NIHR | National Institute for Health Research

COLLABORATIONS FOR LEADERSHIP IN APPLIED HEALTH RESEARCH AND CARE

Annual Report for period 1 April 2018 to 31 March 2019

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 population health
- 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. In addition, we used this period to lay the foundations for our bid for an NIHR Applied Research Collaboration.

PenCLAHRC strategy
We hypothesised that failure to achieve effective use of research evidence in service delivery relates in part to the failure to effectively address the actual information needs of these groups in a format that makes sense to them. For this reason we have seen 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 as the key to effectively addressing our core aims.

Representatives of these groups, including members of the public, are embedded within organisational structures to ensure strategic decisions are shared by stakeholders. Partner organisations (along with public representatives) have a seat on the Management Board and on the Stakeholder Group that prioritises research questions. The Management Board advises 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 “uncertainties” that reflect problems facing decision makers, closely linked to programmes to build capacity. 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 has remained unchanged, with NIHR funding primarily providing 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 and includes uncertainties in implementation. The process is closely aligned to our “Making Sense of Evidence” programme so that activities at improving the use and generation of evidence are mutually informing and reinforcing. 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. These continuing projects have 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 can lead to tension with partners. 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.

Our developing understanding of implementation science research underpins much of our work with partners in attempting to increase the use of evidence to improve services and health outcomes. Research in this area includes joint work with the AHSN to synthesise results of joint implementation projects. A particular focus has been the work of our Person-Centred Coordinated Care (P3C) Group who 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

We work with NHS partners, private sector providers including charities and the AHSN to increase the effectiveness of services through better use of evidence, building on 2 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

Our drive to increase the capacity of staff 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), 3 have been awarded and 3 have submitted and either await viva or are completing corrections. 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

1. **Health service Modelling Associates programme:** The further development of this programme (http://clahrc-peninsula.nihr.ac.uk/health-service-modelling-associates-programme) has had a significant effect on engagement with our NHS partners, and more importantly, has led to measureable service change in a number of areas. The group now include 26 HSMAs of whom 19 have gone on the second phase of training, delivering projects aimed at improving service efficiency across pathways in inpatient and outpatient care and in the ambulance service.
2. **Person-centred Coordinated Care Programme:** This programme of work with NHS providers has led to the production of a series of tools which can be used by researchers and by services which are trying to increase the degree to which their services are person-centred. During this period a set of key research outputs have been produced to guide the use of these tools. A website http://www.p3c.org.uk/ has also been established to provide free access to relevant instruments.
3. **The Hemi Spaire project:** A key PenCLAHRC approach is to work closely with clinicians and other decision makers to try to address important questions, an approach illustrated by this project. The question of whether an alternative surgical approach to hemiarthroplasty of the hip after hip fracture could reduce damage to muscles and improve later function was raised by a local orthopaedic surgeon. Our team helped to transform this question into a clear research proposal funded by NIHR RfPB.

Summary progress against short and medium term aims

Short Term Aims	
Aim 1	Maximise research output/impact from current PenCLAHRC Projects
Progress	*£4.6M in external funding and 70 papers in the reporting period. Numerous projects have led to specific impacts on policy and services including PenCHORD modelling being used as the basis for national decision making on the location of Stroke services and locally on location of audiology services for children in Cornwall.*
Aim 2	Work with SW AHSN on topic identification and implementation
Progress	*AHSN & PenCLAHRC staff contribute to both prioritisation systems. 8x 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. We have developed joint projects with the NHS locally and nationally, local authority, the Police social care providers and charities.*
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	*23 Making Sense of Evidence (MSE) workshops conducted for 486 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 paediatric audiology services in Cornwall; further development of Risk Assessment Tools (RATs) to aid diagnosis for cancer in primary care being implemented in the context of an externally funded evaluation.*
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 12 funded PhDs (4 within NIHR RCDCP) - 6 submitted and 3 awarded. 19 HSMAs in Round 2 (6 in Round 1). Multiple training opportunities for partners in Making Sense of Evidence, Operational Research, 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 >£28.7million in external research funding and published 373 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. The work of PenCHORD and of the HSMA programme are helping to demonstrate that research can directly provide solutions to problems of service organisation. The latter and our “Researcher in Residence” programme are also showing promise in the spread of relevant skills amongst NH staff.

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 Britten and 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 PGfAR*, RCT recruitment of 280 to time, intervention delivery complete) and **Partners 2** (psychosis in primary care, *NIHR PGfAR,* successfully piloted, full RCT underway) projects. Detailed process evaluations are contributing to an overarching theory of how creating an individualised shared understanding and plan can be the underpinning driver for team based care for complex needs.
- A £2.5M *NIHR PGfAR programme* – **Dementia Patient Care Team** has been awarded this year to further take forward and test this approach with for individuals with dementia and their carers.
- 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.
- 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 received funding from *NIHR-RfPB and NIHR-HTA* respectively. A further bid for a definitive trial of the intervention for carers tested in the feasibility study has now been submitted to the NIHR PH programme.
- The **Person Centred Coordinated Care (P3C)** programme addresses individuals with long term conditions or frailty needing care from multiple teams (see 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. Our recently developed measure of patients' experiences of P3C (translated into 5 languages, and now being used around the world eg SELFIE and SUSTSAIN), and now a Rasch calibrated system for measurement and feedback is being developed.
- 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. The trial is complete and final report will be submitted shortly. We are currently discussing whether this feasibility study should form the basis for an application for a definitive trial.

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 local service providers across three health systems (Yeovil (Symphony), Taunton, Exeter) and have gained NHS matched funding to continue the Researcher in Residence work in Torbay following recognition of the service impact of understanding and acting on international and locally acquired evidence
- Care Homes: We continue to work closely with private and third-sector residential care providers across the South West to improve our shared understanding of how they can provide excellent care and improve outcomes. We have written a collaborative systematic review on implementing evidence-based practice in care homes and a qualitative study of how care-home managers define and achieve success; we have been awarded RfPB funding for a project on implementing deprescribing in care homes and await the outcome of two other care-home-focused bids.

Capacity Building

- Two CLAHRC-funded PhD students within this theme and a PhD funded by the University of Gothenberg (Dr 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, to community and practice nurses in training and now to care of the elderly consultant trainees. The teaching is being evaluated with support from Health Education England and the model has been published in the Lancet.

Healthy People, Healthy Environments (led by Professor Logan)

Research

Highlights include (*major grants in italics*):

- **HeLP**: The HEalthy Lifestyles Programme a novel school-based obesity prevention programme evaluated in an *NIHR-PHR*-funded cluster RCT involving 32 schools and 1324 children has completed and results published.
- **All Saints Fellowship**: We are currently conducting a Charity-funded study with secondary school children which seeks to better understand the relationship between school environment and childrens' behaviours with regard to food and exercise.
- **PAReNT** (*NIHR RfPB* – Whear, Thompson Coon et al) was a synthesis of the evidence relating to the experiences and effects of peer support for parents of infants in neonatal care from those giving, receiving or implementing it. Parent to parent support was found to help mothers feel more supported, increase their confidence in their ability to care for their baby and reduce their stress.
- **STARS**, Supporting Teachers And childRen in Schools (*NIHR-PHR funded*) tested an intervention to reduce child behaviour problems in a large cluster RCT and results have been published. We are now involved in an EEF funded trial of an adapted intervention in a larger group of schools.
- **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.
- **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. The study is complete and about to be published. .
- We completed an evidence synthesis review (*NIHR RfPB*) to determine the factors that influence older adults' engagement in physical activity (**OPPA**).
- 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 – (Awarded)*
  - *Mealtime interventions in care homes. (submitted)*

Mental Health and Dementia (led by Professor 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.
- **Caring About Care** (*NIHR HS&DR*) is an ongoing project synthesising the qualitative and quantitative evidence on the experiences of care for people with dementia in hospital, their families and the staff caring for them, and the changes that have been made to healthcare services in hospital to help improve these experiences of care. Working with our multi-disciplinary expert advisory group and local networks we are using our findings to develop plans for service change to improve the experience of care for people living with dementia whilst in hospital.
- **Robopets** was a systematic review to assess the effectiveness of robotic animals for improving the psychological wellbeing and quality of life of older adults in residential care, a research question generated by a PenCLAHRC Care Home workshop. The review found that robopets have the potential to reduce loneliness and agitation, increase social interactions as well as provide comfort and pleasure although the long term value is yet to be established.
- 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 been published.
- **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 within the Devon Memory service.

Improving Health and Wealth

Highlights include:

- **Mealtime interventions in care homes.** Evidence synthesis and primary research along with stakeholder engagement resulted in the development and testing of a training package for care homes to enhance the mealtime experience. This work was recognised in CQC report as contributing to the 'Outstanding' rating awarded to participating homes.
- **Promoting social inclusion. Our researchers have offered evidence-based advice to government, businesses and leisure providers on improving inclusion for people with dementia and their carers. They have contributed to the 'Rethinking Heritage' initiative in partnership with Alzheimer's Society and Historic Royal Palaces, and worked with the National Coastal Tourism Academy to produce a toolkit for businesses.** The Prime Minister's Dementia Air Transport Group, chaired by Ian Sherriff, has collated first-hand experiences of people with dementia and their carers who travel by air to inform Civil Aviation Authority guidance 'Supporting people with hidden disabilities at UK airports' issued in June 2018, resulting in introduction of workforce training and the 'hidden disability' lanyard system.
- **Integrated hospital Psychological Medicine Service**
  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 programme, jointly delivered by the acute and mental health trusts, integrates psychological care alongside physical care for people attending the acute hospital, ensuring that care is compassionate and person-centred. It includes training for hospital staff to assess anxiety and depression and to develop appropriate treatment pathways. Already implemented in Head and Neck surgery teams, Oncology, Diabetes and Obesity service, a process of translation to all relevant departments is underway. In addition joint clinics for higher risk groups are being established, beginning with a joint psychiatry-rheumatology service for young people with medically unexplained symptoms.

Capacity Building

- We have supervised two CLAHRC-funded PhDs and four RCDCP-funded PhDs focused on care for people with dementia with one completed and a second submitted. 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.

Diagnostics and Stratified Medicine (led by Professor Hyde)

Research

Highlights include (*major grants in italics*):

- We continue to support 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 philanthropic donation is supporting an RCT of these tools which aim to improve early cancer diagnosis in primary care. Prof Hamilton is part of a consortium recently awarded funding for a new NIHR PRU in Cancer Diagnostics.
- 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**) through conducting and IPD meta-analysis. This project is unusual for a study using this methodology in that it incorporates a substantial element of PPI http://clahrc-peninsula.nihr.ac.uk/research/interpress-ipd-inter-arm-blood-pressure-difference-cardiovascular-events-cerebrovascular-disease-and-mortality-an-individual-pat .
- We support research developing personalised care in Inflammatory Bowel Disease (IBD) by Dr Ahmed. Excluding Inflammatory bowel disease in the differential diagnosis of abdominal pain in children is often difficult. Our study of faecal calprotectin showed that a "negative" result effectively excludes the diagnosis. This also 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.

- Improving diagnosis of dementia is a major activity. The DECODE Study is examining a decision support aid for primary care and assessing its impact on workload in memory clinics. We also work with the Cochrane Dementia and Cognitive Improvement Group in their programme of test accuracy reviews.
- 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.
- Led by Prof Hyde, 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).

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.
- 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. (submitted)*

Evidence for Policy Making (led by Professor 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.
- NHS England is commissioning us to identify options for the number and geographical location of units to deliver thrombectomy across England. This work has identified the critical interdependence between the number of thrombolysis centres (of which there are more than enough in England) and thrombectomy centres (which need to increase). Ensuring the balance between these two types of revascularisation will determine the overall population benefit achieved by the NHS.

- Our collaboration with the Stroke Sentinel National Audit Programme (SSNAP) has led to NIHR HSDR funding to develop and evaluate a Machine Learning tool which "audits" the decisions of stroke physicians against those which would likely have been taken by a "reference group" of physician colleagues
- 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 Robopets Review attracted Ministerial Comment (May 2019) as part of dissemination (liaison through NIHR Press Office)
- The PenCLAHRC EST leads one of the NIHR Evidence Synthesis Centres (established by HS&DR) and is currently being considered as a Policy Review Programme evidence synthesis centre. The collaboration with North Thames CLAHRC in methodological development (using qualitative comparative analysis)

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
- Using machine learning, we are working with Torbay Trust to identify and pre-empt the conditions that lead to breaches in A&E waiting time targets
- Attempts to "disinvest" from services shown to be ineffective have had limited success. We remain interested in developing an approach to adoption which allows the use of innovative health technologies in the "right" people i.e. where benefits are maximal. Our progress has been slow, but collaboration with the AHSN around "spread and adoption", alongside ongoing interest in data and analytics is improving prospects.
- OR modelling through our **HSMA** programme (see Added Value Example) has shaped STP priorities across the area served by the CLAHRC and AHSN.

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 continues. Working with North Thames CLAHRC we have contributed further to the development of training in Qualitative Comparative Analysis (QCA)
- In collaboration with colleagues elsewhere in the College of Medicine, we have obtained funding from HDRUK to inform the development of a Master's course in data management
- With funding from the Health Foundation we are working on "Mind The Gap" – a project to increase the capacity of senior managers to communicate effectively with data analysts and so improve NHS management performance
- Our highly successful "Health Service Modelling Associates" (HSMA) programme was co-funded by SW AHSN with expanded numbers of participants.

We are supporting the development of "embedded researchers" in two trusts across the region, in one case working on the implementation of a large new information system with associated pathway development

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. 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 best location of Urgent Care Centres in Cornwall – Cornwall STP have decided to set up Urgent Care Centres in the three locations identified by the model. https://www.shapingourfuture.info/plans-to-create-a-community-based-model-of-care-unveiled/
- Using Modelling to understand delays in Mental Health Services in Devon - this led to an £8 million investment in a new mental health ward at Torbay Hospital https://www.dpt.nhs.uk/news/successful-bid-for-a-new-8-million-mental-health-ward-in-torbay
- Modelling the high level health and social care capacity needs in Cornwall – the results from the model were used to directly inform Kernow CCG's winter planning for winter 2018.
- Modelling mental health referral and assessment capacity – this informed the re-design of all community, assessment, crisis and acute services provided by Devon Partnership Trust.
- Determining the best location to host new hearing assessment equipment for under four year olds hearing tests – the three sites identified by the model are being upgraded, including West Cornwall where a new sound treated room is being developed.
- Modelling Continuing Health Care (CHC) activity and waiting lists – this informed the financial and operational planning for the provision of CHC in Devon.
- Modelling capacity requirements for Crisis Cafe provision in Devon – this informed the requirements for the new crisis café service which is now is now operating across Devon.

2. 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 has further refined these tools for use in primary care to support the referral of potential cancer by primary care physicians. A formal trial of these tools, funded by a large charitable donation, is now under way.

3. 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.

4. **Supporting Teachers and Children in Schools *(Healthy people, Healthy Environments Theme)***

PenCLAHRC funded early feasibility work and supported study design and delivery of the NIHR PRH funded 'Supporting Teachers And children in Schools (STARS)' trial. The trial examined the effect of attending Teacher Classroom Management (TCM) training for teachers on their behaviour-management strategies and if this in turn would lead to better mental health for the children they teach. Suggested benefits in the study led the Education Endowment Foundation (EEF) to fund a replication of the trial, but training more than one teacher per school and involving schools in different areas of the country. As part of this project we are now training over 210 teachers across the country during the 2019-20 academic year and evaluating the impact on 6000 children's mental health and academic attainment.

4. Patient and Public Involvement, Engagement and Participation (PPI/E/P)

PenCLAHRC is committed to patient and public involvement as evidenced by our spending (c. £160,000 in this period) in this area, the work of a dedicated team, and three active involvement groups. We work with our regional NIHR partners; the CRN, the RDS and the AHSN to share good practice. This report is aligned to our strategic plan (https://tinyurl.com/yaq6nqqe):

Aims 1-9: Embedding involvement across PenCLAHRC

The PenCLAHRC PPI team runs regular advice clinics. We help researchers to work closely with patients and carers, for example by having public co-applicants on their teams, an approach which can significantly strengthen the involvement of patients in the research. Members of our public involvement groups are involved in academic work including co-authoring peer-reviewed articles and developing research funding applications. Involvement across PenCLAHRC includes the Cornwall-based Health and Environment Public Engagement (HEPE) group and the PenCRU Family Faculty as well as the Peninsula Public Involvement Group (PenPIG). We involve additional community and patient groups in research within specific areas, for example in the past year we have worked with: parents who left their partners due to domestic violence, care home residents, parents of premature babies, and people who live with MS.

Aim 10-16: Developing involvement through research and theory building

With PenPIG we are developing sociological work on the expertise brought to research by patients and carers. We are also investigating impact from involvement through in-depth analysis of audio-recordings of meetings, looking at what is said by patients in research meetings and how this is received and taken up (or not) by researchers. Recent peer-reviewed articles on patient and public involvement are:

- **Anonymous members of the Peninsula Public Involvement Group, Liabo K**, O'Dwyer S. Research commentary: a carers' roadmap for research, practice, and policy on suicide, homicide, and self-harm. *Behavioral Sciences* (in press, accepted April 26th 2019)
- **Liabo K**, Roberts H. Co-production and co-producing research with children and their parents. *Archives of Disease in Childhood* (in press, accepted March 12th 2019)
- **Cockcroft EJ**. "Power to the people": the need for more public involvement in Sports Science for Health. Sport Sciences for Health 2019, DOI: 10.1007/s11332-019-00548-y:
- Staley K, **Cockcroft E**, Shelley A, **Liabo K**. 'What can I do that will most help researchers?' A different approach to training the public at the start of their involvement in research. *Research Involvement and Engagement*, 2019:5;10 https://doi.org/10.1186/s40900-019-0144-4
- Roberts H, **Liabo K**. Research with children and young people: not on them. What can we learn from non-clinical research? *Archives of Disease in Childhood* Published Online First: 31 October 2018. doi: 10.1136/archdischild-2018-315925

Kate Boddy presented on PPI at the Cochrane Colloquium in September 2018, and at the Society for Academic Primary Care's conference in Southampton in March 2019. Emma Cockcroft presented at the NIHR early career research conference in London, October 2018. Emma Cockcroft, Kristin Liabo, Nicky Britten, Nigel Reed and Julie Harvey were contributors to 'International Perspectives on Evaluation of Patient & Public Involvement in Research' in Newcastle, November 15th and 16th 2018.

Aim 17-21: Furthering collaboration with patients and members of the public

PenPIG members have expanded their expertise and reach within research. For example, Nigel Reed has taken a lead on the patient and carer involvement in Exeter University's new Nursing Academy, citing his learning within PenPIG as enabling this. Diana Frost and Heather Boult contributed to a workshop on developing impact indicators of engagement, with collaborators from across the University of Exeter. Malcolm Turner has been inspired to become a Cochrane Citizen, completing several levels of their online systematic review training. We have produced two videos with PenPIG: https://tinyurl.com/yypjgdqd (What is patient and public involvement in research?) and https://tinyurl.com/yypjgdqd (What is PenPIG?) With a member of PenCRU Family Faculty we produced another video for the NHS at 70 celebrations https://tinyurl.com/yxlsk2qg

Aims 22-23: Expanding the work of the involvement team
Being co-applicants on research funding applications continues to be core to PenPIG and the PPI team's roles within PenCLAHRC. In the past year we have been co-applicants on five successful bids. We also continue, with PenPIG, to teach on various undergraduate and masters programmes at the University of Exeter College for Medicine and Health. In 2018 Emma Cockcroft and Kristin Liabo from the PPI team collaborated with INVOLVE on their new guidance for involving members of the public as co-applicants on research bids.

5. Training

Our training lead is Professor Vicki Goodwin.

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 more than one objective. Training opportunities are widely publicised, including through local NIHR infrastructure (NIHR CRN and NHIHR CRF), partner NHS organisations and the AHSN.

1. Trainees

In 2018/19 we have a total of twelve Academy members whose doctorates have been funded by PenCLAHRC of whom six are health services researchers, two nurses, one physiotherapist, one dietician, one medic and one health economist. Three Academy Members have been awarded their PhDs, two more have undertaken their viva and are completing their corrections, with one awaiting viva. One has successfully upgraded from MPhil to PhD. A further twelve Academy Members, funded from other sources, are supervised by PenCLAHRC staff of whom one has been awarded his MD (the first orthopaedic trainee in the Peninsula Deanery to achieve this).

We have hosted an IVSA award from Leicester BRC (Hannah Young) and one of our Academy Members (Abi Hall) had an IVSA hosted by East Midlands CLAHRC. One of our post-doctoral researchers (James Fullam) was hosted by Professor Sallie Lamb at the Oxford CLAHRC for his SPARC award.

All of our Academy Members benefit from the training opportunities provided by Researcher Development Programmes from both partner Universities. Those 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, Academy Members maintain regular contact with our Training Lead to ensure full use is made of training opportunities locally and nationally. Three of our Members attended the 2018 NIHR Infrastructure Doctoral Training camp at Ashridge and two attended the ICA Conference in 2019. Emma Cockcroft (post-doctoral researcher) and Sonam Zamir (PhD student) were both selected to present their research at the NIHR CLAHRC Early Career Development Conference in London on 4th Oct

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 who work with us. 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 (23 workshops for 486 delegates including physiotherapists, nurses, midwives, GPs, hospital doctors, managers, NHS library staff, local authority staff service users). Having two dedicated GPs funded one 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 ran an 'Introduction to R for healthcare' workshop for 26 delegates in March 2019 using our newly developed online materials found at www.rforhealthcare.org. The site has had 370 visitors and 1830 pages views from people from 12 countries.
- 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 two people (a university researcher and a speech and language therapist) have 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.

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. Following the success of this pilot programme, we launched phase 2 in 2018 which saw 19 HSMAs from 12 NHS Organisations recruited to undertake projects, with selection support from PenPIG – PenCLAHRC's PPI team. The projects addressed a wide range of issues, including: ambulance response times, mental health services, glaucoma treatment, patient flow, timely discharge and cancelled operations. In December 2018, the HSMAs presented their work at a seminar event to an audience of more than 100 NHS staff from across the region (https://www.youtube.com/watch?v=JWjOyH4D8hg). The projects have led to significant outputs including strategies that have helped to reduce the Continuing Healthcare (CHC) Assessment backlog in Devon by using System Dynamics modelling and an £8 million investment in a new mental health ward at Torbay Hospital (https://www.dpt.nhs.uk/news/successful-bid-for-a-new-8-million-mental-health-ward-in-torbay). The programme has also led to our partner organisations developing in-house operational researcher roles and collaborative projects and with individual's interested in applying for NIHR pre-doctoral fellowships.

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. In 2018/19 the two SWARM Fellows were Dr Johannes Retief and Dr Andrew Woodgate who are conducting research into cognitive function testing pre- and post-op for elderly patients.

Professor Dave Jones visited us and gave two seminars, one for the national RCDCP students and one for a large group of NHS and academic staff in Exeter, which was video linked to Plymouth and Truro. In addition we have run a number of Pre-doctoral clinical fellowship workshops around the region.

We have supported the development of two NIHR Clinical Doctoral Research Fellowship applications, of which one was successful (Hazel Parker, a pharmacist). 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 have hosted an HEE/NIHR physiotherapy Internship (Sarah Paviour) who has now submitted an ICA Pre-doctoral Fellowship. Our Training lead and methodological experts are currently supporting the development of a number of Pre-doctoral Fellowship applications for methodologists.

6. **Links with NIHR Infrastructure and the wider innovation landscape**

PenCLAHRC continues to have strong links across NIHR infrastructure. We continue to foster, and in many cases lead, cross-CLAHRC activities generated through regular meetings of Directors and Programme Managers, coordinated by a jointly funded Partnership Programme. Cross-CLAHRC working continues to be stimulated by groups with common methodological or subject interests including PPI, Child Health, OR Modelling, Economics, Stroke, and Mental Health, in which our staff are actively involved.

A range of projects generated within PenCLAHRC have been enhanced and further developed through collaboration with other CLAHRCs. Examples of ongoing collaborations include the HERO (NIHR HTA) trial of extended rehabilitation in older people with colleagues from Yorkshire and Humber, and MYRIAD (MRC) trialling promotion of positive mental health and resilience in Adolescence with Oxford CLAHRC. A further, exciting new development is the ESEE trial (Enhancing Social and Emotional health and wellbeing in the early years) which underlines our ongoing strengths in addressing social and emotional health problems. This trial, funded by the NIHR Public Health programme, with PI Tracy Bywater from Yorkshire and Humber CLAHRC, has Dr Vashti Berry as a co-investigator. The South West Peninsula CRN has led pilot site development alongside Yorkshire and Humber CRN and North West Coast CRN.

A further collaboration with Yorkshire and Humber is with their NIHR Patient Safety Research Collaborative (PSRC). The PSRC is developing cancer risk assessment tools (RATs), based on the work of Prof Willie Hamilton in PenCLAHRC. This approach calculates the cancer risk associated with symptoms presented by people to their GP and feeds this back to the practitioner. Further work on this continues in Exeter, including an RCT of implementation into routine practice funded by a large charitable donation.

Our association with Yorkshire and Humber CLAHRC has been developed to become a part of our planned TriARC partnership, also including North Thames. This brings together a complementary balance of research skills and population characteristics over a large range of service types. Our strong links with North Thames CLAHRC were highlighted in last year's report and these have continued.

Our collaboration with the South West Academic Health Science Network (AHSN) remains a cornerstone of our regional collaboration network. The AHSN has had a dynamic period of development and consolidation and we remain closely involved at Board, and more junior levels. Our Director and Deputy Director are non-executive directors of the AHSN and play an active role in organisational development. The AHSN's work on spread and adoption is now in even sharper focus. The SW AHSN is the national lead Network in the implementation of High Sensitivity Troponin (HST) tests for people with chest pain. The high sensitivity of the test means that when negative, the patient can be reassured that their pain is not a heart attack and, in many cases, admissions to hospital can be avoided. Previous collaborative work between PenCLAHRC and the AHSN examined the use of HST within hospital systems throughout Devon, Somerset and Cornwall, assessing potential for improving patient flows, and formed the basis for the network's leadership role.

The SW AHSN, PenCLAHRC and the Association of Healthcare Analysts (APH) have developed a regional network of business intelligence analysis – the Regional Information Analysts network. This links with the Health Service Modelling Associates programme developed in PenCLAHRC and part-funded by the AHSN and demonstrates ongoing significant capacity development in the use of analytic capacity for service development and delivery.

We have also developed strong links with other elements of NIHR infrastructure, including:

- **NIHR Research Design Service (RDS) South West.** PenCLAHRC and the RDS work closely together. RDS staff continue to offer support for applications developed in response to questions identified by PenCLAHRC and the RDS Director, Prof Gordon Taylor, works in close association with CLAHRC staff in Exeter and Plymouth
- **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*) remains on secondment to the *London in vitro diagnostic collaborative*.

7. Links with Industry

As has been the case throughout this CLAHRC funding period, the focus of our industrial strategy has remained on working with as wide a range of industrial partners as possible. In the twelve-month period covered by this report we have pursued not only activities to increase the productivity and depth of our existing relationships but have also actively pursued new relationships that will enable us to achieve the ends set out in our strategy.

Again, our close working relationship with the South West Academic Health Science Network (SW AHSN) has played an important role in this. Their appointment of a new CEO, Dr Jonathan Gray, and appointment of new board members who bring an understanding of the needs of industry has enabled us to identify new opportunities and, based on that, to bring new life to existing relationships as well as to engage with new partners to mutual benefit. We continue to work productively with our AHSN colleagues on both general capacity building and generic development and on engagement with specific companies. This includes activities to support innovations identified through the NHS-England supported Small Business Research Initiative for Healthcare (SBRI Healthcare), with which the AHSN is closely involved.

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, for example, pharma or biotech but we have also found it profitable to engage with organisations and commercial entities from further afield. Our VSimulators project provides an apt example. This project 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. It has involved collaboration both with local partner organisations and with larger multinationals such as WSP Group PLC UK (Parsons Brinckerhoff), Foster and Partners, and Emirates DNEC Engineering Consultants.

Please indicate the total number of UK Small and Medium Enterprises (SMEs) you have worked with during the reporting period and provide brief details of key examples.
We have actively sought to build, develop, and extend our engagement with SMEs and this is a core element of our strategy for working with industry. In this reporting period we have worked with 13 SMEs. Our focus has been on strengthening existing collaborations while pro-actively seeking novel opportunities to work with SMEs whose activity is aligned with our strengths and strategic aims. To this end, we have built on our existing success and our success to date in this area shows progress compared to our position at the commencement of this period of CLAHRC funding and in line with our strategy. Our engagement with SMEs covers a wide range of activity but there are three areas particularly worth highlighting because of either our strong track record or because they represent areas of important growth and development for us.

First, we are working with an increasing number of SMEs in the technology and IT sector; this represents an area of growth for us. For example, through our embedded researcher-in-residence model, a collaboration with Torbay and South Devon Foundation Trust, we have worked with spin-off enterprises such as the NHS Quicker app and Health & Care Videos Ltd. In our WordApp project we have worked closely with SUVO Technology, a fast-growing mobile and web app development company, and with Robb Research Ltd, a provider of national-scale software solutions. This work has enabled the collaborative development of software and related tools that

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). Our work with the SW AHSN around policing and mental health has led to a collaboration on a funding bid with Flowmoco, a Cornwall-based Drupal specialist provider that delivers web sites and mobile apps for enterprise clients using agile techniques.

Second, we remain actively engaged with SMEs active in the long-term care sector. We have a number of related projects related to research, implementation science, and capacity development in this sector and we are actively building collaborative work with a number of organisations and key individuals. Our range of collaborations in this sector reflects the diversity of provider organisations from smaller companies like Classic Care Homes and Southern Healthcare (each a small nursing-home group that each runs two nursing homes) to Somerset Care Group, one of the major care providers in Southern England that currently owns and manages 27 care and nursing homes and has a growing share of the regional domiciliary care market. Our engagement with and across these organisations is central to multiple projects currently underway as part of our CHIK-P programme of work and our newly-NIHR-funded Deprescribing project.

Please provide details of; i) any new strategic partnerships between your NIHR CLAHRC and industry ii) the progress of ongoing strategic partnerships between your NIHR CLAHRC and industry for the period 1 April 2018 to 31 March 2019.

We have a new strategic partnership, through the Partners 2 project, with Livewell South West. 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.

Please provide brief details of key examples of studies active for the period 1 April 2018 to 31 March 2019, as follows:

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.

Please provide brief details of key examples of agreements signed with industry including:

- **Non-Disclosure Agreements;**
- **Model Trial Agreements, including mICRA and mCTAs.**

We have not signed any new Non-Disclosure Agreements or Model Trial Agreements during the period covered by this report.

8. **Forward Look**

We believe that the progress against our key objectives documented in this report, vindicates our original approach to CLAHRC and we intend 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 much of our attention has been directed at preparing the bid to establish a new NIHR Applied Research Collaboration in our region.

That application was built on continuing the fundamental principles on which we have built our activities within PenCLAHRC but adapting these to address the conditions posed by the new competition. We have also used this opportunity to consider carefully which aspects of our work have been successful and which we should change or cease. One consequence of this review

was that we felt that a change to our theme structure was required. The changes were partly in response to changes in emphasis in the ARC competition compared to previous CLAHRC competitions but also reflected some changes to ways of working. These changes are partly in response to the balance between areas of work that our partners have indicated they value but also will we believe make it clearer to these partners where we propose to focus our efforts in the future. Within the new ARC we plan to organise our work within 5 themes – Complex Care, Dementia, Mental Health, Public Health and a cross-cutting Methods for Research and Implementation Theme.

It is important to note that while there is a shift in emphasis we are determined to preserve the legacy of the current CLAHRC, gaining the maximum research and health impact from existing work.

We are 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 also welcome the 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 have contributed significantly to the design of the process and will use the opportunity presented by the imminent publication of the results 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 and the planned ARC in Yorkshire 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.

We have a broad spectrum of work across clinical/policy areas and will continue to work with a number of CLAHRCs and potential ARCs in these areas where others may lead. Our particular strengths in Dementia, Child Health and the use of Operational Research Modelling have led to us to offer to work with others to provide some degree of national leadership in promoting inter-CLAHRC and inter-ARC cooperation in these areas. This work is already on-going in the fields of Child Health and OR.