 67 jobs in the first year and up to 246 by 2016. The company and various partners are already working with Liverpool City Council and the Local Economic Partnership to provide for this expansion within the city. Another example is the construction of a 10,000m^2 Liverpool BioInnovation Centre located within the Knowledge Quarter of the city. This has come about through partnership between the universities in Liverpool, the City Council and the NHS. It provides accommodation to start-up and SME businesses developing physical and biological science based products and services for the health service.

Industrial engagement is concerned with the development of life science and health related businesses, but also health improvement within the workplace. For example, the Perception group from the department of Psychological Sciences at the University of Liverpool has established a Perception Action network with Universities of Manchester and Lancaster which also includes other groups that use perception research, such as the flight lab and the Virtual Engineering Centre at Daresbury. This group has the specific brief to translate university research to industrial partners and as a result of this collaboration the group has joint projects with international companies such as Sony, JaguarLandRover and GE (avionics). NWC CLAHRC would be able to access such a network and be able to early adopt some of the new concepts and outcomes from the network for the benefit to the NWC footprint.

The Clinical Research Facility (CRF) at the Royal Liverpool University Hospital is a unique facility in the NHS that has just achieved MHRA Phase 1 Accreditation. This represents both capital investment to equip the facility and also commitment to key associated posts; for example the hospital has appointed three Consultant Clinical Pharmacologists each with a 50% commitment to research and the hospital is actively developing systems for patient recruitment. This The CRF has already attracted Covance, a global drug development company, to Liverpool with a five year agreement for phase 1 trials. The CRF is expected to more than double in size in the next five years as further industry partners are attracted.

There are several examples of leading practice within our region and partner organisations. For example, the Cheshire and Merseyside and Lancashire and Cumbria NIHR Comprehensive Research Networks (CRNs) in the NWC region, and they are both in the top three CRNs nationally as measured by the median number of days to complete local reviews, embedded through the NW Exemplar pilot for NIHR. This has been achieved through purposeful and consistent partnership working between the region's HEIs, NHS Trusts and an industry oriented culture in the CRNs.

The region's track record in business engagement and innovation is not limited to major companies and large infrastructure facilities. A completely different type of example of collaboration with business concerns the need for well-designed orthopaedic shoes attractive to women so that they will actually wear them. The University of Central Lancashire and the Royal College of Arts brought together patients, clinicians and shoe designers to work on this for the first time and this has led to new designs. This is an excellent example of how the CLAHRC can simultaneously achieve health and wealth outcomes for both patients and small businesses by bringing together organisations to exploit applied research outcomes.

The partners have engaged with industry support mechanisms such as TSB, EU, Research Councils, Wellcome Trust Health Innovation Challenge Fund, NIHR i4i. For example, the Centre for Genomic Research at University of Liverpool is involved in a Unilever led TSB consortium involving SMEs (Ampliphi Biosciences Corporation; Skalene Ltd; Biocontrol Ltd and the University of Glasgow). The project is focussed on the development of instruments and bioinformatics to accelerate commercial applications of metagenomic approaches.

In the case of funding opportunities such as NIHR i4i projects gaps between the innovation and development of new medical technologies are bridged and research needs are clinically translated through early pilot studies and trialling. The involvement of patient groups and the subsequent dissemination of best practice could all be assisted by the NWC CLAHRC and AHSN. Therefore, in some collaborative/consortia projects and industry networks, they would be able to participate in some of the CLAHRC themes to progress along the 'technology readiness and/or innovation path'. An example of a potential NIHR i4i project is Sepsis Ltd, a University of Liverpool spinout that is developing an easy point of care diagnostic for sepsis detection. The technology has the potential to be used as portable diagnostic and detection equipment that can be utilised in many different settings from A&E to GP surgeries to field use in remote locations.

13.3 Processes to Engage Industry

The NWC CLAHRC will, as far as possible, use the existing and effective industry engagement mechanisms already developed by its partners and also NOCRI. Industrial engagement is a leading priority for the NWC AHSN. It is establishing mechanisms to connect industry, the NHS and HEIs across the NWC region. They will be a major collaborator for the NWC CLAHRC so we can exploit our common interests. We will expand these industry engagement programmes by introducing additional opportunities arising from our research and identified needs where industry can actively provide solutions. Each of our projects will be required to undertake an assessment of opportunities for industrial collaboration and this will be scrutinised by the External Advisory Panel. Identified opportunities will be taken forward by the Director of Stakeholder Engagement. One route it to use the mechanisms supported by NOCRI and TRUSTECH. TRUSTECH is the NHS Innovation Service for the North West and offers a technology transfer service to NHS organisations and a commercial consultancy service to industry, acting therefore as an Innovation Gateway, building commercial relationships between NHS and Industry. These processes will facilitate two-way communication, not only encouraging industry to exploit applied research outcomes but also as a source of innovative ideas and needs feeding into the Themes. Another route is to use the strong business engagement functions. For example, the Business Gateway team at Liverpool University specialises in leading business collaborations with the University by connecting industry with research expertise; it has developed a portfolio of over 120 projects involving 60 businesses and £56m of funding.

There are established public-private sector partnerships in the region that have developed the bioscience sector. For example, BioNOW is a membership organisation supporting business growth, competitiveness and innovation in the biomedical and life science sectors across the North West of England. We will participate in their events and also invite them to nominate the industry representative for the Board. This will facilitate two-way communication, not only encouraging industry to exploit applied research outcomes but also as a source of innovative ideas and needs feeding into the Themes.

Our dissemination and communication activities described in sections 5.6 and 14 will include industry and the third sector among its audience. Each Theme will organise a training or implementation workshop to promote research findings and CLAHRC outcomes to a mixed audience of industry, academia and clinical personnel. An annual showcase of the NWC CLAHRC where new concepts, innovations, devices, services and clinical solutions would be profiled. Also, through our work with local authorities, we will engage with their economic development functions. We will organise NWC Challenges Away Days to bring scientific, medical and clinical personnel together to propose challenges requiring innovative, cross-discipline team work to overcome current issues and technical challenges. In addition, the NWC CLAHRC could participate in the N8 Industry Innovation Forum with challenges provided by industry which the NWC CLAHRC may participate under the specific themes outlined earlier.

Industry engagement will be a standard agenda item on all NWC AHSN Steering Board and Management Team agendas and it will be led by the Director of Stakeholder Engagement.

13.4 Identified Opportunities to Engage Industry

The Board will require each Theme and associated programmes to consider and develop opportunities for engagement with industry as an integral part of the design of the work. Plans will be expected to name potential collaborators/beneficiaries and to include milestones and measures for industry engagement. This will be monitored by the Research Panel as part of its peer review processes of candidate work streams. Opportunities already identified that could arise from the Themes include:

- Training and CPD is not the exclusive preserve of HEIs; the strategy for building capability and implementation of research outcomes will provide opportunities for private training providers serving healthcare workers from Care Assistants to Consultants.
- The third sector is a substantial provider of mental health support services, both funded by philanthropy and commissioned by local authorities and health services. Theme 4 Improving Mental Health will engage with these organisations directly.
- The providers of care for those with complex needs are often drawn from the private sector in the form of care and nursing homes and community care workers. They will benefit from the outcomes of Theme 5 Managing Complex Needs; specific events and communications will be directed to them.
- Theme 6 Delivering Personalised Health and Care will involve pharmacists and analytical services companies in the personalisation of treatment programmes, particularly for chronic conditions managed within the community; examples are already emerging such as the Wolfson Centre for Personalised Medicine is working with a diagnostics company for the pharmacotherapy of alcohol addiction.

13.5 Partnership with the NHS and Engagement with NIHR Funded Infrastructure

Through the establishment of many successful partnerships between the NHS, industry and academia there are a number of networks and major externally funded Centres of Excellence within the region, providing some of the best provision of core services in the UK and hosting key elements of national research infrastructure. These include the Centre for Genomic Research (MRC/NERC), the Liverpool Cancer Research Centre, the National Consortium for Zoonosis Research and The Wolfson Centre for Personalised Medicine, all of which are world-class interdisciplinary hubs for collaborative research across the UK and further afield. Expertise in personalised medicine is complimented by the MRC Centre for Drug Safety Science which brings together a critical mass of knowledge and technologies in order to advance the understanding of adverse drug reactions. The newly awarded MRC-Arthritis Research UK Centre for Integrated Research into Musculoskeletal Ageing (CIMA; a joint development between the Universities of Liverpool, Newcastle and Sheffield) that builds on expertise in musculoskeletal biology and expands access to state-of-the-art facilities.

The NWC region hosts the NIHR Pancreas Biomedical Research Unit, the Alder Hey Clinical Research Facility for Experimental Medicine. The national Medicines for Children Network is based in Liverpool. Our region also boasts a full set of topic specific NIHR networks, 2 Medicines for Children, 2 Cancer, 2 Comprehensive and 1 each of Dementias and Neurodegenerative Diseases (DeNDRoN), Stroke, Mental Health, Diabetes and Primary Care. It is particularly significant that many of these networks have a strong and mature geographical coverage in the NWC region and a reputation for effectiveness. This will assist us to reduce health inequalities for all communities, as research has a prominent local profile in trusts and Primary Care, and the national pilot for community pharmacy research site development.

The NWC CLAHRC team are aware of NIHR proposals to consolidate these networks from April 2014 through the formation of a single Local Clinical Research Network (LCRN) aligned with the geographical footprints of AHSNs and we are in contact with the developers of both expressions of interest submitted for the NWC. The NWC CLAHRC expects to work closely with these networks both before and after this transition. The Director of the LCRN will be a member of the NWC CLAHRC Board. Direct linkages will be formed within the Themes and their management teams; some examples of leading linkages are listed below and it shows the congruence between the NWC CLAHRC's Themes and existing NIHR investment. The CLAHRC will work with the new LCRN as the NICH Clinical Research Networks consolidate into a new structure from April 2014 to maximise LCRN/AHSN/CLAHRC communication.

PATIENT AND PUBLIC INVOLVEMENT AND ENGAGEMENT

The NWC CLAHRC's collaborators share a strong commitment to, and successful history of, engaging patients and the public in research. The partner Universities also took a leading role in developing PPI support within the NIHR Research Design Services (RDS). We have a significant repository of expertise in how to effectively engage patients and the public in research and have mature systems that provide the framework for our PPI strategy. This includes extensive programmes of PPI linked to our current research as well as formal links to the NIHR NW RDS PPI team (led by Prof. Downe) and the North West People in Research Forum (NWPiRF). Prof. Downe is on the board of NWPiRF, which provides access to a large number of individual patients and members of the public, as well as formally constituted PPI groups linked to the NIHR research networks, NHS trusts, CCGs, partner Universities, Local Authorities and health charities. We have engaged with key members of the following groups in the design of the CLAHRC and its Themes.

- NIHR RDS North West PPI in research support structures;
- Lancaster University Public Involvement Network (LUPIN);
- Older People Researching Social Issues (OPRSI);
- Spectrum Centre for Mental Health Research User Researchers;
- MHRN NW Service Users in Research Forum;
- Service User Research Endeavour (SURE);
- NIHR Comprehensive and Topic Specific Network PPI groups.

Our strategy involves patients and the public in decision making at all levels in the CLAHRC and its Themes to:

- Set research and implementation priorities, project aims and objectives;
- Consider methods used to carry out the research and implementation projects;
- Recruit people into research and implementation projects;
- Inform communication of findings, their potential applications and implementation and dissemination;
- Engage the wider public through our neighbourhood projects, publicising our work through the web, social and printed media to the public and service users across the NWC CLAHRC area.
- Target all publicity materials and activities at both professional and lay audiences, ensuring such materials are written in plain English, with translations available as required.

14.1 Objectives for Patient and Public Involvement and Service User Engagement

- Recruit PPI stakeholders through our existing networks and those of our collaborators, and maintain a programme of ongoing recruitment and communication with relevant groups;
- Develop and maintain support from service users and the public as stakeholders engaged across the activities within NWC CLAHRC;
- Ensure a regular system for mentorship and support for all our PPI Stakeholders;
- Support our PPI stakeholders into leadership roles within the work of the NWC CLAHRC;
- Work with other strategic PPI partners (notably the AHSN, NWPiRF and RDS NW) to undertake regular needs assessments and deliver educational programmes addressing specific PPI topics;
- Actively support PPI representatives on the NWC CLAHRC Steering Board and other structures;
- Support the RDS in maintaining its multi-level PPI toolkit, for use by/with different stakeholder groups, including providing links to key self-help resources, and facilitate access to it for our PPI stakeholders'
- We will use the MRC funded Public Involvement Assessment Framework (PiAF) currently being produced by Popay et al to produce and implement an evaluation of the impact of our PPI strategy..

14.2 Enabling Structures and Processes

Our strategy has been developed in line with the NIHR PPI plan 2013-15. It will be led by the Director of Stakeholder Engagement (ADSE) and a full time PPI facilitator. We will set up a PPI panel, jointly chaired by a PPI stakeholder and the ADSE. The PPI Panel will draw its membership from the thematic PPI forums as well as other groups including, for example, the NWPiRF. This panel will oversee the development and delivery of our PPI engagement and support programme. It will have two seats on the Steering Board. Each Theme will have two identified PPI leads who will sit on its Programme Management Team and will establish and support a PPI forum comprising 'lay experts' engaged in the Theme's work. Themes will have a PPI forum, involving service users and/or members of the public in all research and implementation projects.

The PPI programme will include systems for mentorship, CPD, other types of support for CLAHRC PPI representatives and research staff and mechanisms to ensure good communications about PPI within the CLAHRC and externally. The facilitator will also develop and support a cadre of PPI champions drawn from the 'lay experts' involved in our programmes who will work as outreach leads into the wider NW health community helping to draw in new service users and members of the public into our work and communicating about the NWC CLAHRC. This will be additional to the core role of engagement in NWC CLAHRC projects.

CAPACITY DEVELOPMENT

15.1 Capacity Building Strategy

NWC CLAHRC recognises that capacity building is essential to support the aim of a step change in health outcomes that underpin our theme objectives. Our collaborators work in a range of settings and organisations, with varying needs for capacity growth and direction, and at different stages of development. If we are to successfully integrate stakeholders across our projects and Themes, they will need CPD, support, mentoring and access to post-graduate research training opportunities. We have therefore developed a portfolio of capacity building measures to develop the skills of those participating in our projects and them with support.

Our plans apply to staff employed within our collaborating organisations and engaged in our projects, including clinical and public health managers and commissioners, service users linked to those organisations or other patient groups and PPI organisations. In addition it encompasses members of the public from our partner neighbourhoods, local authority employees and 3rd sector providers participating in Theme 1 Improving Public Health Systems and Theme 2 Improving Mental Health. In the text that follows we refer to such people collectively as "Participants".

We propose that a number of staff from our collaborators will be actively engaged in our NWC CLAHRC project portfolio as Participants. Their role will be as integrated members of the research and implementation project teams. Whilst this role clearly provides opportunities to lead on contextualising, refining and implementation elements within the themes and projects for which the NWC CLAHRC will provide individual and group support, guidance and mentorship; some will wish to extend their academic and research skills more formally.

15.2 Our Objectives

- To put in place a mentorship scheme for professional staff (e.g. clinicians, commissioners, public health professionals and managers).
- To provide a mentorship and support service for service users and members of the public supporting the NWC CLAHRC which is equivalent to but distinct from the scheme for professional staff.
- To provide training, including offering a number of bursaries for formal research training through our HEI partners and also formal training courses as well as knowledge mobilisation placements.
- To ensure that there is project focused research guidance, supervision and training for all Participants within project teams, provided by academic and other colleagues.
- To integrate, wherever possible, capacity development programmes with the Education and Training Theme of the NWC AHSN and link to existing stakeholder CPD programmes.
- To utilise stakeholder appraisal, job-planning and career management processes so that CLAHRC is an integral and deliberate part of Participant job roles and development plans.
- To recruit, train and support Research and Implementation Champions to promote the adoption of the applied research outcomes.
- To ensure that wider staff development and public engagement programmes and implementation projects are robustly informed by research into the use of knowledge and evidence in health, communities of practice and neighbourhood development.
- To regularly evaluate and revise capacity building programme to ensure that it meets the needs of the NWC CLAHRC programmes, stakeholders, Participants and collaborating organisations.

15.3 Management and Leadership of Capacity Building

The Director of Capacity Building and Implementation is responsible for capacity building activity and running the programmes described herein and monitoring the satisfaction of Participants and ensuring that the skill requirements of the Themes and associated projects are met. An early task will be to engage with each Theme Leader to carry out a skills assessment for that Theme and plan implementation in details.

The Director of Capacity Building and Implementation is also responsible for managing the Research and Implementation Champion programme. They will employ a variety of dissemination strategies and monitor impact through organisations collecting and auditing relevant process and outcome data. We will engage with them in a feedback loop in analysing these findings to inform the ongoing work of the NWC CLAHRC. These approaches will be applicable more widely within our collaborating organisations so that they can apply them to other areas of development and service evaluation.

15.4 The Mentor Scheme

Where appropriate, Participants will be assigned a mentor from within the NWC CLAHRC project team. Mentors will be assigned after discussing developmental plans and needs with a senior member of the Theme

project they are linked to, and the mentee. The NWC CLAHRC assigned mentors will be responsible for the development of their mentee stakeholders. Mentors will be in contact with mentees at least every few months initially, reducing to at least twice yearly, with at least one face to face meeting per year. These email, telephone and personal meetings will be in addition to, and separate from, project meetings and contacts.

Mentor support required for non-professional stakeholders such as service users and members of the public will be shared with the PPI support team, and is described in section 14 above.

15.5 Evidence Synthesis CPD courses (in collaboration with the AHSN)
A core skill often lacking in staff is the confidence to define clinical questions in a way that enables them to access the research evidence, then identify, assess and synthesise the available evidence and use that synthesis in the development of appropriate policy or practice changes. Our Evidence Synthesis and Implementation Theme will offer structured CPD opportunities in the form of participatory action research projects for groups and individuals of health care professionals to develop these skills and to assess their impact on the delivery of care and the health of the populations involved. The Theme Leader, Prof Dickson, has experience in the delivery of such programmes and with her colleagues has recently completed a guide to these aspects of evidence synthesis that will be included in this CPD programme.

15.6 Knowledge Mobilisation Secondments, Formal Qualifications and Training Programmes
We will offer a range of masters and doctoral programmes, provided as linked modules with a research dissertation. Participants will be invited to apply for bursaries to subsidise the fees for these courses. Not all stakeholders will want to undertake formal research training, nor might it be useful. An alternative option being offered is Knowledge Mobilisation Secondments to allow a greater proportion of time to be devoted to a project for a period, mirroring the NIHR scheme, but on a smaller scale within the CLAHRC budget. We believe these will enable a step change in implementation projects and Knowledge Exchange activity
.
We will particularly encourage non-clinicians to take up these opportunities, as there are fewer comparable schemes available for them:

- 36 bursaries to cover part-time masters courses (MPH and MRes) fees altogether across our partner HEIs commencing across the first three years of the NWC CLAHRC.
- 10 bursaries for part-time MPhil/PhD programmes
- 12 PhD studentship bursaries for fees and stipends to train the next cadre of HSR researchers for the NHS and public health over the first three years of the CLAHRC. These will be competitive and targeted at graduates from relevant subjects. These would mirror the approach of CASE studentships, with the engagement of collaborators and HEIs in each PhD award.
- Knowledge Mobilisation Secondments,linked to particular projects for stakeholders engaged in leading roles within a project or theme.

The CPD courses include a number of modules covering a range of research skills that participants will be able to select from as well as take the complete course. Participants undertaking four modules including ones relating to both qualitative and quantitative methods will be awarded a PGCert and those taking eight a PGDip. Opportunities to prepare theses at masters or doctoral levels will be embedded within the projects that they are engaged in.

Lancaster and Liverpool Universities are part of the North West ESRC DTC (Doctoral Training Centre) (along with the University of Manchester). This offers a wide spectrum of advanced postgraduate research training, including inter-alia statistics and quantitative methods, a wide range of qualitative techniques, research design, surveys and analysis. Students will have access to the latest developments in social science methodology and will be able to take full advantage of existing resources in each of the institutions within the DTC. It has a robust management structure to monitor and enhance the breadth of provision within each training pathway as well as regular scrutiny of the quality and innovatory nature of training available. Examples of current, relevant activity within the DTC include the social determinants of health, healthy ageing, international public health, managing long-term conditions, primary care and health technologies. Specialist thematic events are also held. These opportunities would be open to any student registered at Lancaster/Liverpool/Manchester, including those engaged in the NWC CLAHRC. The Universities offer a range of methodological and practical taught modules in addition to robust supervision (e.g. 2 supervisors, regular recorded meetings, independent annual review and progress approval systems).

EXPLOITING INTELLECTUAL PROPORTY

16.1 IP Policies

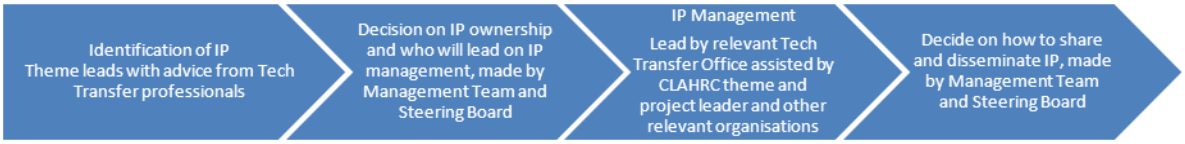
The CLAHRC is cognisant of the need to manage Intellectual Property (IP) during its activities and it is anxious to ensure that it is exploited for the purposes of wealth creation and patient benefit. It will manage IP in a way that it does not become an obstacle to collaboration with industry or other partners by respecting their pre-existing background IP and the rights of those who develop IP to benefit from it. The NWC CLAHRC will carefully develop IP practices specifically designed to support its strategic service improvement and wealth creation aims, and reduce the "bench to bedside" time. Jointly developed IP policy will be consistent with that of the NWC AHSN for sharing benefits and cross-licensing. Indeed, this consistency of approach is important so that third parties have a consistent experience when engaging with pan-NWC health research bodies and it also facilitates sharing of infrastructure. We are particularly aware that formal and rigid IP policies can be experienced as a barrier by some small businesses so we will implement them in a pragmatic way.

Knowledge exchange is extremely valuable in contributing to the spread of innovation through the NHS and higher education. Stakeholder commitment to the IP policy will be secured by including it in the master collaboration agreement to be entered into by members and also collaboration agreements governing individual projects. The agreement will provide for acknowledgement of NWC CLAHRC support for IP creation whilst also protecting the rights of research participants and each organisation. This is particularly relevant to documents, protocols, training materials and software so that licensees and users are made aware of the NIHR and CLAHRC's involvement with their creation.

IP may arise from any NWC CLAHRC applied research delivery activity. Tangible forms of IP include patents and copyright to guides, software, training materials or protocols. In most cases this IP will be owned by network members or collaborators and we will assist them to add value to it and remove barriers to its exploitation. We will also raise awareness of the potential for IP creation among applied researchers and collaborators so that it can be protected at an early stage. The IP policy will anticipate the possibility of the CLAHRC host acquiring an interest in the IP so that it can be exploited through licensing for income generation where it is appropriate to do so. Any income arising will be reinvested in CLAHRC activities.

16.2 IP Management

The Director of Capacity Building and Implementation will manage IP in a way that assists the NWC CLAHRC to achieve improved patient care through early testing and adoption across the footprint. Theme Programme Management teams will be accountable for identification and management of IP opportunities, including facilitation of IP exploitation which will be a standing agenda item at Management Team meetings. The Steering Board will also have a standing item on the agenda to review IP. Where appropriate, NWC CLAHRC will utilise the collective skills, knowledge and experience of Business Development and Technology Transfer units in the universities and TRUSTECH (who provide the North West NHS with an Innovation service) and industry facing groupings such as the University of Liverpool's Business Gateway. The screening of IP opportunities will be undertaken by Liverpool Impact Science who will advise on exploitation options including spin-out or licensing.



The Liverpool Joint Research Office, the Lancashire and Cumbria Clinical Research Hub and the two NIHR CLRNs (Cheshire & Merseyside; Lancashire & Cumbria) already provide the basis for aligning research processes across HEIs and NHS Trusts which can be shared across the footprint. Practical implementation of the NWC CLAHRC's IP policy will be achieved by working with TRUSTECH, the University of Liverpool's Joint Research Office, the Lancashire and Cumbria Clinical Research Hub and both the Merseyside and Cumbria and Lancashire CLRNs already provide the basis for aligning research processes across HEIs and NHS Trusts. These are established mechanisms for aligning research processes across HEIs and NHS Trusts. It will work alongside existing arrangements for collaborative working, such as Liverpool Health Partners and the NWC AHSN, to manage jointly developed IP. Typically, the organisation best placed to manage the IP will be appointed to lead the exploitation of that IP and share any downstream benefits, such as royalty income or equity shares, with the collaborating organisations.

DECLARATIONS AND SIGNATURES

17. A declaration signed by specified representatives of the applicant NHS Trust/Provider of NHS services fully endorsing the application for an NIHR CLAHRC award and that appropriate support will be provided to the NIHR CLAHRC should the application for funding be successful.

Declaration by the NHS Trust/Provider of NHS services of compliance with all NIHR research management initiatives including uptake of NIHR Research Support Services and use of model research agreements/contracts.

Declaration by the relevant Academic Health Science Network Board or other appropriate nascent AHSN governance structure, that there is full endorsement of the application for a NIHR CLAHRC award and that there is agreement with the proposed research/implementation Themes proposed.

Declaration that matched funding (to at least the level requested by NIHR) from HEI, NHS or other collaborators is approved by the contributing organisation and the local AHSN Board or other appropriate nascent AHSN governance structure.

Please print this page, have it authorised and return it by post by 20 May 2013 to the address stated at the bottom of this form.

The NHS Trust fully endorse the application for an NIHR CLAHRC award and assert that appropriate support will be provided to the NIHR CLAHRC should the application for funding be successful.

The NHS Trust Collaboration will comply with all NIHR research management initiatives, including uptake of NIHR Research Support Services and use of model research agreements/contracts.

Signature …….. **Date: ……**
(NHS Trust Chief Executive)

The Academic Health Science Network Board or other appropriate nascent AHSN governance structure, fully endorse the application for an NIHR CLAHRC award and agree with the proposed research/implementation Themes proposed.

The Academic Health Science Network Board or other appropriate nascent AHSN governance structure, approve matched funding (to at least the level requested by NIHR) for HEI, NHS or other collaborators.

Signature …….. **Date: ……**
(AHSN Director)

I confirm that I have checked the financial details of application (Reference: CLAHRC-2012-xxxxx) and that this NHS organisation is prepared to carry out this research at the stated cost and to administer the awards if made. The staff salary quoted are correct and in accordance with the normal practice of this institution.

Signature …….. **Date: ……**
(NHS Chief Finance Officer)

This form, together with other requested attachments, must be submitted by **1:00pm** on **13 May 2013.** Any questions about the completion of the form should be directed to Claire Vaughan (claire.vaughan@nihr-ccf.org.uk).

A signed hard copy of the Declaration and Signatures form should be sent by **20 May 2013** to:

Claire Vaughan
NIHR Central Commissioning Facility
Grange House
15 Church Street
Twickenham
TW1 3NL