NIHR CLAHRC
South West Peninsula

NHS
National Institute for
Health Research

NIHR Collaboration for Leadership in Applied Health Research and Care South West Peninsula (PenCLAHRC)

Annual Report for period 1st April 2017 – 31st March 2018

1. OVERVIEW OF ACTIVITIES

CLAHRCs aim to promote the generation and use of patient-focussed research evidence to benefit the health of the population. PenCLAHRC has three major objectives:

- To substantially increase the volume and quality of patient-focussed research
- To facilitate the use of research evidence to inform service delivery to improve the health of the population
- To build capacity within the health economy to generate and use research evidence.

In addition, we aim to promote the growth agenda and to influence the culture of partner NHS organisations towards the more effective use of evidence and the culture of academic partners towards a clearer focus on research impact through co-production.

In the table below, we summarise progress against the short-, medium-, and long-term goals through which we aim to meet these objectives. We have focussed primarily on creating supportive systems, engaging partners, and maximising research capacity.

PenCLAHRC strategy

The development of a partnership between decision makers – policy makers and managers within provider and commissioner organisations, clinicians of all disciplines, and members of the public – and academics underpins our activities. We hypothesise that failure to achieve effective use of research evidence in service delivery in part relates to the failure to effectively address the information needs of these groups.

Representatives of all of these groups, including members of the public, are embedded within organisational structures to ensure strategic decisions are shared by stakeholders. All partner organisations (along with representatives of our public involvement group) have a seat on the Management Board and on the Stakeholder Group that prioritises research questions. The Management Board meets twice a year to advise on strategy, and the extent to which we are reflecting their priorities and capacity needs. As well as health and social care partners we have made a significant effort to engage with third sector organisations and industry, working closely with our AHSN.

We have established a system to elicit the "uncertainties" that reflect problems facing decision makers, closely linked to our programmes to build capacity amongst partner organisations. Together these activities – mechanisms to capture uncertainties, and development work to build capacity – make it possible for us to extract decision-making needs from complex clinical and policy issues and translate them into answerable questions. These are prioritised against agreed criteria with advice from stakeholders. This process may lead to reviews of evidence, primary research or the

development of implementation plans with partners. Throughout we aim to keep the originators of the "uncertainty" involved in the process to ensure that our work is kept practically relevant and impactful. Where resource constraints or lack of appropriate skills mean that these uncertainties cannot be taken forward we endeavour to direct people to the NIHR-RDS or pass questions on to the NIHR prioritisation system.

Applied health research

Our core strategy remains unchanged - NIHR funding primarily underpins the human infrastructure that enables us to produce preliminary data (sometimes producing stand-alone studies) and apply for grant funding for definitive studies to address important uncertainties. Our process for identifying potential uncertainties has evolved in response to continuing evaluation and includes uncertainties in implementation and research. The process is increasingly closely aligned to our "Making Sense of Evidence" programme so that our activities in improving both the use and generation of evidence are mutually informing and reinforcing. In addition, we have identified some specific topics such as multi-morbidity and care of older people with complex problems for which we have sought with partners to identify key uncertainties. Our public and patient groups remain at the heart of all activities including question selection and research and implementation design.

Externally funded studies based on CLAHRC activities have led to high impact outputs and a number are still in progress. The existence of these continuing projects has important positive consequences for our relationship with partner organisations. There is often a problem in attempting to reconcile the timescales to which definitive research projects operate with the fast-moving needs of the NHS which can lead to tension with partners who find it hard to see the direct relevance of the CLAHRC to their needs. Being able to present them with the results of previously developed projects allows us to demonstrate how these can impact on service provision and hence increase support for our activities.

We have continued to expand our portfolio of implementation science research. We have worked jointly with the AHSN using ethnographic approaches to evaluate our implementation of evidence-based approaches in the design of acute stroke care and the use of patient-initiated clinics in outpatient services in chronic disease. Our Person-Centred Coordinated Care (P3C) Group have worked with local NHS organisations aiming to establish integrated care to develop methods to understand and evaluate the implementation of New Models of Care spanning primary and secondary care and health and social care.

Improving health through the use of evidence (see Section 5)

We work with NHS partners, private sector providers, the AHSN and Strategic Clinical Networks to increase the effectiveness of services through better use of evidence, building on two fundamental principles:

- Incorporation of "implementability" throughout the research process including question selection, intervention design, choice of outcome measures, research conduct, and research dissemination. Synthesis of evidence is guided by those who will use it. By taking an integrated approach to knowledge mobilisation and involving end users at all stages we focus our efforts on interventions that are not only effective but feasible and acceptable to organisations, clinicians, and patients

- Context is crucial and potential projects are approached by building an appropriate team on the topic area including end users of information, academics, and managers. Design of service improvement strategies is preceded by diagnostic evaluation of potential barriers and facilitators at the levels of system, organisation, team, and individual.

Capacity building (See Section 7)

Our drive to increase the capacity of staff within the local health economy to use and generate evidence has four main strands:

- ***PhD studentships***

14 PhD studentships are directly supported by the CLAHRC (including four studentships from the Research Capacity in Dementia Care Programme), one has been awarded and 3 have submitted and await viva. CLAHRC staff also supervise students funded from other sources

- ***Explicit training***

We deliver training in evidence-based practice, research methods, and operational research in multiple formats including short courses aimed at all disciplines, bespoke training for teams or disciplinary groups, and training for members of the public. Relationships developed during these sessions have been instrumental in implementation of evidence and generation of research projects

- ***Health Service Modelling Associates***

In 2016/7 we offered part-time 1year secondments to 6 NHS staff to train in operational research modelling, working on projects agreed by their organisations. The programme was enormously popular with NHS organisations and this year we took a cohort of 26 Associates through three months of training (Jan 2018 – Mar 2018) and project proposal development. A subset of 19 Associates from 12 organisations were taken through to Phase 2 to receive advanced simulation development training and develop their projects

- ***Joint projects***

Conducting joint projects in partnership with NHS staff addressing uncertainties of direct relevance to their practice is a powerful way of enabling them to develop research and implementation skills and of ensuring that academics understand the needs of the service. A large number of PenCLAHRC projects include NHS staff as partners; others work with individuals and groups from other public and third sector organisations.

Wealth creation

We work directly and through the AHSN to build links with industry and third sector organisations where we can provide the research skills to appropriately evaluate innovative interventions and to ensure that innovations created within the NHS can be exploited. Our major contribution is through the design and evaluation of more effective and efficient services and public health interventions, freeing resources and contributing to improved population health in ways that have knock on effects for productivity.

Key achievements in the period

- **Facilitating the delivery of improved services (see Section 8)**

PenCLAHRC has worked with partners, building on a strong relationship with the AHSN, to use evidence to improve service delivery and patient outcome and key examples are discussed in section 8. Fundamental to these successes has been the development of relationships between academics and those delivering and using services to ensure that we answer questions of direct relevance to them in a way that meets their information needs

- **Expansion and consolidation of the capacity development programme (see Section 7)**

Our capacity building programmes have expanded and been reorganised with the expansion of programmes such as the HSMAs, strengthening of generic training for PhD students and establishment of “communities of practice” amongst students with congruent topics

- **Attracting external grant funding**

Using our core NIHR funding to attract external grants to undertake definitive research remains central to our strategy and has resulted in the award of £24.1M in external grants since the start of the funding round.

Summary progress against short and medium term aims

Short Term Aims	
Aim 1	Maximise research output/impact from current PenCLAHRC Projects
Progress	*£4.9m in external funding and 94 papers in the reporting period. TXA & Stroke Impact case studies feature in the National CLAHRC Impact Document and both the subject of a recent DH request for information (April 18).*
Aim 2	Work with SW AHSN on topic identification and implementation
Progress	*AHSN & PenCLAHRC staff contribute to both prioritisation systems. 8 jointly funded projects, primarily aimed at service improvement since 2015.*
Aim 3	Identify next generation of prioritised topics for research and implementation
Progress	*3 Stakeholder Prioritisation Rounds held since funding began, generating 142 uncertainties. Those not currently being addressed by PenCLAHRC are sent to the RDS & NETSCC for further research consideration. In 2017, NETSCC identified that, of the 52 questions referred, 35 were in remit for HTA, 10 for HS&DR and 2 for Public Health Research.*
Aim 4&5	Effective links with NHS, local authorities, public health and social care
Progress	*Our Management Board and Project Prioritisation system include representatives from public health and all partner NHS Organisations. Joint projects with NHS, local authority (STARS and HeLP), the Police (ExPERT), social care providers (Integrated Care Evaluation and Care home interventions (CHIK-P)) and charities (Family Vision, Singing for Aphasia).*
Medium Term Aims	
Aim 1&2&3	Engage NHS organisations, clinicians and the public in identifying key information needs & translating this information into clear research questions prioritised against clear criteria.
Progress	*24 Making Sense of Evidence (MSE) workshops conducted for 455 NHS/LA/Police staff, academics, patients and members of the public during reporting period. 142 elicited "uncertainties" considered in 3 rounds of Prioritisation Process, (8 prioritised).*
Aim 4,5&6	Knowledge Mobilisation and translation of evidence into improved services
Progress	*Multiple examples of service improvement e.g. redesigned pathway for Bladder Cancer diagnosis leading to a substantial decrease in patient referral to treatment time; development of Risk Assessment Tools (RATs) to aid diagnosis for bowel cancer, implemented within GP surgeries across the region/country*
Aim 7	Research into effective methods for translation of research evidence into service provision
Progress	*Implementation Science projects include ASPIC (AHSN funded), CHARLIE (review of implementation approaches in care homes – CHIK-P), DeIrDre (Alzheimers Society-supported), evaluation of effects of the PROFHER trial, work on operational research as an implementation method including evaluation of the AHSN-supported HSMA programme, and a DH-funded evaluation of the national Patient Safety Collaboratives.*
Aim 8	With partners, build capacity of staff to use and generate evidence
Progress (Section 7)	*Includes 14 funded PhDs (4 within NIHR RCDCP), 19 HSMAs in Round 2 (6 in Round 1), 2 SWARM Fellows, support for a Trust Physiotherapist to submit a NIHR Doctoral Research Fellowship application. Multiple training opportunities for partners in Making Sense of Evidence, Operational Research (OR), PPI, Qualitative Research Methods and Statistics.*
Long Term Aims	
Aim 1	To produce a step change in the generation of patient-focused research
Progress	*Since the start of the current funding round PenCLAHRC has attracted £24.1 million in external research funding and published 302 papers. The studies were generated in association with our 3 lay groups, 3rd sector and NHS organisations, and clinicians.*

Aim 2	To improve health outcomes for patients and the public through effective use of evidence
Progress	*Multiple examples of evidence-based impact on services and health including the re-design of acute stroke services increasing appropriate thrombolysis, tools for cancer diagnosis included in NICE guidance, reductions in waiting times for mental health outpatients through use of OR, and routine use of tranexamic acid in trauma by UK paramedics and ED staff.*
Aim 3	To increase the capacity of staff to use and generate research evidence
Progress	*See medium term aim 8.*
Aim 4	To help change the culture of organisations in the health service so that explicit use of research evidence in policy making and practice becomes "normal business"
Progress	*This remains challenging. Achieving cultural change is difficult and the CLAHRC is small compared to the size of the NHS and academic organisations with which we work. Successful exemplars in some clinical areas (e.g. stroke care) and some organisations (e.g. SWASFT) provide cause for optimism. Work with the AHSN in key areas including development and evaluation of New Models of Care is promising.*

2. PROGRESS MADE IN EACH RESEARCH THEME

In each theme we aim to deliver against our objectives of increasing the production of high-quality research, facilitating better use of evidence to improve health and health services, increasing capacity to use and generate evidence, and contributing to the growth agenda. PenCLAHRC strategy is built on the hypothesis that working with decision makers – members of the public, clinicians, and policy makers – to answer their information needs through use of new or existing evidence increases the likelihood of achieving health gain. This frequently requires working across themes and we actively encourage this. The sections below highlight progress against our aims alongside some noteworthy achievements in each theme. However, it is important to note that the space available only allows us to present exemplars. Many activities, particularly relating to implementation and capacity building, are discussed in other sections. The sections below are organised by key CLAHRC objectives, but projects frequently address more than one objective (e.g. Research and Improving Health and Wealth or Research and Capacity building).

Person Centred Care (led by Professors Nicky Britten and Richard Byng)

Research

Highlights include (*major grants in italics*):

- Novel person-centred approach to care using an individualised bio-psycho-social 'shared understanding and plan' has been developed in the **Engager** (prison leavers, *NIHR PGfAH*, RCT recruitment of 280 to time, intervention delivery complete, now being implemented by Midlands Mental Health Commission) and **Partners 2** (psychosis in primary care, *NIHR PGfAH,* successfully piloted, RCT underway) projects
- REACH-HF (Rehabilitation Enablement in Chronic Heart Failure): This *NIHR Programme Grant*, to develop and test an individualised rehabilitation programme which includes user friendly manuals for both patients with heart failure and their caregivers, facilitated by trained health professionals, is complete and submitted for publication. Two further bids have been submitted to trial adapted interventions in other populations with long term cardiac disease
- Disabled children are admitted to hospital disproportionately often and members of the PenCRU Family faculty designed the **Hospital Comms** project to improve the ability of hospital staff to communicate effectively with their children. The training has been converted into a manual and a multi-site study is about to commence
- Two further studies based on questions from our PenCRU Family Faculty, interventions to improve the health of carers and interventions to improve continence in children with disabilities, have now received funding from *NIHR-RfPB and NIHR-HTA* respectively

- The **Person Centred Coordinated Care (P3C)** programme addresses individuals with long term conditions needing care from multiple teams (see Added Value Example – P3C and also Improving Health and Wealth below). With the AHSN, we have engaged with local systems, and developed theory, innovation, and a consistent evaluation framework for P3C - contributing to making New Models of Care more evidence informed. We developed 2 measures: one to assess patients' experiences of P3C (translated into 5 languages, and now being used around the world), and one an implementation and reporting tool to measure and support organisational change. Commissioning guidance has also been developed and will be launched imminently
- A £2 million (*HTA Programme*) grant in collaboration with CLAHRC YH, is examining the effectiveness and cost effectiveness of a home exercise programme for frail older people discharged home from hospital following acute illness or injury (**HERO**)
- **The Singing for Aphasia** trial *(Stroke Association)* is a pilot trial to prepare for a definitive evaluation of the effectiveness of singing groups in people with aphasia after stroke
- As part of the **MASTERMIND** study *(MRC)* we are assessing the use of n-of-1 trials to underpin choice of third line treatments in patients with DM using patient chosen outcomes.

Improving Health and Wealth

Highlights include:

- Reconfiguration of services aiming to provide **Person-Centred Coordinated Care (P3C)** is seen as key to increasing the efficiency of the NHS. In collaboration with the AHSN we are completing project work with five local service providers across four health systems (Yeovil (Symphony), Taunton, Exeter, and Torbay) to evaluate a range of community and primary-care-based projects, adapting the evaluations to the needs of each service
- There is concern that published research may fail to affect practice. We have used routine data to examine the effect of the NIHR-funded Profher Trial (which demonstrated equivalence between surgical and conservative management of fractured upper humerus) on practice. This demonstrated a substantial fall in operative management, with the decline being more rapid in units which participated in the trial
- Pain relief is essential in the management of hip fracture and delays in achieving relief can slow progress through ED. We are working with the ambulance service, orthopaedic surgeons, and anaesthetists to explore the possibility of Paramedic-Administered **FIC Blocks**
- Care Homes: We are working closely with a range of long-term residential care providers across the South West to improve the care they provide while at the same time improving our understanding of how the sector can improve. Two central pieces of work, our collaborative systematic review of how to implement evidence-based practice in care homes and our qualitative study of how care-home managers achieve success, are almost complete.

Capacity Building

- Two CLAHRC-funded PhD students within this theme and PhD funded by the University of Gothenberg (Dr Helen Lloyd)
- SHERPA is a consultation model for clinical decisions in multimorbidity based on a derivative of both principles of clinical epidemiology and the Engager bio-psycho-social shared understanding. It is being taught on the Plymouth GP vocational training scheme and to community and practice nurses in training. The teaching is being evaluated with support from Health Education England.

Healthy People, Healthy Environments (led by Professor Charles Abraham)

Research

Highlights include (*major grants in italics*):

- **HeLP**: The HEalthy Lifestyles Programme was a novel school-based obesity prevention programme evaluated in an *NIHR-PHR*-funded cluster RCT involving 32 schools and 1324 children. Results are published and we are in the process of bringing together investigators from the 4 comparable NIHR funded school-based studies to examine policy implications
- **STARS**, Supporting Teachers And childRen in Schools (*NIHR-PHR funded*) tested an intervention to reduce child behaviour problems in a large cluster RCT. Data collection is complete and results are about to be submitted for publication
- **ComPoD**: The Commmunity-based Prevention of Diabetes study has recently reported a randomised, waiting-list-controlled, multi-centre trial funded by the *NIHR-SPHR, Public Health Practice Evaluation Scheme*. An intervention based on NICE guidance (as commissioned by the NHS Diabetes Prevention Programme) was evaluated at 6 months and reported a moderate effect
- **MAGI**: The Mechanisms of Action in Group Interventions study is funded by the *NIHR/MRC EME* Programme to better understand change mechanisms in group-based interventions, for example for weight loss or management of long term illnesses. The study extended and tested a conceptual model developed by the lead investigators. Findings provide guidance for intervention designers and facilitators that can optimise intervention effectiveness
- **CAWT:** The Calories Are Walking Times programme is funded jointly with the University of North Carolina and has shown important differences in perceptions and motivation when food energy content is presented as walking times, compared to calories. This format is being field tested (in relation to food purchases) in the US and, if successful, UK trials are planned
- In collaboration with Manchester University, we have completed the intervention (**Strengthen**) in a pilot trial (*NIHR PHR*) to evaluate health trainer support in improving the health behaviours and wellbeing of people receiving community sentences or supervision
- **E-coachER**: (*NIHR-HTA*) is an RCT evaluating web-based coaching added on to an Exercise Referral to increase physical activity and health in patients with long term conditions. We have completed recruitment and follow up of 450 participants
- We completed an evidence synthesis review (*NIHR RfPB*) to determine the factors that influence older adults' engagement in physical activity (**OPPA**). Protocol published here and final results submitted for publication
- Led by the University of York, we are collaborating in an evaluation (*NIHR PHR*) of the Incredible Years Infant and Toddler Programme; a newly-developed programme that aims to improve the social and emotional wellbeing of children under two and their parents (**E-SEE**)
- In addition to **C2** (below) we have collaborated in an evaluation of two other community-based interventions. The **Communities in Control** study, funded by *NIHR SPHR*, is an evaluation of the "Big Local" Lottery fund initiative in which 150 disadvantaged UK areas received £1m. The study forces on process of community empowerment and its effects. The **Communities that Care** project, funded by an Australian NHMRC grant is evaluating a US model to reduce alcohol consumption in under 18's through community and school intervention across Australia. If successful (and preliminary data is promising) translation to the UK is planned.

Improving Health and Wealth

Highlights include:

- **C2:** The **Connecting Communities Programme** seeks to create the conditions for resident-led service provider partnerships in very low-income communities as a means of identifying and responding to local barriers to health. During the reporting year, a C2 National Network

Charity has been created to support regional development hubs. The C2 learning programme has been delivered to Public Health registrars, housing associations, and newly commissioned sites; it has also been commissioned by Devon and Cornwall police to support the piloting of a new role within the police force; Police Community Management Officers. Several C2 partnerships have attracted substantial funding over the last year

- We are working with public health experts, schools and local charities to support children exposed to domestic violence through a parent leadership coaching programme **(Family Vision**).

Capacity Building

- Two CLAHRC-funded PhDs:
  - *Functional image training as a personalised intervention for weight loss*
  - *Mealtime interventions in care homes (submitted).*

Mental Health and Dementia (led by Professor Chris Dickens)

Research

Highlights include (*major grants in italics*):

- **Catch-US** (*NIHR HS&DR*) is a study of the transition from child to adult services for young people with ADHD. Results show dramatic variation in service provision and interviews with young people and families suggest consistent patterns of service failure
- In the **MBCT for young people with emotional disorders and their carers** project, we have worked collaboratively with colleagues from the AccEPT Clinic at University of Exeter, Virgin Care Devon, King's College London, South London and Maudsley Trust, and the Mindfulness in Schools Project to produce a joint programme manual, as well as to pilot 8 therapy groups. A bid to the NIHR-HTA programme will be submitted in the next round
- An *NIHR-HTA*-funded linked evidence synthesis of the **Mental Health of Children and Young People with Long-Term Conditions** examined the effectiveness of mental health interventions for these children and has submitted for publication https://soundcloud.com/user-859854006
- **MYRIAD** is a seven-year project, funded by a *Wellcome Trust Strategic Award*, in which we are collaborating with Oxford University to examine the potential for mindfulness training to prevent depression and build resilience during early adolescence
- **ShareD,** an *NIHR RfPB -funded* study led by Prof McCabe, seeks to explore how people with dementia and their carers are involved in decisions when they receive a diagnosis
- **Decode** is a clinical decision support system designed by Dr Llewellyn which aims to improve the effectiveness of primary care referrals for memory assessment. Research funded by the *Halpin Trust* is allowing modelling of potential effects of its implementation on referral pathways and testing of a beta version in the Devon Memory service
- Prof Owens is leading an *MRC-funded* **Suicide Prevention** study to examine a public health intervention (based on previous CLAHRC supported work) to help members of the public recognise and respond to possible suicidal intent in a public setting
- **Parental Engagement in Schools. (***Education Endowment Fund*). We are synthesising international evidence on parental engagement in children's learning and describing what schools in England are doing to support parental engagement and show how far this practice matches the current evidence. The focus is on both learning outcomes and behaviour.

Improving Health and Wealth

Highlights include:

- Following collaboration with Oxford CLAHRC (Walker) and a review of evidence, we are supporting the implementation of an **Integrated Psychological Medicine Service (IPMS)** across the RD&E Hospital. This aims to provide 1) routine and standardised psychological assessments to patients attending the hospital, 2) a workforce trained in responding

appropriately to psychological distress, assessing associated risks and case managing patients and 3) availability of suitable psychological / drug treatments for mental disorders, delivered using a stepped-care model. The system is currently being rolled out in the Head and Neck Cancer Service with plans to learn from the process and extend to all clinical areas

- The **Action to Prevent Suicide** programme of research has addressed antecedents and circumstances of suicide. We produced a simple public education leaflet, 'It's safe to talk about suicide', used as a basis for training frontline staff in local authorities, and emergency services, also adopted by London Borough of Haringey and by the Fire Officers' Association as part of its Blue Light MH project (with Mind). Formal evaluation identified substantial unfilled demand and we have received funding to enable information to be accessed electronically and ensure wider availability
- **DeIrDRe**: Dissemination and implementation of evidence-based practices in dementia care: a systematic review, funded by *Alzheimer's Society*. We worked with a charity to produce a scoping review of the evidence on this topic and conducted a systematic review of the effectiveness of dissemination and implementation practices in dementia care and the factors that may help or hinder their success (Published 2017).

Capacity Building

- We have supervised two CLAHRC-funded PhDs and four RCDCP-funded PhDs focused on care for people with dementia with one thus far successfully completed. Students work together in a community of practice to develop and evaluate interventions that address questions prioritised in dementia care by the James Lind Alliance (See RCDCP report).

Diagnostics and Stratified Medicine (led by Professor Chris Hyde)

Research

Highlights include (*major grants in italics*):

- We are supporting Prof Hamilton's influential work on improving **Cancer Diagnosis** in primary care *(DH - DiSCO)*. This includes evaluating the impact of NICE guidelines on diagnosing cancer *(NIHR – RfPB*) and a systematic review and economic modelling of risk assessment tools in general practice *(NIHR)*. A major donation will fund an RCT of these tools in primary care
- We support research developing personalised care in Inflammatory Bowel Disease (IBD) by Dr Ahmed. This includes the identification of genetic profiles of those at high risk of side-effects associated with drugs commonly used to treat IBD, use of new tests differentiating irritable bowel syndrome from IBD and evaluating tests monitoring TNF alpha inhibitor drug dose
- Research on Inter-arm Blood Pressure difference (IAD) shows it is a major prognostic factor, included in European Guidelines on BP measurement and a feature in the BMJ. (*NIHR-RfPB).* Further funding has been received (*NIHR RfPB*) to explore risks associated with IAD (**Interpress**). We are also working on the identification of postural hypotension (**DROP** score)
- Improving diagnosis of dementia is a major activity. We assist the Cochrane Dementia and Cognitive Improvement Group in their programme of test accuracy reviews, contributing to 5. Our DECODE Study is examining a decision support aid for primary care and memory clinics
- We are participating in the **TriMaster trial**, part of the MRC Stratified Medicine programme led by Prof Hattersley. This will help individualise third-line treatments for type 2 diabetics. The co-created patient-facing materials have been suggested as best practice for the HRA website
- We have completed our evaluation of the **UNITED** programme of systematically identifying and changing treatment of patients with monogenic diabetes (DH-Wellcome). We support research on clinical decision tools to improve differentiation of **MODY**, types 1 and 2 diabetes to underpin personalisation of care. This includes a systematic review of the accuracy auto-antibody tests
- We are working with PenTAG *(DH TARS contract)* to provide a health technology assessment to inform the National Screening Committee on whether to introduce population screening for lung cancer using low dose CT scanning. This includes support from PPI (PenPIG)

- Working with Prof Fortnum (Nottingham (*NIHR BRC*)), we have completed a major programme of research on the effectiveness and cost-effectiveness of screening for hearing loss at school entry (**Hearing Screening**). We are extending this into a Cochrane review of hearing test accuracy
- Contributing to work on stroke, we have completed a Cochrane review on the accuracy of pre-hospital stroke scales, in collaboration with the University of British Columbia, Canada.

Improving Health and Wealth

Highlights include:

- The Early Diagnosis in Cancer Group (Prof Hamilton) has produced evidence to underpin tools to inform GP decision-making (see NICE Guidance). With Dr Walter (Cambridge) the **CanTest** study (*CRUK*) examines what tests can be moved safely and acceptably to primary care
- The team led by Prof Hyde have made a substantial contribution to the new PRISMA reporting guidelines on systematic reviews of test accuracy studies (PRISMA-DTA) published in JAMA
- **UNTEST** is investigating rising ordering of routine tests, using thyroid function as an exemplar, and attempting to develop interventions to change practice via electronic test ordering systems
- Building on research examining the accuracy of **High Sensitivity Troponin** in acute chest pain we developed an implementation plan with the AHSN to reduce unnecessary admissions. We are extending research through funding from Fujita Health University School of Medicine, Japan.

Capacity Development

- We are working with an international team with Prof Bossuyt (AMC) to develop teaching on the evaluation of diagnostics (https://www.medicaltestevaluation.org/introduction.html)
- We have two CLAHRC-funded PhDs who are already producing new research:
  - *Low dose CT to define pre-operative MI risk (submitted)*
  - *Accuracy and feasibility of GP testing for dementia.*

Evidence for Policy Making (led by Professor Ken Stein)

Staff primarily based within this theme provide major input (particularly systematic review, modelling, and implementation science expertise) to numerous projects in other themes.

Research

Highlights include (*major grants in italics*):

- We have extended the regional analysis reported last year and published the most comprehensive analysis of trade-offs between access time and unit size in Hyper-Acute Stroke Units (HASUs) in England and Wales. Our regional analysis is informing policy by CCGs and STPs in the South West
- The *Stroke Association* funded a project, with Oxford AHSN and University of Newcastle exploring the provision of thrombectomy in England, completed in late 2017. This is currently informing National Specialist Commissioning by NHS(E)
- Our study, using OR modelling of the distribution of neonatal intensive care and its implications (**NeoNet**) and steered by the National Clinical Reference group for neonatal intensive care, concluded in late 2017 and is being disseminated by NIHR HS&DR
- Operational Research (OR) modelling to optimise the management of chronic hepatitis B (CHB) in children and young people is nearing completion (**HepFree**) (*NIHR PGfAR*)
- The CLAHRC Evidence Synthesis Team (EST) continues to drive specific systematic reviews (e.g. ***Caring About Care**, NIHR HS&DR* - improving the care of people with dementia in hospital; supports reviews in other CLAHRC themes e.g. effectiveness of "robopets" on well-being of care home residents and Parent-to-Parent Support Interventions for Parents of Babies in a Neonatal unit (*PaReNt, NIHR RfPB*). The EST has continued to develop innovative approaches to dissemination of reviews e.g. for recurrent abdominal pain

- The PenCLAHRC EST is a significant contributor to one of the national Evidence Synthesis Centres established by NIHR HS&DR and continues to carry out methodological development in evidence synthesis and information science.

Improving Health and Wealth
Highlights include:

- Implementation of the findings of a CLAHRC OR project on the **Bladder Cancer** pathway in Royal Cornwall Hospital (Truro) is realising a predicted 5.5 week reduction in the time from referral to treatment of invasive cases, a 35% reduction in time spent in the hospital system
- Supported by NHS England, we are developing a generic model of A&E which dynamically inform departments across the SW Region on the probability of 4 hour waiting time breaches
- Attempts to "disinvest" from services shown to be ineffective have had limited success. Working with SW AHSN, we are developing a focus on "appropriate care" aiming to re-frame the process of adoption and disinvestment through better engagement with clinicians and novel routine data to monitor uptake and impact of new health technologies. Initial work is within the new Innovation and Technology Tariff approach to rapid adoption of high impact health technologies being taken forward by AHSNs
- OR modelling through our **HSMA** programme (see Added Value Example) has shaped STP priorities in addressing 4hr waits in A&E in North Devon and Yeovil
- The **ASPIC** ethnographic research project on implementation in two PenCLAHRC projects (Acute Stroke Pathways and Patient-Initiated Clinics) has provided important insights into scaling up innovations, highlighting the critical importance of factors at the level of the organisation and team, the value of high quality evidence and external facilitation.

Capacity Development

- Two CLAHRC-funded PhDs are nearing completion in early 2018:
  - *Exploring the effects of De-implementation through NICE ("Do Not Do") on clinician behaviour*
  - *Research use and knowledge mobilisation in the third sector.*
- Systematic review training through short courses and "clinics" supporting researchers and NHS staff. Working with North Thames CLAHRC we have contributed to the development of training in Qualitative Comparative Analysis (QCA) and have delivered an advanced Information Science workshop ("Beyond Searching").

Our highly successful "Health Service Modelling Associates" (HSMA) programme has been co-funded by SW AHSN in its second year with expanded numbers of participants. Collaboration is underway with NT CLAHRC to develop a parallel approach, building on their previous experience of "embedded researchers".

3. IMPACT ON HEALTHCARE PROVISION AND PUBLIC HEALTH

PenCLAHRC works closely with partners in the local health economy, especially the AHSN, with members of the public, and with third sector organisations to ensure our research is relevant to policy and practice. With partners we seek existing evidence which can inform more effective practice and use this as the basis for helping to design effective strategies for change. Although a primary focus is local services, many projects have resulted in significant impact nationally and internationally. Examples include:

1. Improving cancer detection in primary care *(Diagnostics Theme)*
Professor Hamilton's research group, supported by PenCLAHRC, investigates methods for early detection of cancer in primary care. We have previously reported the central role of this work in informing the development of the NICE guidance "Suspected cancer: recognition and referral"

(published June 2015; Guideline Development Group chaired by Prof Hamilton). The group is continuing to refine tools for use in primary care and has produced a range of tools to support the referral of potential cancer by primary care physicians. A formal trial of these tools, funded by a large charitable donation, will commence this year.

2. Using Operational Research Modelling to facilitate local service improvement (*Evidence for Policy and Practice Theme)*

PenCHORD staff work with local partners to produce models to help inform decisions regarding effective organisation of specific services. Examples of the types of projects this year include:

- Determining the required size of a Clinical Decision Unit RD&E – underpinned Board decision on 5 year plan for ED.
- Determining the optimal size of Derriford Hospital Ambulatory Care Unit - £1m business case for extended hours and increased staffing.
- Modelling outpatient clinic systems to identify bottlenecks and examine potential solutions – outcomes have included a redesign of Derriford Hospital Plastic Surgery Clinic and currently a set of options being considered by RCHT Acute Eye Service.

3. Using Operational Research Modelling to underpin national decision making on service configuration (*Evidence for Policy and Practice Theme)*

Our modellers have also obtained funding to undertake modelling projects to provide information for national decision making on service configuration. Examples include:

- NeoNet: Providing a national demand/capacity model for neonatal care in England. informed work of National Clinical Reference Group for Neonatal Care http://clahrc-peninsula.nihr.ac.uk/research/penchord-neonet-providing-a-national-demand-capacity-model-for-neonatal-care-in-england
- Modelling the optimal provision of thrombectomy services for acute stroke in England informed NHS England's new National Stroke Plan for England. *"The modelling work undertaken by PenCHORD has been invaluable in helping the NHS decide how and where services for thrombectomy for stroke should be organised. It has also raised critical questions about the organisation of the whole of acute stroke care in way that will influence the new National Stroke Plan for England"* Professor Tony Rudd, National Clinical Director for Stroke, NHS England.

4. The DeSTress project *(Mental Health and Dementia Theme)*

This ESRC funded project aimed to inform policy and practice regarding the development of effective, meaningful and non-stigmatising responses to mental distress in low-income communities. The team have now been awarded funding from Health Education England to develop mental health training for GPs working with low income patients.

5. Eliciting Clinical and Policy Uncertainties to inform research priorities (*Evidence for Policy and Practice Theme)*

An intrinsic part of the model used to ensure that we deploy research evidence to help decision makers is the explicit elicitation of potential questions. We use a variety of methods, working with members of the public, clinicians and health sector organisations to document their clinical and policy uncertainties. Inevitably many cannot be addressed by the CLAHRC and we seek other avenues, including sharing them with NETSCC. In 2017 we shared 52 unprioritised questions with NETSCC. Of that total, 35 were in remit for the Health Technology Assessment programme, 10 for the Health Services & Delivery Research programme and 2 for the Public Health Research programme. All of the in-remit topics have been assessed through the NETSCC prioritisation process.

4. PATIENT AND PUBLIC INVOLVEMENT AND ENGAGEMENT

Patients and carers continue to inspire and remind us of the purpose of our work as outlined in our strategic plan. We work with patients and carers collaboratively, through our engagement by design approach. We have three established groups of patients/carers/members of the public - PenPIG who provide particular input into our governance structures, parents of disabled children through the PenCRU Family Faculty and members of the public in Cornwall (HEPE). We also work with people through charities, community centres, care homes, schools and adverts in newspapers and surgeries and recruit appropriate people to design and support specific research projects, working closely with the CRN.

Aims 1-9: Embedding involvement across PenCLAHRC
Collaboration with patients and carers runs through all PenCLAHRC's activities. PenPIG is represented on the PenCLAHRC management board and members attend CLAHRC planning workshops and presentations. The PPI team reports to the Strategic Executive Group and is represented on the Project Oversight and Executive Group. In the last year, the team ran 15 PPI advice clinics, facilitated lay reviews of 22 plain English summaries, contributed to 22 funding applications as co-applicants and ran 48 research workshops with members of the public. This included a workshop to respond to the NIHR involvement standards consultation. Members of PenPIG attended 22 research meetings as co-applicants. In addition, all involvement groups meet regularly, attend training and contribute to teaching. The impact from patients and carers is captured in the funding applications we submit, where we explain what impact PPI had on the study design. We have an open dialogue with our involvement groups about the impact they experience (or not) through their work with us. This includes annual one-to-one meetings with all members of PenPIG for mutual feedback.

Aim 10-16: Developing involvement through research and theory building
Facilitated by our regular PPI writing workshops, journal club and seminars, we have published 7 articles on a range of topics in patient and public involvement (Boddy et al 2017, Borek et al 2018, Gibson et al 2017, Goodwin et al 2017, Maguire & Britten 2017a, Maguire & Britten 2017b, Liabo et al 2017). In April 2018 the team published a BMJ editorial about patients' roles in research https://tinyurl.com/y9mdbald. Members of the PenCRU Family Faculty co-produced an intervention and a successful funding application to improve the health of parent carers https://tinyurl.com/ojh6tqg.

Aim 17-21: Furthering collaboration with patients and members of the public
One example of a programme of work developed with patients is the person-centred care theme. Dr Lloyd's team worked with members of PenPIG to co-design interview topic guides, carer involvement and measurements of person-centred and co-ordinated care. The team ran workshops on data interpretation, theorising and implementation with participants and practitioners on Integrated Personal Commissioning, leading to modifications to the programme. People with experience of receiving person-centred care worked with researchers to analyse findings and co-presented at a conference. Professor Byng and Dr Jack worked with PenPIG members on a paper on delivering person-centred primary care for people with co-morbidities.

We regularly involve patients and carers as co-applicants on research funding applications and Kristin Liabo sits on the INVOLVE working group to develop information for researchers regarding public co-applicants. With PenPIG member Andrea Shelly and visiting fellow Kristina Staley we have co-produced training for patients and carers new to involvement. Family Faculty member Nicole Thomas produced a video about their research on dentistry for children with autism.

Aims 22-23: Expanding the work of the involvement team
Members of our involvement groups have hosted visitors from a number of organisations including the research advisory panel of CLAHRC North Thames, ZonMW (the Netherlands Organisation for

Health Research and Development), BOSK (a Dutch childhood disability charity), Melbourne University and the Gothenburg Centre for Person-centred Care. Staff and PenPIG members have given invited lectures in Lausanne and Glasgow and a led a workshop for the Norwegian Nursing Association.

5. TRAINING

Increasing the capacity within the local health economy to use and generate research evidence is a key objective for PenCLAHRC. Our activities fall into five broad areas although these overlap and training opportunities frequently meet objectives of more than one group.

1. Trainees

We have a total of eleven doctoral trainees funded directly through PenCLAHRC of whom nine are health services researchers, one is a health economist and one is medically qualified. In addition, we have a further four PhD trainees funded through the Research Capacity Dementia Care Programme (RCDCP) – these additional studentships are for clinicians from NMAHP backgrounds and we have two nurses, a physiotherapist and a dietician in post. Six of the trainees have successfully upgraded from MPhil to PhD. One trainee has been awarded her PhD with three further submissions awaiting viva. A further 13 PhD students funded from other sources are supervised by PenCLAHRC staff.

One of our post-doctoral researchers (Dr James Fullam) was successful in being awarded NIHR SPARC (Short Placement Awards for Research Collaboration) funding to undertake a placement in Oxford with Professor Sallie Lamb.

All of our PhD trainees benefit from the training opportunities provided by Researcher Development Programmes from both partner Universities. Those students undertaking research on dementia are part of a Community of Practice Group which meets fortnightly and provides opportunities for shared learning, co-researching and co-authoring research with support from senior clinical academics. In addition to the routine supervision provided by PhD supervisors, trainees maintain regular contact with our Training Lead to ensure full use is made of training opportunities locally and nationally. Two of our trainees attended the 2016 NIHR Infrastructure Doctoral Training camp and two attended the national NIHR Trainees event.

2. Formal training for PenCLAHRC partners

We have a core programme of training open to staff from all partners and to members of the public. As well as giving participants knowledge and skills these courses promote academic engagement with NHS staff and members of the public and help us elicit uncertainties regarding clinical and policy questions.

Training offered during the period has included:

- “Making Sense of Evidence (MSE)” Workshops in a wide variety of formats covering introduction to research, literature searching and critical appraisal skills in relation to trials, systematic reviews, and diagnostic and qualitative studies (24 workshops for 455 delegates including physiotherapists, nurses, midwives, GP trainees, ED staff, doctors, and service users). Having two dedicated GPs funded a day per week has helped to increase our reach with workshops being held in Devon, Somerset and Cornwall. We regard these workshops as a key activity to help staff get onto the first rung of the “research escalator” as well as providing applicable skills for everyday practice. Formats include both general training and bespoke courses for teams working in a particular area or for single discipline groups who express a need to get basic training before joining open programmes. This is an area of particular strength in PenCLAHRC and course materials from our MSE training are made freely available to any NHS or University staff and wide dissemination is encouraged. Feedback from the workshops is very positive, rating on average 4.6/5

- We run a range of Operational Research (OR) modelling workshops (over 160 delegates). In addition we held a Problem Structuring workshop in Leeds for the Yorkshire and Humber AHSN Improvement Academy (20 delegates)
- Our Evidence Synthesis team have held 'Searching and beyond' training regionally and nationally, including for CLAHRC North Thames. In addition, the team regularly host 'Creative Communication' seminars and workshops involving local, national and international speakers to promote different ways to communicate research
- We run advice clinics for academic and healthcare staff on "Search and Review" (fortnightly), PPI (fortnightly), Statistics (three per term) and Qualitative Research (three per term)
- We have a long-running programme of tutor training in Evidence-Based Practice to promote spread and sustainability. In the current period one additional researcher has attended the Oxford 'Teaching evidence-based practice' course and joined our 'Making Sense of Evidence' tutor team.

3. Staff development

Our staff are our key resource and we have an active appraisal programme in which staff and line managers are encouraged to focus on training and development needs. Our partner universities have extensive training programmes open to staff and we supplement these with external courses and opportunities for secondments as well as providing access to the training opportunities listed above.

It is important to note that we see an equal importance in addressing the development needs of members of the public who work with us either in our standing PPI groups or on specific research studies. They are therefore invited to attend courses alongside PenCLAHRC and NHS staff.

4. **Developing methodological skills for NHS staff**

Staff who propose clinical or policy uncertainties that are adopted as part of the CLAHRC are encouraged to maintain involvement with the resulting projects both to ensure the continuing relevance of the research to practice and to enable them to work with methodologists to develop their skills.

Our CLAHRC has developed particular expertise in the use of operational research modelling as a method to investigate service delivery limitations and challenges and to test *in silico* potential solutions. We have shown with NHS partners that this can form the basis for successful implementation of evidence-based services leading to improvements in patient outcomes. We are undertaking these activities jointly with other CLAHRCs in order to spread expertise.

A demand from our partners for greater access to modelling than we could supply led to the establishment of the Health Service Modelling Associate (HSMA) scheme in April 2016. We ran a one-year pilot where six employees from NHS Trusts across the region were released one day a week to develop operational research skills and work on modelling projects of strategic importance to their organisations. Following the success of this pilot programme, we have launched HSMA 2018 in collaboration with the South West AHSN. In Phase 1, (Foundations of Health Service Modelling), we took a cohort of 26 Associates through three months of training (Jan 2018 – Mar 2018) and project proposal development. They received training in Operational Research concepts, pathway modelling, geographic modelling and visualisation, 'soft' skills (such as meeting facilitation and engaging with stakeholders), problem structuring and implementation planning. A subset of 19 Associates from 12 organisations were taken through to Phase 2 where 15 received advanced simulation development training and mentoring to support them with their projects. A further 4 Associates became Honorary HSMAs and had access to training but not mentoring. Projects include "How can we reduce delays to discharges and improve patient flow?" and "What influences the waiting time for frail patients (over 65 and with a frailty score of 6 or above) for discharge?" We are

collaborating with other CLAHRCS (North Thames and Wessex) to share our learning and experiences of the HSMA programme.

We are keen to work with groups of clinicians who wish to increase capacity in their areas as we see this as the basis for future productive research and service improvement. We have fostered a relationship with the South West Anaesthesia Research Matrix (SWARM) and have jointly supported a number of Research Fellows. Currently the SWARM Fellow is Dr Johannes Retief who is conducting research into cognitive function testing pre- and post-op for elderly patients. In addition, we have supported a Physiotherapy Fellow (Emily Rogers) who has been developing her research skills and undertaken PPI and a scoping review on 'frail older couples and rehabilitation' and as a result submitted an NIHR Clinical Doctoral Research Fellowship application in April 2017. We have also hosted a South West HEE/NIHR Post-doctoral Physiotherapy Fellow (Dr Sophia Hulbert) to further develop her research skills and develop her research on self-management for people with Parkinson's. We are currently supporting a number of NIHR ICA Pre-doctoral Fellowship applications.

6. LINKS WITH NIHR INFRASTRUCTURE AND THE WIDER INNOVATION LANDSCAPE

A significant strength of CLAHRCs has been the establishment of cross-CLAHRC links with regular meetings of Directors and Programme Managers, coordinated by a jointly funded Partnership Programme. These meetings serve multiple purposes including sharing knowledge and skills and facilitating liaison with bodies such as NHS(E). Cross-CLAHRC working is also stimulated by the existence of groups with common methodological or subject interests including PPI, Child Health, OR Modelling, Economics, Stroke, and Mental Health Groups in which our staff are actively involved.

We are keen to ensure that the impact of CLAHRC projects crosses regions. A recent successful example is a collaboration between Prof Dickens (*Mental Health and Dementia Theme Lead)* and a group from the Oxford CLAHRC who have conducted research on the integration of psychological care into cancer pathways. This has informed a much broader implementation of an "Integrated Psychological Medicine Service" in the Royal Devon and Exeter Hospital. This service, initially in the Head and Neck Cancer Service but now being rolled out across all specialities, aims to provide 1) routine psychological assessments to patients attending the hospital, 2) a workforce trained in responding appropriately to psychological distress, and 3) availability of suitable psychological / drug treatments for mental disorders, delivered using a stepped-care model. We strongly encourage staff to work with other CLAHRCs when applying for external funds – successful examples include HERO (NIHR HTA), a trial of extended rehabilitation in older people with colleagues from Yorkshire and Humber, and MYRIAD (MRC) trialing promotion of positive mental health and resilience in Adolescence with Oxford CLAHRC.

As discussed in section 11, we are developing a strategic alliance with CLAHRC NT to make the most of opportunities for research and capacity building. We share interests in areas including modelling, capacity building, person-centred care, child health, and older people/ multimorbidities. We have areas of complementary expertise and the very different populations and service configurations offer excellent opportunities to test the applicability of research.

We work closely with the South West AHSN, which is a significant partner for many of our activities within the local health economy. We share the same geography and the same partner organisations. Our overlapping aims, particularly with regard to service improvement and evaluation and spread of innovation, make cooperation imperative and fruitful. There is cross representation across the organisations including at Board level and on prioritisation and working groups. This helps both organisations to remain connected to the needs of our NHS partners with shared opportunities to identify their priorities. Specific joint projects include the Person-Centred Coordinated (P3C) programme to support new models of integration; improvements in acute stroke care; establishment and evaluation of Patient Initiated Clinics (PIC); a DH-funded evaluation of Patient Safety Collaboratives; and effective strategies to maximise the benefits of treatment for stroke. The

AHSN provides an important conduit for PenCLAHRC to gain access to industry and third sector organisations. In this area, the development of the £5 million Social Investment Fund by the AHSN is offering a unique opportunity for collaborative development of service innovation and delivery.

We also have strong collaborations with other parts of the NIHR infrastructure including:

- **NIHR Research Design Service (RDS) South West.** PenCLAHRC and the RDS work together to maximise potential benefit from research. RDS staff have provided methodological input to a number of successful grant applications Research questions considered through our identification and prioritization systems which are unsuitable for PenCLAHRC are passed on to the RDS. This collaboration will be facilitated by the recent appointment of Prof Gordon Taylor (RDS Director) to a post within IHR
- **NIHR Clinical Research Network (CRN): South West Peninsula.** Eighteen current projects (all with additional external grant funding) are currently being supported by the CRNs across the country
- **NIHR Exeter Clinical Research Facility.** We have developed shared standard operating procedures, joint training, and collaboration between methodologists
- **Peninsula Clinical Trials Unit (PenCTU) and Exeter Clinical Trials Unit.** We work closely with both local CTUs and share methodological expertise and standard operating procedures
- **NIHR Medtech and In vitro diagnostics Co-operatives.** Prof Hyde (*Diagnostics Theme Lead*) is currently seconded 1 day per week to help the establishment of the London *In Vitro Diagnostics* ***Co-operative*****. Prof Goodwin (*Training Lead*) is working with** *Devices for Dignity* on the design of support garments for people with osteoporotic fractures.

7. LINKS WITH INDUSTRY

Our industrial strategy has always been, and remains, to work with as wide a range of industrial partners as possible. In this past twelve months we have focused on increasing the quality and depth of our existing relationships as well as on developing new partnerships that will allow us to deliver this strategy.

In part we have done this through our strong existing relationship with the South West Academic Health Science Network (AHSN). Changes to their senior team, including the appointment of a new CEO, Jonathan Gray, who is experienced in and committed to working closely with industry, have enabled us to improve our industrial relationships and range of engagement activities. We work with AHSN colleagues on ad hoc relationship-building and engagement with specific companies, including work to support innovations identified through the NHS-England supported Small Business Research Initiative for Healthcare (SBRI Healthcare).

The nature and scope of industry in the South West Peninsula means that we more often engage with industry around social and economic issues rather than around, for example, pharma or biotech. This is obvious in our partnerships with organisations such as Exeter Community Initiatives (as part of our Family Vision project), Sovereign Housing (as part of C2), and Link & Bloom Ltd (as part of Fresh Air).

UK Small and Medium Enterprises (SMEs) worked with during the reporting period

We feel there are three areas in which our engagement with SMEs is worth highlighting because of their strategic importance to us or because they are areas that we wish to develop further:

- Technology
- Long-term care
- Organisations focused on community and environmental development and sustainability.

First, in relation to the technology industry we have worked with a growing number of SMEs; this represents an area of growth for us. For instance, we have worked with Robb Research Ltd, a

provider of national-scale software solutions, on the WordApp project to develop appropriate software and related tools to deliver in line with patients' needs. Our VSimulators project, which centres on the development of a facility to explore how people experience motion and vibrations in the built environment as well as design of a rehabilitation programme for people with problems with movement, has involved collaboration with two new partner organisations: E2M Technologies (an electric motion technology company best known for its work in control loading systems and custom electric actuator solutions such as those involved in pilot-training simulators) and Holovis (an experiential design and immersive and mixed reality specialist) (see below for details of strategic partnerships with these two companies).

The second area, and largest for us in terms of the number of partners and collaborations, relates to SMEs working in long-term care. We have several linked pieces of work grouped together within the Care Home Implementation and Knowledge-Mobilisation Project (CHIK-P) and as part of this we work with a diverse range of provider SMEs including smaller private providers (e.g. Classic Care Homes Ltd and Palm Court Care Ltd) and medium-sized chains (e.g. Somerset Care Group), and a local network of for-profit and not-for-profit providers, the Devon Care Kite Mark. As part of our Deprescribing project we have initiated strategic partnerships with Pottles Court Care Home, Somerset Care Ltd, and Summercourt Care Home; Pottles Court and Summercourt are small- to medium-sized care homes; Somerset Care is a larger chain and currently owns and manages 22 care and nursing homes.

Third, we have invested in relationships with SMEs that focus on community and environmental development and sustainability. For example, in our Family Vision project we have worked with Get Up and Grow Coaching Ltd., Castle Hill House, and Coombe House; in the Somerset Test and Learn project we have worked closely with Village Agents Somerset; and in My Nature Toolkit we have worked with the Sensory Trust and Castle Hill House. These projects tend to be characterised by work involving small, local SMEs and we feel that this level of engagement is key to the success of these projects.

Strategic partnerships between your NIHR CLAHRC and industry

In this reporting period we have, as listed in the Finance & Activity Report, initiated strategic partnerships with E2M Technologies and Holovis (as part of the VSimulators project) and with Pottles Court Care Home, Summercourt Care Home, and Somerset Care Ltd (as part of the Deprescribing project). These partnerships are described above.

Our existing long-term strategic partnerships with Lightfoot Solutions, Oxygen House (formerly Andromeda Capital), and DECIPHer-IMPACT are ongoing and continue to provide substantial mutual benefit (c £130k in matched funding provided by Lightfoot Solutions).

Examples of contract commercial trials, industry collaborative research studies and other academic commercial research

We continue to collaborate with Nestlé through their Nestlé Institute of Health Sciences as part of the Earlybird 3 project. We were not engaged with any contract commercial trials or other academic commercial research during this period.

Examples of any partnerships or studies with industry which have led to further industry, public or charity research funding, including as part of consortia

N/A

Details of key examples of agreements signed with industry including Non-Disclosure Agreements and Model Trial Agreements, including mICRA and mCTAs

We have signed a new non-disclosure agreement with TalarMade Ltd in relation to the DiScOVer project. We have not signed any new Model Trial Agreements during the period covered by this report.

8. MATCHED FUNDING

Matched funding for PenCLAHRC comes from multiple sources including NHS organisations, the AHSN, the partner Universities, charities including Cerebra, Stroke Association, the Alzheimer's Society, and the private sector. The source of funding has a substantial influence on the purposes for which it can be employed. In this period the total matched funding attracted was c £2 million (Research c.£1.5m; Implementation c.£500k) against a target of £1.5 million. Only a small sample of projects supported by matched funding can be reported. Our strategy explicitly aims to be responsive to the needs of decision makers and projects often cross themes and frequently include elements of both implementation and research.

Key activities and achievements supported by matched funding

1. **Person Centred Coordinated Care (P3C) *(Person-Centred Care Theme)***

We have a programme of work related to the integration of services across primary and secondary care and between health and social care, supported by matched funding from the AHSN, NHS(E) and Torbay Hospital Trust. This work aims to provide rapid evidence to those designing the services. It has also led to the development of two methods for evaluating the extent which such services are succeeding in delivering person centred care. These measures are being widely used in the UK and recently adopted by researchers in the USA and Australia. A guide based on this work to the "commissioning, implementation and development of person centred coordinated care (P3C)" for NHS Commissioners has now been signed off by NHS(E).

2. **Support for Operational Research Modelling *(Evidence for Policy and Practice Theme)***

PenCHORD, our operational research modelling group has conducted a large number of projects, all either externally funded or supported by matched funding from the NHS or AHSN. The close involvement of NHS colleagues (which provides "in kind" match) is crucial to ensuring that the solutions tested within models are applicable and feasible within the clinical context. Areas where staff have worked with NHS services to achieve service improvement include reducing waiting times for bladder cancer treatment, reducing A&E breaches, and optimising the location of outpatient services. Of particular note is the programme of work on modelling effective delivery of services for acute stroke (see Added Value example). The *Heath Service Modelling Associates* programme (see Added Value Example) involves NHS staff being seconded to work part time with the team, learning new skills and addressing problems of direct relevance to their host organisations.

3. **Service Improvement and Research in Orthopaedic Care (*Person Centred Care and Evidence for Policy and Practice Themes)***

Staff from the RD&E orthopaedic, anaesthetic and ED departments have been involved in the development of research and implementation projects, making a substantial contribution in time. Only 2 examples will be discussed. The first, concerns the delivery of effective early pain relief while reducing the risk of opiate-associated confusion in patients with hip fracture. The team are working with the Ambulance Trust to pilot the use of regional blocks by paramedics before patient transport to hospital. The second is a Stroke Association-funded trial of singing groups for patients with post-stroke aphasia: http://clahrc-peninsula.nihr.ac.uk/singing-for-aphasia-spa-trial-information.

4. **Evidence to improve the care of disabled children *(Person Centred Care Theme)***

Cerebra provides substantial matched funding for PenCLAHRC to generate and disseminate evidence of relevance to children with disabilities and their families. We work with the charity and with our "Family Faculty", made up of over 300 members with disabled children who are partners in the choice, design and delivery of research projects (http://www.pencru.org/getinvolved/ourfamilyfaculty/). Two of the current projects supported by the charity are:

a) Parents with disabled children experience particular challenges to their health but have difficulty accessing appropriate services. We have piloted an intervention, co-designed with parents, and have now received funding from *NIHR RfPB* to begin formal trials
b) Problems with continence was identified by our Family Faculty and by the James Lind Alliance as a major problem for disabled children. We have now been awarded funding by *NIHR-HTA* to conduct preliminary work to characterise options for intervention which can then be the subject of formal evaluation.

Cerebra funding also allows us to conduct reviews of evidence to answer questions posed to us by members of the charity and by our Family Faculty. These reviews, published as our "What's the Evidence Series" (http://www.pencru.org/evidence/), are widely used by both families and professionals working with children with disabilities.

9. FORWARD LOOK

We believe that the progress against our key objectives documented in this report, vindicates our original approach to CLAHRC and we hope to continue to build on this foundation. The challenge facing us is to ensure the continuation of success in a rapidly changing NHS and, more widely, public service context; changes which pose considerable challenges but which we believe also offer us significant opportunities. The current NIHR funding for the CLAHRC ends in September 2019 and we anticipate further opportunities for funding in this space but with a different emphasis. A key challenge for the next year is to ensure that we are able to use these opportunities to preserve the legacy of the current CLAHRC while answering the challenges posed for us by NIHR and continuing to contribute to the generation of health benefits from research.

We are particularly encouraged to note the increasing emphasis within NIHR and other research funders on the need to involve clinicians, policy makers and the public in the definition, prioritisation and delivery of research questions, an approach championed within PenCLAHRC since its inception. We remain convinced that this engagement with decision makers to identify and attempt to resolve key uncertainties increases the likelihood of producing research with a high chance of influencing practice and policy. Over the past 10 years within PenCLAHRC this approach has led to research with genuine relevance to practice and helped us to facilitate service improvement with local and national impact.

We welcome the current initiative, led by Dr Wood's team in the DH in partnership with the AHSNs, to elicit uncertainties from key opinion leaders within the NHS. We are contributing to the design of the process and will use the opportunity to work with our local AHSN to further explore key issues for the region.

There is an increasing challenge to researchers to ensure (and demonstrate) that their research has impact beyond their immediate partners. Much of our existing research has been conducted with partners in other CLAHRCs and other universities and a number of projects can demonstrate impact beyond our region. We are keen to ensure that this approach is more effectively institutionalised in the future. We have developed a partnership with CLAHRC North Thames to build a consistent approach to reaching and including our diverse populations from the rural elderly to multiply disadvantaged urban BME communities. The aim is a standard process whereby we assess the feasibility of undertaking research and of implementing our research findings across sites. Our

partnership also embraces capacity building and shared learning. We are sharing best practice across our teaching/training domains and plan to co-build capacity, particularly in operational research, child health research and in public health. This partnership represents a step change in current collaborations across CLAHRCs in that it moves away from an opportunistic approach toward a more explicit, standard and consistent policy.

In addition to working even more closely with other CLAHRCs we will continue to prioritise our partnership with the AHSNs, both locally and nationally, and with other parts of the NIHR infrastructure including the newly funded NIHR-Policy Research Units where we anticipate significant synergies. The recent development of a clearer national network of AHSNs will increase the opportunities for this collaboration.

Amongst the areas which we believe will offer particular opportunities for continuing impact in the future is the use of operational research modelling (PenCHORD) as a tool in service improvement. Some impacts of this programme are highlighted elsewhere in the report and we plan to continue to invest and to expand our research examining how we can most effectively use this approach. We have now recruited to the second cohort of our HSMA programme (a joint initiative with the AHSN) which allows NHS organisations to second staff on day release to learn the techniques while working on problems relevant to their organisations. This offers the opportunity to solve specific problems and to establish a cadre of skilled staff in the local health economy with whom we can work in the future. We are hoping to trial this model with our partner CLAHRCs.

At the centre of our activities over the next year will be laying the basis for the next NIHR funding opportunity in applied health research. We anticipate that this is likely to play to our existing strengths in working closely with decision makers to solve real world problems using high quality research, building capacity and delivering health gain based on effective use of evidence.