NIHR | National Institute for Health and Care Research

NIHR APPLIED RESEARCH COLLABORATIONS (ARCs)

ANNUAL REPORT - FY 2022/23

Please complete the form using a font size no smaller than 10 point (Arial).
Please submit as a Word Document.

1. NIHR ARC Details

Name of the NIHR Applied Research Collaborations (ARC): South West Peninsula (PenARC)

Name, job title, address, email and telephone number of an individual to whom any queries on this Progress Report will be referred:

Name: Greer Husbands / Jo Smith

Job Title: NIHR ARC Operations Director / Deputy Director

Email: g.e.husbands@exeter.ac.uk / jo.smith@plymouth.ac.uk

Tel: 07738 050491 / 07734 109106

2. Declarations and Signatures

The Director will be asked to electronically sign (DocuSign) to confirm they have reviewed the Annual Report and the information is accurate.

Contact details of the NHS Organisation administering the NIHR ARC award:

Name of the NHS Organisation: Royal Devon University Healthcare NHS Foundation Trust

Address: Barrack Road, Exeter, EX2 5DW

Name of the Chief Executive of the NHS organisation: Suzanne Tracey

The CEO will be asked to electronically sign (DocuSign) the following statement once all annual report documentation has been received:

"I hereby confirm, as Chief Executive of the NHS organisation administering the NIHR Applied Research Collaboration, that this Annual Report and the Financial Report have been completed in accordance with the guidance issued by the Department of Health and provides an accurate representation of the activities of the NIHR Applied Research Collaborations for early translational (experimental medicine) research and hereby assign all Intellectual Property rights to which I am/we are legally entitled in the Reports defined in the Contract for this award between myself/ourselves and the Secretary of State for Health and Social Care to the Secretary of State for Health and Social Care on behalf of the Crown."

3. MANAGEMENT & GOVERNANCE OF NIHR ARC AWARD

3.1 Please highlight any significant changes to management & governance arrangements of the ARC award as described in your original application, such as:

- Change of Director or other key personnel
- Any changes to governance structure
- Please confirm that your oversight board has met; please highlight any pertinent direction/steer provided by the board

250 words

Key personnel: In June 2022, Dr Kristin Liabo replaced Professor Ken Stein as PenARC Deputy Director. In January 2023 Greer Husbands replaced Jo Shuttleworth in the role of PenARC Programme Manager.

Governance structure: Our structure remains the same but there have been significant changes in partner organisations (and hence Management Board representatives) during the reporting period. In April 2022, two partners, Northern Devon Healthcare NHS Trust (NDHT) and the Royal Devon and Exeter NHS Foundation Trust (RD&E) merged to become the Royal Devon University Healthcare NHS Foundation Trust (RDUH). Locally the CCGs have been superseded by ICBs and ICSs. Nationally the dissolution of PHE has meant that local representatives for the UK Health Security Agency and Office for Health Improvement and Disparities have been invited to join our Management Board.

Management Board: The PenARC Management Board met virtually in April 2022 and in person in September 2022. Three new clauses have been added to the Board TORs to keep abreast of the changing organisational landscape in health and social care. The Board are satisfied with the overall direction of PenARC and are keen that the ARC remains nimble and responsive to changes in the health and social care environment. The Board particularly commended PenARC's Health Service Modelling Associates (HSMA) Programme. This programme protects time for service-based colleagues to work on operational research projects. It has had high uptake and has produced numerous examples of direct impact on services both locally and nationally.

3.2 Please highlight progress made in implementing the approved ARC strategy, including:

- Any changes to the approved strategy
- Any risks to delivery of the ARC award identified and plans for mitigation.
  - Please include risks to delivery of theme strategies as well as any additional initiatives (if applicable)
- Top three significant achievements by the ARC during the financial year

Strategy

There has been no change to the PenARC overall strategy which is based on responsiveness to the needs of our partner organisations and public collaborators.

Risks to Delivery

Both the overall ARC strategy and those of individual themes depend on co-production of research evidence in response to system needs. Ongoing pressures within NHS, public health, and social care organisations, reflecting resource constraints and staff shortages, exacerbated by the pandemic, continue to affect stakeholders' capacity to engage and collaborate with PenARC. Additionally, the changing landscape of health and social care (including the transition from Clinical Commissioning Groups to Integrated Care Systems and the dissolution of Public Health England) can pose challenges to engagement and co-production of research. Fortunately, the strong relationships established with partners across the system and the fact that many staff within the new organisations have previously worked with PenARC in other roles has served to mitigate these difficulties. In addition, our strong programme of capacity building has cemented relationships with organisations and individuals across the system.

Although infrastructure funding provides welcome stability, many staff are on short term contracts related to specific projects, including those supported by external grants. Recruitment and retention can be difficult, especially towards the latter period of ARC funding. The extension period is welcome although the effects of inflation will pose considerable challenges.

Further mitigation related to both challenges is provided by our strong and deepening relationships with other parts of the NIHR infrastructure in the region and with the AHSN. Working closely with these other parts of the system provides a larger pool of talent with staff able to move between organisations as needs arise (often in joint posts) and pool skills and connections into the local health and social care system. The establishment of a BRC, membership of the NIHR Schools of Primary Care and Public Health and grants for Exeter HS&DR Evidence Synthesis Centre and PRP Evidence Review Facility have been especially valuable with regard to strengthening collaborative working across research infrastructure.

Three significant achievements

Choosing just 3 achievements to highlight is difficult, with many candidates. These examples illustrate the breadth of activity.

1. The post-pandemic backlog in elective care has promoted renewed interest in research we conducted to improve outpatient follow up. The NHS England guidance: Implementing Patient Initiated Follow Up, aims to fundamentally change the organisation of outpatient care in chronic disease. The guidance references four studies, two of which were conducted by PenARC (formerly PenCLAHRC). The systematic review of evidence recently updated by PenARC is helping local providers to respond to this guidance. We attach considerable importance to continuing to ensure and track impact from past PenARC research, as demonstrated by this example.

2. Dr Kerryn Husk and Prof Ruth Garside lead a longstanding programme of research on the effectiveness of social prescribing amongst a broad range of populations, producing both primary research and multiple briefing documents for services, including Defra Green Social Prescribing Evaluation. This research features prominently in recent guidance from the World Health Organisation on how to introduce social prescribing at a community level.

3. PenCHORD, the operational research modelling group within PenARC, seeks to use sophisticated mathematical modelling techniques to work with services to help them improve their effectiveness and efficiency. This includes but is not limited to: the Health Services Modelling Associates (HSMA) Programme which teaches service-level staff key skills in data modelling before tackling a service issue as a project; a range of projects utilising machine learning and 'explainable AI' to influence stroke service provision; and an ongoing international operational research peer collaboration group developed in response to COVID-19. In a recent example, Dr Alison Harper (PenARC Research Fellow) received the prestigious Lynn Thomas Impact Medal for developing an app and digital platform to provide live waiting times for A&E departments and other centres of urgent care.

700 words

Please provide an update on progress against the ARC's overarching objectives using the attached Objective Tracking Table.

3.3 Co-Funding

Please provide:

- **A narrative on key activities supported by the co-funding received in the reporting period allocated for;**
  - **i) research and;**
  - **ii) implementation;**

- **A narrative on key achievements arising from the co-funding received in the reporting period, clearly indicating the Specific Theme type it sits within and whether the achievement relates to applied health research and/or implementation; and,**
- **Information on any new partners including new partnership agreements and co-funding commitments.**

500 words

We continue to leverage co-funding from multiple partners across the health and social care setting. It is important to note that the eligibility rules for co-funding require that we record only co-funding that is received from formal members of our collaboration. A considerable proportion of our work is with national organisations, who are not collaboration partners and their contribution to our co-funding is therefore excluded. For instance, during this FY, we are unable to formally recognise and report on more than £600k in co-funding from national organisations who have worked with us on our HSMA programme.

There has been no increase in partners and therefore no additional co-funding commitments during the reporting period.

Within the reporting period the total amount of co-funding from formal member organisations leveraged by PenARC was £682,766 in comparison to the PenARC award of £1.8M, providing a 38% co-funding equivalent. In addition, we leveraged University Member co-funding totalling £1.1M.

Key activities and achievements

Projects frequently cut across multiple themes, something we actively encourage, and frequently include elements of both research and implementation. Wherever possible we use co-funding to complement work funded through other sources. The following are exemplar projects supported by co-funding from our formal collaboration members.

Southwest Academic Health Science Network (SWAHSN):
SWAHSN is a key partner providing substantial co-funding (£243,050) across PenARC activities with a particular focus on implementation and capacity building. Examples include:

PenMHRI (Research and Implementation) – SWAHSN provided support towards a joint post (Applied Mental Health Research & Service Improvement Lead) within this initiative with a particular remit to work with health and social care providers to ensure relevance to service needs. ***(Mental Health and Complex Care Themes)***

HSMA Programme - Supported by SWAHSN and a substantial contribution from other participating organisations. Participants develop new skills, provide evidence-based solutions for problems defined by their employers, and then join a growing alumnus group with whom we continue to work. This programme has local and national reach and has recently become accredited. ***(Methods for Research and Improvement Theme)***

Plymouth City Council:
Health Determinants Research Collaborative (Research and Implementation) – Our innovative research partnership has been awarded funding to help tackle health inequalities in Plymouth. ***(Complex Care and Public Health)***

Violence Against Women and Girls (Research) - A collaborative partnership with organisations across Plymouth researching ways of tackling violence against women and girls in the city. ***(Mental Health and Public Health)***

Royal Cornwall Hospitals NHS Trust:
Cornwall and Isles of Scilly Weight Management Project (Research) – The Trust identified a need to capture the voice of people who access weight management services, and those who are unable to, or choose not to, in Cornwall and Isles of Scilly. ***(Methods for Research and Improvement)***

Somerset ICS:

Community Mental Health Pilot Evaluation (Research and Implementation). Evaluation of 3 pilot sites (including Somerset) testing models of delivery of community mental health services. The project has been completed during the reporting year, with follow-on scoping work with partners to better understand the mental health needs of underserved communities. ***(Mental Health)***

3.4 Please describe progress against the ARC's plans for collaborative working. This should include how the ARC is working with:

- **local member organisations that comprise the Collaboration; and,**
- **industry.**

Please include a brief description of any significant successes or any challenges faced.

500 words

We offer multiple opportunities for interaction with our local partners. For instance, in September 2022 we hosted 80 senior representatives from South West health and social care organisations to discuss the integration of health and social care. The PenARC Research Knowledge Exchange event was well received and will become an annual event allowing us to shape our future efforts to ensure we best meet the needs of our partners in the changing health and social care environment.

The following examples illustrate the breadth of these collaborations:

- Recently we were partners in the successful bid to establish a Health Determinants Research Collaboration in Plymouth. This is an initiative led by Plymouth Council and local public health departments in partnership with the University of Plymouth and PenARC.

- A collaborative project with local partners including Devon and Cornwall Police, Plymouth City Council, health services and charities has been awarded funding to understand the most effective ways to reduce and prevent male violence against women and girls in the city.

- A joint bid has been submitted to the NIHR/EPSRC call for Research Hubs in Multiple Long term Conditions including as partners the 3 ICSs, Universities of Plymouth and Exeter, SWAHSN and PenARC.

Collaboration with the SWAHSN is a cornerstone of our regional network with reciprocal involvement at Board level, multiple joint projects, and joint posts. The development of a Regional Innovation Strategy Group (RIS) led by the SWAHSN with PenARC as a key partner brings together local ICSs and providers to agree priorities for innovation and research. The aim is to seek to implement evidence-based solutions to common problems across the region while learning how this can best be achieved. It is envisaged that RIS will also offer an opportunity for industry to work with the partnership to evaluate potential innovations.

In addition to strategic level activities, collaborating on concrete projects serves to build relationships between SWAHSN and PenARC staff members and service partners. A current example is the evaluation of two new CATUs in Cornwall which aims to produce decision-making and a 'Rapid Insights Guide' to provide actionable guidance and resources for Integrated Care Systems.

ICSs are clearly becoming the key players in regional health policy and the building of close relationships with their staff is a key objective. All three have been co-applicants on recent grants and senior PenARC staff have been invited to contribute to their strategic development.

We work closely with the NIHR CRN South West Peninsula (SWP) and in 2022 we ran a joint ARC-CRN SWP Internship programme for the first time. We successfully appointed four interns (three nurses and a social care practitioner).

Given the regional demography our key industry partnerships are with the care home sector. We have numerous examples of ongoing collaborative work, encompassing research, implementation science, and capacity development, with organisations (including both small care homes and larger providers) and key individuals in the sector, e.g., the EXCHANGE network of research active care homes.

3.5 Please specify in what way the NIHR ARC is supporting the evaluations of AHSN priority programmes (local evaluations, high priority service innovations, such as digital innovations).

- **Please provide details on any relevant research and implementation programmes co-produced/ongoing with the AHSN(s). In order to assess the relevance of these projects, you might want to consider the following points:**
    - **the project(s) value proposition, how the research addresses regional/local needs, the strength of evidence underpinning the project(s), the outcomes/outputs as well as the potential impact.**

500 words

Our close partnership with SWAHSN is strengthened by reciprocal involvement in governance arrangements, joint projects and posts. Increasingly this has become a 3-way partnership, involving the CRN SWP.

Establishment of the ICSs provided a catalyst for consolidating links between the SWAHSN, the universities, NIHR infrastructure and the local NHS and social care organisations. We have established a ***Regional Innovation Strategy (RIS) Group*** which provides an explicit system for the definition of regional research and innovation priorities. The partnership will work together to address capacity building, adoption of large studies, evaluation of local innovation and evaluation of implementation of imported evidence-based innovation in key areas of need.

Joint PenARC/SWAHSN projects include work on improvement and implementation, particularly in areas such as: mental health, innovation in care homes, remote working, and health inequalities research, and capacity building:

- Development of a remote consultation toolkit using Beneficial Change Network funding – a central set of resources available to directly support outpatient transformation managers and other clinical leaders with optimising remote consultations (ORCER).
- Learning how Community Assessment Treatment Units (CATUs) in Cornwall and the Isles of Scilly can best support frail patients with urgent needs in the community and seeking to understanding their impact on ED referrals (part of the NHS Insight Priority Programme).
- The nationally recognised Health Services Modelling Associates Programme (HSMA), in which staff based in health and social care organisations are trained in simulation and modelling techniques to support service improvement and decision-making.
- The Peninsula Mental Health Research Initiative (PenMHRI), which promotes close working between mental health services and public collaborators to build research capacity in the southwest region. This focuses on children and young people and on people who “fall into the gap” with mental health needs beyond the capacity of primary care but who are not considered to meet criteria for secondary care services.
- The Hidden in Plain Sight project, which uses a data-driven approach to identify people with ‘complex lives’ in General Practice (i.e., attend frequently, have multiple psychotropic prescriptions and characteristically have complex social factors, chronic pain and mental health problems) who may benefit from a multi-disciplinary approach, including social prescribing and well-being support.
- The CHOICES project, which investigates the use of community-based wellbeing activities for children and young people delivered as a potential prevention and early intervention pathway (i.e. via social prescribing).
- A study of the implementation and effectiveness of an evidence-based person-centred training programme (WHELD) designed to help care homes improve the well-being and mental health of residents with dementia and reduce their sedative medications.
- An investigation into how best to deliver the DeStress training to help GPs provide more supportive consultation practice with low-income patients experiencing poverty-related mental distress.
- A study of the implementation of the Falls Management Exercise programme for people aged 65 and over to inform a revised implementation toolkit and a national adoption and spread programme for the training.

- The development and 'proof of concept' evaluation of a network of research teams embedded in adult social care organisations aimed at informing service improvement.

4. PROGRESS MADE IN EACH THEME

4.1 Please use the Objective Tracking Table to detail progress made against the objectives (short, medium and long term) within each Theme's tab.

5. Public and Community Involvement, Engagement and Participation (PCIEP) (no more than 1000 words)

5.1 Please give a brief summary of progress in implementing your PCIEP strategic objectives.

5.2 Please describe how you are promoting the UK Standards for Public Involvement in your Centre. In particular, how you are:

A. Engaging and involving underserved communities in the delivery of your PCIEP strategy.
B. Providing Inclusive opportunities for public members in the delivery of your PCIEP plans.
C. Involving public members in governance of your work and any value this has added.

5.3 Please give us examples of any PCIEP activities you (are proud of) or have identified as making an impact on your work. Please refer to the NIHR definition of PCIEP impact.*

5.4 Please highlight any significant challenges or barriers experienced; this could include challenges you have had in involvement and engagement and how you have overcome this to produce good outcomes

***NIHR definition of PCIEP impact is defined as:**
"The changes, benefits and learning gained from the insights and experiences of patients, carers and the public when working in partnership with researchers and others involved in NIHR initiatives." NIHR Patient and Public Involvement Impact Working Group, 2019

Our PPIE strategy is designed to implement the NIHR Standards for Public Involvement. We are progressing well with our strategy. The showcased activities below are selected from a wide-ranging programme.

AIM 1: To build on and develop the involvement and engagement legacy of PenCLAHRC (Standards: Communication, inclusive opportunities)
Tanya Hynd produces a regular newsletter which is co-written by public collaborators. She has liaised with university finance colleagues to ensure a smooth system of recognition for contributors in different circumstances.

AIM 2: To run a programme of involvement that is experienced as engaging and creative (Standards: Inclusive opportunities and working together)
At a national event hosted by the NIHR Children's Health and Maternity priority programme we ran a lively networking session with a focus on inclusivity. Researchers, service providers, public collaborators and funders were invited to move into dynamic groups that represented an area of interest, for example 'health inequalities', 'teenage pregnancy', 'childhood disability'. We were particularly happy to see public collaborators and NIHR representatives connecting over joint interests and complementary expertise.

We have continued our journal club for researchers and public collaborators, including colleagues from ARC Greater Manchester who presented one of their PPIE publications.

AIM 3: To reach a diverse group of public collaborators (Standards: Inclusive opportunities and working together)
We are addressing this at two main levels:

Making involvement activities safe for new people:

We organised Diversity, Inclusion, Cohesion and Equality training by BoCohCo for public collaborators. The next step is to hold reflective workshops on how to implement learning from this course. We are in the process of self-assessing to the NIHR Race Equality Framework. Kristin Liabo is part of a CRN-led project on how to increase accessibility of mental health research.

Making involvement activities visible to new people:
We invited secondary school students from Dartmouth on a day-visit. We work with Devon Carers and wrote an article for their member magazine. Kristin Liabo worked with refugees. We are collaborating with services to conduct joint PPIE. Opportunities to be involved are advertised in waiting rooms, libraries, and community centres.

AIM 4: To integrate public involvement at the heart of PenARC to support early and ongoing involvement in all research ideas (Standards: Impact and governance)
Public collaborators attend our Management Board and share updates on PPIE. This has impacted on services' understanding of PPIE and developed new relationships between users and providers of services. Public collaborators hosted a stand at the PenARC Research Knowledge Exchange event.

PPIE cafes are a springboard for early and impactful involvement in research, as evident in this feedback: "*I cannot overstate how wonderful the experience has been for me so far. The PenPEG members have been so knowledgeable and supportive. Their personal insights and enthusiasm for research have enabled to me explore new aspects in my work and I look forward to continuing this journey together.*"

AIM 5: To research and evaluate involvement so that we can improve practices and capture involvement impact (Standard: impact)

We co-wrote and published two articles about impact:

Liabo, K, Cockcroft, EJ, Boddy, K, Farmer, L, Bortoli, S. Britten, N. Epistemic justice in public involvement and engagement: creating conditions for impact. Health Expectations. 2022; 25: 1967- 1978. doi:10.1111/hex.13553

Lang I, King A, Jenkins G, Boddy K, Khan Z, Liabo K. How common is patient and public involvement (PPI)? Cross-sectional analysis of frequency of PPI reporting in health research papers and associations with methods, funding sources and other factors. BMJ Open. 2022 May 24;12(5):e063356.

An example of impact is in the Routes to Wellness study where refugees advised on changes to the research language to make the study more acceptable to their communities. For example, the word 'interview' is associated with the Home Office interview, so instead we used 'conversation'.

AIM 6: To enable and support researchers, health and social care service providers and members of the public to build their capacity for collaborative work (Standard: Support and learning)

Our large programme of learning events is co-designed and delivered with public collaborators. Some highlights:

- PenPEG members buddied with new public collaborators and PPIE team staff.
- Silvia Bortoli from the NIHR delivered a national PenARC-hosted seminar on PPIE payments, attended by 62 people from across the UK.
- Online PPIE training workshops were organised for researchers and a diverse group of public collaborators. This training focuses on what 'experiential knowledge' is and how it can inform research. Continuing interest has generated a waiting list.
- We delivered a PPIE training session to the Health Service Modelling Associates (HSMA). HSMA Evelyn Koon from NHS England invited us to repeat the training for her colleagues to "*help us bring PPIE into our work. It'd really help us bring our work to life and I think it'd help improve job satisfaction in knowing directly if our work is having any impact on patients.*"

- Beccy Summers developed a PPIE research course for students aged 14-16 years as a part of The Brilliant Club's Scholars Programme.

- An introduction course taught PPIE to researchers from Denmark, Norway, Brazil and the UK.

In addition to the above we were delighted to be asked by one of the Chief Nurses in Cornwall to deliver a PPIE training session to a group of nurses who are research trainees. This was delivered twice in the reporting period. We were also able to support the same Chief Nurse to include PPIE in a grant.

Significant challenges or barriers experienced in the last year, and areas where we would like further support or information.
It has been challenging to bring in-person meetings back. For some this has been overdue while others prefer to remain online, and some have been unsure. There has been anxiety due to infection risk, and we have at times had to re-organise in-person meetings. We have trialled hybrid meetings, and these are becoming more successful. However, the hybrid format can make it more challenging for remote attendees to participate fully, requiring concerted efforts by PPIE facilitators to make the meeting accessible for all.

6. Academic Career Development (up to 1000 words)

6.1 Progress. Please provide progress against the academic career development plans outlined in your approved application, addressing any feedback provided by the review panel. Please include any additional objectives for the coming year.

a) Regarding research capacity building
b) Regarding NIHR Academy members

6.2 Deviations. Please describe any deviations or barriers to meeting your academic career development objectives and provide details of how these are being addressed.

a) Regarding research capacity building
b) Regarding NIHR Academy members

6.3 Impact. Please describe what has worked well and provide examples of impact. Examples of academic career development impact may include (but are not limited to):

- **Training courses/teaching that have been particularly successful that could be shared with other parts of the Infrastructure;**
- **Preparatory fellowships/funding that have led to successful applications for personal/career development funding;**
- **NIHR Academy members leveraging additional research funding.**

6.4 Collaborations. Please give details of ongoing or planned collaborative academic career development and research capacity building activities with other parts of the NIHR infrastructure, wider NIHR and other partners.

6.5 Equality, Diversity & Inclusion. Please outline how you are supporting equity of opportunities through capacity building and training offered.

6.6 Sharing best practice. Please provide a short paragraph summarising your academic career development and research capacity building activity over the past year that can be circulated to all other academic career development leads. Please include any highlights, novel or innovative approaches to academic career development.

6.7 Expenditure on training. Please specify 2022/23 NIHR spend on academic career development. For ARCs, please include any official co-funded expenditure.

Please provide the overall amount of expenditure on academic career development for this reporting period. This should include:

- **Cohort costs for networking/training/events for multiple NIHR Academy members.**
- **Salary and support costs for NIHR Academy members (can include items such as travel, training, equipment, consumables and PCIEP costs).**
- **Costs for wider academic career development and development.**

6.1 Progress.

a) Research capacity building

Our Making Sense of Evidence (MSE) programme is offered online and in person. We delivered 26 workshops plus an annual conference including 435 delegates, including members of the public, GPs, nurses, therapists, mental health practitioners and healthcare assistants. Staff ran online workshops for "research week" organised by Devon County Council, open to partner organisations such as Devon Health Watch and Devon & Cornwall Police.

With SWAHSN support we are currently running the fifth round of our 15-month Health Service Modelling Associates (HSMA) Programme. The 113 HSMAs are from health, social care and policing organisations across England, including 11 trainee mentors. Health Education England funding (£343k) is supporting development and delivery of this and subsequent programmes. HSMA has also become the first programme to be endorsed and accredited by the Association of Professional Healthcare Analysts, supporting the professional development of participants. We are planning to build a series of spin-off dedicated courses on YouTube available to our international audience based on the success of our HSMA YouTube channel, which now has over 1,000 subscribers.

In 2022 with ARC West and HEE Southwest, we awarded 9 Integrated Clinical and Practitioner Academic (ICA) internships, pre-doctoral and post-doctoral bridging awards. We meet awardees quarterly to monitor progress and support next steps including PCAF, DCAF or ACAF applications.

b) NIHR Academy members

Of our seven PhD students, two have submitted their theses and are awaiting their viva/completing corrections. The cohort are publishing and presenting at national and international conferences such as the Congress of the European Psychiatric Association Section of Epidemiology and Social Psychiatry. We also have two reciprocal studentships funded by ARCs Y&H and NT, with supervisors from PenARC.

Five dementia post-doctoral fellows were recruited during summer and commenced between October and December 2022 and are currently finalising their training and development plans. Since starting, one has been awarded a 5-year Wellcome Fellowship.

6.2 Deviations.

None

6.3 Impact.

We co-hosted a series of webinars covering NIHR Fellowships, Research for Patient Benefit, Health Technology Assessment and Research for Social Care funding programmes and the 'Value of seldom heard voices in ageing research'. We also ran a monthly seminar series covering a broad range of local, national, and internationally focused topics and opportunities.

Our Academic Career Development lead (Vicki Goodwin) and PenARC staff have supported the development of applications for NIHR Fellowships and run mock fellowship interview panels. We saw success at Internship (Grenfell), Pre-doctoral (Senior), Doctoral (Reeder) and Advanced (Wright) Fellowships.

We had a 3-month work placement for a first-year undergraduate student studying computer science with our Healthcare Modelling team during which time he designed and built an open access web application for dynamic network analysis.

6.4 Collaborations.

In 2022 we ran a joint PenARC-CRN SWP Internship programme for the first time, appointing four interns: three nurses and a social care practitioner. They were awarded up to £10,000 to cover salary and on-cost backfill for 30 days alongside training, travel, dissemination, and mentorship. They are currently part-way through their personalised training and development programmes which have included funded master's modules and experiential learning of research delivery with the CRN. One is currently preparing a Pre-doctoral Local Authority Fellowship.

For our Academy members we encourage and support applications to the IVSA and SPARC awards. In 2023, one member completed a SPARC award in conjunction with ARC Greater Manchester around diverse and inclusive Public and Community Involvement and Engagement. This involved her presenting and discussing her research on the meaning of independence to older people with Polish, Chinese and Southeast Asian community groups. A range of dissemination outputs are in development.

We co-produced the report on 'developing a Research-skilled workforce', led by Health Education England South West, and will support the University of Plymouth with implementation.

Locally, a joint Academic Career Development group has been established with the local NIHR Infrastructure ACD leads (ARC, SPCR, SPHR and BRC) to establish shared learning events and support for Academy members.

6.5 Equality, Diversity & Inclusion.
Academy Member recruitment is conducted with at least one male and one female panel member. All panel members complete equality and diversity training and recruitment and selection training.

We offer flexible working arrangements for our Academy Members with the option for office, home based or hybrid studying. Part-time studying/working is fully supported around the personal needs of individuals. Events are planned around the needs our Academy members have identified themselves such as travel times, caring responsibilities and health.

To make our 30-day Internship programme more accessible, particularly for part-time workers, we offered this flexibly over a 12-month period. This also made it more attractive to managers as it had less of an impact on service delivery. We ensured funds were available to cover travel expenses for learning opportunities.

6.6 Sharing best practice.
The aim of our training is both to develop the researchers of the future and increase capacity within the health economy to use and generate evidence. We have well-supported Academy members and an active programme in PenARC and partner organisations to provide staff with research training and to help them work towards NIHR Fellowships. Our Academy Members have the opportunity to work with others in the Tri-ARC collaboration and are encouraged to make the most of opportunities in the NIHR Academy.

We offer a range of opportunities for staff in our partner organisations and members of our PPIE groups to develop their skills from regular methodology "clinics", to short courses such as Making Sense of Evidence, to longer secondments such as the HSMA programme in operational research and modelling. These activities are both valuable in themselves but also provide the basis for long term relationships which help to support impact.

6.7 Expenditure on training.
The salary and support costs for NIHR Academy Members during the period totalled £78,826. A further £37,241 was spent on wider academic career development.

A total of £131,918 was spent on networking, training and events, of which £121,356 (over 90%) was leveraged as co-funding from our Health Service Modelling Associates (HSMA) programme.

7. National Priority Area(s) (if applicable)

Please use the Objective Tracking Table (referring to the National Priority Area tab) to provide information regarding the projects that underpin the NIHR ARC National Priority (NP) Area that you are leading on.

8. Mental Health Initiative (if applicable)

Please use the Objective Tracking Table (referring to the Mental Health tab) to update on the NIHR ARC's progress in meeting its objectives for the Mental Health Funding Initiative, as described in the final proposal.

9. Dementia Capacity Building Initiative

Please use the Objective Tracking Table (referring to the Dementia tab) to provide information regarding the selected projects and other elements of the initiative.

10. NIHR ARC National Lead Area (if applicable)

Please highlight progress on the activities related to the NIHR ARC National Leadership Area by submitting an Added Value Example in the specific template provided.

This specific National Lead AVE should provide an overview of the key activities that have advanced and supported evidence generation and implementation beyond the NIHR ARC's local region.

NIHR ARC - Added Value Example (AVE) Guidance and Form

1. Purpose and users of AVEs

AVEs help NIHR identify high quality examples of research that are showing high promise. The template is structured to collect the information required to help NIHR develop new or update existing case studies. AVEs help NIHR demonstrate the **value of NIHR** to stakeholders (*e.g.* government ministers and departments, patients groups and the public) supporting submissions to the spending review and in answering parliamentary questions. AVEs are also used by NIHR to reflect on the impact of NIHRs work.

Please note: AVEs are **not** used to judge centres. Please submit your **strongest examples of impact as AVEs,** and up to a maximum of five (fewer is fine, quality rather than quantity). Please consider submitting both 'new' AVEs and also 'updated' AVEs - where a step change in progress has occurred.
Each year the NIHR selects the most promising AVEs for further development into NIHR case studies.

2. What does NIHR mean by impact?

The AVEs are seeking to capture 'impact' which we appreciate can feel a bit nebulous as it depends on the context. For NIHR, research impact broadly means **'the demonstrable contribution that research makes to society and the economy, of benefit to individuals, organisations and nations'**; research impact **is about making a meaningful difference to people's lives, through research.** Impact is essentially changes that can be evidenced or demonstrated (effects or benefits) which occur over time as a result of research activities. NIHR wants to know about the real world impact which has resulted from the research it funds.

3. Impact types:

Please consider the following impact types (not an exhaustive list) when providing your example. Does your example relate to:

- **Influencing policy, clinical guidelines or service improvement** - *e.g.* implementation of evidence-based practice, research influenced/shaped (clinical/non-clinical) guidelines, policies, or regulations; public health and care advice informed by research evidence; findings used to support decision making (*e.g.* commissioning decisions, or on how best to improve service provision/integrate care of services).

- **Changes in service delivery, including service reconfiguration or service redesign, patient or care pathways, or patient safety** - *e.g.* research which results in improved patient safety (reduced errors, changes in care coordination), commissioning OR decommissioning of a service as a result of research evidence, care pathways redesigned in response to the pandemic, care pathways/ services improved/redesigned as a result of meaningful engagement and involvement of diverse groups and communities, improved service or social care provision, quality or access, research which results in changes to care pathways to improve management of disease or condition.

- **Improved patient/public/ service user outcomes, social or clinical outcomes** - *e.g.*, improved quality of life, improved QALY/ DALYs, treatment time reduced, new/ improved treatment demonstrated a positive health outcome, decreased diagnosis time, improvements to health risk factors, reducing health inequalities, improved health literacy, improved quality of care, changes to physical health and wellbeing, including enhanced patient experience, *etc*.

- **Economic impact, net health benefits, improvements to efficiencies in health and care system/NHS, boost to industry** - *e.g.* cost-effectiveness of interventions to improve and optimise care/services, including stopping services and/or informing intervention decisions**;** cost savings or efficiency gains to NHS, improving productivity and effectiveness of NHS,

increasing service effectiveness, net health benefits, revenue generated, jobs created, uptake by industry, commercial success, *etc*.

Details of Added Value Example

NIHR ARC details

Name of the NIHR ARC (insert below)
NIHR PenARC
Contacts for AVE*
Name(s): Jo Thompson Coon Vicki Goodwin Rebecca Whear
Contact details: j.thompson-coon@exeter.ac.uk v.goodwin@exeter.ac.uk r.s.whear@exeter.ac.uk
Research or cross-cutting theme (insert below where applicable)
Research for Methods and Improvement

*Please note that the NIHR CCF or NOCRI may approach the individual(s) named above for further information on the AVE or to develop it into a case study.

1. Title of the AVE

Title of AVE (insert below) *[A short title using plain active language that summarises the impact (not the research finding)]*
Implementing patient-initiated follow-up
Is this a new AVE? (insert '**Yes/No**' below)
No
Is this an update of a previously submitted AVE?(insert '**Yes/No**' below)
Yes
If this is an updated AVE, please provide the title and year of submission of the linked AVE (insert below)

PIC (PIC-RA, evaluation & expansion to other specialties) By Vicki Goodwin and Mark Perry, 2012-2013

2. Concise impact Statement (maximum 100 words)

Briefly summarise, in plain English the impact of the research - what has changed, for whom, (and how, and to what extent) and why did this matter?
Giving patients and their carers more control and greater choice over how they access care is a guiding principle of the NHS Outpatient Transformation and Recovery Programme. Patient-initiated follow-up (PIFU) is a key part of the programme. PIFU aims to be responsive to patient need, empowering patients with long term health conditions to take control of their care. PIFU ensures that patients can see a specialist sooner than planned if they need to and avoid unnecessary trips to hospital when they are well. Our evidence underpins recent NHS England guidance for local health and care systems on implementing PIFU.

3. Background and impact information

Please provide a short paragraph in each box - around 250 words

Background summary
Describe briefly the key research insights or findings that led to the impact in this AVE, including why the research is important (*e.g.* overall prevalence of condition, and cost to society and/or NHS and social care) and the hoe long the research has taken to get this point (insert below).
Traditionally, many long-term conditions that require specialist input are followed up on a regular basis in secondary care, e.g., every three to six months. One of the problems with this approach is that resources are used inefficiently and ineffectively both for patients and for the NHS. For example, when attending routine appointments patients may feel well and therefore don't need to see a consultant. At other times, when their condition deteriorates or changes, they may be unable to see the clinical team at short notice. In England, the total volume of outpatient appointments undertaken in hospitals increased by two-thirds between 2008/09 and 2019/20, to 125 million a year with follow-ups accounting for two-thirds of all appointments. Transforming the way that outpatient care is delivered is a key part of the NHS Long Term Plan which aims to reduce up to a third of the face-to-face appointments delivered by outpatient services. Our work in this area began in 2011 through contact with a consultant rheumatologist at University Hospitals Plymouth NHS Trust who was keen to better understand the evidence underpinning PIFU in order to support its implementation. We have conducted evidence syntheses, modelling and implementation evaluation, in addition to working with the SWAHSN to build an implementation toolkit. Findings from the research conducted indicated that PIFU represents potential to improve the patient experience of follow-up clinics and reduce GP visits with little or no impact on costs and outcomes compared with usual care (with the proviso that ongoing evaluation would be required for verification).
Impact information

What change happened/is going to happen as a result of the research?

- Please provide details of the change which resulted from the research activities (*e.g.*, changes in policies, guidelines or practice, quality improvement, service redesign or ways of working,improved health outcomes, costs and/savings, *etc*).
- Outline briefly how your research has led to the change described, adding any (qualitative or quantitative) evidence you have to show these activities have led to change (insert below).

Our quantitative evidence syntheses found:

- Minimal differences in psychological and quality of life measures between PIFU and usual care.
- Patient satisfaction with PIFU is generally positive.
- Few differences in outcomes between PIFU and usual care.
- Ongoing evaluations of outcomes, costs, and variation in benefits is necessary.

Our implementation evaluation found:

- PIFU could be successfully implemented.
- Benefit for patients - accessibility, communication, and convenience.
- Self-reported visits to the GP were significantly lower for PIFU.
- A greater number of telephone contacts between patients and health care professionals delivering the PIFU system.
- Hospital costs of the two service models were similar.
- Mean waiting time for an appointment in the PIFU system was 10.8 days.

Our qualitative evidence synthesis concluded that:

- Successful implementation requires the patient having confidence in using a new system of medical review and this needs to be offered quickly, in a convenient setting. Systems for ensuring regular disease monitoring and general issues surrounding team working, communication and ownership of the change process need early consideration.

This evidence underpins:

- NHS England guidance on implementing PIFU in local health systems published in May 2022.
    - This is further cited in the Getting it Right First Time Clinically Led Specialty Outpatient Guidance
- NHS England guidance on implementing PIFU in trauma and orthopaedic pathways published in February 2023 and endorsed by the British Orthopaedic Association.
- NHS England guidance on implementing Phase 3 of the NHS Response to the COVID-19 pandemic published in August 2020.
- NHS England guidance on implementing PIFU in adult rheumatology services published in June 2022.

Why does this change matter?

Please provide details on who has benefited/been affected (*e.g.* individuals, specific user/affected groups) from the change, and how, and to what extent (*e.g.* local, regional, and/or nationally) (insert below).

NHS England estimate that PIFU is already used in over 180 outpatient specialties nationally. It is particularly popular in trauma & orthopaedics and physiotherapy; nationally, these specialties put 14,000 and 8,000 people respectively on a PIFU pathway in September 2021.

There are several examples in the literature that demonstrate the impact of PIFU implementation on outpatient services:

- In a paper published by the Royal Berkshire NHS Foundation Trust, the authors describe the implementation of PIFU as one of six workstreams to transform outpatient care across their trust. Since 2017, PIFU has been implemented in several specialities with 3.2% total attendances on a PIFU pathway by July 2021. The authors estimate that implementation of PIFU has resulted in a projected saving of up to 15,000 follow-up appointments per year. Furthermore, PIFU patients are now reviewed within 5 days of calling the service compared with waiting up to 12 weeks for an appointment prior to the adoption of PIFU. Waiting time for a new appointment has reduced from an average of 43.3 days in January 2018 to 30.7 days in January 2021. This paper references PenARC's 2013 systematic review.
- In a conference abstract presented at the Association of British Neurologists conference in 2022, authors report the impact of implementing PIFU for neurology patients at Croydon Hospital. The average number of outpatient appointments reduced from 11 pre-PIFU to 1.5 post-PIFU with the average number of ED attendances reduced from 3.1 pre-PIFU to 0.4 post-PIFU.

What was NIHR's contribution to the change?
Outline the NIHR ARC's role and contribution towards the change (insert below).

The research – both evidence syntheses and studies of implementation – which underpins this initiative was directly supported by NIHR funding of PenCLAHRC and PenARC.

Staff have actively promoted the work to a wider audience through multiple avenues.

Where impact is in the early stages yet to be fully realised, describe how the research findings will be taken forward to facilitate impact in the future (*e.g.* knowledge mobilisation, patient and public involvement, capacity building or engagement activities) (insert below).

N/A

4. Engagement with wider stakeholders

Outline the role/contribution of other stakeholders/partners (*e.g.* other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s) (insert below).

We worked closely with clinicians and nursing staff from University Hospitals Plymouth NHS Trust and with service users; their involvement informed the evidence syntheses and was instrumental in the success of the implementation evaluation.

5. Collaboration/involvement of other NIHR infrastructure or programmes

Please specifically identify other NIHR funded infrastructure or research programmes and/teams, involved in the research, and their role/contribution (insert below).
N/A

6. Dissemination and communication beyond academia/research setting

Please provide details, and examples of how you have communicated the outcomes of your research **outside** the academic or research setting. This may include materials/resources for patients, public, clinicians, health and care professionals, policy makers or other stakeholders, and include alternate formats, style and approaches (*e.g.* workshops, networks, press releases, social media, briefings, infographics, videos, animations, etc).
We worked with individuals from a range of perspectives to develop a blog series on PIFU which was published in 2020. The blog posts feature a health commissioner, a consultant, a service manager, a clinical nurse specialist and a service user. We were also invited to produce a podcast on our Cochrane Review on the effectiveness of PIFU in which our lead researcher, Rebecca Whear and consultant rheumatologist, Mark Perry discuss the findings of the review. The plain language summary of the Cochrane Review is available in English, German, Spanish, French, Bahasa Malaysian, Farsi and Chinese.

7. Next steps

Please highlight any follow-on funding, collaboration or further research plans. Where applicable, provide further details (including name of organisation, relevant stakeholders/groups, or company - including type of industry, where relevant - research funder details, nature of further research, future plans (insert below).
Our work from 2011 continues to grow and inform current practice as well as post-COVID recovery plans.
Are there any factors that might prevent or reduce efforts to achieve or further maximise your impact?

8. Evidence and References (if applicable)

Provide a list of the most significant evidence (key sources and/or references) underpinning this example (titles and hyperlinks where applicable) (insert below).

Evidence may include: policy documents, reports, datasets, news articles, videos, news reports, testimonials, quotes, weblinks, awards, reviews.

For publications, please include the link to the Digital Object Identifier (DOI).

The following references are cited in the guidance documents:

Child S, Goodwin VA, Perry MG, Gericke CA, Byng R. Implementing a patient-initiated review system in rheumatoid arthritis: a qualitative evaluation. BMC Health Serv Res. 2015 Apr 15;15:157. doi: 10.1186/s12913-015-0837-9.

Goodwin VA, Paudyal P, Perry MG, Day N, Hawton A, Gericke C, Ukoumunne OC, Byng R. Implementing a patient-initiated review system for people with rheumatoid arthritis: a prospective, comparative service evaluation. J Eval Clin Pract. 2016 Jun;22(3):439-45. https://onlinelibrary.wiley.com/doi/full/10.1111/jep.12505

Whear, R., Abdul-Rahman, AK., Thompson-Coon, J. *et al.* Patient initiated clinics for patients with chronic or recurrent conditions managed in secondary care: a systematic review of patient reported outcomes and patient and clinician satisfaction. *BMC Health Serv Res* **13**, 501 (2013). https://doi.org/10.1186/1472-6963-13-501

Further references:

Whear R, Thompson-Coon J, Rogers M, Abbott RA, Anderson L, Ukoumunne O, Matthews J, Goodwin VA, Briscoe S, Perry M, Stein K. Patient-initiated appointment systems for adults with chronic conditions in secondary care. Cochrane Database Syst Rev. 2020 Apr 9;4(4):CD010763. doi: 10.1002/14651858.CD010763.pub2. PMID: 32271946; PMCID: PMC7144896.

Whear R, Abdul-Rahman AK, Boddy K, Thompson-Coon J, Perry M, Stein K. The clinical effectiveness of patient initiated clinics for patients with chronic or recurrent conditions managed in secondary care: a systematic review. PLoS One. 2013 Oct 7;8(10):e74774. doi: 10.1371/journal.pone.0074774. PMID: 24116009; PMCID: PMC3792120.

Paudyal P, Perry M, Child S, Gericke CA. Evaluation of a patient-initiated review system in rheumatoid arthritis: an implementation trial protocol. BMC Musculoskelet Disord. 2012 Jul 9;13:120. doi: 10.1186/1471-2474-13-120. PMID: 22776284; PMCID: PMC3437210.

9. Health category/ field of research

Please indicate 'YES' to **all** that apply.

UKCRC Health Category	Please indicate 'YES' where applicable	NIHR priority Areas / Fields of Research	Please indicate 'YES' where applicable
Blood		Artificial Intelligence	

Cancer and Neoplasms		Equality, Diversity, & Inclusion	
Cardiovascular		Patient & Public Involvement (PPI)	
Congenital Disorders		Prevention agenda	
Ear		Health information technology/ digital transformation	
Eye		Levelling up (research following burden of patient need)	
Infection		Innovative clinical trials	
Inflammatory and Immune System		Research addressing health inequalities	
Injuries and Accidents		Healthy ageing	
Mental Health		Multiple long-term conditions	
Metabolic and Endocrine		Med-tech	
Musculoskeletal		Covid-19	
Neurological		Public health	
Oral and Gastrointestinal		Obesity/ healthy weight	
Renal and Urogenital		Dementia	
Reproductive Health and Childbirth		Diabetes	
Respiratory		Antimicrobial resistance	
Skin		Social care	
Stroke			
Generic Health Relevance	X		
Disputed Aetiology and Other			

The **completed Added Value Examples and Narrative Report** must be submitted via email to the Infrastructure mailbox (ccf-infrastructure-team@nihr.ac.uk copying ana.gomes@nihr.ac.uk) no later than **5 May 2023.**

NIHR ARC - Added Value Example (AVE) Guidance and Form

1. Purpose and users of AVEs

AVEs help NIHR identify high quality examples of research that are showing high promise. The template is structured to collect the information required to help NIHR develop new or update existing case studies. AVEs help NIHR demonstrate the **value of NIHR** to stakeholders (*e.g.* government ministers and departments, patients groups and the public) supporting submissions to the spending review and in answering parliamentary questions. AVEs are also used by NIHR to reflect on the impact of NIHRs work.

Please note: AVEs are **not** used to judge centres. Please submit your **strongest examples of impact as AVEs,** and up to a maximum of five (fewer is fine, quality rather than quantity). Please consider submitting both 'new' AVEs and also 'updated' AVEs - where a step change in progress has occurred.
Each year the NIHR selects the most promising AVEs for further development into NIHR case studies.

2. What does NIHR mean by impact?

The AVEs are seeking to capture 'impact' which we appreciate can feel a bit nebulous as it depends on the context. For NIHR, research impact broadly means **'the demonstrable contribution that research makes to society and the economy, of benefit to individuals, organisations and nations'**; research impact **is about making a meaningful difference to people's lives, through research.** Impact is essentially changes that can be evidenced or demonstrated (effects or benefits) which occur over time as a result of research activities. NIHR wants to know about the real world impact which has resulted from the research it funds.

3. Impact types:

Please consider the following impact types (not an exhaustive list) when providing your example. Does your example relate to:

- **Influencing policy, clinical guidelines or service improvement** - *e.g.* implementation of evidence-based practice, research influenced/shaped (clinical/non-clinical) guidelines, policies, or regulations; public health and care advice informed by research evidence; findings used to support decision making (*e.g.* commissioning decisions, or on how best to improve service provision/integrate care of services).

- **Changes in service delivery, including service reconfiguration or service redesign, patient or care pathways, or patient safety** - *e.g.* research which results in improved patient safety (reduced errors, changes in care coordination), commissioning OR decommissioning of a service as a result of research evidence, care pathways redesigned in response to the pandemic, care pathways/ services improved/redesigned as a result of meaningful engagement and involvement of diverse groups and communities, improved service or social care provision, quality or access, research which results in changes to care pathways to improve management of disease or condition.

- **Improved patient/public/ service user outcomes, social or clinical outcomes** - *e.g.*, improved quality of life, improved QALY/ DALYs, treatment time reduced, new/ improved treatment demonstrated a positive health outcome, decreased diagnosis time, improvements to health risk factors, reducing health inequalities, improved health literacy, improved quality of care, changes to physical health and wellbeing, including enhanced patient experience, *etc*.

- **Economic impact, net health benefits, improvements to efficiencies in health and care system/NHS, boost to industry** - *e.g.* cost-effectiveness of interventions to improve and optimise care/services, including stopping services and/or informing intervention decisions**;** cost savings or efficiency gains to NHS, improving productivity and effectiveness of NHS,

increasing service effectiveness, net health benefits, revenue generated, jobs created, uptake by industry, commercial success, *etc*.

Details of Added Value Example

NIHR ARC details

Name of the NIHR ARC (insert below)
PenARC
Contacts for AVE*
Name(s): Vicki Goodwin
Contact details: v.goodwin@exeter.ac.uk
Research or cross-cutting theme (insert below where applicable)
Complex Care

*Please note that the NIHR CCF or NOCRI may approach the individual(s) named above for further information on the AVE or to develop it into a case study.

1. Title of the AVE

Title of AVE (insert below) *[A short title using plain active language that summarises the impact (not the research finding)]*
Implementing an exercise programme to reduce falls in older people
Is this a new AVE? (insert '**Yes/No**' below)
Yes
Is this an update of a previously submitted AVE?(insert '**Yes/No**' below)
No
If this is an updated AVE, please provide the title and year of submission of the linked AVE (insert below)

2. Concise impact Statement (maximum 100 words)

Briefly summarise, in plain English the impact of the research - what has changed, for whom, (and how, and to what extent) and why did this matter?
Patient focussed, face-to-face, exercise programmes aimed at improving strength and balance in those over the age of 65 have been shown to be effective in improving the independence and confidence of the patients and reducing the risk of injury. Widespread roll-out will result in reduced costs to health and social care services. When we started NFIT there were 13 Falls Management Exercise (FaME) classes available in Devon (mainly in the south of the county). There are now 27 classes available with a further 7 planned in 2023 spread throughout the county.

3. Background and impact information

Please provide a short paragraph in each box - around 250 words

Background summary
Describe briefly the key research insights or findings that led to the impact in this AVE, including why the research is important (*e.g.* overall prevalence of condition, and cost to society and/or NHS and social care) and how long the research has taken to get this point (insert below).
Over 220,000 UK emergency hospital admissions each year are due to falls in older people resulting in disability and reduced quality of life. Fractures due to falls are estimated to cost health and social care over £4.4 billion annually. However, falls are not inevitable. By improving an individual's strength and balance, alongside skills to help getting up from a fall (should this happen), the likelihood of a fall occurring or having damaging consequences, such as a long lie on the floor, can be minimised. The Falls Management Exercise (FaME) programme is a group-based, face-to-face, six-month exercise programme specifically aimed at improving the strength and balance of people aged 65 and over. Research has shown that FaME results in fewer falls, improved confidence, and reduced fear-of-falling (Skelton et al, 2005; Iliffe et al 2015). In a national cost-effectiveness evaluation of FaME (Public Health England 2018), the societal return on investment (ROI) of the programme over a 2-year time horizon was estimated to be £2.28 per £1.00 invested, suggesting that FaME is highly cost-effective. The PhISICAL study reported similar outcomes when implementing FaME in the East Midlands (Orton et al 2020) and subsequently developed an implementation toolkit for commissioners in 2019. FaME is recommended by NICE (Quality Standard 86) and the World Health Organisation (2021) but is still not available everywhere across England. More needs to be understood about how best to increase its availability and ensure high quality delivery. The FLEXI (FaLls EXercise Implementation) study commenced in October 2021 to understand how best to promote the spread and adoption of FaME.
Impact information
What change happened/is going to happen as a result of the research? ● Please provide details of the change which resulted from the research activities (*e.g.*, changes in policies, guidelines or practice, quality improvement, service redesign or ways of

working,improved health outcomes, costs and/savings, *etc*).
- Outline briefly how your research has led to the change described, adding any (qualitative or quantitative) evidence you have to show these activities have led to change (insert below).

As part of the FLEXI study looking to promote spread and adoption in Devon, East Midlands and Greater Manchester, some members of the team attended the South West AHSN Spread Academy where it became apparent that whilst the team could evaluate spread and adoption, there needed to be a process to facilitate the uptake of FaME. This resulted in the establishment of the National FaME Implementation Team (NFIT) in April 2022, comprising a team of experts from Later Life Training (an SME), AGILE (older adults special interest group from Chartered Society of Physiotherapy), Age UK, Royal Society for the Prevention of Accidents (RoSPA), FaME services (a community interest group) and members of the FLEXI Research Team. NFIT offers advice to those delivering FaME (or wanting to) about getting started, mentorship, an online Community of Practice, Quality Improvement advice and evaluation advice.

When we started NFIT there were 13 FaME classes available in Devon (mainly in the south of the county). There are now 27 classes available with a further 7 planned in 2023 spread throughout the county.

Why does this change matter?
Please provide details on who has benefited/been affected (*e.g*. individuals, specific user/affected groups) from the change, and how, and to what extent (*e.g*. local, regional, and/or nationally) (insert below).

The NHS Long Term Plan states that extending independence with age requires a targeted and personalised approach. FaME is personalised to participants' abilities and is aimed at those at high risk of falls. By reducing falls and improving functional ability, FaME also helps people maintain their independence for longer. The NHS Long Term Plan highlights the importance of focusing on prevention and reducing health inequalities. Falls incidence increases with age and increasing deprivation. Risk factors for falls, such as multiple long-term conditions, also increase with age. FaME has been shown to reduce falls risk, injurious falls and increase habitual physical activity and we will analyse outcomes by demographic characteristics to address inequalities.

FaME is already commissioned by Leicester, Leicestershire and Rutland Integrated Care Board (ICB). Whilst there has been an increase in local availability in Devon and developments in Greater Manchester, this has not been commissioned by the ICBs. Elsewhere in England and the UK, provision is patchy and inconsistent.

What was NIHR's contribution to the change?
Outline the NIHR ARC's role and contribution towards the change (insert below).

The FLEXI study is funded through the ARC National Priorities Programme for Ageing, Dementia and Frailty and is a collaboration between PenARC, ARC Greater Manchester (GM) and ARC East Midlands (EM).

Where impact is in the early stages yet to be fully realised, describe how the research findings will

be taken forward to facilitate impact in the future (*e.g*. knowledge mobilisation, patient and public involvement, capacity building or engagement activities) (insert below).
Our impact is in the early stages, but we have already been in conversation with NHS England and the National Clinical Lead for Older People (Dr Adrian Hayter) and with Chris Connell from NICE (Falls guidelines currently being updated) to discuss how we ensure our work is included in relevant policy. Within FLEXI we are currently addressing 4 objectives: • Understand how best to foster the adoption of FaME by health commissioners in Devon and Greater Manchester and assess the role the toolkit plays in this. In Devon we are using the Model for Unleashing methodology supported by the SW AHSN to co-produce adoption and spread plans and evaluate the implementation process and the role of the toolkit. • Study the delivery of FaME in Devon and Greater Manchester including adaptations for different population groups, mode of delivery (remote /in person/blended) and adherence with participant outcomes and cost information to update the national return on investment tool developed by Public Health England. • Test ways to maintain programme fidelity and quality over time. Working with Later Life Training, a national not-for-profit organisation with expertise in FaME, researchers will measure the quality of programmes, test what works to make them better and why, and use their national community of practice platform to support programme fidelity and adoption. • Updating the FaME implementation toolkit, finalising the adoption and scale plan, disseminate to the AHSN and wider stakeholders.

- **Engagement with wider stakeholders**

Outline the role/contribution of other stakeholders/partners (*e.g.* other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s) (insert below).
FLEXI is funded through the ARC National Priorities Programme for Ageing, Dementia and Frailty and is a collaboration between PenARC, ARC GM and ARC EM. We have a PPIE group with diverse representative from across the 3 regions who meet regularly to inform our work. We work with local falls leads and commissioners who are active contributors to both spread and adoption activities as well as supporting the FLEXI evaluation. NFIT has been key to driving change through working with local FaME providers, service managers, commissioners, Public Health Leads, academics, professional networks, Later Life Training (SME) and RoSPA.

- **Collaboration/involvement of other NIHR infrastructure or programmes**

Please specifically identify other NIHR funded infrastructure or research programmes and/teams, involved in the research, and their role/contribution (insert below).

The study was funded through the NIHR National priorities Programme for Ageing, Dementia and Frailty involving a collaboration between ARC EM; ARC GM and PenARC.

- **Dissemination and communication beyond academia/research setting**

Please provide details, and examples of how you have communicated the outcomes of your research **outside** the academic or research setting. This may include materials/resources for patients, public, clinicians, health and care professionals, policy makers or other stakeholders, and include alternate formats, style and approaches (*e.g.* workshops, networks, press releases, social media, briefings, infographics, videos, animations, etc).

We recognise the need to achieve widespread dissemination of findings to clinicians and policy makers. We are currently developing a strategy to achieve these aims.

We are also committed to disseminating findings to those who have taken part in the research and more widely amongst service users.

- **Next steps**

Please highlight any follow-on funding, collaboration or further research plans.
Where applicable, provide further details (including name of organisation, relevant stakeholders/groups, or company - including type of industry, where relevant - research funder details, nature of further research, future plans (insert below).

We are currently completing our evaluation of implementing FaME (FLEXI Study due to finish autumn 2023). As part of this we will be updating (a) the Public Health England Return on Investment Tool and (b) the Commissioning toolkit and will be produce relevant outputs (publications, visual outputs, videos).

An application led by Prof Liz Orton (Nottingham), has just been supported to facilitate rollout of FaME across England/the UK through commissioning by ICBs. This funding (from a Research England policy fund) will pay for a part-time policy officer based at Nottingham from 1st May 23 to 31st March 24 to:

Falls prevention and spread of FaME

Our policy officer will work:

1) With Later Life Training and the National FaME Implementation Team (N-FIT) to raise awareness of a new national community of practice for FaME providers/commissioners.

2) To influence inclusion of FaME in NHS England's Ageing Well programme via existing contacts (Delivery and Policy lead for Enhanced Health in Care Homes, NHSE; National Clinical Director for Older People)

3) With falls leads in the ICSs in Greater Manchester, Devon and East Midlands (areas we currently work with in our research) to influence inclusion of FaME in falls commissioning plans
4) Apply for membership of the OHID-led national falls and fragility fractures working group to influence policy development.
5) With David Meddings, (WHO injury prevention lead) to assist WHO policy development. Contact has been made between Orton/Logan/Meddings for this purpose.

We are hosting an NFIT event in Devon on June 6th 2023 to celebrate success so far and share good practice and learning.

Are there any factors that might prevent or reduce efforts to achieve or further maximise your impact?

Support for spread beyond the current 3 regions will require further resources to support and facilitate implementation.

- **Evidence and References (if applicable)**

Provide a list of the most significant evidence (key sources and/or references) underpinning this example (titles and hyperlinks where applicable) (insert below).
Evidence may include: policy documents, reports, datasets, news articles, videos, news reports, testimonials, quotes, weblinks, awards, reviews.

For publications, please include the link to the Digital Object Identifier (DOI).

FLEXI Project (including video)

- FLEXI: Falls management exercise programme led by NIHR ARC East Midlands working with NIHR ARC Greater Manchester and NIHR ARC South West Peninsula

NFIT Flyer 2022 (laterlifetraining.co.uk)

- FaME class availability in Devon: https://docs.google.com/presentation/d/13fQC7k5FO66iCuP8pOFc9JIEmcNZDmQy/edit#slide=id.p1 *(Note: open link using Google Docs)*

- **Health category/ field of research**

Please indicate 'YES' to **all** that apply.

UKCRC Health Category	Please indicate 'YES' where applicable	NIHR priority Areas / Fields of Research	Please indicate 'YES' where applicable
Blood		Artificial Intelligence	
Cancer and Neoplasms		Equality, Diversity, & Inclusion	
Cardiovascular		Patient & Public Involvement (PPI)	
Congenital Disorders		Prevention agenda	yes
Ear		Health information technology/ digital transformation	
Eye		Levelling up (research following burden of patient need)	
Infection		Innovative clinical trials	
Inflammatory and Immune System		Research addressing health inequalities	
Injuries and Accidents		Healthy ageing	yes
Mental Health		Multiple long-term conditions	
Metabolic and Endocrine		Med-tech	
Musculoskeletal		Covid-19	
Neurological		Public health	yes
Oral and Gastrointestinal		Obesity/ healthy weight	
Renal and Urogenital		Dementia	
Reproductive Health and Childbirth		Diabetes	
Respiratory		Antimicrobial resistance	
Skin		Social care	
Stroke			
Generic Health Relevance			
Disputed Aetiology and Other			

The **completed Added Value Examples and Narrative Report** must be submitted via email to the Infrastructure mailbox (ccf-infrastructure-team@nihr.ac.uk copying ana.gomes@nihr.ac.uk) no later than **5 May 2023.**

NIHR ARC - Added Value Example (AVE) Guidance and Form

1. Purpose and users of AVEs

AVEs help NIHR identify high quality examples of research that are showing high promise. The template is structured to collect the information required to help NIHR develop new or update existing case studies. AVEs help NIHR demonstrate the **value of NIHR** to stakeholders (*e.g.* government ministers and departments, patients groups and the public) supporting submissions to the spending review and in answering parliamentary questions. AVEs are also used by NIHR to reflect on the impact of NIHRs work.

Please note: AVEs are **not** used to judge centres. Please submit your **strongest examples of impact as AVEs,** and up to a maximum of five (fewer is fine, quality rather than quantity). Please consider submitting both 'new' AVEs and also 'updated' AVEs - where a step change in progress has occurred.
Each year the NIHR selects the most promising AVEs for further development into NIHR case studies.

2. What does NIHR mean by impact?

The AVEs are seeking to capture 'impact' which we appreciate can feel a bit nebulous as it depends on the context. For NIHR, research impact broadly means **'the demonstrable contribution that research makes to society and the economy, of benefit to individuals, organisations and nations'**; research impact **is about making a meaningful difference to people's lives, through research.** Impact is essentially changes that can be evidenced or demonstrated (effects or benefits) which occur over time as a result of research activities. NIHR wants to know about the real world impact which has resulted from the research it funds.

3. Impact types:

Please consider the following impact types (not an exhaustive list) when providing your example. Does your example relate to:

- **Influencing policy, clinical guidelines or service improvement** - *e.g.* implementation of evidence-based practice, research influenced/shaped (clinical/non-clinical) guidelines, policies, or regulations; public health and care advice informed by research evidence; findings used to support decision making (*e.g.* commissioning decisions, or on how best to improve service provision/integrate care of services).

- **Changes in service delivery, including service reconfiguration or service redesign, patient or care pathways, or patient safety** - *e.g.* research which results in improved patient safety (reduced errors, changes in care coordination), commissioning OR decommissioning of a service as a result of research evidence, care pathways redesigned in response to the pandemic, care pathways/ services improved/redesigned as a result of meaningful engagement and involvement of diverse groups and communities, improved service or social care provision, quality or access, research which results in changes to care pathways to improve management of disease or condition.

- **Improved patient/public/ service user outcomes, social or clinical outcomes** - *e.g.*, improved quality of life, improved QALY/ DALYs, treatment time reduced, new/ improved treatment demonstrated a positive health outcome, decreased diagnosis time, improvements to health risk factors, reducing health inequalities, improved health literacy, improved quality of care, changes to physical health and wellbeing, including enhanced patient experience, *etc*.

- **Economic impact, net health benefits, improvements to efficiencies in health and care system/NHS, boost to industry** - *e.g.* cost-effectiveness of interventions to improve and optimise care/services, including stopping services and/or informing intervention decisions**;** cost savings or efficiency gains to NHS, improving productivity and effectiveness of NHS,

increasing service effectiveness, net health benefits, revenue generated, jobs created, uptake by industry, commercial success, *etc*.

Details of Added Value Example

NIHR ARC details

Name of the NIHR ARC (insert below)
ARC South West Peninsula (PenARC)
Contacts for AVE*
Name(s): Dr Daniel Chalk
Contact details: d.chalk@exeter.ac.uk
Research or cross-cutting theme (insert below where applicable)
Methods for Research and Improvement

*Please note that the NIHR CCF or NOCRI may approach the individual(s) named above for further information on the AVE or to develop it into a case study.

1. Title of the AVE

Title of AVE (insert below) *[A short title using plain active language that summarises the impact (not the research finding)]*
Health Service Modelling Associates (HSMA) Programme
Is this a new AVE? (insert '**Yes/No**' below)
No
Is this an update of a previously submitted AVE?(insert '**Yes/No**' below)
Yes
If this is an updated AVE, please provide the title and year of submission of the linked AVE (insert below)
Health Service Modelling Associates Programme (2022)

2. Concise impact Statement (maximum 100 words)

Briefly summarise, in plain English the impact of the research - what has changed, for whom, (and how, and to what extent) and why did this matter?
Programme participants develop skills in operational modelling and data science techniques and are supported to apply these directly to real world problems in their organisations. In 2021, the programme opened to a national audience and is now taking on cohorts of over 100 participants per round. Recent projects have led to transformations to urgent treatment times, identification of strategies to reduce backlogs in both rheumatology and children's neuro-development assessment, and the identification of new sites for cardiac services. The programme has also now become the first ever programme to be accredited by the Association of Professional Healthcare Analysts (AphA).

3. Background and impact information

Please provide a short paragraph in each box - around 250 words

Background summary
Describe briefly the key research insights or findings that led to the impact in this AVE, including why the research is important (*e.g.* overall prevalence of condition, and cost to society and/or NHS and social care) and the hoe long the research has taken to get this point (insert below).
The Health Service Modelling Associates (HSMA) Programme is currently in its fifth iteration and continues to not only provide significant training in Operational Research and Data Science for staff working in health, social care and policing, but – crucially – supports associates to apply these skills to projects that generate real impact and change for their service users and organisations. Associates primarily work in analytical roles, but not exclusively, and we have welcomed a number of clinicians, managers and other roles onto the programme. Associates are taught extensive skills in modelling and data science, including Discrete Event Simulation (for modelling pathway and queuing problems), Network Analysis and System Dynamics (for modelling whole system interactions), Agent Based Simulation (for modelling behavioural dynamics), Geographic Modelling and Visualisation (for analysing the impact of service location decisions), Machine Learning (for developing decision support algorithms that can help clinicians and managers make decisions), Natural Language Processing (for automating the extraction of information from free text data) and Forecasting methods (to try to predict future levels of activity). Associates are also taught how to program in Python and R from first principles, assuming no prior knowledge of coding. All approaches taught on the programme are Free and Open Source (FOSS) and associates are taught the importance of collaborative development and open science. Associates are supported to use these new skills on impactful projects of importance for their organisations and service users. They receive mentoring support from experienced Operational Researchers and Data Scientists over the course of the programme.
Impact information
What change happened/is going to happen as a result of the research? ● Please provide details of the change which resulted from the research activities (*e.g.*, changes in policies, guidelines or practice, quality improvement, service redesign or ways of working,improved health outcomes, costs and/savings, *etc*). ● Outline briefly how your research has led to the change described, adding any (qualitative or

quantitative) evidence you have to show these activities have led to change (insert below).

For HSMA 4 we recruited 80 HSMAs from health, social care and policing organisations all across England.

Projects included:

- A participant from UCL Hospital developed a model of their Urgent Treatment Centre with the Emergency Department to better understand how to allocate resources to minimise waiting times. The model identified solutions that were presented to the Chief Executive, and staffing rotas were rewritten based on the recommendations. Since implementing the changes, the hospital has seen a transformative impact on their urgent care performance (https://arc-swp.nihr.ac.uk/news/data-improves-urgent-care/).

- A participant from Oxford Health NHS Foundation Trust developed a model to identify bottlenecks in children's neuro-development assessments (ADHD and Autism), with the average waiting time at around 2 years. The model identified the location of the bottleneck and exposed an exponential increase in waiting times. The model also showed that just one additional "second assessor" clinician would stop the increase, and a web application was developed to allow decision makers to identify the resourcing required to reduce the waiting times by a defined amount within a defined time.

In October 2022, the 5th round of the HSMA programme launched, recruiting 113 new HSMAs from across England. The programme has also become the first programme to ever receive accreditation from the Association of Professional Healthcare Analysts (AphA), and a dedicated HSMA team is being built to support its long-term development and delivery. We have also introduced formal Patient and Public Involvement and Engagement (PPIE) training into the syllabus to support HSMAs to bring in the patient voice into the heart of their research projects.

Why does this change matter?
Please provide details on who has benefited/been affected (*e.g.* individuals, specific user/affected groups) from the change, and how, and to what extent (*e.g.* local, regional, and/or nationally) (insert below).

The development of data science and modelling skills, and the promotion of free and open science principles, are important aspects of building in-house capacity within health, social care and policing organisations, and crucial to the career development of analysts working in the health service. This was a key theme identified by the 2022 Goldacre report). By securing accreditation for the programme, we have additionally provided a means to enable the professionalisation of these skills within this sector.

HSMA impact is broad and extensive, leading to real-world change for services and service users. Details can be found on the HSMA Resource Site. The HSMA programme demonstrates that by building in-house capacity to undertake modelling and data science, we can supply the skills to staff and their organisations to tackle the significant challenges they currently face and build sustainable operational service designs for the future. By building a dedicated team to develop and deliver the programme, and securing extensive external funding, we continue to ensure the sustainability of the programme to ensure these skills can continue to be fostered and supported as we move into the future to reduce backlogs and waiting times, not only in "headline" areas such as urgent care, but also in other areas such as children's neuro-development assessment, where current average waiting times are so extensive.

The extension of the programme nationally has included the opportunity for staff from other centres to train as tutors to further extend the availability of these skills across the country.

What was NIHR's contribution to the change?
Outline the NIHR ARC's role and contribution towards the change (insert below).

PenARC-funded staff from the Peninsula Collaboration for Operational Research and Data Science (PenCHORD) led the development and delivery of the programme, drawing on the research work of PenCHORD to ensure the training content of the programme is practical and applied. Mentoring support for the programme is mostly drawn from PenARC staff who use their own knowledge and experience in applying these methods to real world collaborative research projects to advise and guide HSMAs through their project journeys.

PenARC staff led the bid for the £343,000 of investment from Health Education England to run the fifth and sixth rounds of the programme, as well as securing accreditation. Whilst being largely externally funded currently, the importance of the programme acting as a capacity building "strand" to the ARC-resourced research team cannot be overstated – a key element of the programme is its mantra to not only teach important skills, but to support staff to immediately apply them to projects that are relevant and impactful for their organisations. This requires real-world experience drawn from the collaborative research projects that are at the heart of PenARC's work.

For the fifth round of the programme, we have worked closely with the PenARC's dedicated group pf public collaborators, Peninsula Public Engagement Group (PenPEG) to add new PPIE training into the curriculum. PenARC PPIE Team staff and PenPEG members developed and delivered the content, sharing their experiences of successful working in this way for research projects. They also provided access to open clinics and other resources to support the HSMAs in the development of ideas to incorporate patient and public involvement in their project proposals.

Where impact is in the early stages yet to be fully realised, describe how the research findings will be taken forward to facilitate impact in the future (*e.g.* knowledge mobilisation, patient and public involvement, capacity building or engagement activities) (insert below).

The impact from HSMA projects often takes some time to formalise as recommended changes from models are implemented. The number of projects is also extensive and growing. To support this, we have recruited a dedicated administration and communications role in the HSMA team to support the ongoing tracking and dissemination of impact outputs from projects. In addition, dedicated internal tracking systems are being developed to support these efforts.

We are also currently planning to develop a number of "spin-off" offerings from the HSMA Programme to reach a broader audience. Our HSMA YouTube channel now has over 1,000 subscribers, but is currently simply a host for recordings of HSMA lectures, events and bonus tutorials. Even so, a number of our videos have 10-20k views, and there has been particular demand for our pathway modelling videos using the Python package SimPy, which has little to no training available. Therefore, we plan to build up a dedicated YouTube offering, providing bite-sized courses and training content accessible to anyone anywhere in the world, and acting as a potential gateway into the HSMA programme.

4. Engagement with wider stakeholders

Outline the role/contribution of other stakeholders/partners (*e.g.* other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s) (insert below).

We secured £343,000 of funding from Health Education England to support the development and delivery of the HSMA programme in its fifth and sixth rounds and help to start to establish a dedicated HSMA team. We are working in partnership with the South West Academic Health Science Network (SW AHSN) who have commissioned us to undertake the work, and are helping to promote the programme and disseminate the outputs.

We have worked with the Association of Professional Healthcare Analysts (AphA) to secure both formal endorsement and accreditation of the HSMA programme, becoming the first ever programme to be accredited by AphA.

The HSMAs come from health, social care and policing organisations across the country. In the current round (HSMA 5) we are working with participants from over 80 organisations nationally, including NHS England, Nottingham University Hospitals NHS Trust, West Midlands Police, South Central and West Commissioning Support Unit, Coventry City Council, the National Crime Agency, Devon Partnership Trust, Public Health Dorset, NHS Devon Integrated Care Board and many more.

We work with "trainee mentors" who receive training to mentor projects on the HSMA programme. To this end, we are working with existing academics and modelling and data science practitioners from organisations such as the University of Plymouth, Whole Systems Partnership, Nottinghamshire Healthcare NHS Trust and Lancaster University.

The HSMA Programme leveraged co-funding to a value of over £738,000 from regional and national stakeholders during 2022/23.

5. Collaboration/involvement of other NIHR infrastructure or programmes

Please specifically identify other NIHR funded infrastructure or research programmes and/teams, involved in the research, and their role/contribution (insert below).

For the fourth round of the programme, we partnered with ARC Kent, Surrey and Sussex who provided a trainee mentor to provide mentoring support for a project looking at reducing the waiting times for assessment of children's neuro-development in Oxford.

We also partnered with the NIHR PenARC Patient Engagement Group (PenPEG) to develop and deliver new training content for the HSMA 5 programme and provide support to HSMAs looking to explore patient engagement in their own work.

6. Dissemination and communication beyond academia/research setting

Please provide details, and examples of how you have communicated the outcomes of your research **outside** the academic or research setting. This may include materials/resources for patients, public, clinicians, health and care professionals, policy makers or other stakeholders, and include alternate formats, style and approaches (*e.g.* workshops, networks, press releases, social

media, briefings, infographics, videos, animations, etc).
Regular updates about the programme are promoted via our social media channels and on our HSMA Resource Site. Our comms team have developed a number of stories about the HSMA programme and its projects, and links to a selection of these stories can be found on the HSMA Resource Site – News. Information about HSMA projects can also be found on the Projects page. All materials from the HSMA Programme are made available to anyone anywhere via Free and Open Source. Our lecture recordings can be found on our HSMA YouTube channel, which currently has over 1,000 subscribers and around 90,000 video views. The materials for the current round (HSMA 5) are available at: https://github.com/hsma5. Historic materials remain available at : https://github.com/hsma4 and https://github.com/hsma-chief-elf/hsma3. Each round of the HSMA programme culminates in a national presentation event at which the participating HSMAs present their project work and the impact it has had for them, their organisations, and their service users. These events are typically extremely well attended (100 – 200 people) by those from academia, health, social care, and policing. Recordings of these (and other) events are also available on our YouTube channel. We run regular presentation events and campaigns promoting the programme to audiences of health, social care, and policing staff across the country via national networks such as the Association of Professional Healthcare Analysts (AphA), NHS-R, Health Education England, the College of Policing, and various local and national Public Health networks. We also have a regular column in the monthly AphA magazine.

7. Next steps

Please highlight any follow-on funding, collaboration or further research plans. Where applicable, provide further details (including name of organisation, relevant stakeholders/groups, or company - including type of industry, where relevant - research funder details, nature of further research, future plans (insert below).
We plan to launch the sixth round of the HSMA Programme around April 2024 – this is to accommodate the new 15-month structure for HSMA that began with HSMA 5, and to allow a 3-month gap between programmes to support the existing cohort to co-author publications and further disseminate their work. Again, we will make at least 100 places available. We are actively exploring with our current funder (Health Education England) the possibility of building a longer-term relationship to support the sustainability of HSMA beyond HSMA 6. As discussed elsewhere, we are also planning to build up our YouTube offering which would allow us to reach an international audience and build on the preliminary success of the existing HSMA YouTube channel, as well as act as a channel for dissemination and promotion of the HSMA programme. We are in talks with various potential funders to explore support for developing this spin-off of the HSMA programme.

We will continue to build our HSMA team to support these and other developments, ensuring a sustainable expansion of the programme and the training and support we offer.

Are there any factors that might prevent or reduce efforts to achieve or further maximise your impact?

We are reliant on continuing funding to deliver the HSMA programme at a national scale and expand its reach and impact. We continue to work with our existing funders to explore longer term funding arrangements to support this.

8. Evidence and References (if applicable)

Provide a list of the most significant evidence (key sources and/or references) underpinning this example (titles and hyperlinks where applicable) (insert below).
Evidence may include: policy documents, reports, datasets, news articles, videos, news reports, testimonials, quotes, weblinks, awards, reviews.

For publications, please include the link to the Digital Object Identifier (DOI).

"…the truly excellent work you guys have done pulling together the cardiac and mapping data into a useable tool, utilising technologies not often used across the NHS has, to put it mildly, been very well received by the Cardiac clinical board … The clinical team have gone away very very excited about the possibilities… ...and I have already had the chief exec of [Hampshire Hospitals NHS Foundation Trust] asking if we can use this to help them plan their new hospital build!! So we may have a load more work coming our way!"
(Barry Thomas, Associate Director of Transformation Intelligence, NHS England South East)

"Since increasing the number of rooms available to UTC, as suggested from the demand and capacity modelling, we have seen an increase in performance and are currently one of the top 4 performing Trusts in London. This is reflective of better care being delivered to patients and a better working environment for staff."
(Victoria Banks, Deputy Divisional Manager for Emergency Services, University College London Hospitals NHS Foundation Trust)

"Stephen's practical use of data science methodology is an area that we as a Trust are keen to develop further and this is a strong example of bringing theory in practice. Stephen's work has sparked interest in the Trust's community division, who are keen to understand how they can use this approach to identify and support patients that are most at risk of admission." (Sam Maunder, Associate Director of Finance, Royal Devon University Healthcare NHS Foundation Trust)

- HSMA Resources: https://sites.google.com/nihr.ac.uk/hsma
- HSMA YouTube: https://www.youtube.com/channel/UCCY9_Gxg6kM-xjk9vV0mzIQ
- HSMA 5 Training: https://github.com/hsma5
- HSMA 5 Urgent Care Project: https://arc-swp.nihr.ac.uk/news/data-improves-urgent-care/

9. Health category/ field of research

Please indicate 'YES' to **all** that apply.

UKCRC Health Category	Please indicate 'YES' where applicable	NIHR priority Areas / Fields of Research	Please indicate 'YES' where applicable
Blood		Artificial Intelligence	YES
Cancer and Neoplasms	YES	Equality, Diversity, & Inclusion	
Cardiovascular	YES	Patient & Public Involvement (PPI)	YES
Congenital Disorders		Prevention agenda	
Ear		Health information technology/ digital transformation	YES
Eye		Levelling up (research following burden of patient need)	YES
Infection		Innovative clinical trials	
Inflammatory and Immune System		Research addressing health inequalities	YES
Injuries and Accidents	YES	Healthy ageing	
Mental Health	YES	Multiple long-term conditions	
Metabolic and Endocrine		Med-tech	
Musculoskeletal	YES	Covid-19	YES
Neurological		Public health	YES
Oral and Gastrointestinal		Obesity/ healthy weight	
Renal and Urogenital		Dementia	
Reproductive Health and Childbirth		Diabetes	
Respiratory		Antimicrobial resistance	
Skin		Social care	YES
Stroke			
Generic Health Relevance	YES		
Disputed Aetiology and Other			

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NIHR ARC - Added Value Example (AVE) Guidance and Form

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Please note: AVEs are **not** used to judge centres. Please submit your **strongest examples of impact as AVEs,** and up to a maximum of five (fewer is fine, quality rather than quantity). Please consider submitting both 'new' AVEs and also 'updated' AVEs - where a step change in progress has occurred.
Each year the NIHR selects the most promising AVEs for further development into NIHR case studies.

2. What does NIHR mean by impact?

The AVEs are seeking to capture 'impact' which we appreciate can feel a bit nebulous as it depends on the context. For NIHR, research impact broadly means **'the demonstrable contribution that research makes to society and the economy, of benefit to individuals, organisations and nations'**; research impact **is about making a meaningful difference to people's lives, through research.** Impact is essentially changes that can be evidenced or demonstrated (effects or benefits) which occur over time as a result of research activities. NIHR wants to know about the real world impact which has resulted from the research it funds.

3. Impact types:

Please consider the following impact types (not an exhaustive list) when providing your example. Does your example relate to:

- **Influencing policy, clinical guidelines or service improvement** - *e.g.* implementation of evidence-based practice, research influenced/shaped (clinical/non-clinical) guidelines, policies, or regulations; public health and care advice informed by research evidence; findings used to support decision making (*e.g.* commissioning decisions, or on how best to improve service provision/integrate care of services).

- **Changes in service delivery, including service reconfiguration or service redesign, patient or care pathways, or patient safety** - *e.g.* research which results in improved patient safety (reduced errors, changes in care coordination), commissioning OR decommissioning of a service as a result of research evidence, care pathways redesigned in response to the pandemic, care pathways/ services improved/redesigned as a result of meaningful engagement and involvement of diverse groups and communities, improved service or social care provision, quality or access, research which results in changes to care pathways to improve management of disease or condition.

- **Improved patient/public/ service user outcomes, social or clinical outcomes** - *e.g.*, improved quality of life, improved QALY/ DALYs, treatment time reduced, new/ improved treatment demonstrated a positive health outcome, decreased diagnosis time, improvements to health risk factors, reducing health inequalities, improved health literacy, improved quality of care, changes to physical health and wellbeing, including enhanced patient experience, *etc*.

- **Economic impact, net health benefits, improvements to efficiencies in health and care system/NHS, boost to industry** - *e.g.* cost-effectiveness of interventions to improve and optimise care/services, including stopping services and/or informing intervention decisions**;** cost savings or efficiency gains to NHS, improving productivity and effectiveness of NHS,

increasing service effectiveness, net health benefits, revenue generated, jobs created, uptake by industry, commercial success, *etc*.

Details of Added Value Example

NIHR ARC details

Name of the NIHR ARC (insert below)
NIHR ARC South West Peninsula (PenARC)
Contacts for AVE*
Name(s): Kristin Liabo, Stuart Spicer, Louise Hall
Contact details: Kristin Liabo: k.liabo@exeter.ac.uk Stuart Spicer: stuart.spicer@plymouth.ac.uk Louise Hall: louise.hall@swahsn.com
Research or cross-cutting theme (insert below where applicable)
NHS service engagement in research Patient and public involvement

*Please note that the NIHR CCF or NOCRI may approach the individual(s) named above for further information on the AVE or to develop it into a case study.

1. Title of the AVE

Title of AVE (insert below) *[A short title using plain active language that summarises the impact (not the research finding)]*
Impact from innovative patient involvement, and collaboration between AHSN, PenARC and the NHS.
Is this a new AVE? (insert '**Yes/No**' below)
Yes
Is this an update of a previously submitted AVE?(insert '**Yes/No**' below)
No
If this is an updated AVE, please provide the title and year of submission of the linked AVE (insert below)

2. Concise impact Statement (maximum 100 words)

Briefly summarise, in plain English the impact of the research - what has changed, for whom, (and how, and to what extent) and why did this matter?
This evaluation of Community Assessment and Treatment Units (CATUs) has produced two distinct types of impact: • Within the CATU being evaluated, it enabled identification of areas of care for improvement, e.g., the designation of a care assistant to focus specifically on patient-centric care to improve this area of functioning. • The co-creation of the evaluation which included patient/family perspectives produced an approach to the research evaluation of community assessment treatment units which can be more widely applied. This is reflected in the 'Rapid Insights Guide' providing actionable guidance and resources for ICSs and will inform research with partners in Norway.

3. Background and impact information

Please provide a short paragraph in each box - around 250 words

Background summary
Describe briefly the key research insights or findings that led to the impact in this AVE, including why the research is important (*e.g*. overall prevalence of condition, and cost to society and/or NHS and social care) and the hoe long the research has taken to get this point (insert below).
CATUs were established to treat frail older adults during the COVID 19 pandemic. CATUs primarily take referrals from the ambulance team and emergency departments (ED), but also other services. Before CATUs, all frail patients in Cornwall with an urgent care need were admitted to ED for assessment and treatment on a ward. Learning about CATUs is important to finding solutions to blockages in the ED system. During a one-year evaluation we explored the CATU patient journey from home, referral in, treatment and discharge. Between April 2020 and December 2022, the CATUs supported nearly 4,000 patients thought to require urgent admission. With only 4% referred on to the acute hospital, approx. 3,750 hospital admissions were avoided. The CATUs saved between 2,300 (direct referrals) and 5,200 (all community referrals) hours of ambulance handover waits at Royal Cornwall Hospital Trust with an associated cost between £300,000 and £675,000. During winter months it is inappropriate to bring frail older adults together for a PPIE meeting, due to infection risks. Also, many are unable or unwilling to travel or attend group meetings due to their living situation and frailty. The PPIE team for Bodmin CATU comprised: • Chris Marriott, public collaborator with experience of working with vulnerable people's protection as a police officer;

- Beccy Summers, PenARC PPIE team researcher and qualified nurse
- Cathy McCabe, qualitative researcher, SW AHSN

Together they devised an approach which was sensitive to patients' vulnerability while giving them the opportunity to share their CATU experiences. Patients' views informed the evaluation of CATUs and service innovation in Bodmin CATU.

Impact information

What change happened/is going to happen as a result of the research?

- Please provide details of the change which resulted from the research activities (*e.g.*, changes in policies, guidelines or practice, quality improvement, service redesign or ways of working,improved health outcomes, costs and/savings, *etc*).
- Outline briefly how your research has led to the change described, adding any (qualitative or quantitative) evidence you have to show these activities have led to change (insert below).

Beccy, Chris and Cathy circulated the unit and assessed which patients were available to be approached, and any communication needs they might have (e.g., hearing aids, sign language). They sensitively engaged with people who appeared open and interested in talking to them. They followed a short, semi-structured list of questions which focused on people's experiences of the CATU (what had worked well, what was missing, and what could be improved), taking notes of what people told them. Participants were informed that their views would be shared, anonymously, with the CATU staff.

Experiences shared in these conversations informed the CATU evaluation's qualitative interviews and data analysis. The PPIE findings also directly informed the CATU service manager's pilot intervention to enhance person-centred care, allocating a staff member to focus on person-led needs. The innovative approach taken by the project PPIE team offers scope for adoption in future work.

The evaluation provides in-depth knowledge of CATUs and how they have worked in Cornwall and contributes to a concerted effort by research and healthcare systems to respond to current challenges in ED across Europe. A key output is a 'Rapid Insights Guide' that codifies the learning from the CATUs and provides actionable guidance and resources for Integrated Care Systems.

Why does this change matter?

Please provide details on who has benefited/been affected (*e.g*. individuals, specific user/affected groups) from the change, and how, and to what extent (*e.g*. local, regional, and/or nationally) (insert below).

A demographic shift has resulted in an increase in numbers of older patients accessing urgent health and social care services. This shift toward a more elderly population is set to continue, with the number of people aged 85 and over forecast to increase by two-thirds over the next 20 years. No single component of the care system can manage this increase in isolation. There is a need for alternative modes of care that can provide a safer and more appropriate alternative to hospital admission. CATUs were established to divert frail, older patients from attending ED and treat them closer to their homes.

The voices of frail older adults are usually absent from quality improvement and PPIE activities due to their physical and mental condition and also the prevalence of formal paper or online data collection methods. By inviting them to participate in small, informal, safe and anonymous conversations which focused on their situation in the 'here and now', our approach to PPIE described here acted as a conduit for their anonymous voices to be heard by service managers, staff and researchers.

The service manager and staff benefitted from knowing how the service was experienced by patients and family members, and this enabled them to adjust their service accordingly while also giving confidence around aspects that are working well.

The CATU evaluation benefitted from the PPIE by being alerted to the aspects of a CATU service that are important to patients and family members, and to look at this specifically in their analysis of data.

What was NIHR's contribution to the change?
Outline the NIHR ARC's role and contribution towards the change (insert below).

This change could not have happened without PenARC's investment in people and relationships. PenARC's established network of public collaborators and funded team of experienced PPIE researchers provided the groundwork for this novel and tailored approach to engagement resourced by the CATU evaluation project.

Beccy's time on the project was made possible through her PenARC-funded role, enabling an agile and timely response to requests to support projects with potential for impact which have short-term and limited resource.

Chris' involvement in the project was made possible through her status as a member of PenARC's dedicated PPIE group, the Peninsula Public Engagement Group (PenPEG). As a result the PPIE Lead was aware of her specific expertise in working with the CQC and the police and had confidence in her professional and reliable approach to PPIE. This kind of knowledge and trust in people develops over time and exemplifies PenARC's cultivation of sound research relationships.

With services under increasing pressure, we believe this is an example of NIHR Infrastructure enabling effective collaborative working between services and research, with benefits to both.

Where impact is in the early stages yet to be fully realised, describe how the research findings will be taken forward to facilitate impact in the future (*e.g.* knowledge mobilisation, patient and public involvement, capacity building or engagement activities) (insert below).

This work will help systems (managers, staff, researchers) understand factors that make a successful and spread-ready model.

We are developing an accessible 'Rapid Insights Guide' that codifies the learning from the CATUs and provides actionable guidance and resources for Integrated Care Systems.

We have connected with researchers in Norway who are evaluating a policy intervention that is similar to CATUs. We will seek synergetic learning from evaluations across different care systems.

The PenARC PPIE team will continue to explore future opportunities for PPIE to be initiated in service development and research simultaneously.

4. Engagement with wider stakeholders

Outline the role/contribution of other stakeholders/partners (*e.g.* other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s) (insert below).
This work was supported by funding from the Accelerated Access Collaborative at NHS England and NHS Improvement. Close working with Cornwall Partnership Trust, Royal Cornwall Hospitals NHS Trust and South Western Ambulance Service NHS Trust was a core factor in the success of this multi-organisational collaborative project, as was support from the SW AHSN. The involvement of our PPIE collaborators was central to this work and is described in previous sections.

5. Collaboration/involvement of other NIHR infrastructure or programmes

Please specifically identify other NIHR funded infrastructure or research programmes and/teams, involved in the research, and their role/contribution (insert below).

6. Dissemination and communication beyond academia/research setting

Please provide details, and examples of how you have communicated the outcomes of your research **outside** the academic or research setting.This may include materials/resources for patients, public, clinicians, health and care professionals, policy makers or other stakeholders, and include alternate formats, style and approaches (*e.g.* workshops, networks, press releases, social media, briefings, infographics, videos, animations, etc).
We have not yet communicated this work within the academic setting, our priority thus far having been communication with services. A primary aim has been to encourage service organisations planning this type of initiative to seek partnership with ARCs and other research infrastructure to encourage PPIE collaboration. We presented on the CATU evaluation at NIHR PenARC's Research Knowledge Exchange event in September 2022 (attended by large numbers of staff from health and care organisations within the south west region) and to an internal seminar with researchers from Norway in February 2023.

7. Next steps

Please highlight any follow-on funding, collaboration or further research plans. Where applicable, provide further details (including name of organisation, relevant stakeholders/groups, or company - including type of industry, where relevant - research funder details, nature of further research, future plans (insert below).
Are there any factors that might prevent or reduce efforts to achieve or further maximise your impact?
PPIE in services needs to be carefully approached so that patients do not feel pressured into being involved. In the example provided here, and as a direct result of the existing PPIE infrastructure provided by PenARC, we were fortunate to have a safe and appropriate team configuration to conduct the PPIE ethically. Specifically, this included someone with experience as a lay reviewer of care homes with the Care Quality Commission as well as a professional knowledge of safeguarding during her career as a police officer (Chris Marriot, long-term PenARC public collaborator); and someone with a nursing background alongside PPIE research expertise (Becky Summers). We are mindful of emphasising that the applicability of this approach elsewhere relies on having equivalent knowledge and experience in the PPIE team. To continue to develop this work will require sustained resourcing of PPIE through NIHR infrastructure.

8. Evidence and References (if applicable)

Provide a list of the most significant evidence (key sources and/or references) underpinning this example (titles and hyperlinks where applicable) (insert below). Evidence may include: policy documents, reports, datasets, news articles, videos, news reports, testimonials, quotes, weblinks, awards, reviews. ***For publications, please include the link to the Digital Object Identifier (DOI).***
https://arc-swp.nihr.ac.uk/research/projects/catus/

9. Health category/ field of research

Please indicate 'YES' to **all** that apply.

UKCRC Health Category	Please indicate 'YES' where applicable	NIHR priority Areas / Fields of Research	Please indicate 'YES' where applicable
Blood		Artificial Intelligence	
Cancer and Neoplasms		Equality, Diversity, & Inclusion	YES
Cardiovascular		Patient & Public Involvement (PPI)	YES
Congenital Disorders		Prevention agenda	
Ear		Health information technology/ digital transformation	
Eye		Levelling up (research following burden of patient need)	
Infection		Innovative clinical trials	
Inflammatory and Immune System		Research addressing health inequalities	
Injuries and Accidents	Yes although impact more widely (ED not just A&E)	Healthy ageing	
Mental Health		Multiple long-term conditions	
Metabolic and Endocrine		Med-tech	
Musculoskeletal		Covid-19	
Neurological		Public health	
Oral and Gastrointestinal		Obesity/ healthy weight	
Renal and Urogenital		Dementia	
Reproductive Health and Childbirth		Diabetes	
Respiratory		Antimicrobial resistance	
Skin		Social care	
Stroke			
Generic Health Relevance	YES		
Disputed Aetiology and Other			

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ana.gomes@nihr.ac.uk) no later than **5 May 2023.**

NIHR ARC - Added Value Example (AVE) Guidance and Form

1. Purpose and users of AVEs

AVEs help NIHR identify high quality examples of research that are showing high promise. The template is structured to collect the information required to help NIHR develop new or update existing case studies. AVEs help NIHR demonstrate the **value of NIHR** to stakeholders (*e.g.*, government ministers and departments, patients' groups and the public) supporting submissions to the spending review and in answering parliamentary questions. AVEs are also used by NIHR to reflect on the impact of NIHRs work.

Please note: AVEs are **not** used to judge centres. Please submit your **strongest examples of impact as AVEs,** and up to a maximum of five (fewer is fine, quality rather than quantity). Please consider submitting both 'new' AVEs and also 'updated' AVEs - where a step change in progress has occurred.
Each year the NIHR selects the most promising AVEs for further development into NIHR case studies.

2. What does NIHR mean by impact?

The AVEs are seeking to capture 'impact' which we appreciate can feel a bit nebulous as it depends on the context. For NIHR, research impact broadly means **'the demonstrable contribution that research makes to society and the economy, of benefit to individuals, organisations and nations'**; research impact **is about making a meaningful difference to people's lives, through research.** Impact is essentially changes that can be evidenced or demonstrated (effects or benefits) which occur over time as a result of research activities. NIHR wants to know about the real world impact which has resulted from the research it funds.

3. Impact types:

Please consider the following impact types (not an exhaustive list) when providing your example. Does your example relate to:

- **Influencing policy, clinical guidelines or service improvement** - *e.g.* implementation of evidence-based practice, research influenced/shaped (clinical/non-clinical) guidelines, policies, or regulations; public health and care advice informed by research evidence; findings used to support decision making (*e.g.* commissioning decisions, or on how best to improve service provision/integrate care of services).

- **Changes in service delivery, including service reconfiguration or service redesign, patient or care pathways, or patient safety** - *e.g.* research which results in improved patient safety (reduced errors, changes in care coordination), commissioning OR decommissioning of a service as a result of research evidence, care pathways redesigned in response to the pandemic, care pathways/ services improved/redesigned as a result of meaningful engagement and involvement of diverse groups and communities, improved service or social care provision, quality or access, research which results in changes to care pathways to improve management of disease or condition.

- **Improved patient/public/ service user outcomes, social or clinical outcomes** - *e.g.*, improved quality of life, improved QALY/ DALYs, treatment time reduced, new/ improved treatment demonstrated a positive health outcome, decreased diagnosis time, improvements to health risk factors, reducing health inequalities, improved health literacy, improved quality of care, changes to physical health and wellbeing, including enhanced patient experience, *etc*.

- **Economic impact, net health benefits, improvements to efficiencies in health and care system/NHS, boost to industry** - *e.g.* cost-effectiveness of interventions to improve and optimise care/services, including stopping services and/or informing intervention decisions**;** cost savings or efficiency gains to NHS, improving productivity and effectiveness of NHS,

increasing service effectiveness, net health benefits, revenue generated, jobs created, uptake by industry, commercial success, *etc*.

Details of Added Value Example for National Leadership Area

NIHR ARC details

Name of the NIHR ARC (insert below)
NIHR ARC South West Peninsula
Contacts for AVE*
Name(s): Prof Stuart Logan and Prof Vashti Berry
Contact details: Stuart.logan@exeter.ac.uk; V.Berry@exeter.ac.uk
National Leadership Area
Children's Health and Maternity

*Please note that the NIHR or NOCRI may approach the individual(s) named above for further information on the AVE or to develop it into a case study.

1. Title of the AVE

Title of AVE (insert below) *[A short title using plain active language that summarises the impact (not the research finding)]*
Implementation of evidence-based interventions in child mental health, early years education settings, and maternity services.
Is this a new AVE? (insert '**Yes/No**' below)
Yes
Is this an update of a previously submitted AVE? (insert '**Yes/No**' below)
No
If this is an updated AVE, please provide the title and year of submission of the linked AVE (insert below)

2. Concise impact Statement (maximum 100 words)

Briefly summarise, in plain English the impact of the research - what has changed, for whom, (and how, and to what extent) and why did this matter?
As leaders of the Children's Health and Maternity National Priority Programme we have worked collaboratively with our partners and ARC colleagues towards increasing implementation and sustainability of evidence-based interventions in this area. More care-experienced young people are being offered trauma-focused cognitive behavioural therapy, a toolkit to help early years settings deliver toothbrushing programmes has been developed, maternity services are increasingly offering mental health services to new mothers, and guidance to increase support from independent domestic violence advisors in maternity services has been developed. This has been achieved through a national collaboration of service users, academics, and clinicians who drive and shape the work.

3. Background and impact information

Please provide a short paragraph in each box - around 250 words

Background summary
Describe briefly the key research insights or findings that led to the impact in this AVE, including why the research is important (*e.g.* overall prevalence of condition, and cost to society and/or NHS and social care) and the hoe long the research has taken to get this point (insert below).
The NIHR ARC used its strong foundation of expertise in children's and maternal health to facilitate identification of four interventions for which there was significant evidence from research but limited implementation in practice. Close working with people with lived experience, clinicians, academics, and national ARC colleagues has enabled widespread implementation of two of these projects, generating substantial learning about how to move from research to practice settings. The other two interventions have used learning from the wide variation in existing implementation to develop guidance and tools to support implementation: • ADaPT study: 9000 young people are in local authority care and CYP leaving care are at high risk of life-long mental health difficulties. Rates of PTSD are 12 times higher in care-experienced young people than their peers. Trauma-focused CBT is a first-line NICE-recommended treatment, but not implemented widely. • BRUSH study: Tooth decay is preventable, yet tooth extraction is the commonest reason for hospital admission in childhood. Supervised toothbrushing with fluoride toothpaste in early years settings can increase rates of brushing, particularly for children in the most deprived areas, and reduce rates of decay. • ESMI-III study: Women are at risk of experiencing mental health difficulties directly arising from maternity/perinatal/neonatal experiences. The NHS Long Term Plan commits to implementing Maternal Mental Health Services by 2024 to ensure timely access to evidence-based assessment and treatment. • RIVA study: Around 1 in 5 pregnant women experience domestic violence and pregnancy is a time when women have repeated contact with health services. Independent domestic violence advisors (IDVAs) are effective for addressing the safety of women and providing emotional and practical support.
Impact information
What change happened/is going to happen as a result of the research? • Please provide details of the change which resulted from the research activities (*e.g.*, changes

in policies, guidelines or practice, quality improvement, service redesign or ways of working,improved health outcomes, costs and/savings, *etc*).
- Outline briefly how your research has led to the change described, adding any (qualitative or quantitative) evidence you have to show these activities have led to change (insert below).

All four projects are having an impact on the implementation of evidence-based interventions:

- ADaPT (Trauma-focused Cognitive Behavioural Therapy for children in care): 201 mental health workers from 11 Trusts have been trained in Cognitive Therapy for PTSD. All services now screening for PTSD in care-experienced young people. 30% of services are now implementing the intervention; a further 30% partially implementing. Videos to support delivery of the intervention and animations to improve engagement of young people are freely available via the UK Trauma Council website.
- BRUSH (optimising toothBrushing pRogrammes in nUrseries and ScHools): An evaluation of the variation in implementation nationally is complete. A toolkit to facilitate implementation of toothbrushing programmes in early years services is being co-designed with early years professionals and children and will be piloted before the end of the project.
- ESMI-III (The Effectiveness and Implementation of Maternal Mental Health Services): Phase 1 aimed to understand variation in implementation of mental health provision in maternity services. The findings and recommendations have been widely disseminated, including at national NHS England Implementation events. They have informed the development of national and regional implementation guidance and workshops, and national scale-up of the services.
- RIVA (Evaluating models of health-based mateRnIty Violence Advisor provision in maternity services): Data from a national survey and world café event with NHS staff, commissioners, services users, and policy makers have been used to develop guidance to support health services in implementing Independent Domestic Violence Advisor (IDVA) models in Trusts with maternity services.

Why does this change matter?
Please provide details on who has benefited/been affected (*e.g*. individuals, specific user/affected groups) from the change, and how, and to what extent (*e.g*. local, regional, and/or nationally) (insert below).

- ADaPT – Care-experienced children and young people are now more likely to be screened for PTSD and offered evidence-based treatment in Trusts across the country – 11 Trusts taking part: 30% implementing fully, 30% implementing partially.
- BRUSH – More children under 5 will receive toothbrushing interventions in early years settings using a toolkit that has been co-designed with early years staff, parents, young children, and commissioners representing all regions of the country.
- ESMI-III – New mothers at risk of mental health problems are gaining timely access to mental health services within maternity services in a national roll-out, guided by the research findings. A safeguarding pathway within MMHS for women at risk of loss of custody of their baby due to safeguarding concerns is also in development.
- RIVA – Pregnant women and new mothers experiencing domestic violence will be able to access emotional and practical support through more sustainable IDVA models in maternity services, following guidance developed through this research.

What was NIHR's contribution to the change?
Outline the NIHR ARC's role and contribution towards the change (insert below).

The Children's Health & Maternity Priority Programme selected these projects through an iterative prioritisation process involving academics, clinicians, and service users from 9 NIHR ARCs. The wider Children's Health and Maternity Priority team support this project by connecting teams to the ARC network to support wider reach, engagement from health and care organisations, and to provide support in implementation science and patient and public involvement & engagement. The programme team have also connected all four supported projects in a Community of Practice to share and develop learning to strengthen engagement and involvement of service users through this project and to share learning more widely, particularly in terms of involvement of service users in projects dealing with sensitive topics. Two of the supported projects are co-funded with other National Priority Areas - Health and Care Inequalities and Prevention including Behavioural Risk Factors. ARC West also provided additional funding to the ADaPT project to enable the development of freely available video resources to support trained mental health practitioners in delivery of TF-CBT and to promote engagement from young people.

Our leadership and co-ordination of this area of national priority has enabled a balancing of stakeholder voices and a consistency of care, thereby avoiding a 'postcode lottery' of access to services.

Where impact is in the early stages yet to be fully realised, describe how the research findings will be taken forward to facilitate impact in the future (*e.g.* knowledge mobilisation, patient and public involvement, capacity building or engagement activities) (insert below).

A cross-project study is seeking to better understand the barriers and facilitators to implementation across a range of health service, social care, and voluntary settings and examine the role of external teams such as researchers in driving effective implementation.

- ADaPT – The project has already been able to respond to many barriers, but the full analysis of the research findings will provide a platform to develop further guidance and measures to improve implementation.
- BRUSH – The implementation toolkit will be pilot tested within this project to enable further refinement. The project team are exploring ways to then disseminate the toolkit to early years settings nationwide.
- ESMI-III – The team are extending the current work to develop training and implementation guidance for a safeguarding pathway to support women at risk of loss of custody of their baby due to safeguarding concerns, in collaboration with the Centre for Child and Family Justice.
- RIVA – An extension to this work has begun to generate practical guidelines/top tips for NHS Trusts that are currently or are considering implementing an IDVA programme with respect to how to successfully involve survivor service-users in their implementation activities. The project has also established a partnership with Safelives, UK-wide domestic abuse charity, to provide specialist IDVA implementation support to achieve additional impact in all sites.

4. Engagement with wider stakeholders

Outline the role/contribution of other stakeholders/partners (*e.g.* other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s) (insert below).

- ADaPT – University College London/Anna Freud Centre, University of Exeter, Norfolk and Suffolk NHS Trust, UK Trauma Council, University of Bath, Bradford Institute of Health, University of Bristol, University of East Anglia, University of Southampton, University of Newcastle, King's College London, University of Sheffield, Warwick Business School, UK Trauma Council, ARC West, ARC North Thames, ARC North East & North Cumbria, Oxford Health NHS Trust, Care-Experienced Young People's Advisory Group, Professional Advisory Group, CoramBAAF, Fostering Network, National Youth Advocacy Service, Investing in Children
- BRUSH – Office for Health Improvement and Disparities, NHS England Transformation Programme Team for Oral Health, Department for Education, Designed to Smile (the team behind the national oral health promotion programme in Wales), Regional and Beyond PSHE and Healthy Schools network, The Hygiene Bank (a charity) and the University of Trondheim in Norway, The Centre for Applied Educational Research, Department for Education Stronger Practice Early Years Hub – Bradford, Yorkshire and Humber Dental Public Health consultants, Lancashire and Cumbria Oral Health Improvement Group, University of Sheffield, Bradford Improvement Academy.
- ESMI-III – King's College London, University of Exeter, University of Liverpool, University of Lancaster, Guy's and St Thomas' NHS Foundation Trust, Devon Partnership NHS Trust, NHS England, NHS Improvement, Health Education England, NHS Digital, Maternal Mental Health Alliance, Birth Companions, ARC South London Public and Patient Involvement Group, ARC South London Birth Trauma and Loss Public Involvement Group, Section of Women's Mental Health Parent Advisory Group, IoPPN, Health Innovation Network, Halley Stewart Trust
- RIVA – Safelives, King's College London, Newcastle University, University of Exeter, Bradford Teaching Hospitals, University of Bristol.

5. Collaboration/involvement of other NIHR infrastructure or programmes

Please specifically identify other NIHR funded infrastructure or research programmes and/teams, involved in the research, and their role/contribution (insert below).

This programme is co-led by ARC Yorkshire and Humber, with ARC North East and North Cumbria (NENC) and ARC West also sitting on the Programme Management Group. The wider collaboration also includes ARC West Midlands, ARC South London, ARC North Thames, ARC North West Coast, and ARC Northwest London.

ARC NENC leads two national programmes (the Health and Care Inequalities and Prevention including Behavioural Risk Factors) which co-fund two of the projects (ADaPT and RIVA).

ARC West provided additional funding to support the development of resources from the ADaPT project.

6. Dissemination and communication beyond academia/research setting

Please provide details, and examples of how you have communicated the outcomes of your research **outside** the academic or research setting. This may include materials/resources for patients, public, clinicians, health and care professionals, policy makers or other stakeholders, and include alternate formats, style and approaches (*e.g.* workshops, networks, press releases, social media, briefings, infographics, videos, animations, etc).

- All four supported projects presented updates at an in-person networking event in London for stakeholders including health professionals, policy makers, and service users.
- ADaPT – NIHR ARC Inequalities and Prevention National Symposium, organised by NIHR Applied Research Collaboration (ARC) North East and North Cumbria (NENC), 16-17.11.22
- ESMI-III
    - Talk given on Radio 4's Woman's Hour in November 2022
    - MMHS National Implementation Event, 28/04/2022 – organized by NHSE&I
    - Workshop on Parent-Infant Separation at Birth, 07/07/2022 – Organised by NHSE&I
    - East of England Clinical Network Meeting – 28/06/2022 – Organised by East of England NHSE&I regional network.
    - MMHS Regional NHS England Meeting (Preliminary MMHS Regional Evaluation) - 17/05/22 – Organised by London NHSE&I Regional Leads
    - PMH Clinical Network London Meeting, 13/07/2022 – organized by NHSE&I PMH Clinical Network London
    - South London ARC PPIE Meeting, 09/06/2022
    - Maternal and Perinatal Mental Health Systems and Policy Research meeting, 17/05/2022 – KCL
    - ESMI-III Workshop, 08/09/2022 – Organised by NHSE&I
    - Marce Society International Conference, ESMI-II and ESMI-III Symposium, 20/09/2022
- RIVA:
    - Regular meetings with Domestic Abuse Commissioners Office
    - Presented RIVA studies at a keynote presentation for the Maternal Mental Health Alliance (MMHA) roundtable event. 3.11.22 - https://maternalmentalhealthalliance.org/wp-content/uploads/MMHA-BRIEFING-Perinatal-mental-health-and-domestic-abuse-Jan-23.pdf
    - NIHR ARC Inequalities and Prevention National Symposium, organised by NIHR Applied Research Collaboration (ARC) North East and North Cumbria (NENC), 16-17.11.22
    - Presentation to NHSE Senior Programme Manager for National Domestic Abuse and Sexual Violence Programme - 11.11.22 and 6.3.23
    - Presentation to Scottish 70-30 Commission – aim to prevent child maltreatment 20.2.23 https://www.wavetrust.org/scottish-government-declares-support-for-7030-campaign /
    - https://www.parliament.scot/chamber-and-committees/official-report/search-what-was-said-in-parliament/chamber-and-committees/official-report/what-was-said-in-parliament/meeting-of-parliament-27-01-2022?meeting=13545&iob=122970

7. Next steps

Please highlight any follow-on funding, collaboration or further research plans.
Where applicable, provide further details (including name of organisation, relevant stakeholders/groups, or company - including type of industry, where relevant - research funder details, nature of further research, future plans (insert below).

- ADaPT – This project hopes to build on the learning from the current work to test a model of implementation in new services and those that are struggling to implement, service mapping to understand the mental health treatment pathways of care-experienced young people across services, and implementation of core assessment tools, which would sit well across social-care and mental health services.
- BRUSH – This project aims to extend the current work to monitor supervised toothbrushing programmes in deprived areas in the context of NHS England's CORE20PLUS5, develop resources to further support implementation, further pilot the toolkit and resources, and begin development of an oral health data platform.
- ESMI-III – Additional funding has been awarded from the Halley Steward Trust to build on the learning to embed 'HOPE Boxes' for women at risk of separation from their babies at birth due to safeguarding concerns across the integrated care system.
- RIVA – This project hopes to run an implementation-based national clinical trial to test out the effect of the implementation guidelines developed from this RIVA study in improving the effectiveness of healthcare based IDVA programmes.

Are there any factors that might prevent or reduce efforts to achieve or further maximise your impact?

All four projects are examining barriers to implementation, and therefore further impact, by studying variation across sites. These will be reported to inform future roll-out alongside guidance to support successful further implementation. Feeding back findings on implementation barriers and solutions in real time helps ensure that learning can have a rapid impact on delivery.

The network of service users, service providers and academics established through this priority programme is crucial both to the wider roll-out of these interventions and to the identification of further opportunities for implementation of evidence-based interventions in Children's Health and Maternity. This will be difficult to sustain without further funding.

8. Evidence and References (if applicable)

Provide a list of the most significant evidence (key sources and/or references) underpinning this example (titles and hyperlinks where applicable) (insert below).
Evidence may include: policy documents, reports, datasets, news articles, videos, news reports, testimonials, quotes, weblinks, awards, reviews.

For publications, please include the link to the Digital Object Identifier (DOI).

Easter, A., De Backer, K., Fisher, L., Slade, P., Bridle, L., Challacombe, F., Davey, A., O'Mahen, H., Rayment-Jones, H., Holly, J., Sharp, H., Howard, LM., Sandall, J. ESMI-III: The Effectiveness and Implementation of Maternal Mental Health Services Interim Report: Phase 1. NIHR Applied Research Collaboration South London. 2022.

Gray-Burrows, K. A., Day, P. F., El-Yousfi, S., Lloyd, E., Hudson, K, & Marshman, Z. (under review). A national survey of Supervised Toothbrushing Programmes in England. British Dental Journal.

Forbes, C., Alderson, H., Domoney, J., Papamichail, A., Berry, V., McGovern, R., Sevdalis, N., Rankin, J., Newman, M., Healey, A., Easter, A., Heslin, M., Feder, G., Hudson, K., Wilson, C.A., Melendez-Torres, G.J., Howard, L., Trevillion, K. (under review). A survey and stakeholder consultation of Independent Domestic Violence Advisor (IDVA) programmes in English maternity services. BMC Pregnancy and Childbirth.

9. Health category/ field of research

Please indicate 'YES' to **all** that apply.

UKCRC Health Category	**Please indicate 'YES' where applicable**	**NIHR priority Areas / Fields of Research**	**Please indicate 'YES' where applicable**
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Cancer and Neoplasms		Equality, Diversity, & Inclusion	
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Congenital Disorders		Prevention agenda	YES
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Eye		Levelling up (research following burden of patient need)	
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Mental Health	YES	Multiple long-term conditions	
Metabolic and Endocrine		Med-tech	
Musculoskeletal		Covid-19	
Neurological		Public health	YES
Oral and Gastrointestinal	YES	Obesity/ healthy weight	

Renal and Urogenital		Dementia	
Reproductive Health and Childbirth	YES	Diabetes	
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Skin		Social care	YES
Stroke			
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- **Changes in service delivery, including service reconfiguration or service redesign, patient or care pathways, or patient safety** - *e.g.* research which results in improved patient safety (reduced errors, changes in care coordination), commissioning OR decommissioning of a service as a result of research evidence, care pathways redesigned in response to the pandemic, care pathways/ services improved/redesigned as a result of meaningful engagement and involvement of diverse groups and communities, improved service or social care provision, quality or access, research which results in changes to care pathways to improve management of disease or condition.

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- **Economic impact, net health benefits, improvements to efficiencies in health and care system/NHS, boost to industry** - *e.g.* cost-effectiveness of interventions to improve and optimise care/services, including stopping services and/or informing intervention decisions**;** cost savings or efficiency gains to NHS, improving productivity and effectiveness of NHS,

increasing service effectiveness, net health benefits, revenue generated, jobs created, uptake by industry, commercial success, *etc*.

Details of Added Value Example

NIHR ARC details

Name of the NIHR ARC (insert below)
ARC South West Peninsula (PenARC)
Contacts for AVE*
Name(s): Professor Martin Pitt
Contact details: M.Pitt@exeter.ac.uk
Research or cross-cutting theme (insert below where applicable)
Methods for Research and Improvement

*Please note that the NIHR CCF or NOCRI may approach the individual(s) named above for further information on the AVE or to develop it into a case study.

1. Title of the AVE

Title of AVE (insert below) *[A short title using plain active language that summarises the impact (not the research finding)]*
PenCHORD – NIHR ARC National Leadership in Operational Research and Data Science
Is this a new AVE? (insert '**Yes/No**' below)
Yes
Is this an update of a previously submitted AVE?(insert '**Yes/No**' below)
No
If this is an updated AVE, please provide the title and year of submission of the linked AVE (insert below)

2. Concise impact Statement (maximum 100 words)

Briefly summarise, in plain English the impact of the research - what has changed, for whom, (and how, and to what extent) and why did this matter?
We aim to promote the use of Operational Research (OR) and Data Science tools to improve the provision of health and care nationally. Recent developments aimed at increasing national reach include: • The Health Service Modelling Associates (HSMA) training and mentoring programme has been expanded to allow attendance from across England. (Funded by Health Education England). • Development of the national Health and Care Operational Research Network (HaCORN) • Developing methods for the use of artificial intelligence in health and care, building on research in stroke care. • Championing Open Science through use of open-source software and making all materials open access.

3. Background and impact information

Please provide a short paragraph in each box - around 250 words

Background summary
Describe briefly the key research insights or findings that led to the impact in this AVE, including why the research is important (*e.g.* overall prevalence of condition, and cost to society and/or NHS and social care) and the hoe long the research has taken to get this point (insert below).
The Peninsula Collaboration for Health Operational Research and Data Science (PenCHORD), established in 2011 as part of the SW Peninsula ARC (formerly CLAHRC), is now the UK's foremost research team applying operational research (OR) and data science methods to improve the delivery of health and care. On the regional level, PenCHORD works closely with health and social care organisations in the south-west to apply evidence and data-based approaches to address key issues identified by the services. We also support regional placements of health and care staff who work closely with us on project based and training initiatives. On the national level, as the theme lead for OR within the national ARC network, PenCHORD champions national liaison across the health operational research and data science research community. The Health and Care Operational Research Network (first established in April 2020) is hosted by PenCHORD and provides a collaborative forum for health and care practitioners and the research community. In addition, PenCHORD is actively engaged with the Association of Professional Healthcare Analysts (AphA). In addition to our research initiatives, PenCHORD has a strong focus on delivering training to address the pressing capacity building needs for analysts and service managers in health and care services. Foremost in this context is our much-lauded Health Services Modelling Associates (HSMA) programme which forms the basis of a separate AVE submission. In addition, PenCHORD is central in the support of the University of Exeter's Health Data Science MSc course.
Impact information

What change happened/is going to happen as a result of the research?

- Please provide details of the change which resulted from the research activities (*e.g.*, changes in policies, guidelines or practice, quality improvement, service redesign or ways of working,improved health outcomes, costs and/savings, *etc*).
- Outline briefly how your research has led to the change described, adding any (qualitative or quantitative) evidence you have to show these activities have led to change (insert below).

Central to PenCHORD's research mission is to bridge the translation gap between data science research and health/care communities. Examples include:

- **Increasing data science capacity and capability in the NHS:**
  Annually HSMA now provides 100 clinicians and analysts from health, social care and policing organisations with 100+ hours of advance data science and modelling training.
- **Improving national and regional emergency stroke:**
  - Two successful NIHR HS&DR grants in emergency stroke care (income >£900k over 4 years) working with the national stroke audit team.
  - Commissioned by each of the UK's national health service organisations (England, Scotland, Wales, and Northern Ireland; ~100k strokes/yr) as well as more local stroke service planners (South West England, East of England, and London)
  - Informed national (England, Scotland, Wales, and Northern Ireland; ~100k strokes/yr) and regional planning (South West England, East of England, and London) of number and location of emergency stroke care hubs, and is part of the UK guide for implementation of mechanical thrombectomy.
- **Supporting ambulance services improve response times:**
  South Western Ambulance Service now uses a forecasting tool jointly developed with PenCHORD to plan ambulance staffing up to 84 days ahead. The tool was validated with the Welsh, London and Yorkshire ambulance services.
- **Reducing delayed transfers of care:**
  The Integrated Care Board within Bristol, North Somerset and North Gloucester now use a computer-based tool to support planning of discharges and balance of costs between community and acute. A project is underway to transfer the tool to Somerset Integrated Care System (ICS).

Why does this change matter?

Please provide details on who has benefited/been affected (*e.g.* individuals, specific user/affected groups) from the change, and how, and to what extent (*e.g.* local, regional, and/or nationally) (insert below).

The following quotes demonstrate the benefit of PenCHORD within the NHS:

Professor Tony Rudd, previously National Clinical Director for Stroke, NHS 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."

Martin Dennis, Specialty advisor to the Chief Medical Officer (Scotland):

"The modelling of hyperacute stroke care in Scotland was an important part of the Scottish Government's programme to plan and implement a Scotland wide thrombectomy service. The modelling was commissioned by the Thrombectomy Advisory Group (TAG) and was based on data from the Scottish Stroke Care Audit. It provided estimates of the likely thrombolysis and

thrombectomy volumes, their distributions across centres, and the likely gains in patient outcomes. The results of the modelling were important to the decisions by TAG to:

1. Emphasise the importance of optimising existing pathways for delivery of thrombolysis, to increase the numbers of patients treated and to reduce the door to needle times

2. To advise, at least until pre-hospital diagnostic accuracy can be improved, to adopt a model where patients are transported by the ambulance service to the nearest hospital which can provide thrombolysis (drip) and only after the eligibility for thrombectomy has been determined, transported (ship) to a Thrombectomy hub.

3.Plan for a three thrombectomy centre model based in Glasgow, Edinburgh and Dundee which would collaborate to sustainably deliver thrombectomy in the middle of the night."

What was NIHR's contribution to the change?
Outline the NIHR ARC's role and contribution towards the change (insert below).

NIHR support has provided the sustained infrastructure enabling PenCHORD to conduct its work. Although researchers within PenCHORD successfully attract external funding through research grants and commissioned work for service providers, NIHR PenARC funds core staffing and underwrites contracts providing a stable base for this work.

In addition to staff salaries, other contributions include:

- Sustained involvement with PenARC's PPIE team has ensured that PenCHORD researchers can develop projects with PPIE perspectives from the initial idea development, including PPIE representation on grant applications, and dedicated sessions within HSMA.
- PenARC-funded staff provide methodological expertise in qualitative methods, implementation science and health economics to underpin effective deployment of OR.
- The core activities of PenARC support identification of key areas for OR deployment. For example, a research question identified by a Geriatrician at the PenARC Research Knowledge Exchange event has led to pilot work with dementia data to examine the possibility of modelling contributing to improved patient flow. Links with 3 ICSs in the Regional Innovation Strategy group are being used to prioritise areas of focus.
- Core underwriting enables the underwriting of activities such as the South West Analytics and Infrastructure in Healthcare (SWAIH) event which was developed in advance of agreements to provide funding from external stakeholders.
- Similarly, staff are able to undertake national roles. For instance, Martin Pitt has a national role within AphA and PenCHORD has facilitated AphA's progression as an accrediting body and is managing development of their course accreditation process.

Where impact is in the early stages yet to be fully realised, describe how the research findings will be taken forward to facilitate impact in the future (*e.g.* knowledge mobilisation, patient and public involvement, capacity building or engagement activities) (insert below).

We will continue to use multiple avenues to spread the use of OR within health and social care. These include the expansion of training opportunities nationally (including by making materials freely available on our HSMA YouTube channel, building networks, working with national organisations, and by demonstrating the effectiveness of these approaches through work with national policy makers.

AphA is an important forum for staff working in modelling within health and social care and we are supporting its aim of advancing skills within the analytical community with the development of a set of recommended courses and resources. This builds on the recommendations of the Goldacre review to support the professionalisation of health data analysts. Alongside this, we are also supporting adoption of a national competency framework, and which will be incorporated into AphA's accreditation process.

In late 2022, we developed the SWAIH network (South West Analytics and Infrastructure in Healthcare) to facilitate joint working between ~50 organisations across the South West, supporting the development of a regional data collaborative to improve use of health data in planning and research. With funding partners including Health Data Research UK (HDR UK), the Association of Professional Healthcare Analysts (AphA) and the South West Academic Health Science Network (SW AHSN) the launch event in July 2023 for ~300 attendees will debate and share information around the development of shared data platforms. SWAIH will also support the development of the Great Western Secure Data Environment (GWSDE) and other data platforms including One SouthWest and the national Federated Data Platform.

4. Engagement with wider stakeholders

Outline the role/contribution of other stakeholders/partners (*e.g.* other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s) (insert below).

Networking is at the core of PenCHORD's work and we actively foster collaborative links across the health and care landscape. This includes our ongoing regional partnerships with our many ARC partners in the South West (including the SWAIH network) but also at the national and international level. It also includes developing relationships with other key stakeholders in industry and the voluntary and third sectors as well as the other national ARCs. PenARC is a core partner in the Regional Innovation Strategy group with service providers and policy makers and it is envisaged that OR modellers will be key to successful deployment of innovation.

We have successful research secondments with Devon Partnership Trust (DPT), and Somerset NHS Foundation Trust. Andy Mayne (Somerset NHS FT) is now Head of Data Science, AI & OR, having been promoted during his placement with us and works with the GWSDE and SWAIH network. Sammi Rosser (DPT) was promoted to a Data Scientist during her secondment.

Tom Monks and Mike Allen (Turing Institute Fellows) participate in engagement activities, including Mike Allen's presentation on "Explainable AI" at the Institute's 2023 National Conference.

Sean Manzi received funding from The Healthcare Improvement Studies Institute and continues to participate in their research community.

We are an active partner in the EPSRC LEAP programme which is engaged in supporting research and training across the region.

The HaCORN collaboration has ~75 members and we have established a Partners Advisory Circle with over fifty organisations as part of the external engagement for the MSc in Health Data Science.

5. Collaboration/involvement of other NIHR infrastructure or programmes

Please specifically identify other NIHR funded infrastructure or research programmes and/teams, involved in the research, and their role/contribution (insert below).

Our stroke research has engaged in several funded collaborations through the following research programmes:

- OPTimising IMplementation of Ischaemic Stroke Thrombectomy (OptImIST) – NIHR Programme Grant (£1.983m)
- Stroke Audit Machine Learning (SAMueL-2) – NIHR Health Services and Delivery Research (£589k)
- Mobile Stroke Unit – NIHR Health Services and Delivery Research (£539k)

PenCHORD leads the SWAIH network which is working closely with ARC West to develop a regional network to respond more effectively to the Goldacre review proposals to improve research access to data the application of data science in the region.

We are developing programme grant applications in collaboration with ARC West and have a current partnered grant submission looking at pathway modelling for paediatric care.

6. Dissemination and communication beyond academia/research setting

Please provide details, and examples of how you have communicated the outcomes of your research **outside** the academic or research setting. This may include materials/resources for patients, public, clinicians, health and care professionals, policy makers or other stakeholders, and include alternate formats, style and approaches (*e.g.* workshops, networks, press releases, social media, briefings, infographics, videos, animations, etc).

Dissemination is an important part of the research cycle within PenCHORD.

Following initial research with Bristol, North Somerset and South Gloucestershire ICB, the recent IPACS research project (Improving Patient flow between Acute, Community and Social care) has been promoted and disseminated to NHS Somerset, University Hospitals Plymouth NHS Trust and Royal Devon University Healthcare NHS Foundation Trust. Dr Alison Harper is working closely with delivery teams in these organisations to ensure the model is entirely 'owned' and any bespoke refinements made within each organisation.

All content developed within the HSMA programme is shared on the programme's YouTube channel. This channel now has over 1000 subscribers and reaches a global audience. A video providing training on SimPY has over 14k views, and regularly receives commendations on its value from an international audience.

PenCHORD has a growing social media presence on Twitter, and regularly promotes its stories of impact to a primarily regional and national organisation.

As part of its involvement in AphA, PenCHORD also features as part of a recently established and developing collaboration with the Health Service Journal (HSJ).

7. Next steps

Please highlight any follow-on funding, collaboration or further research plans.
Where applicable, provide further details (including name of organisation, relevant stakeholders/groups, or company - including type of industry, where relevant - research funder details, nature of further research, future plans (insert below).

Currently PenCHORD is engaged in developing a range of collaborative opportunities.

These include the following initiatives:

- We are developing funded partnerships for SWAIH including both HDR UK, the Great Western SDE, AphA and SW AHSN.
- Extending our sustained collaboration with Devon Partnership Trust to support the application of Health Data Science.
- Roll-out of Better Care into Plymouth and Royal Devon University Healthcare NHS Foundation Trust.
- Supporting placements with health and social care organisations – through the HSMA and MSc project work as outlined.
- Working closely with the UK Association of Healthcare Analysts (as outlined in section 3)

Are there any factors that might prevent or reduce efforts to achieve or further maximise your impact?

Key factors that present challenges to continuing success include:

- Operational pressures in the NHS – the constant pressure and shifting priorities with the health and care services often detracts from their ability to work consistently in research partnerships which is core to our collaborative approach.
- Staff constraints – data science researchers are in demand. We have a strong focus on retention and ensure individual researcher development plans. These pressures are exacerbated as we move towards the end of the cycle of PenARC funding.
- Data access and availability – research can sometimes be limited by delays to accessing data. SWAIH and the regional shared data platforms should improve this.
- Working across multiple organisations – maintaining and co-ordinating projects with many moving parts and players is challenging.

8. Evidence and References (if applicable)

Provide a list of the most significant evidence (key sources and/or references) underpinning this example (titles and hyperlinks where applicable) (insert below).
Evidence may include: policy documents, reports, datasets, news articles, videos, news reports,

testimonials, quotes, weblinks, awards, reviews.

For publications, please include the link to the Digital Object Identifier (DOI).

Allen M, James C, Frost J, Liabo K, Pearn K, Monks T, Zhelev Z, Logan S, Everson R, James M, Stein K. Using simulation and machine learning to maximise the benefit of intravenous thrombolysis in acute stroke in England and Wales: the SAMueL modelling and qualitative study. Health Soc Care Deliv Res. 2022 Oct; 10(31). DOI: 10.3310/GVZL5699

Zhelev Z, Peters J, Rogers M, Allen M, Kijauskaite G, Seedat F, Wilkinson E, Hyde C. Test accuracy of artificial intelligence-based grading of fundus images in diabetic retinopathy screening: A systematic review. J Med Screen. 2023 Jan 9. DOI: 10.1177/09691413221144382

Harper A, Mustafee N, Yearworth M. The Issue of Trust and Implementation of Results in Healthcare Modeling and Simulation Studies. 2022 Winter Simulation Conference (WSC), Singapore. 2022 Jan 30;: 1104-1115. DOI: 10.1109/WSC57314.2022.10015276

Whear R, Bethel A, Abbott R, Rogers M, Orr N, Manzi S, Ukoumunne OC, Stein K, Thompson Coon J. Systematic reviews of convalescent plasma in COVID-19 continue to be poorly conducted and reported: a systematic review. J. Clin. Epidemiol. 2022 Nov; 53-64. DOI: 10.1016/j.jclinepi.2022.07.005.

Onen-Dumlu Z, Harper AL, Forte PG, Powell AL, Pitt M, Vasilakis C, Wood RM. Optimising the balance of acute and intermediate care capacity for the complex discharge pathway: Computer modelling study during COVID-19 recovery in England. PLoS One. 2022 Jun 7;17(6). DOI: 10.1371/journal.pone.0268837

Dr Alison Harper, PenCHORD Research Fellow, received the Operational Research Society Lyn Thomas Impact Medal for her work as part of a team of researchers who developed an app and digital platform to provide live waiting times for A&E departments and other centres of urgent care (https://arc-swp.nihr.ac.uk/news/impact-medal-awarded-for-digital-platform-that-can-reduce-ae-waiting-times/).

9. Health category/ field of research

Please indicate 'YES' to **all** that apply.

UKCRC Health Category	Please indicate 'YES' where applicable	NIHR priority Areas / Fields of Research	Please indicate 'YES' where applicable
Blood		Artificial Intelligence	Yes
Cancer and Neoplasms		Equality, Diversity, & Inclusion	
Cardiovascular	Yes	Patient & Public Involvement (PPI)	Yes
Congenital Disorders		Prevention agenda	

Ear		Health information technology/ digital transformation	Yes
Eye		Levelling up (research following burden of patient need)	
Infection		Innovative clinical trials	
Inflammatory and Immune System		Research addressing health inequalities	Yes
Injuries and Accidents	Yes	Healthy ageing	
Mental Health	Yes	Multiple long-term conditions	
Metabolic and Endocrine		Med-tech	Yes
Musculoskeletal		Covid-19	Yes
Neurological		Public health	Yes
Oral and Gastrointestinal		Obesity/ healthy weight	
Renal and Urogenital		Dementia	
Reproductive Health and Childbirth	Yes	Diabetes	
Respiratory		Antimicrobial resistance	
Skin		Social care	Yes
Stroke	Yes		
Generic Health Relevance			
Disputed Aetiology and Other			

The **completed Added Value Examples and Narrative Report** must be submitted via email to the Infrastructure mailbox (ccf-infrastructure-team@nihr.ac.uk copying ana.gomes@nihr.ac.uk) no later than **5 May 2023.**

NIHR | National Institute for Health and Care Research

NIHR APPLIED RESEARCH COLLABORATIONS (ARCs)

BENEFICIAL CHANGE NETWORK (BCN) INITIATIVE

FINAL REPORT (2020 - 2022)

Please complete the form using a font size no smaller than 10 point (Arial).
Please submit as a Word Document.

1. NIHR ARC Details

Name of the NIHR Applied Research Collaborations (ARC):

Name, job title, address and email of an individual to whom any queries on this Progress Report will be referred:

Name: Greer Husbands

Job Title: NIHR ARC Operations Director

Address: g.e.husbands@exeter.ac.uk

Email: 07738 050491

2. AHSN Details

Name of the Academic Health Science Network collaborator:

Name, job title, address and email of an individual to whom any queries on this Progress Report will be referred:

Name: Lynnette Chapman

Job Title: Evaluation and Learning Director

Address: South West Academic Health Science Network, Vantage Point, Pynes Hill, Exeter

Email: lynnette.chapman@swahsn.com

3. Declarations and Signatures

Name and address of the NHS Organisation administering the NIHR ARC award:

Name: Royal Devon University Healthcare NHS Foundation Trust

Address: Barrack Road, Exeter, EX2 5DW

NIHR | National Institute for Health and Care Research

Name of the Chief Executive of the NHS organisation: Suzanne Tracey

I hereby confirm, as Chief Executive of the NHS organisation administering the NIHR Applied Research Collaboration award, that this Progress Report has been completed in accordance with the guidance issued by the Department of Health and Social Care and provides an accurate representation of the activities of the NIHR ARC; and hereby assign all Intellectual Property rights to which I am/we are legally entitled in the Reports defined in the Contract for this award between myself/ourselves and the Secretary of State for Health and Social Care to the Secretary of State for Health and Social Care on behalf of the Crown:

Signature of Chief Executive: ……[ ]…….. Date: ……[ ]……

4. Final Report information

Plain English Summary (120 words)

- In plain English, briefly summarise the activity undertaken and key output(s)/impact from the BCN funding.

We developed a remote consultations toolkit via an extensive consultation and testing process as follows:

- Initial literature review and interviews with clinicians and managers to adapt an existing remote consultation maturity framework prototype.
- Extensive literature review on remote consultations tools and best practice with over 130 references.
- Ten in-depth interviews in Devon.
- Secondary analysis of 15 clinician interviews which our project partners in ARC West simultaneously carried out Bristol.
- Consultation with a patient panel.

The results were triangulated to develop a toolkit in two parts:

- Maturity assessment tool: An Excel-based maturity matrix
- Maturity guidance: A detailed evidence-base of useful tools, information, and case studies to help organisations improve in the areas identified by the maturity assessment tool.

Summary of Progress (200 words)

Please provide succinct descriptions of how the NIHR ARC has worked in partnership with local AHSN to prioritise activity:

- For each project describe each research priority/ innovation along with a rationale as to why they were chosen.

Consultation took place with Regional Medical Directors to confirm regional priorities and to identify alignment with BCN themes. Following that consultation an ARC Reference Group reviewed the evidence to determine what research or evaluation was required to strengthen the evidence base for potential high impact innovations.

Through this process and after consultation with ICB system leaders in the South West and West of England, the board agreed to pool resources and focus on:

- Development of a remote consultation toolkit (The ORCER project led by the South West AHSN and PenARC)
- Qualitative study on the impact of remote consultations on workforce (The ReCon Project led by ARC West)

The two project teams collaborated through:

A) A monthly board meeting, with representation from four organisations (ARC West, PenARC, South West AHSN and West of England AHSN). The board was kept informed on project process and advised on strategic direction.

B) A monthly delivery team meeting, consisting of the project delivery leads for ORCER and ReCon. Through this group, information was shared between the project both ways: the 15 interviews carried out for ReCON were used to inform ORCER, and the ORCER literature review was made available to shape the ReCON topic guides and reporting.

Impact information (300 words)

- **Outline the change(s) enabled by the BCN funding (*e.g.,* changes in policies, guidelines or practice, quality improvement, service redesign or ways of working, improved health outcomes, care processes and pathways, costs and/savings, *etc*);**
- **How did this initiative contribute to the identification of evidence gaps and who has (or will) benefit (*e.g.,* individuals, specific user/affected groups) from the change, and how.**
- **Outline the role/contribution of other stakeholders/partners (e.g. other research funders, research teams, health and social care providers, voluntary and community sector, universities, NHS, public involvement groups, commissioners, policymakers, industry, ICS, etc) towards bringing about the change(s).**

The key change enabled by the BCN funding is publication of the ORCER toolkit. This is a central set of resources available to directly support outpatient transformation managers and other clinical leaders with optimising remote consultations. It has been made available online at www.swahsn.com/orcer/ .

Early in development of the toolkit, we worked with the Outpatient Transformation Manager in the Royal Devon and Exeter and Northern Devon Healthcare NHS Trusts, who acted as project champion and toolkit advisor. In collaboration with this clinical advisor, we piloted the ORCER maturity toolkit in the pain management specialities in these two hospitals in May 2022. These hospitals were under the same Trust management but in certain specialities the proportions of remote consultations in each hospital differed substantially. By completing the maturity assessment tool, speciality staff were able to uncover reasons for the differences. We facilitated a discussion on these reasons and provided guidance on strategic steps to take to remove barriers. The hospitals are now actively working on optimising their remote consultations services in this speciality using the insights from this process.

> *"The ORCER tool has great potential to improve remote consultations. The South West AHSN consulted with us as they developed it, listening to the clinical and administrative experts while following their own rigorous process. They worked in partnership with us to design bespoke pilot workshop in our pain management speciality. We hope that the output of the pilot will help us optimise VC across the Trust."* ***Dr Stuart Kyle, Clinical Lead for Outpatient Transformation, Royal Devon University Hospital***

The toolkit is freely available online and we are promoting it so that other organisations are able utilise it to optimise their remote consultation offering.

Forward Look (200 words)

- **Please highlight any follow-on activities that have happened as a consequence of this funding initiative (*e.g.*, new funding calls, new collaboration plans, *etc*).**

Following the Devon pilot, we provided some light-touch support to two further organisations with using the ORCER toolkit:

The Outpatient Transformation Manager in Torbay Healthcare Trust identified five specialities they would like to use the tool with to optimise use of remote consultations. We attended their board meeting to support this manager with sharing the toolkit with the board and they supported its use.

We shared the results of the pilot with Birmingham NHS Trust and West Midlands NHSEI and coached them through the process of how to use the toolkit to develop an action list for improvement.

We have also been in discussion with the curator of the NHS Futures Remote Consultation page to add the toolkit to NHS Futures so that it is more widely publicised.

Lessons Learned and/or further comment (150 words)

- **Please provide an overview of any significant issues/challenges encountered in the delivery of this funding initiative and any lessons learnt; and**
- **Is there anything else you want to tell us in relation to this initiative?**

The main challenge with the toolkit is finding sufficient resource to support organisations with using it. The toolkit contains two parts: the maturity assessment tool and the maturity guidance. The guidance can be freely accessed; however, it provides significantly more value if the assessment tool is used in advance. The maturity assessment tool can currently only be requested from the SWAHSN, reducing use. We are currently unable to measure effective use of the toolkit or how many organisations have accessed the guidance. The Devon pilot showed that completion of the maturity tool is best done when facilitated by the AHSN, additional resource would therefore be beneficial in facilitating more organisations to use this effectively, and to bring these organisations together in a community of practice to make use of the toolkit self-sustaining. With this in mind, we submitted a short funding proposal to NHSEI, but were unsuccessful in this instance.