National Institute for Health Research

NIHR Collaboration for Leadership in Applied Health Research and Care West Midlands (CLAHRC WM)

First Annual Report

January 2014 – March 2015

Contents

Welcome

Welcome from Prof Richard Lilford

Director of the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care West Midlands (CLAHRC WM); Chair in Public Health, University of Warwick.

The NIHR CLAHRC WM has been established to conduct imaginative, high-quality health service evaluations to improve patient care. We have created a collaboration of patients and the public, service personnel, and applied health researchers to fulfil our mission. In CLAHRC WM, service change and applied research are embedded in the same structure – driving projects across the four service themes of **Maternity and Child Health**, **Youth Mental Health**, **Prevention and Detection of Disease**, and integrating care for people with **Chronic Diseases**.

We have seen a number of changes in the past year, including the transition from the pilot CLAHRC for Birmingham and Black Country to the CLAHRC West Midlands, and the movement of myself and the central management team from the University of Birmingham to the University of Warwick.

During the first reporting year we have seen excellent performances from each of our themes, which has allowed us to expand our geographical reach, academic capacity and capability; maximise opportunities to significantly impact on local health and social care communities; and extend knowledge on applied health research globally. We hope to continue this upward trajectory and, by the end of the five-year project, we aim not just to achieve positive service change, but most importantly, to develop a self-sustaining system where the CLAHRC way of working has become the natural way of working...

CLAHRC WM in Numbers

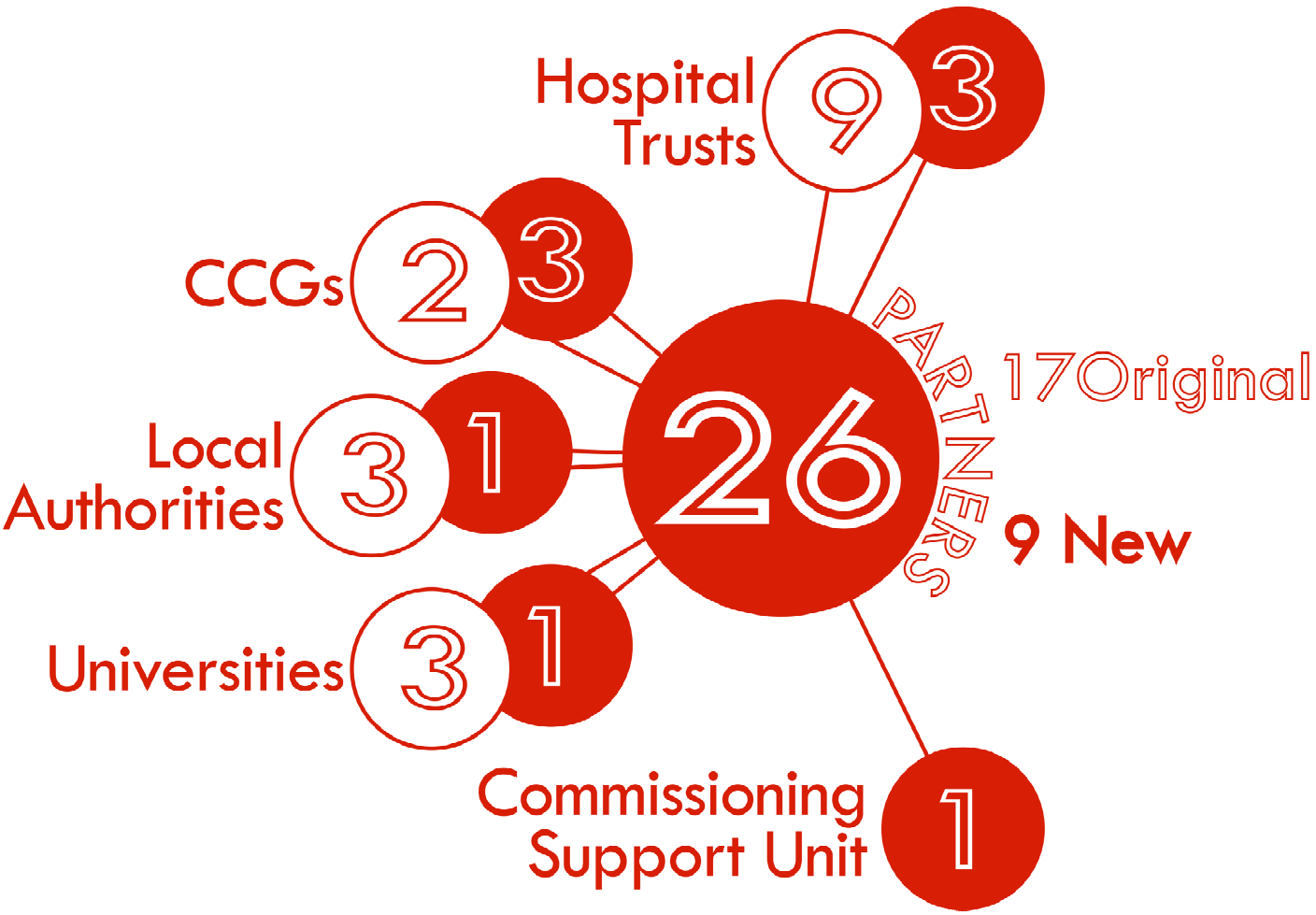
£4,725,281

External Grant Income Leveraged to Date
(inc. some existing legacy grants)

248 STAFF

96 NIHR Investigators
52 NIHR Associates
82 NIHR Trainees

4 service themes • 2 cross-cutting themes



£4,469,885
Matched Funding
Leveraged in Year 1

£1,186,767
Research
Matched Funding

£3,283,118
Implementation
Matched Funding

13 PPI
Advisors

141
PEER REVIEWED PAPERS

89 Projects

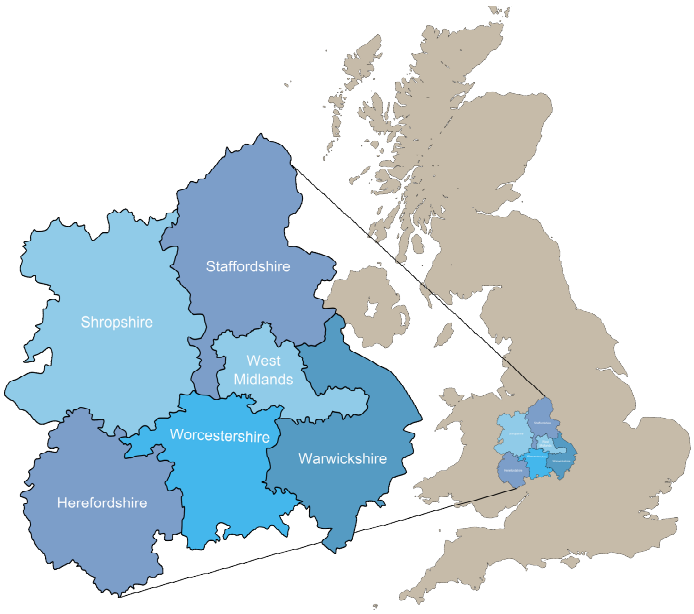
1,267 News Blog subscribers
27% News Blog open rate

797 Twitter followers

432 Tweets published

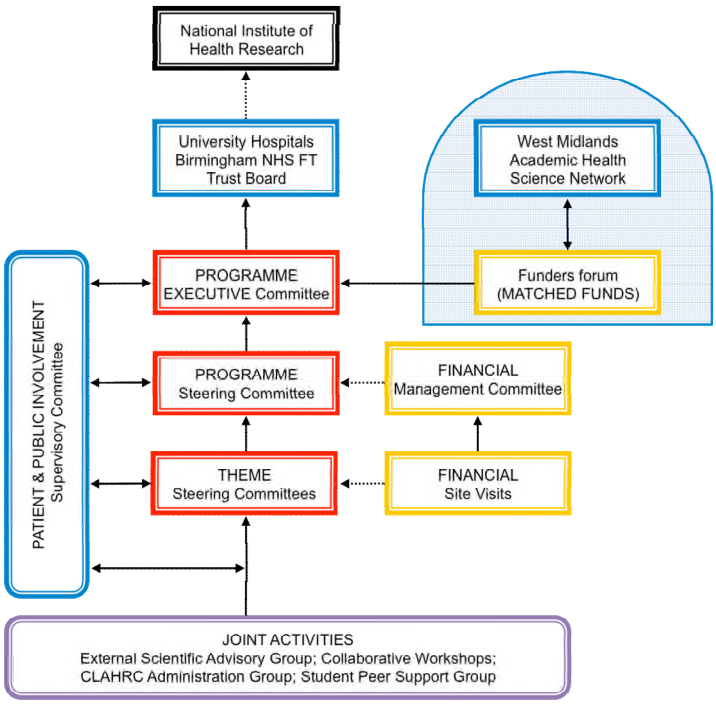
Overview of Activities

During the first reporting year, we have successfully made the transition from the pilot CLAHRC for Birmingham and Black Country to the CLAHRC West Midlands, expanding our geographical reach, academic capacity and capability; maximising opportunities to have significant impact on local health and social care communities; and extending knowledge on applied health research globally.



CLAHRC West Midlands Director, Professor Richard Lilford, recently transferred from the University of Birmingham to the University of Warwick (Prof Lilford was delighted to accept an Honorary Professorship from the University of Birmingham).

The central management function has also been relocated to the University of Warwick office to enable headship and leadership from this centre, and to maximise the opportunities to attract international collaboration and external grant funding. This change conforms to our 'tight-loose' management arrangements, combining centralised security and assurance, along with distributed leadership through themes and their respective health and social care partners.



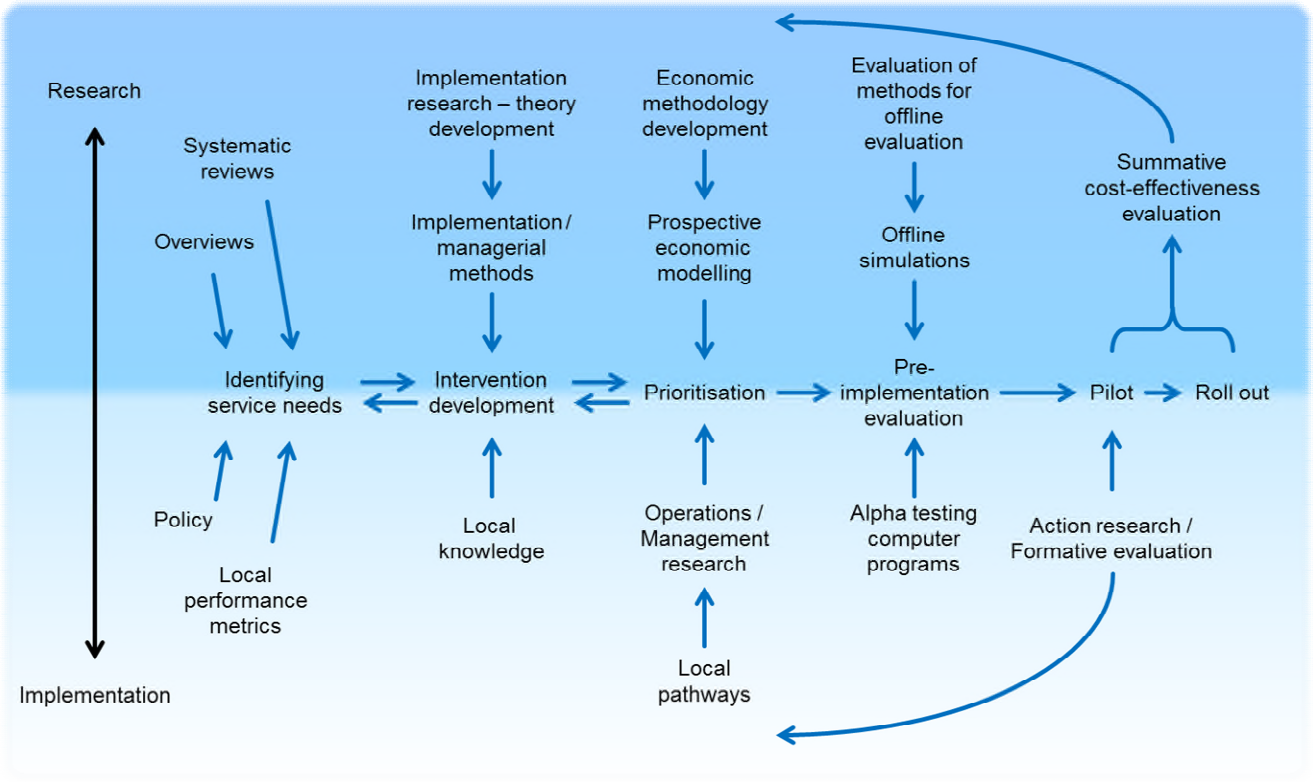
CLAHRC West Midlands Management Organogram

We have established our management structures effectively and highlight the appointment of Dr Jacky Chambers (former Director of Public Health of Heart of Birmingham PCT, now 'retired') as an independent Chair of the Programme Executive Committee.

In May 2014, we held our first international Scientific Advisory Group (SAG) meeting, comprising experts in applied health services research from across the globe. We hold our second in June 2015, chaired by Professor Jeremy Grimshaw (Ottawa Hospital Research Institute), alongside our inaugural Matched Funders Forum (MFF), and hope both events prove to be a great success.

Through extensive consultation with our stakeholders during the development of the grant application, we prioritised four service themes and two cross-cutting themes, all of which made

steady progress on implementing the **IDEaL framework** in their respective teams. The IDEaL framework sets out our core principles where we **I**dentify, **D**evelop, **E**valuate **a**nd **L**ead service innovation. We ensure that service users, carers, and members of the public are actively involved at all stages of the IDEaL framework; and our plan is to draw on the existing Patient and Public Involvement (PPI) faculty, many of whom already have a role in informing service development (see pages 38-40).



The IDEaL Framework

The new-look CLAHRC West Midlands now comprises three main Higher Education Institutes (HEIs) – the University of Birmingham, Keele University and the University of Warwick – to align more closely to the Academic Health Sciences Network (AHSN) distributed local network. Driving industry collaboration through existing networks and strategies was a key aim in the approved grant application, and the three key HEI partners have made progress already with Birmingham and Warwick-led industrial collaborations. We have also cemented solid working arrangements with the West Midlands AHSN throughout our general management structures, communications and engagement, and PPI.

We have seen continued success with postgraduate support and development, and are developing the research capacity and capability of Diffusion and Leadership Fellows (DLFs, funded through matched-funding from our health and social care partners); as well as continuing to support postgraduate development and supervision (see page 41).

In addition, we have developed innovative new communication mechanisms, including the creation of theme-specific motifs to identify service areas (an idea that may be adopted across related NIHR initiatives) and our fortnightly CLAHRC West Midlands News Blog that disseminates key messages to health and social care partners, and to the wider public (see pages 36-37).

University of Warwick, University of Birmingham, Keele University

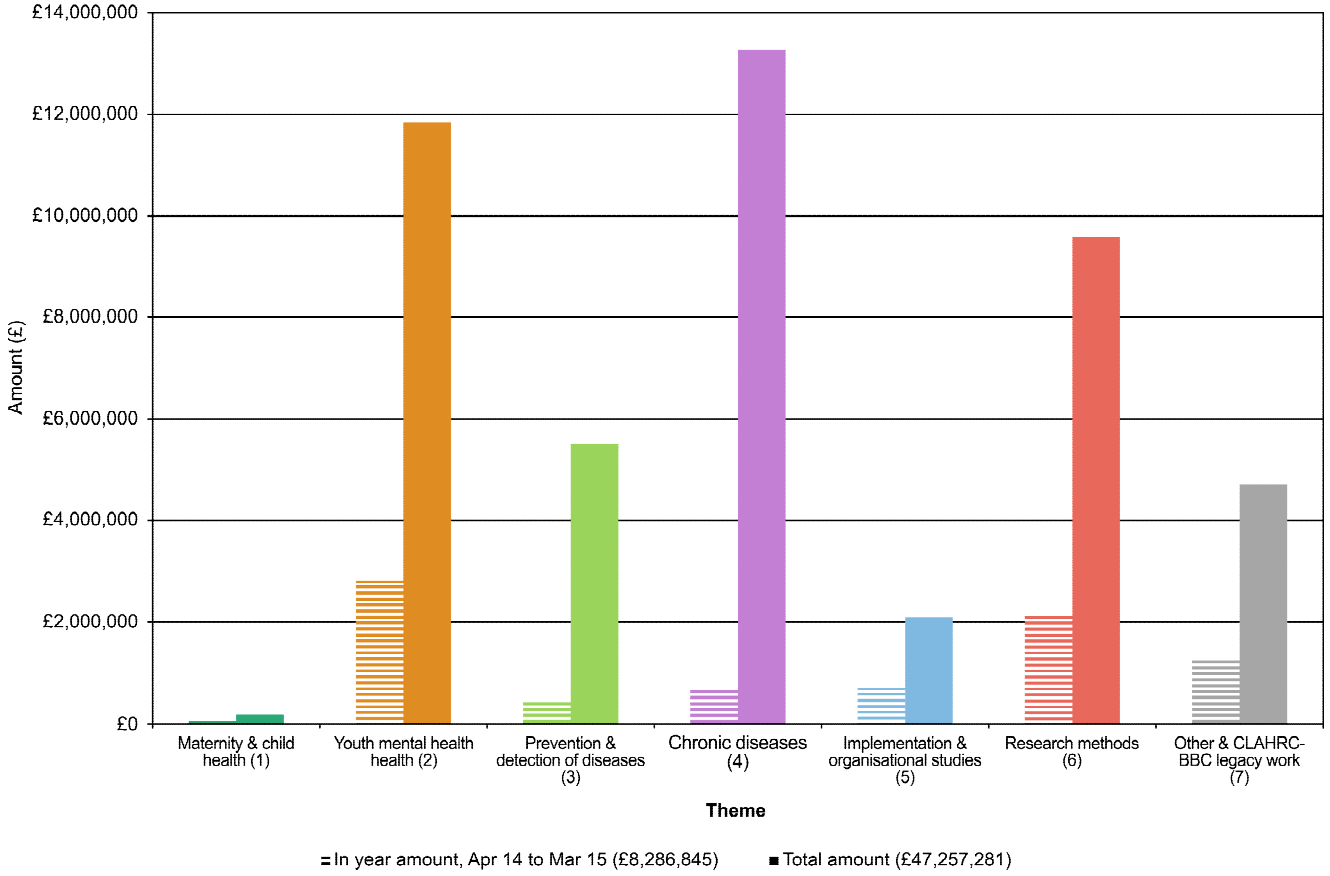
We list our top four achievements during the first reporting year as follows:

1. **Youth Mental Health:** Our work regarding early intervention through the redesign of youth mental health services has led to major impact on services and has recently been termed "*the plank that cemented the re-commissioning of services in Birmingham to offer mental health services from 0-25 years*" (see pages 16-17).

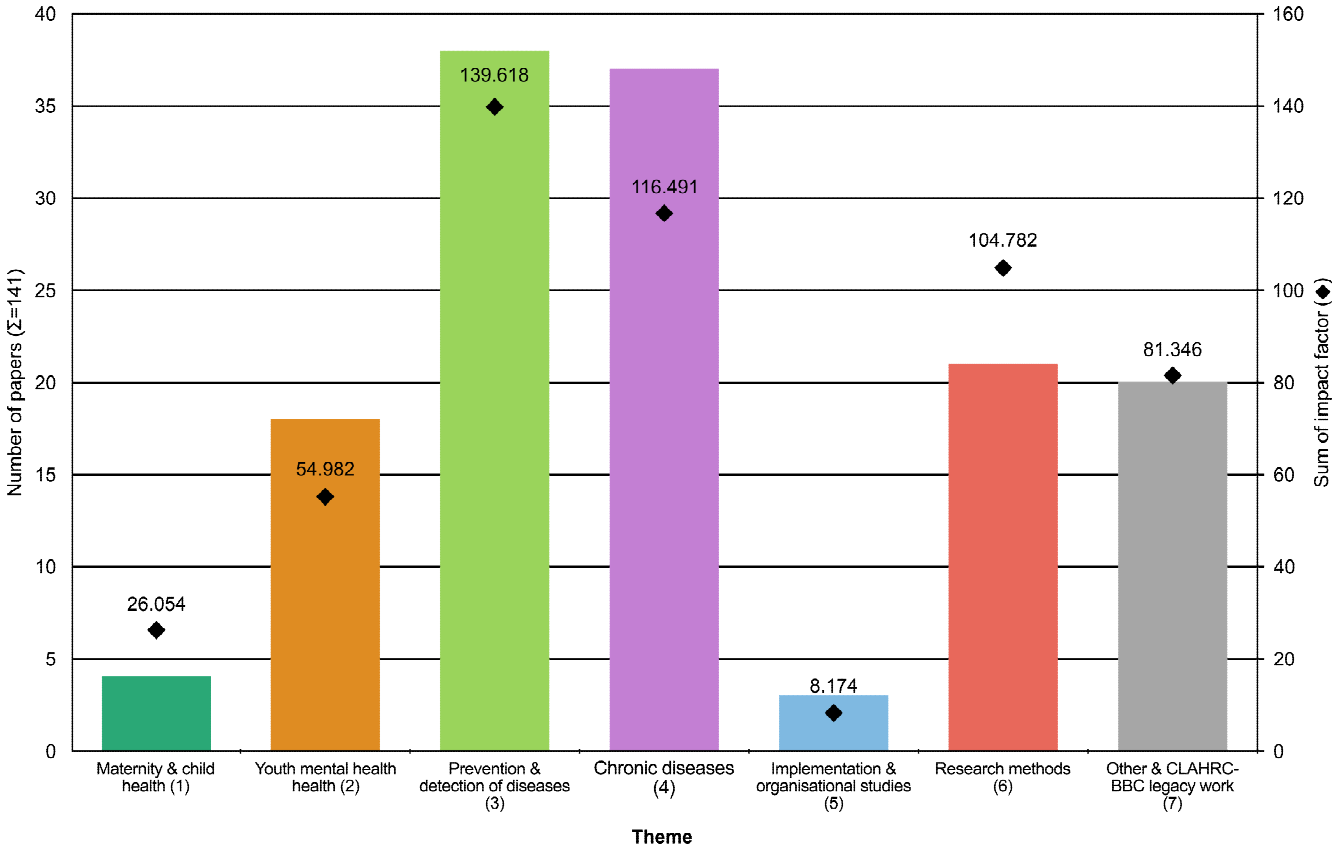
2. **New Partner Organisations:** We have widened our geographical reach, enhancing both our academic capability and enriching our health and social care engagement to increase opportunities to influence service delivery (see page 10). Nine additional partners are formally joining the CLAHRC West Midlands Partnership Agreement via a 'Deed of Adherence' that outlines the new party's contribution to matched funds. The new partners will benefit from being involved in applied health research activity and we envisage that through engagement with CLAHRC research, we will increase the capacity of individuals to apply knowledge and evidence to change practice and services in respective localities.

3. **Primary Care Research:** The Keele Research Institute for Primary Care & Health Sciences, based at Keele University, has established itself as a world leader in Primary Care Research and has recently secured re-designation of its membership to host one of the NIHR Schools for Primary Care Research (SPCR) (see pages 24-25).

4. **Academic Outputs:** We have secured a total contract value of **£47,257,281** in external grant funding (£42,540,012 of 'new income', excluding legacy grants still running in the new CLAHRC timeframe). We have expended £8,286,845 within the financial reporting year. In addition, we cite **141** peer-reviewed papers published in the first reporting year (see pages 42-49) (with a further 13 accepted or published after 1st April 2015), compared with 0 in the first year of the pilot CLAHRC-BBC. This includes 20 papers in journals with an impact factor over six (see figures opposite).



Total grant income generated by Theme, with in-year amount (Apr 14 to Mar 15)



Papers published by Theme, with sum of Impact Factor

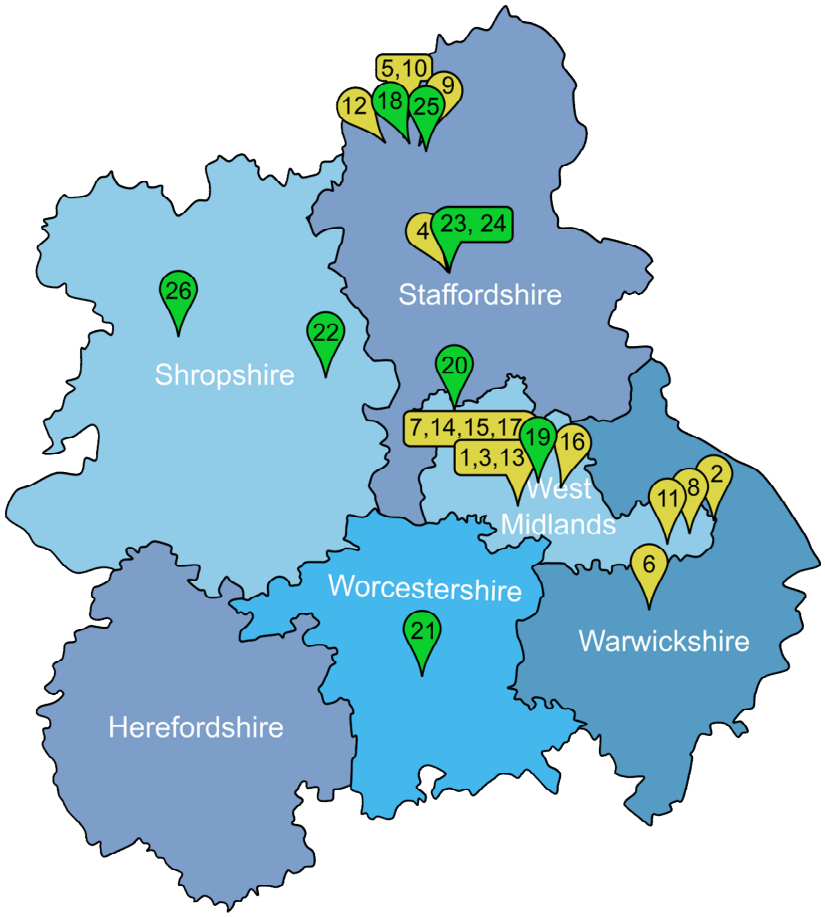
Partner Organisations

Original partners (as per submitted bid):

1. University Hospitals Birmingham NHS Foundation Trust
2. University Hospitals Coventry & Warwickshire NHS Trust
3. Birmingham Women's NHS Foundation Trust
4. South Staffordshire & Shropshire Healthcare NHS Foundation Trust
5. Staffordshire & Stoke-on-Trent Partnership NHS Trust
6. Warwickshire County Council
7. Birmingham City Council
8. Coventry City Council
9. Stoke-on-Trent Clinical Commissioning Group (CCG)
10. North Staffordshire CCG
11. University of Warwick
12. Keele University
13. University of Birmingham
14. Birmingham Children's Hospital NHS Foundation Trust
15. Birmingham and Solihull Mental Health NHS Foundation Trust
16. Heart of England NHS Foundation Trust
17. Sandwell and West Birmingham Hospitals NHS Trust

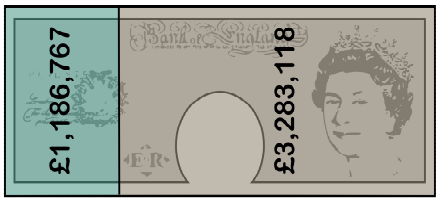
New partners (joining through Deed of Adherence):

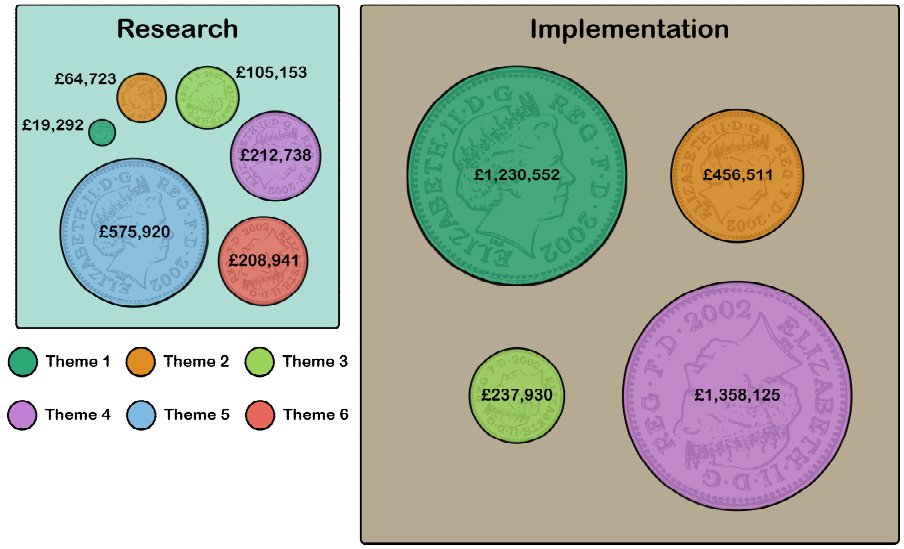
18. University Hospitals of North Midlands NHS Trust
19. Aston University
20. The Royal Wolverhampton NHS Trust
21. Worcestershire County Council
22. Telford & Wrekin CCG
23. Cannock Chase CCG
24. Stafford & Surrounds CCG
25. Midlands and Lancashire Commissioning Support Unit
26. Shrewsbury & Telford Hospital NHS Trust



Matched Funding

For 2014-15, there is a total of £4,469,885 matched funding, consisting of £1,186,767 for research, and £3,283,118 for implementation.





Implementation: *The Concept of Diffusion and Leadership Fellows*

Our Diffusion and Leadership Fellows (DLFs) are funded through matched funding from health and social care partners (see page 41).

Key implementation activities and achievements:

- Development, piloting and implementation of the maternity triage system at Birmingham Women's Hospital, along with supporting adoption in new settings (pages 12-13).
- Consultation and development of the 0-25 youth mental health service in Birmingham (pages 16-17).
- Implementation of interventions aimed at reducing treatment delay in Birmingham (pages 16-17), including the launch of the new Youthspace website (www.youthspace.me).
- Implementation of the 'Health Checks' programme (pages 18-19).
- Development of the HECTOR research protocol (page 23).
- Support for the wider roll-out of the STarT Back study (pages 26-27), as well as securing additional funding to facilitate training.

Research: *Additional Academic Input and Postgraduate Placements*

In addition to the matched funding provided by our health and social care partners, which largely supports implementation activity, we have secured matched funding through our main university partners. This matched funding essentially encourages research activity by supporting academics and postgraduate studentships at participating universities.

1.Maternity and child health

Theme Lead: *Prof Christine MacArthur, University of Birmingham*
c.macarthur@bham.ac.uk

Leadership: We have forged new partnerships with the University Hospitals of North Midlands (UHNM), New Cross (Wolverhampton) and Shrewsbury and Telford Maternity Units as part of the wider adoption and spread of the maternity triage system. A new partnership with Aston University will bring additional expertise in pharmacy practice to the evaluation of e-prescribing at Birmingham Children's Hospital NHS Foundation Trust (BCH).

Research Highlights: We report strong engagement with Birmingham Women's NHS Foundation Trust (BWNFT) and continue to support the implementation of the caseload **Home Birth Service** (see page 13). We continue to work with BWNFT to improve the number of pregnant women being offered membrane sweeping at term to reduce induction of labour. A new project has been developed with BCH to evaluate an innovative facility that provides space for parents, patients and staff for "breaking bad news" and for reflection.

Implementation Highlights: The **Birmingham Symptom specific Triage System** (BSOTS) has been designed, implemented and evaluated at BWNFT. This is a new standardised method for the assessment and determination of clinical urgency for women with unscheduled attendances to obstetric services. Waiting times before assessment have been significantly reduced compared with standard practice, and it is now considered the standardised method. It is envisaged that wider adoption at UHNM, Wolverhampton, and Shrewsbury and Telford will have significant impact on waiting times and the delivery of maternity services in these settings. A further grant application will be developed to conduct a wide-scale evaluation of the system in due course.

Examples of Impact: We have established a **Research Midwives Forum**, the first of its kind in the region, bringing together research midwives from across the West Midlands, to encourage engagement, collaboration, and capacity for applied health research across trusts. Two forums have taken place during the first reporting year, with another planned in June 2015. The NIHR Clinical Research Network (CRN) has also been involved.

A joint dissemination and engagement event is planned with the National Childbirth Trust aiming to facilitate change through sharing research and good practice on midwifery-led care and choice of place of birth.

Key Objectives:

Evaluation of maternity triage system developed in the CLAHRC pilot in other maternity settings.

Excellent progress has been made to implement and evaluate the maternity triage system in other maternity settings in the region. A licensing agreement has been drawn up to protect the intellectual property of the system, which will be signed by new partners. Dr Nina Johns

(Obstetrician and Leadership Fellow) has presented the triage system at the Royal College of Obstetricians and Gynaecologists, generating great interest from other maternity units.

Evaluation of home birth teams. A review of the implementation of the caseload Home Birth Service at BWNFT was completed in autumn 2014 and findings and recommendations were fed back in early 2015. An 'action plan' to support ongoing progress has been agreed. A further methodological study, to compare the robustness of rapid approaches to qualitative data analysis with traditional approaches, has come from this work. A co-design study to explore midwives' discussions with mothers on their options for place of birth is underway. A grant application to extend the home birth research to involve discussion with fathers is being prepared.

Examine effects of very early discharge. A literature review and data scoping exercise has been completed. However, as there will shortly be significant changes to the routinely-collected maternity data, this objective has moved from short- to medium-term. A protocol to establish whether routinely-collected hospital episode statistics (HES) data can be used to describe the burden of avoidable early infant postnatal admissions has been produced. We are planning a study using community midwives to identify the numbers and characteristics of mothers and babies locally being readmitted up to the point of discharge by the midwife.

Evaluate the rollout of e-prescribing at BCH. A case study of the impact of current systems for prescribing, dispensing and administering medicines on a single hospital ward is in progress. Further studies are planned, including an ethnographic study of the implementation of the e-prescribing system on the ward (alongside Aston University), and a simulation modelling study.

Evaluate Advanced Care Plans (ACP). A protocol has been developed to evaluate new palliative care services in Birmingham. This will include evaluation of a new building environment, 'Magnolia House', aimed at providing a space for difficult conversations.

Health and behaviour change. A protocol has been developed to explore interventions aimed at temporary smoking cessation from parents of children who are in intensive care at BCH. Future work is planned to explore harm reduction from children's exposure to secondary tobacco smoke and may involve industry collaboration – we are in discussions with a small business to use a tobacco smoke analyser test that is sensitive enough to identify children's exposure.

Links with NIHR Infrastructure: We are working with the Birmingham Clinical Trials Unit (CTU) to scope the routine data available for maternity research and to identify approaches to storing and linking study data.

We are liaising closely with the maternity group of South London CLAHRC to share knowledge and explore and develop areas for collaboration. We are also collaborating with Oxford CLAHRC on a randomised controlled trial to evaluate the '*effectiveness of regular weighing and feedback by community midwives in preventing excessive gestational weight gain*'. Through this collaborative project the theme is working closely with Thames Valley Clinical Research Network, and the School of Primary Care Oxford.

2. Prevention and early intervention in youth mental health

Theme Lead: *Prof Max Birchwood, University of Warwick*
m.j.birchwood@warwick.ac.uk

Leadership: The Research & Innovation department of Birmingham & Solihull Mental Health NHS Foundation Trust (BSMHFT) recently moved to the Barberry Centre in order to establish '**The Centre for Public Mental Health Applied Healthcare Research**'.

Major Grants Awarded: The team secured a total of £11.2m external funding, including a major EU grant, '**MILESTONE'**, to explore transitions between children and adult mental health services in other EU countries; '**PARTNERS2**' (in collaboration with Peninsula CLAHRC), a pilot trial of primary care based collaborative care for people with serious mental illness; and a grant from local NHS to evaluate the new 0-25 youth mental health services in Birmingham, which will be delivered by the Birmingham Children's Hospital (BCH).

Research Highlights: Researchers have collaborated with young people (**Youth Board**) to develop e-learning tools and digital tools around the '*Five Ways to Wellbeing*' agenda (see www.youthspace.me). We have also developed excellent working relationships with teachers and pupils in local schools through the establishment of the '**SchoolSpace**' network. Through this network, we are offering bespoke training sessions (focused on general education about adolescent mental health, self-harm, eating disorders, and anxiety and depression) to improve the mental health literacy of teachers/pupils, and provide schools with support in managing students' mental health. The www.youthspace.me website is now available on the intranet of many participating schools.

Implementation Highlights: With the support of the West Midlands AHSN, we have been able to expand information sharing and our digital capacity to increase the number of young people accessing appropriate mental health services. This work includes the development of e-learning modules, an interactive online map of services, and smartphone apps, aimed at engaging and informing young people about mental health and services/support available.

Examples of Impact: In light of the findings generated through the CLAHRC pilot, new early intervention mental health services are to be offered in Birmingham from **0-25 years**. These will be provided by '*Forward Thinking Birmingham*' through BCH and will be evaluated by this theme (see pages 16-17).

Prof Max Birchwood has supported the BIG Lottery in the development of a £70m investment in '**HeadStart**', aiming to improve resilience in young adolescents and equip them with the skills to deal with difficult life circumstances, alongside Birmingham City Council and The Children's Society. Prof Birchwood directly influenced the group to maintain the number of evaluation sites for this project to ensure statistical significance and allow results to be generalisable.

Research evidence generated by this theme regarding delays in treatment of first episode psychosis led directly to the Government's new waiting time initiative for mental health services, to align with physical health care services. The Department of Health has established a task group to support the implementation of the new treatment target and has a £200m budget to support changes to reduce treatment delay across England. Our previous work has demonstrated that introducing effective service interventions can significantly reduce the duration of untreated psychosis among young people experiencing first episode of psychosis and improve the chances of recovery within an urban population.

Key Objectives

Eating disorders. A series of qualitative interviews are being carried out with a sample of young people with eating disorders and their carers, to understand the psychological and contextual experience of developing an eating disorder. Participants were recruited through the Eating Disorders Unit at the Barberry Centre, Queen Elizabeth Hospital.

A longitudinal exploration of factors associated with development of eating disorders is underway. Participants aged 13 have been recruited through collaboration with five local schools (the 'SchoolSpace' network) and will be followed up every six months until aged 16. The study aims to examine prevalence rates, risk and resilience factors, and transition to eating disorders in adolescence. The second survey has just been completed by 626 young people (a response rate of 81%). The team is collaborating with 'Vison 360', a digital healthcare company, in order to support research activities, including the development of a secure data platform to conduct surveys and collect data from participating schools.

Looked after children in social care. Work is being developed alongside 'LYNC', an NIHR Programme Development Grant, to understand the mental health and social care needs, and service use of young people leaving the social care system. Qualitative interviews with 12 care-leavers and local authority staff have been completed and the findings form the basis of a full NIHR Programme Grant.

Early detection of depression. Working with the **Prevention and Detection of Diseases theme (3)** we aim to screen/detect young people at risk of developing depression using The Health Information Network (THIN) database. Findings have been submitted for peer review and implementation of a primary care based intervention is being considered.

Links with NIHR Infrastructure: We are collaborating with the NIHR Biomedical Research Unit (BRU) in South London and Maudsley NHS Foundation Trust, and the Institute of Psychiatry, Psychology and Neuroscience (IoPPN) at King's College London on '**ECLIPSE**', a new NIHR Programme Grant focusing on implementation of cognitive remediation in first episode psychosis.

This theme is associated with the Cambridge CLAHRC as part of the '**SUPEREDEN study**' concerned with early intervention for young people experiencing psychosis.

We are planning an MRC grant to follow-up recently published research on Cognitive Behavioural Therapy to reduce compliance with commanding 'voices', collaborating with the IoPPN.

Case Study: A Ground-breaking Early Intervention Service in Birmingham to Offer Mental Health Services for Young People, 0-25 years.

Background: Mental health illnesses can start at an early age and have lifetime consequences – a number can continue into adult life unless treated effectively. The clinical evidence suggests that half of all lifetime mental health illness begins by age 14, and three quarters by 25 (with the exception of dementia).[1-3] Furthermore, referral rates to Child and Adolescent Mental Health Services (CAMHS) have significantly increased in recent years.[4] Research evidence generated through CLAHRC WM showed that young people who present with first psychotic symptoms experience long treatment delays due to bottlenecks within the specialist mental health services, together with poor help-seeking behaviour. Treatment delay is the period between onset of psychotic symptoms and the receipt of anti-psychotic medication – the duration of untreated psychosis (DUP).[5] Influenced by CLAHRC WM research, NICE has recently published a quality standard to recommend that "*more than 50% people of all ages who experience psychotic symptoms for the first time should be treated with a NICE approved care package within two weeks of referral*."[6] Prof Max Birchwood, **Youth Mental Health theme (2)** lead, has been working with NHS England to operationalise this target.

Research Findings and Evidence: Findings published by Prof Swaran Singh showed significant numbers of young people being 'lost' and becoming 'disengaged' at the transition period between child (0-16) and adult (16+) mental health services, the most vulnerable point in their mental health evolution.[2,3] Research in the Birmingham population also showed that 'Did Not Attend' rates were highest in the 16-24 age group, especially among black and minority ethnic groups.[7]

An experimental youth pathway ('*YouthSpace*') was co-produced and implemented with service users in Birmingham and Solihull Mental Health NHS Foundation Trust (BSMHFT). The new service includes a dedicated youth pathway multidisciplinary team and the development of an interactive website to signpost people to services more effectively. In parallel, a public health campaign aimed at increasing mental health awareness in some areas of Birmingham was evaluated, which aimed to change the help-seeking behaviour of, and access to treatment in, young people in the early stages of psychosis. The evaluation showed a significant reduction in treatment delay from 285 to 104 days in the intervention area, compared with no change in the control arm.[5,7-9]

Impact on Services: A ground-breaking service for young people in Birmingham emerged from this evidence base, first to provide services from 0-25 years to avoid losing patients in the transition to adult services, and second to build this around public mental health and early detection principles.[4] This new service predominantly aims to respond to domain two of the NHS Outcomes Framework – *to enhance quality of life for people with mental illness*, but it is also likely to affect elements from all five domains.[4,10] The new 0-25 years Birmingham model was mentioned in the recent (March 2015) Government policy paper, '*Future in Mind*', aimed at

improving mental health services for young people – "*we also note that in some parts of the country, such as Birmingham and Norfolk, there is a move to develop mental health services for 0-25 year olds. This new development will be watched with considerable interest*."[11]

The CLAHRC pilot held a knowledge exchange forum in 2011 to promote these findings among Birmingham's young people, families, commissioners, and clinicians. This was written up by the research group as a special issue of the British Journal of Psychiatry.[1] Furthermore, Dr Diane Reeves, Chief Accountable Officer for Birmingham South Central CCG, became aware of these findings at a dissemination event held by the CLAHRC pilot in September 2013.[7] Dr Reeves has described this as the "*key plank of local, high quality research which influenced the development and re-commissioning of youth mental health services in Birmingham to provide services to Children, Young People and Young Adults (CYPYA) from 0-25 years*."[4,10] This impact is also an example of international quality research alongside local input leading to major change of services. Many other CCGs across England are planning to re-commission mental health services to improve provision for young people in light of the Birmingham model.[11] CLAHRC WM will shortly publish a 'super BITE' to bring together the research evidence and commissioning documentation to describe the events that led to this major service change, and will be hosting a regional event to showcase the example and to support other health and social care organisations to implement similar changes in specialist youth mental health services in their localities.

We can confirm that the new 0-25 years services in Birmingham will be provided by the Forward Thinking Birmingham' partnership (http://forwardthinkingbirmingham.org.uk), led by Birmingham Children's Hospital NHS Foundation Trust. A prospective evaluation of the new service will be completed and led by the **Youth Mental Health theme (2)** at the Universities of Warwick and Birmingham. The evaluation will assess its mobilisation and impact, including relevant outcome indicators in the NHS Outcomes Framework. Findings from this evaluation will be reported soon.

References:

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2. Singh SP, Paul M, Ford T, Kramer T, Weaver T. Transitions of care from Child and Adolescent Mental Health Services to Adult Mental Health Services (TRACK Study): a study of protocols in Greater London. *BMC Health Serv Res*. 2008;**8**:135.
3. Singh SP, Paul M, Ford T, et al. Process, outcome and experience of transition from child to adult mental healthcare: multiperspective study. *Br J Psychiatry*. 2010;**197**(4):305-12.
4. South Central CCG. Appendix 5: Service Specification. Birmingham: South Central CCG, 2015. [Available at: http://bhamsouthcentralccg.nhs.uk/patient-and-public-engagement/0-25-mental-health-services]
5. Birchwood M, Connor C, Lester H, et al. Reducing duration of untreated psychosis: care pathways to early intervention in psychosis services. *Br J Psychiatry*. 2013;**203**(1):58-64.
6. NICE. QS80 Psychosis and schizophrenia in adults. London: NICE, 2015.
7. Birchwood M, editor. Mental health services for young people. SOS! NIHR CLAHRC for Birmingham & Black Country Dissemination Event. Birmingham: Birmingham City Council; 2013.
8. Marshall M, Husain N, Bork N, et al. Impact of early intervention services on duration of untreated psychosis: data from the National EDEN prospective cohort study. *Schizophr Res*. 2014;**159**(1):1-6.
9. Connor C, Birchwood M, Freemantle N, Palmer et al. Reducing DUP: a generalized methodology for Implementation in a variety of healthcare settings. [Submitted to *Br J Psychiatry*].
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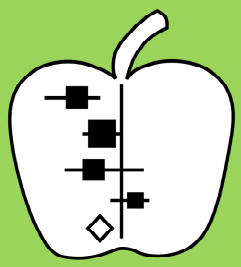
11. Department of Health. Future in mind: promoting, protecting and improving our children and young people's mental health and wellbeing. London: Department of Health, 2015.

3. Prevention and detection of diseases

Theme Leader: *Prof Aileen Clarke, University of Warwick*
aileen.clarke@warwick.ac.uk



Prevention and detection of diseases

Leadership: We have established strong links with the **National Screening Committee** (NSC), part of Public Health England (PHE), which will maximise opportunities for impact in health and social care partners.

Major Grants Awarded: A follow-on grant for £3.5m has been awarded to Warwick Medical School to continue the work of this theme linked through the '**Technology Assessment Review Unit**' for the next five years.

Research Highlights: During the first year, this theme has completed 14 systematic reviews, published 37 papers, and brought in £5,347,010 in total grant income. Four NIHR CLAHRC PhD studentships have been recruited, and competitive funding has been secured from the Economic and Social Research Council (ESRC) for two further studentships.

A linked study, '**Changing case Order to Optimise patterns of Performance in Screening (CO-OPS) Trial**', led by Dr Sian Taylor-Phillips (supported by this theme) has achieved its recruitment target of 1.1m women. Dr Taylor-Phillips was recently invited to present her work on screening at the UK Parliamentary Health Select Committee.

Dr Wendy Robinson (also supported by this theme) has recently completed an evaluation, through RCT design, of the '**Families for Health**' community-based service intervention concerned with supporting families with weight management.

Professor Kate Jolly (matched funded by this theme and the **Maternity and Child Health theme (1)**), has completed '**Lighten-Up Plus**' – a study to evaluate an SMS-based weight maintenance programme. A total of 360 participants were recruited to the trial and a process evaluation showed good uptake of the intervention (with a median of nine weights being entered) and follow-up at nine months is being carried out (*Jolly, et al. BMC Public Health. 2010;10:439 // Jolly, et al. BMJ. 2011;343:d6500*).

Implementation Highlights: A strong **Prevention and Detection Network** has been established (a key objective in our application) including collaboration with local authorities and trusts. The '**Health Checks**' programme has been prioritised as an important service intervention to study.

Examples of Impacts: A number of systematic reviews have been completed and published in the Cochrane Reviews library and have influenced health policy. The impact on influencing national screening policies, particularly in demonstrating the benefits of extending the blood spot testing in neonates, is a highlight.

We recently held a seminar on the '**Health Checks**' programme, which was well attended by collaborating local authorities. Interaction with local authorities has allowed teams to undertake joint training sessions and has influenced attitudes and approaches to the implementation of the programme.

Key Objectives:

Conduct systematic reviews / undertake feasibility studies.

Weight-management: A systematic review looking at wholegrain cereals for the prevention of Coronary Heart Disease has been completed, together with further reviews exploring low glycaemic index diets, nut consumption, co-enzyme Q10, and dietary fibre for the prevention of Cardiovascular Disease.

Childhood obesity: A systematic review of interventions for adolescent obesity and parent-only interventions to tackle childhood obesity has been completed and a grant application has been recently submitted to conduct a trial. We will be hosting a workshop on obesity in collaboration with Public Health England, Public Health West Midlands, and the Wellcome Trust.

Informed uptake of screening: Two systematic reviews on informed uptake of screening and one on opportunities versus planned Health Checks are planned to inform possible studies.

Geographical risk mapping: A study has been published mapping geographical risk in Warwickshire and investigating the association between air pollution and heart failure. The group is scoping the feasibility of using electronic searches to identify patients with untreated atrial fibrillation.

An additional feasibility study to assess the use of the **Wellbeing Adjusted Life Year (WALY)** is also underway. A comparison of the EQ-5D and the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) is being piloted in local settings.

Case finding. A grant to evaluate a web-based intervention for cardiac rehabilitation has been awarded to collaborating academics at the University of Birmingham.

Links with NIHR Infrastructure: Dr Taylor-Phillips was recently awarded an NIHR Clinical Trials Fellowship and will be working with the Birmingham and Warwick CTUs.
Amy Grove recently secured an NIHR-funded doctoral placement and has submitted an application to the NIHR to undertake an exchange with the Yorkshire & Humber CLAHRC, and will be further supported to develop on the NIHR career pathway through fellowship schemes.

Forward Look: Together with the **Chronic Diseases theme (4)**, we are collaborating with local authorities and other health and social care partners in the region to submit a bid to the Prime Minister's '*Challenge Fund*' to improve access to GP services for patients.

Case Study: Service Change in Worcestershire

Worcestershire County Council (WCC) commissions a number of services in order to meet the health and wellbeing needs of the local population. As part of the commissioning process it is necessary to regularly review and evaluate these services in order to assess whether they are meeting these needs, or, indeed, whether such needs have changed. This then helps to determine whether to continue with current services and/or providers.

One such example concerns a '**Health Trainers**' service commissioned by WCC, the contract for which was due to expire. A review, evaluation, and assessment of the service provider were therefore required to determine whether to continue with the current service and/or provider. The service focused on addressing key areas of lifestyle change for the population of Worcestershire, particularly those living in deprived areas. The service evaluation has informed the re-tendering process for this service. The work helped to re-focus the intervention, the target population outcome measurement, and the system of target-based remuneration.

Another example concerns substance misuse treatment services commissioned in Worcestershire. Once again, a review, evaluation, and assessment of the incumbent service provider generated high-quality evidence that helped inform the recommendations for future Worcestershire substance misuse treatment services and was, therefore, key to shaping the service specification for the re-tendering of the service. This analysis ensured that the new service is tailored to the needs of service users and resources are directed to the areas where they will have the greatest impact.

In both examples, the CLAHRC WM Joint Strategic Needs Assessment (JSNA) Officer undertook the analytical work for the service evaluation and needs assessments, presenting the findings at various stakeholder workshops. In the case of the 'Health Trainers' service, the CLAHRC WM JSNA Officer also advised on the service redesign and redeveloped the payment by results structure for the future service.

New providers with different service models have been identified in both cases, with the new services commencing in April 2015. In the case of the remodelled 'Health Trainers' service (now called '**Living Well**'), discussions are taking place with the new provider to undertake a rigorous service evaluation with a more academic approach.

Case Study: Knowledge Exchange and Workforce Development – Public Health Data Workshops Led by Local Authority Collaborative

CLAHRC West Midlands Knowledge-Exchange Facilitators, working as knowledge brokers across the University of Birmingham and WCC, identified some specific knowledge requirements of the local authority around the understanding of public health data. In light of this finding, it was considered useful to undertake a series of taught sessions to WCC staff and staff from other agencies and partners, including Clinical Commissioning Groups (CCGs) and voluntary sector organisations, in the sources of public health data and how they are used.

The rationale for these workshops is to improve the knowledge and understanding of public health data sources to facilitate evidence-led decision-making and commissioning in local authority public health departments and beyond. These training sessions have been consistently over-subscribed and extra sessions have had to be scheduled, further demonstrating that demand to increase knowledge about public health data is high within these settings.

The training workshops were established in collaboration with other departments within the local authority and external partners in order to address wider determinants of health, particularly in relation to planning and housing data.

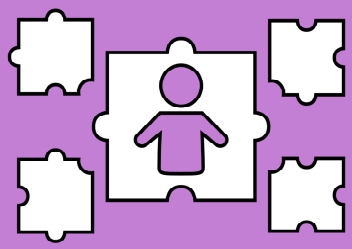
Public health data workshops have been provided to a wide range of professionals in local authorities, CCGs, and the voluntary sector to increase knowledge of public health data sourcing and interpretation.

An additional objective has been to promote the JSNA and its value and contribution to evidence-based decision-making in public health and the associated wider determinants of health.

Originally, the taught sessions were intended as a limited number of workshops for staff within the local authority. Due to the high demand, the remit has widened considerably to become a longer programme reaching out to a much wider audience. Following several requests, there are plans to develop the workshops further to include training in specialist research methodologies and analytical skills.

4. Chronic diseases

Theme Lead: *Prof Jon Glasby, University of Birmingham*
j.glasby@bham.ac.uk



Chronic diseases

Major Grants Awarded: An NIHR HTA grant to evaluate the effectiveness of chondrotin sulphate for hand osteoarthritis (£1.3m) has been awarded, led by Prof Christian Mallen.

Prof Mallen was a co-applicant on two successful NIHR Programme Grants: one with Oxford University to look at back pain in older people (£2m), and the other to look at stratified primary care for musculo-skeletal pain (£1.9m).

Prof Mallen is also Chief Investigator on an NIHR Research for Patient Benefit (RfPB) grant to conduct a trial aiming to improve outcomes for patients with hip osteoarthritis (OA).

Keele University was recently successfully re-awarded tenure to host the NIHR School for Primary Care Research (£4.5m) (see pages 24-25).

Research Highlights: The **ENHANCE** study, led by Keele University, has completed development work to co-design a new nurse-led long-term primary care review. The development work has included offline testing to simulate the enhanced review with patients acting as role models (see page 24).

A project supported by the West Midlands AHSN is underway to explore how GPs and social workers can and should work together.

Implementation Highlights: The **STarT Back** intervention is now being implemented more widely across the West Midlands region, with the support of the West Midlands AHSN. The audit data shows a reduction in physiotherapy waiting times in the intervention provider units (see pages 26-27).

The tools used in the implementation work stream to explore the **management of OA** in primary care have been submitted to NICE as part of the Shared Learning Awards 2015 scheme.

Three further CCGs have signed up as new collaborative partners (see page 10).

Examples of Impacts: A project led by Keele University in collaboration with Shropshire CCG exploring the management of OA has translated to the development of the services through a Local Enhanced Service for OA in primary care settings. The Keele-based group is emerging as a world leader in primary care research, particularly in the area of musculoskeletal research (see pages 24-25).

Work conducted to evaluate interventions designed to provide emotional and psychological support to dialysis patients has shown that a number of doctors have changed their practice to incorporate the service intervention. Furthermore, one hospital in North Staffordshire has used evidence provided by this theme to develop a business case to offer psychological support for dialysis patients.

The Keele group has worked closely with Public Health England to ensure that STarT Back is included in '*Making Every Contact Count*' documentation.

Key Objectives:

Map current and proposed service innovations. Site visits to each of the main collaborating partners providing matched funding has been completed in order to understand local priorities and identify existing or planned service innovations suitable for evaluation. A systematic review of reviews to provide evidence about the effectiveness of interventions for integrated care to the participating trust emerged from these initial discussions and this work is now well underway. It is envisaged that this review will identify successful interventions or models of chronic disease care suitable for implementation and evaluation at participating sites.

Formative evaluations of clusters of innovations. Two service innovations have been identified for formative evaluation, including the '**HECTOR**' pathway for older people with multiple fractures (developed with DLFs at the Heart of England NHS Foundation Trust); and interventions aimed at reducing the 30-day emergency hospital readmissions following a hospital stay (the first of which involves evaluating the '**LACE**' risk predication tool). Protocols for both studies have been developed and peer-reviewed, with ethics approval pending.

Identify innovations or clusters of innovation for further development and evaluation. A two-site cluster of innovations has been identified for potential evaluation. Integrated teams for the management of chronic diseases are being established, including joint primary care and adult social care teams in Birmingham (IMPACT teams); and joint primary care, community, mental health, and public health teams in Coventry. Both initiatives form part of the local authorities' '*Better Care Fund*' plans, and proposals to evaluate these interventions are underway. A further study to explore how GPs and social workers can and should work together has commenced.

Primary care interventions to improve pain management and mental health. The **ENHANCE** study is well underway. An evidence synthesis report to inform this study has been completed. A number of stakeholder engagement events have taken place to co-design and simulate the intervention with formative feedback. A number of focus groups have taken place with practice nurses, and findings have been used to inform a training package (see page 24).

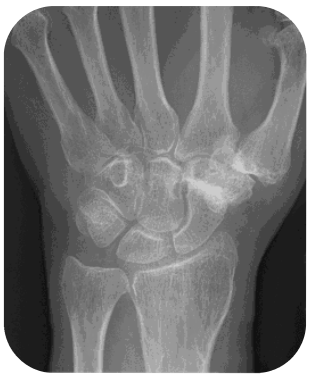
Links with NIHR Infrastructure: We are working with a NIHR Health Technology Co-operative (HTC) in Sheffield on '**Devices for Dignity**' to develop a cost-effectiveness model for frequent home haemodialysis.
We have been collaborating with Peninsula CLAHRC to develop work on multi-morbidity, including a joint application to the NIHR-commissioned call on primary care.

CLAHRC WM led a national workshop on integrated care for chronic diseases in October 2014. The workshop was attended by 10 out of the 13 CLAHRC initiatives, and identified a number of fruitful areas for potential cross-CLAHRC collaborations.

Forward Look: We plan to engage with the British Pharmaceutical Society to explore how pharmacists can be involved in the product development pathway from conception to commercialisation of new treatments.

Case Study: Keele Research Institute for Primary Care and Health Sciences

The Keele Research Institute for Primary Care and Health Sciences, has established itself as a world leader in Primary Care Research. In November 2014, they secured re-designation to host one of the NIHR Schools for Primary Care Research (SPCR). The research team has a strong track record in the area of musculoskeletal research, working closely with respective health and social care partners, and are undertaking a variety of primary care research studies supported by CLAHRC WM. In addition, the group has secured the only NIHR Research Professorship in Primary Care Research in round four of the competition, awarded to Prof Christian Mallen, as well as recently celebrating an outstanding result from the 2014 Research Excellence Framework. This result ranks the Medical School sixth nationally among Schools undertaking primary care research, and fifth in terms of research publications.



ENHANCE Study

Osteoarthritis (OA) and mental health problems are common, and often co-exist with other long-term conditions (LTCs). However, they are seldom prioritised, which results in under-detection and sub-optimal treatment in primary care. Researchers at the Keele Research Institute have developed the ENHANCE study, which aims to test the feasibility and acceptability of a Practice Nurse-led LTC review, for case-finding, assessing and initiating management of OA-related joint pain, anxiety, and/or depression in patients. A number of methods were used to inform and develop the new service intervention, including an evidence synthesis, three stakeholder workshops, a patient advisory group, a practice nurse advisory group, and a focus group with practice nurses to identify implementation barriers. A simulation of the enhanced review with patients and the public took place to further inform and develop the intervention. A bespoke IT template has been created in the EMIS general practice software to guide the clinician and patient through the enhanced review, and further simulation testing will be completed to pilot the usability of the IT template. A number of practices have been identified as early adopter sites and implementation of the new systems will include nurse training sessions. The intervention will be evaluated through a stepped wedge cluster randomised control trial design (see page 33). The ENHANCE study team, is collaborating with the Keele CTU and is engaging with the NIHR Clinical Research Network (CRN) to assist with study set up and recruitment to the pilot trial.

Managing Osteoarthritis

An editorial authored by CLAHRC WM's Prof Christian Mallen and Prof Elaine Hay was recently published in the BMJ (*BMJ 2015; 350: h1352*) and attracted great interest. It called for a review of the use of paracetamol in managing OA and spinal pain following the publication of a systematic review carried out by research collaborators at the University of Sydney (*Machado, et al. BMJ 2015; 350: h1225*). The article synthesised the results of 13 randomised controlled studies, and revealed that there is "*high-quality*" evidence to suggest that paracetamol is ineffective for reducing pain intensity and disability in patients with spinal pain, and has a "*significant, although not clinically important effect*

on pain" among patients with OA. In addition, it was revealed that paracetamol use increased the likelihood of abnormal results on liver function tests by almost four times. In 2013, NICE warned that the long-term use of paracetamol at high dosages (4,000 mg/day) could lead to heart, kidney and intestinal problems, but did not change their guidance following concerns from the Royal College of GPs and arthritis charities regarding the potential impact of using alternative analgesics, such as non-steroidal anti-inflammatory drugs and opioid medication. Mallen and Hay highlighted that the Medicine and Healthcare products Regulatory Agency (MHRA) is currently conducting a review into the safety of over-the-counter analgesics, with its findings likely to influence national prescribing guidance. They write that "*the new evidence provided by Machado and colleagues re-opens the debate*" on the safety and effectiveness of these treatments. As an alternative, they recommend the wider use of non-pharmacological options, such as exercise, manual therapy, acupuncture, and psychological support. However, they emphasise the need for more research into maintaining the benefit of exercise on pain levels over long periods, with approaches to improving adherence being a priority. This editorial has re-opened the debate on the safety and effectiveness of paracetamol, and NICE responded that it will wait until the publication of the MHRA review of the safety of over-the-counter medicines before publishing its guidance on pharmacological management for OA.

IT template in EMIS

A further simulation with patients and the public is planned to test the usability of the IT template in EMIS to guide clinicians and patients through the enhanced long-term conditions review. A pilot study is planned to evaluate the intervention in early adopter sites as 'proof of concept'. If the intervention is shown to be effective in identifying and managing people with multi and complex long-term conditions, then further funding will be sought to extend and spread the intervention to a regional and then national evaluative study.

Case Study: STarT Back

Over 70% of the population will experience a significant episode of back pain at some point during their life. Back pain complaints are the most common reason why middle-aged people visit their GP and the second most common reason for sickness absence from work. A review of current practice suggests that a significant majority of back pain patients are over-treated in the NHS, while a significant number go on to suffer long-term pain and disability. The challenge for practitioners, patients and policy-makers is to be able to classify back pain patients according to their risk of persistent pain and then to target them to appropriate matched treatments.

STarT Back is an example of stratified care for low back pain, whereby patients are screened for risk of chronicity and matched pathways are put in place to target the right treatment to the right patient. STarT Back has been shown to be clinically- and cost-effective – reducing over-treatment of low-risk groups – by ensuring the management of this group is maintained in primary care, with more effective and efficient matched and targeted treatment for medium- and high-risk groups provided by physiotherapists in community and secondary care settings (*Hill, et al. Lancet 2011; 378:1560-71*). A linked study demonstrated that application of the STarT Back approach provided a 40% reduction in referral of low-risk groups, while medium- and high-risk groups gained earlier access to therapy with improved outcomes and significant reduction in time lost from work (*Foster, et al. Ann Fam Med. 2014;12:102-11*).

In early 2014, the West Midlands AHSN supported a funding application to extend the STarT Back approach to care management across the West Midlands, with the aim of:

- Supporting GPs to use the screening tool to match patients to the right treatment.
- Training physiotherapists in treatment approaches to ensure patients are managed according to need.
- Negotiating clear pathways of care between primary, community, and secondary care providers to support patients with back pain.

By February 2015, six clusters were established across the primary/secondary care interface across the West Midlands, with Keele University as its academic base. To date, 109 physio-therapists have been trained in STarT Back matched treatments, spanning 12 NHS providers within the West Midlands region.

An audit tool was developed for NHS leads to evaluate the impact on services. Evidence from early audit data suggests:

- Increased utilisation of the STarT Back tool within general practice settings. For example, a 30% increase in Stafford & Surrounds CCG has been reported.
- STarT Back tool completed 100% of the time by physiotherapists.
- A reduction in physiotherapy waiting times after STarT Back matched treatments have been applied. In Staffordshire & Stoke-on-Trent Partnership NHS Trust, 52% of patients were seen within the target waiting time in pre-intervention, compared with 80% post-intervention. In Telford & Wrekin CCG / Shropshire Community Trust, waiting times were reduced from ten to four weeks.
- 100% patient satisfaction rates.
- Reduction in patients being referred on for second opinion (1% to IMPACT service).

As well as establishing regional cluster sites of implementation, industry partnerships have been developed; links established with other AHSNs to support STarT Back roll-out across networks; and links established with international, national and regional bodies to ensure integration into professional networks. We have created new partnerships with national professional groups (such as RCGP, CSP, and Public Health England MECC programme), as well as national quality improvement bodies (such as Qipp Right Care, Map of Medicine, and NICE) to make STarT Back and educational resources available at a national level. We will also continue to explore possible collaborations with industry partners via the ABPI partnership group.

The STarT Back tool has been fully integrated into the GP clinical system (EMIS) allowing automated completion of the tool and access to high-quality patient information (www.patient.co.uk) and auto-referral to appropriate matched treatments. Quality indicators and evaluation reports have also been built into the EMIS IT systems. Piloted with five practices in North Staffordshire CCG in 2014, this system will be rolled out across the West Midlands as part of the ongoing implementation activities of West Midlands AHSN during 2015. In addition to evaluating the impact at a service level, the STarT Back implementation team are collaborating with the **IOS theme (5)** to evaluate the implementation approaches and role of 'distributed leadership'.

In collaboration with EMIS, an IT solution has been developed to integrate the e-STarT Back tool within existing clinical systems. This enables automated calculation of risk scores in patients, immediate access to patient information, and case finding to enhance referral for matched treatment for medium-/high-risk patients, and identifies lower risk patients to be managed with less intensive methods. This innovation provides the general practices with:

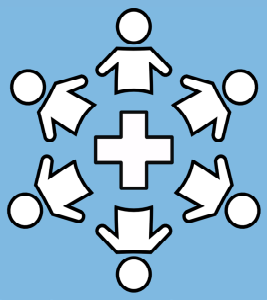
- Access to high-quality patient information, via www.patient.co.uk.
- A pre-populated physiotherapy referral form for completion and sending to physiotherapy.

This e-solution has been presented at two GP protected learning events and presents a real solution for GPs to integrate the STarT Back tool into everyday consultations. The e-STarT Back tool has been tested within pilot sites prior to roll out in 2015, and represents a collaboration with industry that delivers a solution for primary care that will be available at a national level.

Utilising the knowledge, tools, audit data, networks, and systems developed with the cluster pilot sites in 2014, we aim to ensure that all NHS partners across the West Midlands have support to enable them to implement stratified care for low back pain in a systematic way. Funding to support this has been secured through the West Midlands AHSN. In addition, we are working with Public Health England to support the '*Making Every Contact Count'* agenda and to embed STarT Back within this initiative. Planned outcomes for this proposal are:

- Further roll-out of stratified care for low back pain across West Midlands – ensuring each West Midlands-based CCG has the opportunity to adopt this approach for their population.
- Ensure all provider community units have access to training for physiotherapy teams to deliver the matched treatment approaches.
- Measure use of the STarT Back tool as a quality indicator for low back pain.
- Provide tools and resources that support implementation of NICE guidance.
- Provide a validated measure of patient reported outcomes via the musculoskeletal Patient Reported Outcome Measure (PROM).

5. Implementation & Organisational Studies



Theme Leader: *Prof Graeme Currie, University of Warwick*
graeme.currie@wbs.ac.uk

Major Grants Awarded: A partnership with the applied healthcare research unit at Monash University, Melbourne, Australia has been cemented through the '**Warwick-Monash Alliance**', which has brought in additional research income to appoint a Chair and Assistant-Chair in healthcare improvement science in both organisations.

The research group are co-applicants on a successful grant application from the Australian Research Council to examine healthcare improvement in Victoria State, Australia (total grant value A$499,000), demonstrating international reach.

The theme secured additional funding from the Heart of England NHS Foundation Trust (HEFT) for two Chairs in healthcare improvement science, with a particular focus on **Patient Safety**.

Professor Graeme Currie is Chief Investigator on an Economic and Social Research Council (ESRC) grant application to analyse Hospital Episode Statistics with **Ernst & Young**.

Research Highlights: The PPI research activity is nested within this theme and the research group has recently been shortlisted for an NIHR HS&DR bid on patient experience in relation to adsorptive capacity of healthcare organisations.

The group has led on a number of workshops, including **improvement methodologies in healthcare** (which involved international collaborators, the Health Foundation, other CLAHRCs, and Manchester Business School), and **methods to report patient safety data to hospital boards**.

A large number of PhD students are being supervised and mentored, funded through matched funding provided by Warwick Business School. Students are largely embedded in the health and social care partners to enrich learning experience.

This theme is developing both a '**Massive Open Online Course**' (MOOC) and a blended learning masters course in **Healthcare Innovation & Leadership**. Graduates on the University Hospitals Birmingham NHS Foundation Trust 'Annex U' training programme will be enrolled in this course from September 2015. This programme aims to attract graduates from a range of disciplines into the NHS. Staff are employed on a two-year fixed-term employment basis and the course combines NHS work experience with fully-funded masters level study programme.

Implementation Highlights: Prof Currie is leading on the patient safety collaborative, now merged with the West Midlands AHSN. He is also opening an event being held at HEFT to showcase research being undertaken in collaboration with the CLAHRC West Midlands initiative.

Prof Currie is mentoring and supporting Prof Krysia Dziedzic at Keele University, who was recently awarded an NIHR Knowledge Mobilisation Research Fellowship.

Examples of Impacts: Four papers have been published in the top ranking journals listed in the 'Association of Business Schools' (ABS score 4* journals are ranked highest in this field of work and give an indication of the impact of the research).

Key Objectives:

Implementation Research Fellows. A number of Implementation Research Fellows (IRF) have been employed at Warwick Business School to act as boundary-spanners between this theme and the four service themes to study the implementation of evidence in to practice. Three IRFs have been recruited, together with two PPI IRFs, and eight protocols have been developed, with service-embedded studies now underway.

Study the development of services. Access has been negotiated for ten studies to explore the development and implementation of services, including nested studies looking at the service pathway for older people suffering trauma; new service interventions being introduced to manage back pain; and studying the introduction of the maternity triage system at various settings.

We are undertaking a series of research studies to explore PPI in the process of implementation of evidence into practice (see pages 38-40).

Observe adsorptive capacity. The team is developing an adsorptive capacity psychometric tool to review capacity of organisations to apply knowledge and evidence in to practice .

Forward Look: We have secured two additional matched-funded PhD students through a new partnership with Shrewsbury & Telford Hospital to explore redesigning the care pathway for older people.

We have an opportunity to partner with '**GE Healthcare'** in their bid to the Department of Health to drive service transformation in five competitively selected Trusts. Faculty from CLAHRC West Midlands would act as advisors and supervise two PhD students from Warwick Business School to conduct evaluative research.

Links with industry: We have established links with the **Warwick Manufacturing Group** at the University of Warwick through our work with the Institute for Digital Healthcare to support the West Midlands Health Informatics Network. We have specialist skills in Health Informatics being hosted through UHBFT and through work on patient safety and e-prescribing. Work from the pilot CLAHRC is being extended to look at e-prescribing in paediatric care settings. Furthermore, work in this field will be developed further through a collaborative research project with **Ernst & Young** to develop Hospital Episode Statistics data. We are also working with **Boots Alliance** on a collaborative research project to explore the role of Boots in promoting, education and supporting self-management of the patient's own condition.

6. Research Methods

Theme Leader: *Prof Richard Lilford, University of Warwick*
r.j.lilford@warwick.ac.uk

Leadership: The theme recently part-relocated to the University of Warwick, with ongoing collaboration between Warwick Medical School and University of Birmingham.

Major Grants Awarded: A collaborative FP7 grant with **RAND Europe** to identify medical risk in the criminal justice system. The theme will conduct the economic evaluation of a liaison and diversion service (£23,462).

A grant funded by **Heath Education England** to evaluate GP recruitment (£87,439).

Two grants funded by **MRC Public Health Intervention Development Scheme** (£214,923); one to look at improving the health literacy of lay community workers in rural Southern Africa, and the other to look at the interface between the hospital and the community in India.

The **HiSLAC** grant (the largest HS&DR grant ever awarded), evaluating the impact of High-Intensity Specialist-Led Acute Care on emergency admissions to NHS hospitals at weekends.

Research Highlights: This theme, working collaboratively across the Universities of Birmingham and Warwick, are emerging as world leaders in the **stepped wedge cluster randomised controlled trial study design** (see page 33).

Prof Lilford was the senior author on a paper recently published in the Lancet looking at acute trauma care, conducted in collaboration with the NIHR Surgical Reconstruction and Microbiology Research Centre (SRMRC) (*Lord, et al. Lancet. 2014;384:1455-65*).

Examples of Impacts: A paper has recently been published describing the use of systematic reviews to synthesise quantitative evidence of intervention effects **across multiple indications** (*Chen, et al. J Clin Epidemiol. 2014;67:1309-19*). Our work found that systematic reviews of interventions are typically used to evaluate the effects of treatments one indication at a time. A great deal can be learnt from comparing the effects of a given treatment across many related indications, and this work will have implications for the information we can draw from systematic reviews. Furthermore, this paper was featured in the US Agency for Healthcare Research and Quality (AHRQ) '*Effective Healthcare Programme Bulletin'* and received favourable comments from international colleagues on *PubMed*.

We recently published the results of the '**TRaCKED Study**' (Test Result Communication, Knowledge, Evaluation and Development), which showed there are no clear guidelines in place for communication of test results to patients in general practice, and wide variation in practice across sites. New service systems were developed in collaboration with the participating practices with an evaluation following. A number of recommendations have been suggested, including providing clear information to patients, and reducing delays between sampling and communicating the results. In light of these findings, a number of general practices have implemented procedural changes to improve the communication of test results to patients (*Litchfield, et al. Fam Pract. 2014; 31:592-7 // Litchfield, et al. Br J Gen Pract. 2015; 65:e133-40*).

Key Objectives:

Provide methodological expertise in support of applied research in the four service themes.

Statistical support is being provided to a number of projects, including a study investigating the provision of emotional and psychological support for renal patients being carried out within the **Chronic Diseases theme (4)**. Dr Celia Taylor, Associate Professor at Warwick Medical School, is co-applicant on an NIHR RfBP bid to further explore this work, and our group is involved with an NIHR Programme Grant to explore care for patients with multi-morbidities.

The theme is working with Worcestershire County Council to analyse thermal loss from roofs in the council's housing stock and has recently submitted a paper exploring the association of alcohol retail location with alcohol-related hospital admissions.

In collaboration with West Midlands AHSN, we are carrying out a qualitative study around the attitudes of healthcare workers and patients to the '*Hydrate for Health'* water bottle, aimed at preventing dehydration in healthcare, and to understand the barriers and facilitators to its use.

Many of the service themes are still developing projects and protocols, and methodological expertise will be required downstream.

Conduct research on applied health services research methods.

Health economics: A protocol is being developed to look at the health and economic consequences of adverse events at the patient level. This work will feed into an estimation of the burden of preventable adverse events in England and will also be used as part of the economic evaluation on the linked HiSLAC and e-prescribing NIHR grants.

We held an event in January 2015 with Dr Kaveh Shojania, Editor-in-Chief of BMJ Quality and Safety, from which a project to conduct a systematic review exploring publication bias in health services and delivery research emanated.

A grant was recently secured by Dr Taylor to conduct an economic evaluation of the GP recruitment process in the UK.

Stepped wedge: Recent papers, led by Dr Karla Hemming, have been published in Statistics in Medicine and BMJ on stepped wedge cluster randomised control trial design (see page 33)

Systematic reviews: A number of systematic reviews are being carried out, including a review of early childhood cognitive interventions aimed at promoting child development.

To promote public engagement with applied science. Dr Taylor has presented on aspects of NICE decision-making process to the Coventry Rotary. Reverend Barry Clark (PPI), has recently presented at the Church of England's '*Faith, Health and Wellbeing Seminar*' in Birmingham, covering the main components of the CLAHRC WM initiative.

Links with NIHR Infrastructure: Prof Lilford is leading on methodological work to integrate multiple sources of evidence, which will be presented in June 2015 at an international symposium '*Evaluating service and system innovations in health care and public health'*. It is envisaged that this work would lead to a 'state of the science' e-book to assist researchers in the UK and further afield in the evaluation of complex interventions.

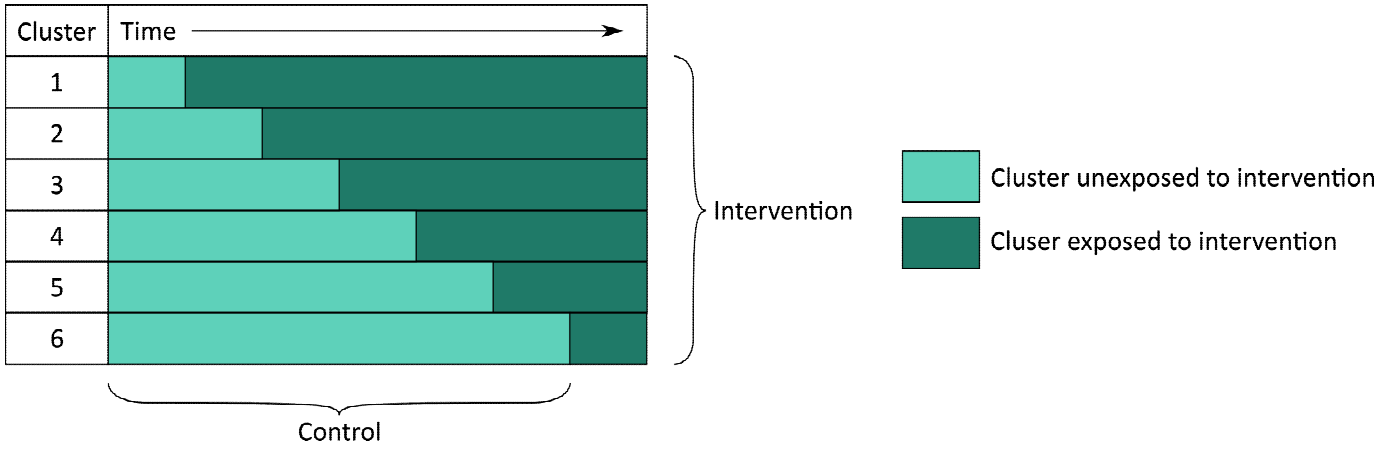
Links with Industry

Medtech/Devices. The West Midlands contains the highest proportion of medical device manufacture in the country and we have strong engagement with some local companies in the region, including **MidTECH** (a company providing support to the device industry) and **Medilink** (an instrument manufacturer). CLAHRC West Midlands has specialised expertise in the application of health economics to inform investment and product development decisions in industry (at the supply-side). This work is receiving growing recognition internationally, and a number of invited presentations and seminars have taken place. Work in this area will continue to advance through follow-on grants and through this theme. There are plans to adapt the methodology so it may be applied to low- and middle-income countries through W-CAHRD (see pages 34-35).

Other academic commercial research. We are planning an event focused on industry engagement, which will include representation from the industry lead from each main university, along with key people from local industry. We plan to include a workshop on the '*headroom method*', a supply-side technique that can be used to inform industry if a particular product or device at the development stage warrants further investment (*Girling, et al. Value Health. 2010; 13(5):585-91*).

Case Study: Stepped Wedge Cluster Randomised Controlled Trial.

The stepped wedge cluster randomised controlled trial (SW-CRT) is a relatively new study design that is increasingly being used for the evaluation of service delivery or policy interventions delivered at the level of the cluster, an alternative to parallel cluster trial designs. The design includes an initial period where no clusters are exposed to the intervention. Subsequently, at regular intervals ("steps") a random cluster (or a group of clusters) crosses from the control to the intervention. This process continues until all clusters are exposed to the intervention. Data collection continues throughout the study, so that each cluster contributes observations under both control and intervention observation periods.



Schematic illustration of stepped wedge study

The SW-CRT is a pragmatic study design that can reconcile the constraints under which policy-makers and service managers operate, with the need for robust scientific evaluation that might otherwise not be possible. It also provides a way to roll-out complex interventions that, for logistical, practical, or financial reasons, cannot be fairly implemented *en masse*, and ensures that all clusters receive the intervention – important if it is likely to be of benefit and unlikely to do harm, or if the intervention would be implemented regardless of evidence for effectiveness. SW-CRT also offers a number of opportunities for data analysis, particularly for modelling the effect of time on an intervention's effectiveness.

CLAHRC WM continues to lead the way in stepped wedge design and is arguably the world's premier centre. Building upon our previous work, we have recently published two more papers about the stepped wedge study design – one in the BMJ (*Hemming, et al. BMJ. 2015;350:h391*), which has been ranked in the top 5% of all articles ranked by Altmetric according to attention received; and one in Statistics in Medicine (*Hemming, et al. Stat Med. 2015;34(2):181-96*). Further, we now have two routines published in the STATA statistical software package – *Hemming & Girling. Stata Journal. 2014;14(2);* and *Hemming & Marsh. Stata Journal. 2013;13(1)*.

Our team is collaborating with Monash University on a bid to the Australian Medical Research Council to generate empirical evidence of the relative amount of systematic and random bias present in studies conducted using the stepped wedge design. This work has also been presented at a number of invited international conferences in 2014, and was disseminated at the Society for Clinical Trials Conference in Arlington, Virginia, USA.

Case Study: CLAHRC for Africa

Prof Richard Lilford also directs the Warwick Centre for Applied Health Research and Design (W-CAHRD), an international applied health research centre, which is a vehicle to disseminate the CLAHRC brand internationally – '**CLAHRC for Africa**'. This was set up with the aim of carrying out applied health research to improve the health of populations in low- and middle-income countries (LMICs). This international centre works in strategic partnership with the Liverpool School of Tropical Medicine, where joint honorary appointments exist. It acts as a global network bringing together individuals, disciplines and organisations to develop practical solutions to health needs and transform health systems in resource-limited nations.

In order to bring solutions to major health challenges, this work requires a range of disciplines in addition to clinical, epidemiological and public health approaches. Therefore, it also brings together social and management sciences, economics, mathematics, statistics and modelling.

The idea behind 'CLAHRC for Africa' is to forge new research ideas and collaborate with partners in other countries to add value to existing ideas. Over the past year, we have been building relationships and collaborative projects with organisations across Africa and India, including the Wellcome Trust Kenyan Medical Research Institute (KEMRI), Malawi-Liverpool Wellcome Trust Clinical Research Programme (MLW), the University of Witwatersrand, the University of Cape Town, the Indian Institute of Technology in New Delhi, and the African Population Health and Research Centre (APHRC) in Kenya. Prof Lilford recently undertook a two-week sabbatical at APHRC where he worked with colleagues to develop grant applications around improving the health of people living in slums.

'CLAHRC for Africa' has been working to forge new research ideas in the following areas:

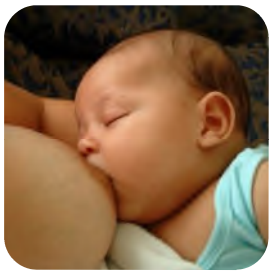
- **Preventing road traffic incidents through the use of in-vehicle technology (IVT)**: An estimated 1.24 million people die every year from road traffic incidents, with 90% occurring in LMICs. Current projections suggest that traffic incidents will become the sixth largest cause of death by 2020. The recent development of IVTs potentially offers exciting opportunities to improve road safety over the short term, but it is being disseminated rapidly with little independent evaluation. In order to study the effect of IVTs on driver behaviour and road traffic incidents in LMICs, we have brought together a cohesive team of international experts in economics, public health, emergency care, road safety, injury prevention, automotive engineering and smart technology from the University of Warwick, the Indian Institute of New Delhi and the University of Michigan Transportation Research Institute.

- **Salt-reduction initiatives in Sub-Saharan Africa**: We are working with the APHRC to look at salt intake and develop salt reduction initiatives in Sub-Saharan Africa. We currently have two collaborative grant applications on this subject submitted to the Wellcome Trust and the MRC.

- **The use of traditional healers**: The World Health Organisation (WHO) states that 80% of people in LMICs go to traditional healers for medical advice. We have carried out a study to show that this is not true and the proportion of people using traditional healers has

plummeted in Africa, with the number of traditional healers going down. A paper reporting this finding has been submitted and is awaiting outcome.

- **Improving health in slums**: We are very interested in improving health in slums and are working with APHRC on issues such as promoting exclusive breast-feeding and nutrition. We have an MRC Global Health Programme application currently under review and have recently proposed a series on slum health to the Lancet, who are favourable to this idea.



Since February 2014, the following major grant applications have been funded, focusing on improving international health:

- A Bill and Melinda Gates Foundation Grant (£5m) to develop a global network around the mathematical modelling of infectious diseases.
- A grant from the UK MRC (£100,000) to carry out a pilot study of the interface between hospital and community in India.
- The MRC Public Health Intervention Development Scheme has awarded £150,000 to Prof Lilford in order to improve the health literacy of lay community health workers in rural Southern Africa.

We are also developing close links with the WHO in order to contribute to the field of improving global health. For example, we were commissioned by WHO to assess the profile and determinants of health research productivity in Africa since 2000. This bibliometric analysis (*Uthman, et al. BMJ Open. 2015;5:e006340*) found significant improvement in health research, with some individual countries already having strong research profiles. The paper concluded that optimal growth and efficiency of health research in Africa will be realised more successfully if the way forward is mapped and monitored in a methodical and co-ordinated manner. In the meantime, countries should implement WHO's strategy on Research for Health.

Staff employed under the **Research Methods theme (6)** develop research methods useful for research in the UK, but which can also be translated to LMICs. Through this, we have developed special expertise in methodological research, which cuts across high- and middle-/low- income countries in supply-side health economics; assessing economic value; Bayesian approaches to knowledge (which is very useful for decision making); and the design of trials and stepped wedge cluster design (see page 33).

We are working with our partners to develop health economics research capacity in LMICs. Prof Lilford was invited to give talks at KEMRI and the MLW on the prioritisation of devices in low-income settings, and hard-to-evaluate service and policy interventions (*Chen, et al. J Clin Epidemiol. 2014;67:1309-19*). Prof Lilford has recently published a paper on health economics of intra-operative oximetry (*Burn, et al. Bull World Health Organ. 2014;92:858-67*) – a landmark analysis of health technology assessment in a low-income context; as well as a paper on an approach to the prioritisation of medical devices in low-income countries, with examples based on the Republic of South Sudan (*Lilford, et al. Cost Eff Resour Alloc. 2015;13(1):2)*.

The CLAHRC WM has provided a model of carrying out collaborative applied health research to improve health systems, which we have been able to disseminate internationally to potentially improve the health of populations in LMICs. Although 'CLAHRC for Africa' is still in a development stage, we are aiming to report progress by next year with more external grant applications.

Case Study: CLAHRC West Midlands News Blog and Communications

The CLAHRC West Midlands News Blog is a fortnightly document that combines blog posts with a newsletter, aiming to inform and encourage debate, as well as keep people up to date with CLAHRC WM developments. Our first issue was released on March 7th 2014, and issue 31 has recently been published (May 22nd 2015).

Over the past year, the content of the blog has continuously evolved, with new features being added and others being changed based on feedback from our readers. Currently, each issue features a number of different blog posts, written by various authors:

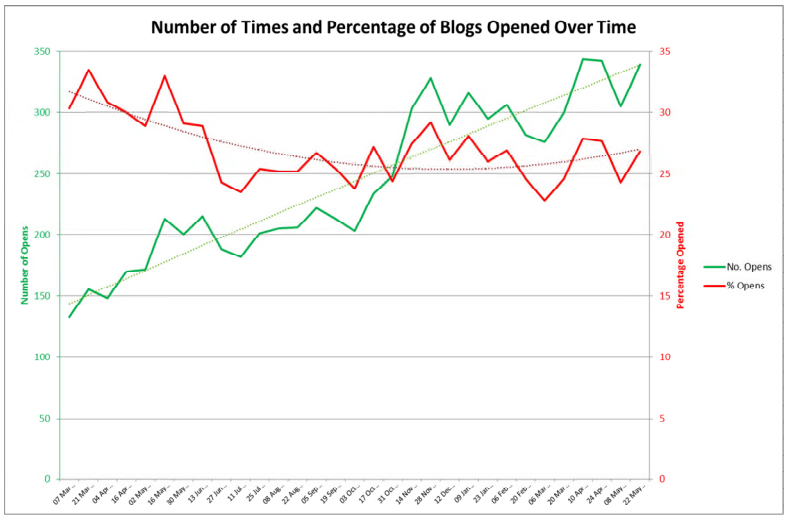
- A main post (~500 words) from the Director, Prof Richard Lilford, or one of the Deputy Directors, Prof Graeme Currie or Prof Tom Marshall. This is usually an in-depth blog on a topic of interest to the author, for instance, an idea for future research/practice, recommendations, or discussion of recent news. Past examples have included whether researchers should double as policy activists; improving hospital care; and interventions to prevent obesity.
- An international post (~500 words) that usually looks at topics affecting low- and middle-income countries, for example the role of traditional healers; the economic effects of low fertility rates; and the 'Muslim mortality paradox'.
- Three or four shorter posts (~250 words) that focus on an interesting or important paper that has recently been published and which we feel may be useful for our readers to read about.
- Occasionally we have other blog posts by 'Guest bloggers' on various topics.

In addition to the blog posts we also have a number of other features:

- We have recently added a section dedicated to PPI (see page 40), which details how patients and the public are involved in our themes, and promotes additional opportunities for future PPI engagement and possible participation in other related activities.
- A profile of a member of the CLAHRC WM team, written in collaboration with said member, which, along with a photo, details their background, highlights their current research, and showcases their personal interests.
- Selected replies regarding previous blog posts.
- A quiz question, with the answer provided in the following issue, often with links to sources that can provide more information, and which receives many responses.
- A news section that highlights various things of interest, for example, calls for abstracts, reports from meetings, job opportunities, welcoming new staff, celebrating achievements.
- Any upcoming events that we feel may be of interest to our readers.
- Recent publications from CLAHRC WM authors (with links to the paper), and/or grants they have successfully secured.

We also provide a PDF version (containing a shortened web address to ensure that people who pick up a printed version can access the online version) and a link to previous issues available online. To try to mitigate spam filters and computer-use policy employed by various organisations, we also send a separate email to affected staff, or, when requested, to personal email addresses.

When the first issue was published it was emailed out to 468 subscribers. Since then, our subscriber list has risen steadily each week and is currently at 1,267 subscribers. We have had a similar growth in those opening each issue, with an average of 27% of our subscribers confirmed as opening the News Blog (recent issues were opened by ~340 subscribers, our highest figures to date). These figures are likely an underestimate due to the method of data collection used by the hosting platform.



Number (green) and percentage (red) of blogs opened.

Global distribution of blog readers

Even though most of our readership is based in the UK, the News Blog has a substantial global reach – subscribers in 56 different countries have opened an issue, with a significant number in the USA and South Africa.

The CLAHRC WM News Blog continues to be published every fortnight. Communications teams from other CLAHRCs have commented that they have used our blog as a template for their own blogs. Prof Lilford recently conducted three radio interviews about the Ebola virus as a result of his deliberations in the News Blog.

@CLAHRC_WM

The CLAHRC West Midlands Twitter page currently has 797 followers and has so far sent out 432 Tweets, sharing our presentations, showcasing our research, or providing updates, for example. On average the page receives 120 visits each month, and our Tweets leave 2,100 ‘impressions’ (delivery of a Tweet to other accounts’ streams).

Google+

We have recently launched a Google Plus page to further engage with our audience and further disseminate the work of the CLAHRC West Midlands.

Patient and Public Involvement and Engagement

We have been developing two key strands in relation to Patient and Public Involvement and Engagement (PPIE), one focused on operational aspects and the other on developing research. On the operational and practical front, we have an overarching goal to combine the Patient and Public Involvement (PPI) that informs service development and delivery, together with the PPI that informs the research and evaluation activity carried out in order to identify the impact of any changes applied to those services. We report some progress against this overarching objective.

PPI in the management of science: We have successfully recruited 13 PPI Advisors following a national advertisement and formal selection process. We received a number of applications and held interviews over a two-day period, where candidates were asked to comment on our BITEs and answer a series of questions. There was PPI involvement at all stages, with an existing PPI Advisor also present at all interviews. We were particularly interested in the PPI Advisors who have similar roles with other health and social care organisations in order to bring together the people who inform service development with those who inform the research and evaluation of those services. The CLAHRC WM team has been impressed with the skills, knowledge and expertise of our PPI Advisors, who come from a range of backgrounds.

In August 2014, we held a welcome event for our PPI Advisors, opened by Prof Richard Lilford. In October 2014, we held the first in a series of training initiatives aimed at supporting our PPI Advisors in their involvement and contribution to the CLAHRC WM initiative. Each PPI Advisor has been linked to either one of the four service themes or to the **IOS theme (5)**, and each theme has developed its own model for engaging with the PPI Advisors. For example, **Youth Mental Health theme (2)** has identified key work-streams for their PPI advisors to lead on, liaising directly with third sector organisations and community groups to disseminate their research findings across the wider West Midlands area.

Three times a year, all our PPI Advisors come together to form the **PPI Supervisory Committee**. This committee has outlined its own ways of working through development of terms of reference, and is contributing to the development of a payments policy. It will also be involved in providing comments on draft BITEs to ensure key information is communicated in a way that is easily accessible. Elections were held for interested PPI Advisors to sit on the Programme Executive and Programme Steering Committees and for an overall Chair. Reverend Barry Clark was elected as the Chair and will also sit on the Programme Executive Committee, along with PPI Advisors Magdalena Skrybant and Ray Fiveash. Deb Smith and Keith Elder were elected to sit on the Programme Steering Committee. The positions will be up for re-nomination after a term of 18 months.

We are sorry to report the recent and sudden death of one of our PPI Advisors, Robert Mottram. Robert was a popular member of the PPI group and made valuable contributions to the **Chronic Diseases theme (4)** and to wider PPI discussions. Robert was an active and effective voice for the disabled and made very pertinent observations. We would like to formally acknowledge Robert for his contribution to the CLAHRC West Midlands initiative.

Involvement in the design of service interventions: The CLAHRC West Midlands operates within an intellectual framework – **the IDEaL framework** (see page 7). This model aims to describe the stages involved in applied health research and illustrates how the CLAHRC **I**dentifies, **D**evelops, **E**valuates and **L**eads service innovation. It demonstrates that there are opportunities for service users, patients, and the public to be involved in all stages, from the identification of services needs to the evaluation of the implementation of evidence into practice.

The research aspects of PPI are led by Dr Sophie Staniszewska and include studies specifically focusing on PPI, and studies within the four service themes that may include some aspect of PPI. The research strategy is being developed and will aim to respond to some of the recommendations outlined in '**Going the Extra Mile'**, the response to the NIHR Breaking Boundaries review recently published (Dr Staniszweska was vice-chair of this review). The following studies are currently underway:

- Understanding the experience of PPI in research implementation – a longitudinal study of the role of public advisors, led by Dr Alison Hipwell. This study aims to explore the PPI Advisor role within CLAHRC WM, how the role might develop over time, and how involvement influences the implementation of research evidence.
- A conceptual mapping of PPI in implementation research, led by Dr Lee Gunn. This study aims to outline previous work that has explored PPI in the implementation of research evidence, and to understand gaps in the current knowledge-base, which will highlight further areas to study.

Programme for engagement in applied science: Providing opportunities to engage in the method of applied science is one of our crucial objectives. The overarching aim is to broaden communities where the public interact with services. We actively encourage our PPI Advisors to pursue roles within services including Hospital and Patient Carer Councils, Health Watch, and Patient Participation groups.

At a recent meeting of the PPI Supervisory Committee it was agreed for the group to have an active role in the dissemination of key messages to their respective groups to form 'communities of practice'.

We recognise the importance of engagement as an awareness raising activity, and as a precursor to more active forms of involvement, where patients can be partners in research, rather than only as recipients of information. CLAHRC WM continues to support national activities aimed at raising awareness, such as the NIHR '**OK to ask campaign'**.

Reaching under-represented groups: Under the pilot CLAHRC, a former colleague, Dr Sabi Redwood, led research into the best methods to reach 'seldom heard' voices and less represented groups within our local communities (*Redwood, et al. BMC Med Res Methodol. 2012;12:7*). We plan to continue this work under the headship of Dr Alison Hipwell and through collaboration with other interested research groups, including the NIHR West Midlands Research Design Service at Keele University. We note this objective aligns to recommendation 10 of the recently published NIHR document '**Going the Extra Mile'** that followed a strategic review of PPI in research. This calls for a diverse and inclusive public involvement community to inform health service research.

News Blog: On the recommendation of the PPI Supervisory Committee, we have expanded the News Blog to contain a PPI section (see pages 36-37). This includes information about PPI activity taking place within the themes and describes the progress of the PPI research plan being undertaken as part of the **IOS theme (5)**. This will replace the 'CLAHRC Voices' platform outlined in the approved application – following a series of training events and audits, the technology was not deemed fit for purpose. PPI Advisors also highlighted that this approach would serve as another method of embedding PPI activity within CLAHRC WM and would provide wider circulation.

Communication and Dissemination: We disseminate information about our work and projects on our website, Twitter feed and the News Blog. We have recently asked all our theme/study leads to submit lay summaries in plain English for each of their respective projects. These will be added to the main website and will enhance our evolving projects document. We also work closely with the communication manager at the West Midlands AHSN to disseminate information to regional networks via a variety of channels. We are continuing to produce BITEs, each based on a published paper, and are planning to publish the first 'super BITE' later this year to bring together a series of papers and commissioning information, which ultimately led to the change in mental health services in Birmingham (see pages 16-17).

We have also participated in a number of events to raise awareness to patients and the public and highlight as examples the '*University of Birmingham Research pop-up shop, Think Corner*' and the annual '*AHSN West Midlands Stakeholder Event*'. Historically, Simon Denegri, Chair of INVOLVE, has retweeted some of the CLAHRC West Midlands tweets and News Blog links.

Additionally, Dr Staniszewska has been involved with the launch of a new international open-access journal to disseminate PPI research, '**Research Involvement and Engagement'** and is Co-Editor in Chief (*see* *www.researchinvolvement.com*).

Furthermore, we are contributing to the online database hosted through the national CLAHRC partnership with Universities UK. A link to this national CLAHRC project database will be included by NICE, which will promote awareness of studies being conducted by CLAHRCs across the country. We have also contributed to a document to showcase the influence and impact of work conducted through the pilot CLAHRCs.

PPI Networks: CLAHRC WM was instrumental in establishing a regional PPI network, **Patient and public Involvement and Lay Accountability in Research and innovation (PILAR)** that aims to foster collaborative working and shared learning across many regional NIHR programmes. Rev. Barry Clark is also chair of this committee and recently presented at the NIHR INVOLVE conference, along with Steven Blackburn from Keele University.

We also have strong links with the HTA programme INVOLVE in regards to PPI activity, and we supported the Clinical Research Network with their PPIE strategy and launch event. Moving forward, we plan to collaborate more closely with the West Midlands Genomic Medicine Centre (WM GMC), which has offered a number of PPI internships/projects to further enable capacity building.

Training

Diffusion and Leadership Fellows: To promote leadership and change we have assigned clinical and managerial staff to act as **Diffusion and Leadership Fellows (DLFs)**, a knowledge-brokerage model designed by Prof Graeme Currie, **IOS theme (5)**. DLFs have been identified by the partner health and social care organisations, as demonstrating leadership in applied research **(Leadership Fellows)**, and/or having roles in service delivery and design **(Diffusion Fellows)**.

The DLFs work at the interface between services and academia to develop and evaluate innovations in delivery of care, and are supported through the various service themes.

We have held a welcome event, and also started a 'needs assessment exercise' to understand current knowledge and skill gaps, and develop a programme of support for the lifecycle of CLAHRC WM. This will be led by a secondment from the host NHS organisation and will major on engagement with health and social care partners.

We ran a competitive application process during the first year, inviting DLFs to undertake a part-time masters at the University of Birmingham (in the first instance), with supervision and mentoring by our service themes. We received 20 applications from across the region, and funded six, commencing in September 2014. They are undertaking various courses, including Masters in Public Health, Masters in Leadership for Health Care Improvement, and the Masters in Health Research Methods – a new programme to improve understanding of the various research methods applied to health and the interpretation of evidence from such research.

Strengths of the research training environment: A number of NIHR-funded researchers have been appointed at the post-doctoral level and will be mentored and supported academically through the headship of their respective Theme Lead, while working alongside DLFs in health and social care partners to understand the 'real world' research environment, and to support the implementation of services. A number of the NIHR-funded faculty are supervising postgraduate students including PhD students, MRes and DLFs undertaking part-time masters courses, who are largely clinically-facing, and those undertaking the Clinical Academic Internship Programme co-ordinated through Birmingham Health Partners.

Research student/support staff development: Expanding our support programme to include the three main universities, has enabled us to expand areas of scientific expertise across our multi-disciplinary themes. PhD students are seen as a core part of their supervisor's themes, so they are able to attend relevant events and seminars within respective areas of study. We plan to offer our PhD students a '**PPI Internship**' opportunity to better understand the role of PPI in health service delivery research. We have a number of 'PPI Professionals' willing to provide 'shadowing' placements and also some specific 'PPI projects', such as a survey of stakeholders to gain feedback on informed consent processes for the WM GMC.

We have nominated PhD spokespeople in the three main universities to assess and determine wider training needs for early career health service researchers (either staff funded directly by NIHR or through mentorship arrangements with DLFs), with a view to implementing a series of **Graduate Tutorials**. We plan to increase our capacity to support early career researchers on the NIHR career development pathway. We have created a '**PhD Community**' on the NIHR Hub to better engage, communicate, and understand students' training needs.

We estimate that we have spent £55,000 on developing or delivering training initiatives though CLAHRC WM during the reporting year.

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This report presents independent research funded by the National Institute for Health Research (NIHR) through the Collaboration for Leadership in Applied Health Research and Care West Midlands (CLAHRC WM) initiative. The views expressed are those of the authors and not necessarily those of the CLAHRC WM collaborative organisations, the NIHR, or the Department of Health.

Notes

Notes

University of Birmingham Office

School of Health and Population Sciences

Primary Care Clinical Sciences

Learning Centre

University of Birmingham

Edgbaston

Birmingham

B15 2TT

Tel: +44(0) 121 414 2634

University of Warwick Office

Room A155, 1st Floor

Health Sciences

Warwick Medical School

University of Warwick

Coventry

CV4 7AL

Tel: +44(0) 24 765 24794

Keele University Office

Room 0.75

Primary Care & Health Sciences

David Weatherhall Building

Keele University

Keele

Staffordshire

ST5 5BG

W: www.clahrc-wm.nihr.ac.uk

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