Contents

Director’s foreword 4 - 5
Introduction to PIHR 6
Our mission, values and vision 7
Our People 8 - 10
Our contribution to Covid19 research 11
Our Research Themes
  Frontiers in Discovery Science 12 - 18
  Brain and Mind 19 - 27
  Health across the Life Course 28 - 37
  Digital Health 38 - 40
  Future Ready Health and Care System 41 - 47
Knowledge Mobilisation 48 - 51
Appendix 1: Major Research Awards 52 - 53
Appendix 2: Our Publications 54 - 109
Director’s foreword

It is strange to reflect that PIHR has been in existence for less than 18 months. In order to recognise all the activity that has taken place during this time, our very first Year in Review covers an extended period (from August 2020, when we were established, to December 2021). Supported by Charlie Dorr, who was appointed as the PIHR Manager in November 2020, our first months were inevitably taken-up by the development of the curation of our research themes, the development of our website, the establishment of our Steering and External Advisory Groups and the drawing up of our strategic plan. However, we have also been working on a range of activities to support our members and achieve our strategic aims.

To enhance collaboration over a remarkably diverse research body, PIHR established four research themes bringing together researchers from different schools and disciplinary areas to network and develop areas for collaboration. At the close of the year, the four research themes (Brain & Mind; Health across the Life Course; Digital Health and Frontiers in Discovery Science) have been joined by a new research theme on the Future Ready Health and Care System. Each theme is steered by a Theme Lead and includes members from multiple schools.

We have also been working on initiatives with the University’s other two faculties: We have worked with the Faculty of Arts, Humanities and Business to run two rounds of the Arts/Health Collaboration fund, supporting 14 pump priming projects; a joint initiative with the Faculty of Science and Engineering, which explores the connections between the environment, plants, animals and human health; and established the cross-faculty Centre for Coastal Communities (co-directed by Sheena and Professor Sheela Agarwal), which brings together coastal research across the whole University.

With respect to capacity building, PIHR has supported the establishment of the Health Early Career Researchers (ECRs) Forum; used Research England’s Strategic Priorities Fund (2020-21) to support training workshops and one-to-one sessions for ECRs on policy engagement and research impact as well as a range of individual projects (one, Dementia Friendly Flying, has been selected to be submitted to Research England); established a mentoring programme with the Faculty of Health’s Associate Dean for Research and in consultation with the ECR Forum’ developed bespoke resources for researchers and posted these on the website; surveyed methodological expertise amongst health researchers to facilitate collaboration; and organised four media training sessions for academics.

Knowledge mobilisation is a core ambition of PIHR, whether it is producing highly impactful research, influencing national policy, sharing good practice internationally, or supporting our local stakeholders and healthcare workers. In February 2021 we organised four consultation workshops on the implementation of the government’s Health Infrastructure Plan 2 (now the New Hospital Programme) in the South West and the implications for the future organisation of health services in the region. The workshops brought together academics from each of the University’s three Faculties, representatives from the local hospital trusts and leading stakeholders from the construction sector and culminated in a consultation report and a submission to the 2021 Wolfson Economic Prize. On a more local level, the Institute has drawn on cross-facility expertise to support the development of the Health and Wellbeing Hub in Plymouth City Centre; supported the Plymouth Public Health team in both building research capacity and research around Covid-19; provided population health information to Plymouth Hospitals Trust to support its strategic planning; and supported the design of new care pathways to shift the balance from hospital based activity to prevention, early diagnosis and community management in Torbay and South Devon. Complementing some of the initiatives led by PIHR, we have invited high profile speakers to present to audiences comprising University and NHS colleagues. In June 2021, Nigel Edwards, Chief Executive of the Nuffield Trust in June 2021, gave a fascinating and wide-ranging talk which touched on some of the themes covered in our HIP 2 consultation; while, following the launch of the Centre for Coastal Communities, Professor Sir Chris Whitty presented on the health and health issues facing coastal communities (September, 2021).

Knowledge mobilisation is a core ambition of PIHR, whether it is producing highly impactful research, influencing national policy, sharing good practice internationally, or supporting our local stakeholders and healthcare workers. In February 2021 we organised four consultation workshops on the implementation of the government’s Health Infrastructure Plan 2 (now the New Hospital Programme) in the South West and the implications for the future organisation of health services in the region. The workshops brought together academics from each of the University’s three Faculties, representatives from the local hospital trusts and leading stakeholders from the construction sector and culminated in a consultation report and a submission to the 2021 Wolfson Economic Prize. On a more local level, the Institute has drawn on cross-facility expertise to support the development of the Health and Wellbeing Hub in Plymouth City Centre; supported the Plymouth Public Health team in both building research capacity and research around Covid-19; provided population health information to Plymouth Hospitals Trust to support its strategic planning; and supported the design of new care pathways to shift the balance from hospital based activity to prevention, early diagnosis and community management in Torbay and South Devon. Complementing some of the initiatives led by PIHR, we have invited high profile speakers to present to audiences comprising University and NHS colleagues. In June 2021, Nigel Edwards, Chief Executive of the Nuffield Trust in June 2021, gave a fascinating and wide-ranging talk which touched on some of the themes covered in our HIP 2 consultation; while, following the launch of the Centre for Coastal Communities, Professor Sir Chris Whitty presented on the health and health issues facing coastal communities (September, 2021).
Introduction to PIHR

The Plymouth Institute of Health and Care Research (PIHR) brings together academics from a wide range of health disciplines (Biomedical Sciences, Dentistry, Health Professions, Health Services Research, Medicine, Nursing, Primary Care, Psychology, Public Health and Social Care) together with researchers in the University’s Faculties of Science and Engineering and Arts, Humanities and Business, and our partners in the public, private and third sectors, nationally and internationally.

PIHR’s role is to enable and accelerate research, support new and productive collaborations, and multiply the quality and impact of our research. It does so by means of a responsive and dynamic system that avoids the limitations of siloed and divisive organisational structures.

Our research covers the spectrum from discovery research (e.g., around the causes of disease), to translation into novel interventions, and to evaluating ways of delivering care. It is represented through five interconnecting research themes which represent our key areas of interest and expertise: Brain and Mind; Digital Health; Health across the Life Course; Frontiers in Discovery Science; and the Future Ready Health and Care System.

Our mission, values and vision

Our mission is to promote an interdisciplinary, inclusive enterprise with a real commitment to working across boundaries in order to meet the needs of the people of the South West and other rural, coastal, and deprived communities worldwide.

Our values are to:

- Pursue excellence
- Act with integrity
- Value all our people
- Work together collaboratively
- Lead innovation
- Make a difference

By 2026, through the work of the Institute, and the support we will provide to the Faculty of Health, we would like the University to be known as a:

- Renowned producer of high-quality globally significant health research, building on our existing research strengths, including interdisciplinarity
- Prominent provider of expertise on enhancing health and care within coastal, rural and dispersed communities
- Model supportive environment for embarking on or developing a health researcher career
- Dynamic research community where academics from diverse disciplines regularly engage and support each other in order to excel
- Reliable, first-choice academic partner for key regional stakeholders and policy-makers
- Key-player for influencing the national health policy debate
Our People

Professor Sheena Asthana is the Director of the Institute and is responsible for its strategic direction and core support activities. She is supported in this role by the PIHR Manager, Charlie Dorr.

We are supported in this endeavour by a Steering Group which comprises:

<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Role</th>
<th>Department/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheena Asthana</td>
<td>Chair, Director of PIHR</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Alastair Smith</td>
<td>Associate Professor in Psychology, Theme Lead for Brain and Mind</td>
<td>School of Psychology</td>
</tr>
<tr>
<td>Alyson Norman</td>
<td>Associate Professor of Psychology</td>
<td>School of Psychology</td>
</tr>
<tr>
<td>Patricia Schofield</td>
<td>Professor in Clinical Nursing</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Camille Carroll</td>
<td>Associate Professor and Honorary Consultant Neurologist</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Edward Meinert</td>
<td>Associate Professor of eHealth, Theme Lead for Digital Health</td>
<td>School of Nursing and Midwifery</td>
</tr>
<tr>
<td>Jenny Freeman</td>
<td>Professor of Physiotherapy and Rehabilitation</td>
<td>School of Health Professions</td>
</tr>
<tr>
<td>Jonathan Pinkney</td>
<td>Professor of Endocrinology and Diabetes</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Mathew Upton</td>
<td>Associate Head of School (Research)</td>
<td>School of Biomedical Sciences</td>
</tr>
<tr>
<td>Mona Nasser</td>
<td>Associate Professor of Evidence Based Dentistry</td>
<td>Peninsula Dental School</td>
</tr>
<tr>
<td>Oliver Hanemann</td>
<td>Chair in Clinical Neurobiology</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Raul Bescos</td>
<td>Lecturer in Dietetics</td>
<td>School of Health Professions</td>
</tr>
<tr>
<td>Richard Byng</td>
<td>Professor in Primary Care Research/PenARC Deputy Director</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Robert Fern</td>
<td>Associate Dean (Research) / Professor in Translational Neurobiology</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Sarah Neill</td>
<td>Professor of Nursing/ Theme Lead for Health across the Life Course</td>
<td>School of Nursing and Midwifery</td>
</tr>
<tr>
<td>Susie Pearce</td>
<td>Associate Professor in Clinical Nursing</td>
<td>School of Nursing and Midwifery</td>
</tr>
<tr>
<td>Tina Joshi</td>
<td>ECR Representative</td>
<td>School of Biomedical Sciences</td>
</tr>
<tr>
<td>Tom Nicholson</td>
<td>Development &amp; Partnership Manager</td>
<td>Research &amp; Innovation</td>
</tr>
<tr>
<td>Victoria Allgar</td>
<td>Professor of Medical Statistics and Director of PenCTU</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>James Daybell</td>
<td>Associate Dean (Research)</td>
<td>Faculty of Arts, Humanities &amp; Business</td>
</tr>
<tr>
<td>Corinne Lindsey</td>
<td>PGR Representative</td>
<td>School of Nursing &amp; Midwifery</td>
</tr>
<tr>
<td>Grace Williams</td>
<td>Public Engagement Manager</td>
<td>Research &amp; Innovation</td>
</tr>
<tr>
<td>Adele Hill</td>
<td>Associate Dean Teaching and Learning</td>
<td>Faculty of Health</td>
</tr>
<tr>
<td>Claire Hutchinson</td>
<td>Honorary Senior Lecturer/Theme Lead for Frontiers in Discovery Science</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Thomas Gale</td>
<td>Professor of Medical Education/ Theme Lead for Future Ready Health and Care System</td>
<td>Peninsula Medical School</td>
</tr>
<tr>
<td>Arasu Kuppuswamy</td>
<td>Medical Director of CCIO</td>
<td>Livewell South West</td>
</tr>
</tbody>
</table>

Our External Advisory Board includes the following members:

- Dr Pauline McGlone, Deputy Chief Operating Officer, Clinical Research Network South West Peninsula;
- Professor Alison Richardson, Professor of Cancer Nursing & End of Life Care, University of Southampton and Head of Nursing Research, NHS England;
- Jenny Camaradou, Patient representation and eHealth expert;
- Professor Carol Brayne, Professor of Public Health Medicine, University of Cambridge;
- Nigel Edwards, Chief Executive, Nuffield Trust;
- Professor Wendy Moyle, Program Director, Healthcare Practice and Survivorship Programme, Menzies Health Institute Queensland, Griffith University;
- Professor Ruth Endacott, Director of Nursing & Midwifery CRN National Coordinating Centre, NIHR;
- Professor Jenny Gallagher, Newland-Pedley Professor of Oral Health Strategy, Dean for International Affairs, Kings College London;
- Professor Paul Cooper, Professor of Oral Biology/Associate Dean for Research, Division of Health Sciences, University of Otago/University of Birmingham;
- Professor Verity Brown, Pro Vice-Chancellor (Impact & Innovation), University of East London and Honorary Professor in the School of Psychology and Neuroscience, University of St Andrews;
- Paul Chrisp, Director, Centre for Guidelines, National Institute for Health and Care Excellence.

We are extremely grateful for the support of our Board who offer their valuable advice and insights in their own time and who play an invaluable role in guiding our external engagement.
Throughout the Year in Review, the Covid-19 pandemic had a profound impact on all of our lives. Both the spread of the virus and the measures taken to halt or manage it have necessitated major changes in how we do things. Academics at the University of Plymouth have undertaken a range of research projects on the impact of Covid and how we have adapted to it in a wide range of areas. This includes how health, social care and education providers have coped as well as how the wider community has been affected. Details of some of our Covid-related projects can be found in the chapters that follow but below is a selection of a few other examples of our Covid work:

- Dr Tina Joshi has provided expert advice on infection control relating to Covid19 to both print and radio media.
- All clinical members of the Hepatology Research Group were involved in delivering care to inpatients with COVID and led recruitment to interventional and cohort studies including RECOVERY, ISARIC and the Remdesevir clinical trials.
- Dr Camille Carroll leads COVID-19 PD UK, a multi-site retrospective cohort study, funded by Parkinson’s UK, to understand the outcome and mortality of hospital admission with COVID-19 in people with Parkinson’s disease and atypical parkinsonian syndromes.
- Dr Kerryn Husk’s work has involved looking at social prescribing during the pandemic and particularly how the cultural sector has adapted to restrictions to support older people’s wellbeing.
- In collaboration with Nottingham Trent University, Professor Antony Caleshu has explored the role of writing, exchanging, discussing and publishing poetry in supporting healing and wellbeing during the COVID-19 pandemic.
- Funded by the British Academy, Dr Julie Parsons has explored support mechanisms for socio-economically disadvantaged and criminalised individuals during the Covid-19 crisis.
- Professor Sube Banerjee has led a study to explore the impact of Covid-19 on people newly diagnosed with dementia and their family carers.
Building on longstanding research on the ability of Schwann cells to regenerate and repair injury, their relationship to cancer development and brain tumours in particular and other successful studies, researchers in the Brain Tumour Research Centre of Excellence (led by Professor Oliver Hanemann with Professor David Parkinson and Dr Claudia Barros as additional PIs) aim to identify new therapeutic targets for brain tumours. They then validate these and test (repurposed) drugs in a variety of model systems for brain tumours, a large biobank, early clinical trials, in addition to exploring combination therapies. In parallel, they stratify brain tumours into molecular defined subclasses, with the overall long-term aim of personalised therapy. Researchers at the Centre co-funded by Brain Research UK (Dr Claudia Barros) also investigate mechanisms of brain tumour initiation towards discovery of novel therapeutic targets.

This is in line with the Centre’s second aim to identify biomarker candidates, which differentiate lower and higher-grade tumours or indicate progression to higher grade, using a variety of complementary approaches. They aim to have simple biomarkers to stain tissue and, if possible, biomarkers in the blood. This is complemented by a new avenue of correlating radiology (radiomics) to these tissue biomarkers. COH lead the NCRI meningioma and metastasis group advising on clinical trials.
IN THE NEWS

Meningioma is the most common form of primary brain tumour. Mostly low-grade, it can become cancerous over time, and develops from cells located in the meninges which protect the brain and spinal cord. Acoustic neuroma is a different type of low-grade, or non-cancerous brain tumour, which develops in nerve-protecting cells called Schwann cells. Both tumours may occur spontaneously, usually in adulthood, or in the hereditary disease Neurofibromatosis type 2 (NF2) in childhood/early adolescence. There are very few treatment options for these tumour types which frequently return following surgery and radiotherapy.

In breakthrough research co-funded by the charity Brain Tumour Research, Drs Sylwia Ammoun and Robert Belshaw have found that the retroviral protease inhibitors ritonavir, atazanavir, and lopinavir (already approved for use in the treatment of HIV/AIDS) target key proteins that are critical regulators of growth in tumours and reduced the growth of schwannoma and grade I meningioma cells in the laboratory.

These findings are extremely significant as drug repurposing is a valuable way to accelerate the testing of new approaches into clinical trials which, if successful, could reach patients sooner.

IN THE NEWS

Without new antibiotics, by 2050 the death toll from drug-resistant infections is projected to reach 10 million people a year, making the coronavirus pandemic seem almost quaint. This is why scientists at Plymouth University have been searching the cold, dark abyss of the north Atlantic – where they have found sponges that contain powerful molecules capable of killing those superbugs.

Kerry Howell, professor of deep-sea ecology, and her colleagues have been carefully collecting specimens of these plant-like animals, bringing them back to the lab and testing pulverised extracts against stubborn, disease-causing bacteria. Among the deep-sea molecules, they are finding promising bactericidal novelties.

“We don’t actually know exactly what they are yet,” says Professor Mat Upton, a microbiologist who leads the laboratory side of the biodiscovery programme at Plymouth. “We’ve got compounds that kill bacteria that we want to try to kill, and we have a pretty good idea that they are new compounds. It is early, but things are progressing through the pipeline.”


ANTIBIOTIC RESISTANCE

Antibiotic resistance has been described by the World Health Organisation (WHO) as one of the major threats to human health and modern medicine. No new class of antibiotic has been introduced into clinical use for nearly 30 years. PIHR’s Antibiotic Resistant Pathogens Research Group (led by Professor Mat Upton) is developing new antibiotics and bringing them to market through Amprologix, a University spin-out company.

These antibiotics are of a new class (bacteriocins), have novel mechanisms of action and have excellent potential for development into the next generation of powerful antibiotics to treat and prevent drug resistant infections. One of the group’s antimicrobials, epidermicin, is in pre-clinical testing.

PIHR researchers also specialise in microbial diagnostics and infection control. Dr Tina Joshi is developing ultra-rapid point-of-care diagnostics for the detection of infections, based on precision microwave engineering and DNA extraction. Her research on infection control focuses on understanding how C. difficile spores adhere to varying clinical surfaces and respond to biocidal insult, as well as using next-generation sequencing techniques to understand spore epidemiology.

In the year in review, she has provided expert advice on infection control relating to Covid19 to both print and radio media and has been elected as Co-Chair of the Microbiology Society’s Impact and Influence Committee.
NOVEL VACCINES

While the antibiotic resistance research group focuses on the threats posed by bacteria, the Vaccine Group (TVG), a University of Plymouth biotech spin-out company led by Professor Michael Jarvis, has been exploring the potential to develop vaccines targeting viruses. In 2021, TVG completed a pre-clinical trial that is a significant milestone in the development of the next generation of COVID-19 vaccines.

LIVER RESEARCH

During 2020-21, Dr Ashwin Dhanda and Professor Matthew Cramp, from our Hepatology Research Group, have explored how immune biomarkers predicted variable outcomes from Covid infection and, as Lead for the BASL Alcohol-related Liver Disease Special Interest Group, Ashwin is leading a national service evaluation to assess whether lockdown has been associated with a higher number and acuity of admissions of patients with alcohol-related liver disease.

Other research highlights include the identification, using next generation sequencing, of six genes expressed in the liver that have rare genetic signatures in the small number of people who appear resistant to the Hepatitis C Virus (Dr Dan Felmlee, Professor Matthew Cramp); ongoing collaboration with Dr Charlie Affourtit to investigate mitochondrial dysfunction in the context of metabolic liver disease and frailty in cirrhosis; and a pilot trial of a novel psychological therapy to reduce alcohol related harm in patients with alcohol dependence and liver disease (Dr Ashwin Dhanda and Professor Jackie Andrade).

NEUROSCIENCE

While some of PIHR’s neuroscience work is disease-orientated (see our research highlights under Brain and Mind), our discovery research seeks to understand the pathological processes that give rise to neurodegenerative diseases as well as disorders of myelinating cells, ischemia and brain tumours. This research is supported by the core investigation of fundamental mechanisms, such as cell death and regeneration.

Professor Shouqing Luo is a world-leading researcher on autophagy regulation and its roles in Huntington’s Disease and other neurodegenerative diseases. Huntington’s disease (HD) is an autosomal dominant progressive neurodegenerative disease, characterized by movement and cognitive dysfunction. There is no effective clinical treatment to slow down the disease progression. Research led by Professor Luo shows for the first time that Bim, a BH3-only pro-apoptotic protein, plays a role in HD progression and is a potential target to tackle neuronal cell death and neurodegeneration.

Most of Dr Konstantin Glebov’s research has been lab-based, focusing on glia cells – the most abundant cell type in the human brain – and how they communicate with neurons. The study of these mechanisms can help to understand the molecular basis of rare brain disorders. Konstantin’s work led him to think about the more general needs of patients with rare diseases and their families, which are still poorly addressed on a local level. This led him to establish, using funding from Research England, the South West Rare Disease Policy Group, an initiative that provides information and resources to families and individuals affected by rare diseases; brings together patients, their families and healthcare providers to work in advocacy; and which is building a rare disease database, where patients and their families can learn more about a number of conditions and find UK specific resources relevant to those conditions.
IN THE NEWS

Most human cells are able to repair damage by dividing at wounds. But mature nerve cells (neurons) in our brain are different. If they attempt division, they will likely die — and this is what happens during brain injury, or in conditions such as Alzheimer’s Disease (AD). Now new research led by the University of Plymouth has uncovered a pathway that has shed new light on how these divisions may be triggered.

This research focused on intracellular structures called microtubules — which are found in most animal cells and can be damaged by a build-up of a protein called Tau in the brain during AD. It found that, among fruit flies, abnormal human Tau destroys microtubules and are correlated with a greater frequency of neurons attempting to divide and neuronal death. The fact that the identified two signalling kinases are found alongside a build-up of Tau in post-mortem brains of Alzheimer’s Disease patients suggests that the mechanism identified using fruit flies may act similarly in humans.

MOTOR CONTROL

Led by Professor Jonathan Marsden, the Motor Control Laboratory is a specialist Brain Research & Imaging Centre (BRIC) laboratory, established in 2021. The aim is to understand how motor control varies across the lifespan of healthy participants and how movements are affected by disease or injury to the central and peripheral nervous system, as well as to explore ways we can improve motor control and functional movements with rehabilitation. Various techniques are used, including whole body recordings during constrained and unconstrained movements, and simultaneous recordings of the electrical signals produced by the brain and muscles during movements.

By selectively stimulating sensory channels, we can understand how sensations (such as vision, vestibular and somatosensory) contribute to standing balance and the stabilisation of eye and head movements. Developments in our ability to investigate movements in more real-world settings using techniques such as 3D motion analysis and virtual reality, combined with advances in robotics, mean we are increasingly able to understand how neurological long-term conditions affect movement and functional ability.
Brain and Mind research represents an area of considerable strength across PIHR. This theme unites fundamental research on the brain and neurological disease with applied sciences in cognition and behaviour, through to community support for mental and physical health, and experiences of identity, agency, and well-being.

These strands are supported by interdisciplinary and complementary programmes of research and state-of-the-art facilities. The University of Plymouth is strategically positioned to combine contemporary scientific enquiry with a strong connection to people and place, enabling the Brain and Mind theme to deliver an effective translational pathway.

Research highlights include the role that virtual reality can play in reducing types of pain typically seen in patients with nerve injuries (Dr Sam Hughes); and evidence on how the brain activity of patients with depression, captured by MRI scans, may help doctors predict who will respond to cognitive behavioural therapy (Dr Elsa Fouragnan). Drs Chun-Wei Hsu and Giorgio Ganis have also used fMRI to show how people can beat lie detector tests by using two mental countermeasures (though we might not want to advertise this more broadly!).

"Credit assignment" is where a person or animal attributes the wrong outcome to an event. It exists in a variety of psychiatric disorders, like addiction or OCD where people still believe that drug consumption or engaging in certain rituals will lead to positive outcomes.

In this study, led by Dr Elsa Fouragnan, low-intensity transcranial ultrasound stimulation (TUS) was used in the lateral prefrontal area of the brains of macaque monkeys. As a consequence of the ultrasound neuromodulation, the animals became more exploratory in their decisions. Behaviour was no longer guided by choice value – meaning that they could not understand that some choices would cause better outcomes – and decision-making was less adaptive in the task.

While currently developed in an animal model, this line of research and the use of TUS could one day be applied to clinical research to tackle psychiatric conditions where maladaptive decisions are observed.

According to Dr Fouragnan, “The really interesting finding in this study is not only discovering where certain decision-making activities take place, but also how neuromodulation can change these and associated behaviours. We hope that this can pave the way to new studies in humans, particularly in patients experiencing mental health issues.”

In brain and mind discovery, more than 100 investigators from across the university work together, with expertise ranging across biomedical research, cognitive, social, and developmental psychology, neural sciences, visual psychophysics, social sciences, human factors, biology, rehabilitation sciences, robotics, music, literature, film, and computational neuroscience.

Brain Research Imaging Centre (BRIC)

Our Brain Research Imaging Centre (directed by Professor Stephen Hall) was launched in 2021. With seven cutting-edge human research laboratories, BRIC includes an MRI suite with the most advanced 3-Tesla scanner available. It will critically advance our enquiry toward the most advanced brain research, improved radiological diagnostics and better patient care.
Within experimental psychology, our researchers aim to understand the mechanisms of thought, from basic associative and cognitive processes, through language and communication, to social interaction and group behaviour. They are interested in all stages of life, from infancy to old age, and examine typical and atypical function.

**IN THE NEWS**

Children aged five to eight will intervene to stop someone breaking the rules, a study suggests. The study of 376 children from around the world found that they were willing to challenge peers who broke the rules and that this appears to be a ‘human universal’.

Dr Patricia Kanngiesser, lead author of the study from Plymouth said: “What is new about this study is that we observed children’s behaviours and travelled worldwide to do so – we didn’t ask children what they intended to do but measured what they actually did in real-life social interactions. It was also really interesting to see that how the children corrected each other varied by location. We assumed that, because everyone knows everyone else in small scale communities, direct interventions would be less common, as people could rely on more indirect ways such as reputation to ensure compliance with rules. But we actually found the opposite to be true”.

*The Times, The Telegraph, Mail Online, 28th December, 2021.*

BRAIN AND MIND TRANSLATION

**Biomedical research**

Our Biomedical Research Group employs state-of-the-art capabilities to explore the mechanisms underlying disease, with a prominent focus on both molecular and in-vitro brain research. Neurodegenerative diseases are an additional area of expertise, including study of Alzheimer’s, Motor Neurone, Huntingdon’s and Parkinson’s diseases.

**Applied Psychology**

Researchers in the School of Psychology examine the mechanisms by which environmental risk factors influence mental health. This includes understanding of the processes that underpin human motivation, which lie at the heart of many health-related behaviours. There is a large focus on how individual differences contribute to behaviour and experience, such as variability in resilience, emotion, and visible appearance, and the social and cognitive implications of these in everyday life.

**IN THE NEWS**

Loot boxes are purchasable video game features which offer randomised rewards. They are widely recognised as being similar to gambling and are currently being considered in the Gambling Act Review. The researchers published a study in the journal Addictive Behaviours, which partly forms the basis of a policy-focused white paper report. The report states that 93% of children in the UK play video games, and that up to 40% of these have opened loot boxes.

Dr James Close, Senior Research Fellow of Biomedical and Health Informatics at the University of Plymouth, said: “Our work has established that engagement with loot boxes is associated with problem gambling behaviours, with players encouraged to purchase through psychological techniques such as ‘fear of missing out’. We have also demonstrated that at-risk individuals, such as problem gamblers, gamers, and young people, make disproportionate contributions to loot box revenues”.

Zoë Osmond, CEO of GambleAware, said: “The research has revealed that a high number of children who play video games also purchase loot boxes and we are increasingly concerned that gambling is now part of everyday life for children and young people... It is now for politicians to review this research, as well as the evidence of other organisations, and decide what legislative and regulatory changes are needed to address these concerns.”
Rehabilitation

Led by Professor Jenny Freeman, the Rehabilitation Research Group undertakes work to enhance understanding of the underlying mechanisms contributing to functional difficulties, as well as the factors that affect rehabilitation, care packages, and service delivery. Much of their work characterises the impact of impairments on function in people with central and peripheral neurological disease. This includes diabetic neuropathy and variables affecting prognosis, such as the risk factors associated with falls in people with MS.

Research highlights include the development of a toolkit and training package for current and future clinicians to enable telerehabilitation; the results of a trial of a standing frame intervention to improve life for people with MS; and an investigation of the role of music and dancing in promoting wellbeing among people with Parkinson’s, dementia, COPD, depression and PTSD.

IN THE NEWS

Researchers at the University of Plymouth are looking for 60 women from the local area who have been suffering with pelvic girdle pain for three months or more since childbirth to take part in a new study testing customised pelvic support shorts as an innovative alternative treatment.

The ‘Evaluating the Management of Chronic Pelvic Girdle Pain following pregnancy: A randomised controlled feasibility’ (EMaPP) trial aims to find out the best way to help women who experience persistent pelvic girdle pain following childbirth. The study, funded by the National Institute for Health Research (NIHR) is being supported locally by the NIHR Clinical Research Network South West Peninsula (CRN SWP).

BRAIN AND MIND COMMUNITY

This is an enormous focus of PIHR research that not only includes the development, specification, and delivery of evidence-based interventions, but also the promotion of behaviours that can support health and wellbeing, both at an individual and at a group level. Some of this research is captured under the Health across the Life Course theme.

Much of our research within medicine and rehabilitation develops and tests interventions to support the recovery, maintenance of function and prevention of avoidable complications in people who have resolving conditions such as stroke and those whose condition is long-term, static or deteriorating such as MS and Parkinson’s disease.

Current highlights include research on post brain injury – whether in the clinical setting (e.g., head injury and neurosurgery in older patients (Dr Ellie Edelmann) or living within community settings and supporting their long-term biological, psychological, and social needs (Dr Alyson Norman).

We have world-leading applied Parkinson’s disease research, led by the Applied Parkinson’s Research Group (Dr Camille Carroll, Dr Stephen Mullin, and Dr Marie Louise Zeissler). A recent success has been the completion of PD STAT, led by Dr Carroll, the largest multi-centre neuroprotective therapy in Parkinson’s disease to be run in the UK. The trial concluded a few months after the start of the pandemic, and the innovative methods implemented to ensure trial delivery and completion have been featured as an NIHR case report.

We have also led the first study to explore the lived experience of anxiety for people with Parkinson’s, which revealed that study participants did not see talking therapy as a useful solution, and more support was needed for people with the conditions, along with their carers and health professionals.

IN THE NEWS

Researcher and practising Occupational Therapist at Royal Devon and Exeter NHS Foundation Trust, Chris Lovegrove said: “There has been research into non-medical interventions, such as talking therapy, for people with Parkinson’s and anxiety, but this was the first study to speak to people themselves to understand what it’s like for them. I was fortunate to have conducted interviews with study participants in person pre-Covid, so I was able to really understand their experiences through their body language and ask ‘how are you really?’”

“It was very sad to hear how hard it has been for some people, but it’s great we’re on the road to help. Ultimately, I want to produce a framework to help people with Parkinson’s live well with anxiety, as well as support their care partners and occupational therapists in the process. The findings from this research will be vital in shaping that.”
Promoting mental and physical health and well-being is an important focus for the Community and Primary Care Research Group who are particularly involved in addressing socio-economic inequalities in mental health (around 66% of people with mental health disorders live in poverty and isolation and only 12% are employed).

This group, led by Professor Richard Byng, has led many trials, including in the Year in Review, PROGROUP (imPROving GROUP treatment for people with severe obesity), which investigates the role of managing social group interactions to help people who have severe obesity achieve long term weight change. This trial, co-led by Prof Jonathan Pinkney, is supported by £2.5m NIHR funding.

Colleagues in Psychology have also been contributing to our understanding of how tools such as functional imagery training can boost confidence and weight loss.

IN THE NEWS

According to a study led by Prof Sube Banerjee, a drug used to treat agitation in people with dementia is no more effective than a placebo, and might even increase mortality.

The research has shown that antidepressant mirtazapine offered no improvement in agitation for people with dementia – and was possibly more likely to be associated with mortality than no intervention at all.

Dr Richard Oakley, Head of Research at Alzheimer’s Society said: “Unnecessary prescribing of antipsychotics to people with dementia is dangerous and associated with a higher risk of death, which is why we’ve been campaigning hard to reduce levels since the late 90s, saving tens of thousands of lives. The gold star treatments for agitation don’t involve drugs and are tailored to the person – like arts and crafts or movement to music. In recent years antidepressants – like mirtazapine – have been considered a fallback if non-drug approaches don’t work.”

The year in review saw the appointment of Rohit Shankar as an Professor in the Faculty. Professor Rohit Shankar leads the Cornwall Intellectual Disability Equitable Research (CIDER), a partnership between the University of Plymouth and Cornwall Partnership NHS Foundation Trust (CFT) focusing on people with intellectual disabilities. Current work includes the study of sudden unexpected death in epilepsy (SUDEP), outputs of which include a risk checklist for SUDEP that has been clinically adopted nationally and internationally and the development of an app EpsMon to monitor current risk for patients. Rohit has also initiated a register of people with comorbid ID and epilepsy, including the collection of DNA samples for this group. Rohit has secured some £6m of research funding to support these activities in the Year in Review.
HEALTH ACROSS THE LIFE COURSE

Our life-course approach provides an alternative framework to a disease-based approach to understanding the health and wellbeing of populations. It promotes a holistic view of people’s health and wellbeing at all ages, allowing us to explore the interlinkages between health and individual, family, community and societal characteristics and why these factors give rise to health inequalities.

It is nevertheless the case that the sheer breadth of research we undertake under this broad theme also relates to other PIHR themes. For example, much of our public health, health services research and research pertaining to clinical innovations for adults is captured under our Future Ready theme.

CHILDREN AND YOUNG PEOPLE

There is a wealth of evidence about the importance of supporting the healthy development of children and young people. PIHR researchers work on the relationships between risk exposures, outcomes and interventions from pre-conception to youth.


We have responded directly to the Covid-19 pandemic in our understanding of the impact this has had on young people, our Covid-19 Learning Partnership working with the Youth Endowment Foundation and 129 young people sought to understand both the impact of COVID-19 on young people at risk of being drawn into violent crime and the most effective approaches to reaching, engaging and serving them during the pandemic. We are also actively involved in research seeking to help schools to support the education of children in care (During this year in review, Drs Nick Axford and Lynne Callaghan have also been collaborating in the Becoming a Man programme, a two-year, group-based social-emotional programme delivered in schools with adolescent boys. Developed in Chicago by Youth Guidance, it seeks to improve education outcomes and reduce criminal activity by promoting positive youth development. Our congratulations to Nick and collaborators who were awarded the President’s Award for Outstanding Prevention Science Research Article at the 2021 European Society for Prevention Research annual conference.

Other highlights this year include our work in paediatric nursing and Dr Susie Pearce’s research on the uncertain futures of young adults with cancer.
IN THE NEWS

Placing parents with children suspected of having illnesses such as meningitis nearer to the centre of decision-making, simplifying health services, and ensuring children see the same health professionals will help accelerate treatment and reduce deaths.

The Before Arrival at Hospital (BeArH) project looked at the pre-hospital journeys of children later diagnosed with a serious infectious illness such as meningitis and sepsis. It found that parents often feel powerlessness and a loss of control over their child’s health and their access to treatment; they report feeling criticisied for using services in the early stages of the illness which can lead to delay in seeking help again, both parents and health professionals miss signs and markers of serious illness; there is a lack of continuity of the health professionals caring for individual children – few see the same professional when seeking help again; and risk averse agencies refer more suspected cases to hospitals, adding extra stress in the system.

Professor Sarah Neill, chief investigator of the project said: “During our research, we heard heart-breaking accounts from parents. Parents, already distressed when their child is unwell, feel disempowered in the face of the established knowledge of health professionals in an overstretched service. For both, that system can be a complicated terrain to navigate. This can lead to a ‘perfect storm’ with tragic outcomes, ironically in a system designed to stop this. We hope that the BeArH findings and follow-up investigations will help to reduce child deaths.”

ADULTHOOD

Researchers in PIHR undertake extensive research on health risk factors and public health; work with very vulnerable populations and have a strong focus on the management of chronic diseases among adults.

Public health

Our public health research together researchers, clinicians, practitioners brings with expertise in systematic reviews, epidemiological studies, the design an evaluation of complex interventions and service evaluation to deliver improved health and social care for patient and public benefit. Following NIHR funded work (2020-21) to explore University, Local Authority and NIHR infrastructure organisations resources could be repurposed to support Public Health research (Dr Cath Quinn), we have embedded a relationship with Plymouth City Council’s Public Health Department to ensure that University and public health staff work in synergy to make the most of collaborative research opportunities.

Highlights of our public health research include Dr Kerryn Huak’s work on social prescribing (an approach designed to support the non-clinical needs of people who may need support with their mental health, who are alone or isolated and who have long-term conditions or complex social needs that affect their wellbeing). In the Year in Review, Kerryn has secured the income for and led the NIHR-funded academic collaborative for the National Academy for Social Prescribing and become the Principal Investigator of MRC and Defra-funded projects relating to green social prescribing.

This year, we also explicitly raised the need to include coastal communities as a focus of public health and health inequalities, through contributing to the Chief Medical Officer’s annual report:

IN THE NEWS

Academics from the University of Plymouth have contributed to a major Government report highlighting the many and varied health challenges facing the UK’s coastal communities. In the Chief Medical Officer’s Annual Report 2021, Professor Chris Whitty says that – despite the significant efforts of local leaders – these communities continue to have a high burden of health challenges across a range of physical and mental health conditions, often with lower life expectancy and higher rates of many major diseases. The report has been developed over the past year and includes a chapter analysing the burden of disease and health service data at a granular level, written by Professor of Health Policy Sheena Asthana and Senior Research Fellow Dr Alex Gibson. This presents compelling evidence that coastal communities experience a significantly higher burden of disease than their non-coastal counterparts and that this is over and above the level of prevalence that can be explained by socio-economic factors and demography. There are also particularly worrying trends in public health-related outcomes for children and young people, with the authors saying that policy needs to recognise, understand and respond to the particular circumstances that have resulted in this excess coastal morbidity.

Working with vulnerable populations

The Community and Primary Care Research Group (led by Professor Richard Byng) has had a very active year publishing on joined up approaches to support vulnerable populations including people experiencing mental health conditions, those experiencing homelessness and offenders under community.

Dr Tom Thompson, Professor Adrian Taylor and Jane Horrell published two systematic reviews from NIHR funded work and led a Special Issue in the journal Mental Health and Physical Activity on physical activity for alcohol and substance misuse, with colleagues at Brown University Medical School, USA and the Karolinska Institute, Sweden. Professor Rob Witton and Dr Martha Paisi in partnership with Peninsula Dental Social Enterprise CIC continue to run their innovative dental outreach clinics for disadvantaged people with dental health problems and to publish on the benefits of this approach for both improving access to dental care and dental students’ education. This builds on our existing reputation at the University for Inclusive Dentistry and supports the concept of social accountability as a key component of dental healthcare education.

Managing long-term conditions

PIHR research covers a wide range of long-term conditions, focu including diabetic foot protection, MS, severe asthma and the recognition of obesity as an important and treatable clinical problem.

Highlights in the Year in Review include the work of the Severe Asthma Research Programme. Joe Lanario is leading an 11-country study into the quality of life of severe asthma patients across Europe using the Severe Asthma Questionnaire (SAQ), a health-related quality of life questionnaire developed by PIHR academics. Working with Plymouth Marjon University, Dr Rupert Jones is developing a new asthma questionnaire, the Generic Asthma Questionnaire, for patients with mild to moderate asthma, to get a full picture of how the condition impacts their quality of life.
IN THE NEWS

Oral bacteria are best known for causing tooth decay and gum disease, but they are not all bad. Inside our mouths exists a delicate ecosystem of microorganisms that mirrors the importance of the gut microbiome and which researchers are discovering can be cultivated in the same way to boost health and longevity.

Dr Raul Bescos in the University of Plymouth’s oral microbiome research group (OMRG) says that the mouth harbours the second biggest bacteria community in the body, yet its microbiome is overshadowed by the attention paid to the gut. “For years we have been trying to kill oral bacteria because we linked it to oral disease, but we now know that up to 90 per cent of bacterial in our mouths is essential for maintaining oral and probably systemic health.”

Dr Zoe Brookes, a dentist and another member of Plymouth’s OMRG says that “we should avoid overuse of mouthwashes labelled as anti-bacterial – usually containing the ingredient chlorhexidine – because they can disrupt the oral microbiome.”

The Times, 27th April, 2021

Clinical innovations

Our clinical researchers work across acute, primary and community care to identify innovative clinical practices and pathways to improve patient health. Highlights in the Year in Review include Professor Daniel Martin’s NIHR HTA funded study (£1.6 million) to evaluate the clinical and cost-effectiveness of a conservative approach to oxygen therapy for invasively ventilated adults in intensive care (UK-ROX). Drawing on his own experience of measuring invasively ventilated adults in intensive care (UK-ROX), Professor Martin has published guidance on how to prevent and recover from Covid19.

We deliver a very wide portfolio of projects relating to clinical innovation and quality improvement. Selecting just a few highlights from this portfolio, in this Year in Review, our researchers have published recommendations about balancing risks and benefits when recommencing oral anticoagulants after major bleeding; research on sex-based inequalities in contemporary UK hospital management of stable chest pain; findings on access and triage strategies to reduce health care waiting times; a review of hygiene adaptations among UK doctors in controlling the spread of SARS-CoV-2 infection; the development of guidelines for adult liver transplantation; guidelines on perioperative and postoperative biochemical monitoring and micronutrient replacement for patients undergoing bariatric surgery; recommendations on how to measure family-centred care practices in adult ICUs; analysis of the psychosocial needs and support impacts in families affected by young sudden cardiac death; trial evidence of the outcomes of an augmented exercise referral scheme using web-based behavioural support for inactive adults with chronic health condition; strategies to improve oral health behaviours and dental access for people experiencing homelessness; and the development of an innovative approach to commissioning a supervised toothbrushing programme.

Demographic ageing has resulted in increasing health service demand, particularly in hospitals where over two thirds of admissions are over 65 years old. However, there are concerns that hospitals may not always provide the right kind of care that older people need.

Exploring alternative care pathways, PIHR research focuses on prevention (such as better nutrition and falls management), early intervention (by modifying risk factors for dementia), supporting people to live in the community (through integrated care and e-Health interventions) and helping people to live as well as possible until they die.

Dementia

Professor Sube Banerjee is an international expert in quality of life in dementia, evaluation of new treatments and services and the interface between policy, research and practice. He led the development of the National Dementia Strategy and worked with the World Health Organisation to make dementia a priority in its Global Action Plan. In 2020, Sube co-authored the update to The Lancet Commission on dementia prevention, intervention, and care. This found that modifying 12 risk factors over the life course could delay or prevent 40% of dementia cases.

IN THE NEWS

According to Professor Sube Banerjee, “these new estimates from the Lancet Commission are very valuable. They set out the things we can do to drive down the prevalence of dementia by acting on modifiable risk factors to promote brain health. It is excellent that the report also shines a light on the immense challenge that dementia poses in low and middle income countries as well as more developed economies such as ours.

The report also highlights the critical importance of helping people with dementia maintain a good quality of life and avoid unnecessary hospital admissions. “People with dementia and their families have suffered disproportionately in this pandemic, and we therefore concluded that stronger measures should be put in place to protect people with dementia in care homes and in their own homes at this time and in future health crises.”
IN THE NEWS

The University of Plymouth has partnered with Heathrow Airport to launch new guidance to support passengers with dementia through air travel. The team held an event in Terminal 5 to launch the new guidance, entitled Flying with Dementia, and spread awareness about the importance of understanding how to help those with dementia and their travel companions. The airport also explained the various ways the terminals have been adapted to support these passengers when travelling.

The guidance was put together following a recommendation by the Prime Minister’s Dementia Challenge Group for Air Transport chaired by University Academic partnership Lead for Dementia, Ian Sherriff BEM, with key contribution from Dr Alison Warren, Associate Professor of Occupational Therapy at the University of Plymouth. The guide also draws heavily on PhD research undertaken by Kate Turner, Lecturer in Occupational Therapy at the University of Plymouth, with the innovative use of cartoons by nationally acclaimed artist, Tony Husband, to highlight research findings.

Dementia air travel guidance launched at Heathrow, featuring PIHR’s Ian Sherriff BEM, Dr Alison Warren and Katherine Turner with Angela Rippon CBE.

Ian Sheriff has also worked with Dentistry students at the University to produce a new guide to help dental professionals incorporate dementia-friendly care into their practice.

Parkinson’s Disease

In the Year in Review, the Applied Parkinson’s Research Group, led by Dr Camille Carroll, has secured funding to support a range of innovations, including include the development and evaluation of a digital system on the monitoring and self-management of non-motor symptoms in people with Parkinson’s and the development of an innovative platform designed to connect people with Parkinson’s with relevant research studies. Successes this year include the group’s receiving a BMJ Award (Highly Commended) for digital innovation, for the Home Based Care pathway, which has been implemented at University Hospitals Plymouth and supports self-management of Parkinson’s with digital remote monitoring with a wrist worn sensor.
Camille’s contribution has been recognised by key stakeholders in her field. In 2021, Helen Matthews, Deputy CEO of Cure Parkinson’s, said: “Camille is a shining light in both Parkinson’s care and research. Camille truly recognises the importance of each individual’s experience of living with Parkinson’s. Her determination to ensure those affected by the condition are kept at the heart of research and healthcare decisions is inspirational, and a perfect example of the very ethos of this award. And simply, she is an outstandingly kind and caring member of the Parkinson’s community. Thank you, Camille, for all that you do.”

Healthy older ageing

An important focus of current research is to make people themselves more central to decision-making affecting their lives. One challenge for both patients and the GPs trying to support them in living healthy lives is that, as people are living longer, many develop multiple health conditions that no single set of guidelines will cover.

Developed by Dr Edmund Jack and evaluated by Dr Dawn Swancutt, the SHERPA model (which stands for Shared Evidence Routine for a Person-centred Plan for Action), sees the practitioner act as a ‘guide’, working with patients to apply evidence and explore solutions in a holistic way. According to Dr Swancutt, “it’s early days and it’s vital that evidence is used to inform all decision making in implementing this model. But if taken on board successfully, we feel it really could transform primary care and help people to feel more empowered, as well as living longer, healthier lives.”

Physiotherapy students, collaborating with Age UK are also offering functional fitness assessments to older people in Devon, then using personalised assessments and shared norm-referenced data to empower participants to realise their own physical fitness goals and independently pursue physical activity training opportunities in their community (Liz Candy, Dr Lisa Bunn).

Similarly, Drs Julian Elston and Felix Gradinger have worked with colleagues to explore the role of a social prescribing ‘holistic’ link-worker for older people with complex, multi-morbidity in improving well-being and addressing frailty.

Camille leads COVID-19 PD UK, a multi-site retrospective cohort study, funded by Parkinson’s UK, to understand the outcome and mortality of hospital admission with COVID-19 in people with Parkinson’s disease and atypical parkinsonian syndromes. Camille also co-leads the £1.3m three-year Edmond J Safra Accelerating Clinical Trials in Parkinson’s Disease (EJS-ACT-PD) initiative with the primary objective of developing the world’s first multi-arm multi-stage (MAMS) platform trial to test potential disease modifying treatments in Parkinson’s disease. She is a co-investigator of three current trials, two funded by NIHR and one by Parkinson’s UK.

In 2021, Dr Camille Carroll won the Tom Isaacs Award, given by Cure Parkinson’s and Van Andel Institute in recognition of her involvement of patients and impact of her work.
Our many activities in this area are hosted by the Centre for Health Technology (CHT). Led by Professor Ray Jones, CHT brings together the University of Plymouth’s wide range of health technology expertise. In the Year in Review, CHT members were joined by Dr Edward Meinert and Professor Shangming Zhou but sadly lost Dr Arunangsu Chatterjee to the University of Leeds.

SUPPORTING AGEING THROUGH DIGITAL INNOVATIONS

In addition to ongoing projects, such as EPIC (funded since 2017 by two consecutive grants of £2.7 million and £4 million from the European Regional Development Fund and the UK Government), RadioMe (£2.7 million, funded by EPSRC) and Healthy Ageing through Innovation in Rural Europe (HAIRE, a £4.5 million Interreg 2 Seas project across four countries), our digital researchers have secured new funding for prestigious projects.

The ESRC-funded Generating Older Active Lives Digitally (GOALD) project is using intergenerational groups to examine how to design and deliver digital resources to provide and engage older people in structured activity programmes with the aim of improving their health and wellbeing. Collaborating with colleagues in the University of Stirling, Plymouth’s role (led by Professor Ray Jones) is to create location-based Virtual Reality (VR) environments, user test technologies such as VR equipment, gaming and fitness wearables and collaborate on the development and evaluation on sports and activity focused reminiscence.

Dr Edward Meinhert is the PI on the impact of a digital system on the monitoring and self-management of non-motor symptoms in People with Parkinson’s project. Funded by Parkinson’s UK (£190k) and in collaboration with Dr Camille Carroll, this project will support the registration of the app as a class I medical device.

Research Highlights

Professor Shangming Zhou’s research focuses on artificial intelligence (AI) and statistics in health and biomedical informatics: data-driven health-related studies using techniques, such as machine learning/deep learning, natural language processing, computational intelligence (artificial neural networks, fuzzy logic, nature-inspired computing etc.), statistical analytics, and data mining.

Two current projects are mining data from electronic patient codes. First, deep phenotyping is being used to predict the development of colorectal cancer stages, including the potential return of cancer after treatment and associated multimorbidity. By revealing connections and interactions between phenotypic factors, the researchers seek ultimately to explore how and why cancer affects people differently and suggest how treatment and prevention could be individualised for sufferers. Second, AI is being applied to electronic records to build evidence for the safe use of medications to assist practitioners in improving their medication-use systems to prevent medication errors and patient harm.

The data revolution
In another project and in collaboration with the charity SUDEP Action and the company, SUVO, Professor Zhou and his team are using patient self-generated data via the Epilepsy Self-Monitoring (EpSMon) app to identify the risks and health outcomes of childbearing women. Through this research, they hope to gain an understanding of how digital technologies might be used to improve the wellbeing of expectant mothers who suffer from seizures. Supported by Health Data Research UK and international partner, Professor Zhou and his team are also developing data-driven solutions to identify the complex interactions between the socioeconomic, cultural and environmental factors that contribute to individual- and population-level health outcomes. In particular, the team advances local modelling technology to explore interactions of these factors at a micro-level across different sub-regions of data space so that they can effectively identify those sub-populations. They hope this will provide important insights into targeted policy development and intervention.

Responding to the Covid19 pandemic

Dr Edward Meinert has secured funding from the NIHR (Artificial Intelligence in Health and Care Awards) to undertake real world testing of an artificial intelligence-enabled app (Wysa) as an early intervention and support tool in the mental health referral care pathway. According to Edward: “Mental health conditions place a large burden on individuals, healthcare systems, and the economy – and this has only been exacerbated by the COVID-19 pandemic. Waiting times and unmet need are of serious concern, so this project is taking a step to do something about it”.

System problems associated with the Covid19 pandemic, in particular the difficulties of physically accessing GP surgeries, were also addressed in the 2020-21 Remote-by-Default Care in the COVID-19 Pandemic project. This £750,000 project, funded by the Economic and Social Research Council (ESRC) and led by Professor Trisha Greenhalgh from the University of Oxford, investigated what is required to scale-up and deliver better remote care. Working closely with ‘deep-end’ practices that service highly deprived populations, Dr Sarah Rybczynska-Bunt and Professor Richard Byng led the Plymouth site which focused on the impact of remote by default on individuals living in poverty or with complex needs.

The Telerehab project funded by the Medical Research Council and led by Professor Jenny Freeman was similarly designed to provide guidance in undertaking effective remote consultations for people with physical disabilities and movement impairment, including people recovering from COVID-19. The resulting toolkit of resources is a guide for health and social care practitioners, patients and their families and was based on literature searches, discussions with over 100 practitioners, students, patients and their families, and a survey of 247 UK health and social care practitioners.

Technology implementation and behaviour change

We continue to explore the role of eHealth solutions (such as apps and online group interventions) in motivating people to change health-related behaviours, such as weight loss, diabetes self-care and adherence. Dr Meinert and Dr Maddie Milne-ives have also been researching the use of mobile apps for health behaviour change, e.g., through their Health Education England funded evaluation of the NoObesity Professionals and NoObesity Families apps.

The findings from a £1.3m NIHR funded trial called e-coachER were published in the British Journal of Sports Medicine and as an HTA Final Report, involving 450 participants involved in an exercise referral scheme (ERS) for chronic health conditions in Plymouth, Birmingham and Glasgow. Using a bespoke web-based support system to promote physical activity did not increase accelerometer recorded physical activity after 1 year, compared with usual ERS, but did improve mental health outcomes. The trial was led by Professor Adrian Taylor, with support from the Peninsula Clinical Trials Unit in Plymouth, and the Medical Statistics group. Finally, our hearty congratulations to Professor Ray Jones, who was awarded an MBE for services to digital health and social care in the 2021 Queen’s Birthday Honours List.

The findings from a £1.3m NIHR funded trial called e-coachER were published in the British Journal of Sports Medicine and as an HTA Final Report, involving 450 participants involved in an exercise referral scheme (ERS) for chronic health conditions in Plymouth, Birmingham and Glasgow. Using a bespoke web-based support system to promote physical activity did not increase accelerometer recorded physical activity after 1 year, compared with usual ERS, but did improve mental health outcomes. The trial was led by Professor Adrian Taylor, with support from the Peninsula Clinical Trials Unit in Plymouth, and the Medical Statistics group. Finally, our hearty congratulations to Professor Ray Jones, who was awarded an MBE for services to digital health and social care in the 2021 Queen’s Birthday Honours List.

The Future Ready Health and Care System

Digital Health
Several key issues will need to be addressed to ensure a future ready NHS. These involve changes to clinical education and workforce development, including equipping staff with the skills and capabilities to make the most of digital and technological developments, and tackling workforce stress. They also include developing and supporting the rapid deployment of new clinical interventions, the promotion of service integration and an openness to radical transformation in terms of overall health system design.

These are all areas in which the PIHR excels and, in 2021, we established the Future Ready Health and Care system as a core research theme.

Research Highlights

**TRAINING AND CONTINUING PROFESSIONAL DEVELOPMENT**

- We have a rich tradition in pedagogic research (see our publications on the future ready workforce in the Appendix) much of this led by our Collaboration for the Advancement of Medical Education Research and Assessment (CAMERA). This ranges from explorations of methods of widening participation and decolonising the curriculum to assessments of different pedagogic approaches (e.g., coaching and peer-learning model for students’ placement learning as opposed to the old mentorship model and using simulated patient assessment in clinical examinations).

**IN THE NEWS**

Commissioned by the General Dental Council (GDC) in preparation of the UK leaving the EU, research led by the University of Plymouth has explored dental education standards across the European Union. This found variation between, and within, countries in the provision of dental education standards. In addition, the research found that there have been many proposals for harmonisation between Member States but little evidence of these having been implemented. Variation was also found in how dental education was quality assured.

Osama Ammar, Head of Public Policy for the GDC said: “Understanding the differences between international education and training standards and quality assurance is important to ensuring the public is protected. This evidence helps us understand more about harmonisation and variation across EU Member States and will help us consider if and how to establish similar forms of recognition arrangements, if we are authorised to do so through the Professional Qualifications Bill.”

With respect to continuing professional development, we undertake research on remediation and professional regulation (including fitness to practice, revalidation and medical licencing).

**IN THE NEWS**

It is thought that, at any time, around 6% of doctors in the hospital workforce may be performing below the standard that is expected of them. As there is a shortage of doctors in the NHS and a fully trained doctor will have cost the taxpayer approximately £500,000 to train, offering remediation to retain expensively trained but underperforming doctors is a logical financial solution. Remediation is, therefore, an important facet of workforce retention and has a direct impact on patient safety.

Following the RESTORE 1 project, which ran from 2017-2020 and reviewed existing studies on what works, where and for whom in remediation, Dr Nicola Brennan has secured NIHR funding for RESTORE2, which will develop and evaluate action plans to improve remediation programmes across five NHS sites across the UK.

Dr Brennan said: “We’ve heard many times that this has been a year like no other, and this isn’t about trying to find areas or people that aren’t working effectively. It’s about exploring how we can optimise existing remediation programmes through the use of evidence-based recommendations. We’ve all seen how important our NHS is, so we want to equip it with the tools to help and retain talent as far as possible. It’s a really important project and we’re looking forward to learning what comes out of it.”

We are also working with local partners to support the development of research capacity – in terms of problem definition, reviewing evidence, designing, implementing and evaluating interventions and supporting evidence-based decision-making.

In 2021, PIHR researchers (led by Dr Penelope Welbourne) secured NIHR funding to support the development of research teams inside social care organisations. We are also working with Plymouth Public Health Department to co-design research and build research capacity.
PREPARING FOR THE DIGITAL REVOLUTION

In an interesting thought piece Joy O’Gorman, a nursing student at the University of Plymouth and digital health champion for the Centre for Health Technology’s eHealth Productivity and Innovation in Cornwall and the Isles of Scilly (EPIC) noted that “MyCOPD – an, evidence-based, NHS-approved management tool for COPD patients, (has) proven to be as effective as pulmonary rehabilitation—the gold standard care for COPD management. . . Yet not one of (the hospital) patients had heard of the myCOPD app and equally it was relatively unknown by the healthcare professionals –despite it being free and licenced for use in the county. A similar situation was discovered in GP surgeries where COPD patients are often referred. . . “Health service leaders would do well to create spaces for innovation where healthcare students can exchange ideas and explore their research during placement experiences. The nursing role as a whole should also be supported by ensuring up-to-date resources and CPD opportunities are made available. More work also needs to be done to ensure eHealth is not an extra-curricular activity for the few.

EPIC has enlisted over 20 student nurses as Digital Health Champions, like Joy, to work in local communities to support the implementation of new and existing health technologies to make a difference in patient care. It supports work-based internships, open to the University of Plymouth students from all disciplines and offers students the opportunity to volunteer at EPIC events in order to learn more about health technology. However, an ongoing research question for PIHR researchers is how to ensure that eHealth does not, as Joy suggests, remain an extra-curricular activity for the few.

WORKFORCE STRESS

Workforce has become a top concern for NHS trusts across the country. Demand for services, and in turn demand for staff to deliver services, has grown more quickly than the pipeline of new staff. Workforce pressures have been exacerbated in recent years by the increasing difficulty in recruiting and retaining overseas staff and the workforce stress presented by Covid19.

IN THE NEWS

A review led by the University of Plymouth has shown that dentists suffer an increased level of stress and burnout – but not enough is known about their colleagues in the wider dental team.

Written in collaboration with the University of Southampton and commissioned by the General Dental Council, the rapid evidence assessment analysed research from the last 14 years on mental health in dental professionals. The work concluded that dentists suffer an increased level of stress and burnout, particularly general dental practitioners, with litigation and regulation the main stressors. It also noted an increase in the number of dentists showing signs of burnout over the 14-year period. However, the review showed there is little or no research on the wellbeing of dental care professionals, such as dental nurses, dental hygienists and dental therapists. The review also showed a lack of research or evaluation on mental health support interventions with dental professionals in mind.

Lead author, Anastasios Plessas said: “Some of the studies that we found suggested that poor mental health may lead to practitioners being less clinically confident and potentially impact treatment decisions. However, further empirical studies need to happen before anyone can know if and how poor mental health and wellbeing impacts on dental teams’ performance and patient safety. Mental health is higher on our society’s agenda than ever before, so we hope the review’s findings will prompt further studies into mental health and the interventions that can help.”

PIHR researchers are engaging in workforce stress related research across a number of clinical areas, including social work, the need for recovery amongst emergency physicians in the UK and Ireland and concerning levels of stress among the nursing and midwifery workforce. Research in the pipeline includes our plans to extend our surveys on factors associated with stress in the social care workforce to other public and third sector workers providing care for vulnerable people, the stress involved in breaking bad news, and developments in mindfulness apps.

IN THE NEWS

Concerning levels of psychological distress are reported in results from a longitudinal study of the UK nursing and midwifery workforce during COVID-19. Analysis of surveys of the UK nursing and midwifery workforce taken at three time points during the first wave of the pandemic found that a significant proportion of participants had probable PTSD. While this declined over the three surveys, almost 29.3% continued to report experiences indicative of a probable post-traumatic stress disorder diagnosis three-months after the first pandemic peak. Severe or extreme stress was reported by almost 17.5% of respondents three-months after the first pandemic peak. 63.2% of respondents redeployed to help with the Covid crisis reported that training to prepare for redeployment either did not occur or was inadequate. 40% reported that they lacked confidence in infection prevention and control training that they had received, or that training had not been received. 22.6% felt that the correct personal protective equipment was not always available.

Professor Bridie Kent, who herself returned to practice to help in the fight against COVID-19, said: “I’ve seen first-hand how the COVID-19 pandemic has impacted nursing colleagues, so to see the study findings echo the huge pressure they’ve been under comes as no surprise. These findings can inform how healthcare organisations should respond to staff wellbeing needs both during the current pandemic, and in planning for future pandemics. We need to look after our workforce.”
IN THE NEWS

At the start of the COVID-19 pandemic, access to all face-to-face dentistry was suspended. Urgent and emergency dental treatment was provided from Urgent Dental Care centres (UDCs) that were rapidly established across the country. Dental practices in England were allowed to reopen in June 2020, but access to treatment was still restricted.

Research published by PIHR researchers suggests that Dentistry needs to be effectively integrated into wider healthcare infrastructures to improve communication and patient care. There is a need to ‘level up’ NHS dental access, prioritising the most vulnerable; to replace the Units of Dental Activity (UDA) system – a measure of the amount of work done during dental treatment – as part of dental contract reform, with a focus on prevention; to provide better mental health wellness support.

Dr Rob Witton, co-led the new study, and said: “The pandemic, and particularly lockdown, have provided some really challenging times for the health sector, and this study shows how tough it has been in dentistry. Rather than looking at how we can return to ‘normal’, though, these studies enabled staff to really analyse their experience and reflect on if and how things could change for the better in future, including better access to dental care and preparedness for any future pandemics.”

HEALTH SYSTEM DESIGN

There is growing evidence of organisational stress in the NHS, with unprecedented backlogs in planned care, delays in emergency care and organisational deficits. Better service integration has long been promoted as one solution to these ongoing challenges. Care integration requires understanding and experience in interprofessional working, which our Faculty of Health is supporting through its unique interprofessional training programme (delivered by the Plymouth Integrative Health and Social Care Education Centre (PIHC)). Additionally, the health service requires an openness to shift activity from resource intensive hospital services to prevention, early diagnosis, self-management and management in the community, i.e., wider system design.

PIHR researchers have a strong track record of working on service integration. Working with services in Torbay and South Devon, PIHR researchers (Professors Richard Byng and Sheena Asthana and Drs Julian Elston and Felix Gradinger) have evaluated a range of innovations in integrated health and social care, from enhanced intermediate care services to the use of multi-disciplinary health and wellbeing teams. This work is part of a wider programme of research on Person Centred Coordinated Care (led by Dr Helen Lloyd), which has involved the development of frameworks to measure experiences and outcomes in multimorbid patients and organisational readiness for integration as well as carrying out a series of service evaluations.

With respect to wider health system design, in the Year in Review, we worked with our trust partners to support key developments including the Health Infrastructure Plan (HIP2), now New Hospital Programme. As part of this we organised a series of online consultation sessions with academics and key regional stakeholders, from the NHS and industry. We also engaged in futuristic research about what the health system of the future may look like in 2050, submitting an interdisciplinary entry to the 2021 Wolfson Economics Prize (the hospital of the future). This work continues space with respect to supporting local design work around the New Hospital Programme and Health and Wellbeing Hubs.

The health and care system, of course, comprises more than the NHS and social care. Dr Clare Pettinger is the Plymouth lead for a cross-institutional research project focusing on disadvantaged communities in the UK food system. Much of our coastal communities research recognises the complex links between economic, social, cultural, environmental and health outcomes. We are also working with colleagues in the Faculty of Science and Engineering to conceptualise what ‘One Health’ means in terms of the linkages between soils, food and human health, with a particular focus on the microbiome.
PIHR is committed to bringing about real improvements to people’s health at a local, national and global level. Knowledge mobilisation is therefore a core ambition, whether it is producing highly impactful research, influencing national policy, sharing good practice internationally, or supporting our local stakeholders and healthcare workers.

One approach in which we specialise is in deploying co-located Researchers in Residence (RiRs) to undertake knowledge mobilisation – working with all stakeholder groups in the complex health and care system. In the Year in Review, the RiR approach has been used to support the evaluations of social prescribing in Devon and Cornwall; integrated care and system redesign in Torbay and South Devon, the alignment of research priorities between UoP and Plymouth Public Health Team, the evaluation of Devon’s population health management programme and an NIHR funded project to support the development of research capacity among social work practitioners in Devon and Torbay.

Much of the research highlighted in this report falls into the category of knowledge mobilisation insofar as a core aim of PIHR researchers is to bridge developments in discovery and translation with real world application. Our stakeholders are not only those who commission and provide health and care services but the people who use those services. One of the highlights in the Year in Review relating to user involvement has been our work in piloting digital panels for Patient and Public Involvement. Leading the panel for Children and Young People and their carers, Professor Sarah Neill hopes to extend this opportunity to activity engage in research design and participation nationally. PIHR members have also worked collaboratively with other medical schools to publish on the barriers to and impact of widening participation approaches in medicine and related disciplines.
A seat at the table

We are also active in governance - whether this be through non-executive directorships on arms-length bodies, trustees of charities or steering group members of professional and research organisations. Many academics contribute their time to such bodies – usually without payment – because we recognise that having a seat at the table is an important mechanism for transferring knowledge in a way that can ultimately make a difference.

In the Year in Review, PIHR members have sat on a number of influential bodies, including:

- Advisory Committee on Resource Allocation (NHS England)
- Health Inequalities Task and Finish Group (NHS England)
- NIHR’s Motor Neuron Disease CSG and portfolio management group,
- Meningioma/Metastasis Subgroup of Brain Study Group (NCRI),
- Prime Ministers Dementia Challenge Group for Air Transport.
- Board of the European Society for Prevention Research,
- Cochrane Priority Setting Methods Group,
- European Pathways Association,
- European Rehabilitation in MS network,
- Scientific Committee European Association of Neuro-Oncology,
- International Scientific Committee World Federation of Neuro-Oncology Societies,
- National Institute for Academic Anaesthesia,
- Council of the Intensive Care Society,
- Academy of Medical Royal Colleges Research Leads Group,
- Royal College of Anaesthetists,
- Academy of Nutritional Sciences,
- Antibiotic Research UK.

We have been Trustees of several leading charities, including:

- Action for AT,
- Alzheimer’s Society,
- Change Grow Live,
- Critical Path for Parkinson’s,
- Cure Parkinson’s Trust,
- Pituitary Foundation,
- Multiple Sclerosis Society,
- Versus Arthritis.

We have also sat on the steering groups of a range of professional/research bodies, both national and international. Examples include:

- Advisory Committee on Resource Allocation (NHS England),
- Health Inequalities Task and Finish Group (NHS England),
- NIHR’s Motor Neuron Disease CSG and portfolio management group,
- Meningioma/Metastasis Subgroup of Brain Study Group (NCRI),
- Prime Ministers Dementia Challenge Group for Air Transport.

Evidence submissions and policy impact

When our research relates to policy, it is important to communicate it to Parliament and other influential decision makers. In the Year in Review, we have submitted evidence to the Education Committee (Dr Alex Gibson & Professor Sheena Asthana), the All Party Parliamentary Group (APPG) for Rural Services (Professor Sheena Asthana), the APPG on Health and the Natural Environment (Dr Kerryn Husk), the Work and Pensions Select Committee enquiry on Children in Poverty (Dr Andrew Jolly) and the Department for Digital, Culture, Media & Sport (Dr Helen Lloyd).

Other policy-relevant work includes the ongoing evaluation for the Defra/DHSC rollout of green social prescribing (Dr Kerryn Husk) and our contributions to the Chief Medical Officer’s 2021 Annual Report (Dr Alex Gibson & Professor Sheena Asthana). Work done through leadership of the NIHR Remote Trial Delivery Working Group (Dr Camille Carroll) has fed into the DHSC UK Clinical Research Recovery Resilience and Growth (RRG) programme, aiming to understand and realise the benefits of new ways of working for clinical trials and trial participants. Her work has also been referenced by NICE undertaking a technology assessment of a digital sensor in Parkinson’s disease management. Dr Clare Pettinger has shared her research and practice to inform the co-creation of the NHS Greener Allied Health Professional hub. Mona Nasser led the research priority setting chapter in the WHO Guidance on Research Methods for Health Emergency and Disaster Risk Management.
### Appendix 1: Major Research Awards

<table>
<thead>
<tr>
<th>UoP Principal Investigator</th>
<th>Funder</th>
<th>Awarded Value</th>
<th>Title of Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Ray Jones</td>
<td>Economic and Social Research Council (ESRC)</td>
<td>£759,538</td>
<td>Connectivity and Digital Design for Promoting Health and Well-being Across Generations, Places and Spaces</td>
</tr>
<tr>
<td>Dr Nicola Brennan</td>
<td>National Institute for Health Research (NIHR)</td>
<td>£662,454</td>
<td>Optimising the delivery of remediation programmes for doctors: A participatory co-design and realist evaluation approach</td>
</tr>
<tr>
<td>Dr Camille Carroll</td>
<td>Safr Foundation</td>
<td>£374,022</td>
<td>Accelerating Clinical Treatments for Parkinson’s Disease: a multi-arm multi-stage clinical trial platform (ACT-PD)</td>
</tr>
<tr>
<td>Professor Richard Byng</td>
<td>Plymouth Hospitals NHS Trust</td>
<td>£269,578</td>
<td>Community Transformation Pilot</td>
</tr>
<tr>
<td>Professor Jennifer Freeman</td>
<td>National Institute for Health Research (NIHR)</td>
<td>£219,353</td>
<td>Management of chronic pelvic girdle pain following pregnancy: A randomised controlled feasibility trial</td>
</tr>
<tr>
<td>Dr Edward Meinert</td>
<td>Parkinson’s UK</td>
<td>£171,675</td>
<td>NMS Assist</td>
</tr>
<tr>
<td>Professor Jeremy Hobart</td>
<td>Novartis Pharma AG</td>
<td>£168,397</td>
<td>Fatigue PRO Selection</td>
</tr>
<tr>
<td>Dr Kerryn Husk</td>
<td>Medical Research Council</td>
<td>£145,322</td>
<td>Intervention development for community-based self-referred social prescribing</td>
</tr>
<tr>
<td>Professor Jeremy Hobart</td>
<td>Novartis Pharma AG</td>
<td>£131,150</td>
<td>Expand Rasch Analysis</td>
</tr>
<tr>
<td>Professor Bing Hu</td>
<td>He Run Qian Li (Beijing) Cultural Development Co Ltd</td>
<td>£124,911</td>
<td>Evaluating the function of nanoparticles in water cleaning</td>
</tr>
<tr>
<td>Dr Julian Elston</td>
<td>Torbay &amp; S Devon NHS Foundation Trust</td>
<td>£111,555</td>
<td>The feasibility and impact of a voluntary peer health and well-being coaching service for outpatients with chronic long-term conditions with low activation (chronic pain, multiple sclerosis and rheumatoid arthritis)</td>
</tr>
<tr>
<td>Dr Edward Meinert</td>
<td>National Institute for Health Research (NIHR)</td>
<td>£97,209</td>
<td>Autonomous Telemedicine - Cataract Surgery Follow-up at Two NHS Trusts</td>
</tr>
<tr>
<td>Professor Shouqing Luo</td>
<td>Rosetrees Trust</td>
<td>£91,256</td>
<td>Lowering autophagosomal overload to mitigate Synucleinopathies</td>
</tr>
<tr>
<td>Dr Edward Meinert</td>
<td>Health Education England</td>
<td>£87,614</td>
<td>Phase 1 mixed-methods study of the NoObesity Digital Health App</td>
</tr>
<tr>
<td>Dr Camille Carroll</td>
<td>Parkinson’s UK</td>
<td>£85,289</td>
<td>Describing the Outcome of Hospital Admission with COVID-19 in Parkinson’s Syndromes in the UK</td>
</tr>
<tr>
<td>Professor Jeremy Hobart</td>
<td>Biogen Limited</td>
<td>£84,599</td>
<td>Changing the Game: Evaluating the Real World Impact and Cost Effectiveness of Fampridine in Multiple Sclerosis</td>
</tr>
<tr>
<td>Dr Susie Pearce</td>
<td>Torbay Medical Research Fund</td>
<td>£71,797</td>
<td>A case study to explore the implementation of a person centred EHCH framework with two care homes in Torbay and South Devon</td>
</tr>
<tr>
<td>Professor David Parkinson</td>
<td>Brain Tumour Research</td>
<td>£67,107</td>
<td>PhD Studentship</td>
</tr>
<tr>
<td>Dr Kate Maslin</td>
<td>Sir Halley Stewart Trust</td>
<td>£59,826</td>
<td>Nutrition and wellbeing of women experience hyperemesis gravidarum in the United Kingdom</td>
</tr>
<tr>
<td>Professor Jonathan Marsden</td>
<td>Rachel Lozano Pre Doc Fellowship</td>
<td>£59,452</td>
<td>Rachel Lozano Pre Doc Fellowship</td>
</tr>
</tbody>
</table>
Appendix 2: Our Publications

Brain and mind discovery
Águila-Carrasco AJD, Marin-Franch I (2021) Predictability of sinusoidally moving stimuli does not improve the accuracy of the accommodative response. SCIENTIFIC REPORTS Vol.11 iss.1 10.1038/s41598-021-94642-2 http://hdl.handle.net/10.1026.1/17459


Carvalho PF, Chen C-H, Yu C (2021) The distributional properties of exemplars affect category learning and generalization. SCIENTIFIC REPORTS Vol.11 iss.1 10.1038/s41598-021-90743-0 http://hdl.handle.net/10.1026.1/15353


Brain and mind translation


Appendix 2: Our Publications Awards


Brain and mind community


Brennan N (2021) Emotions, psychological safety and recommendations for designing remediation programmes MEDICAL EDUCATION 10.1111/medu.14687


Appendix 2: Our Publications Awards


McColl E (2021) Standards in Dentistry BRITISH DENTAL JOURNAL (BDJ) Vol.231 Iss.2 10.1038/s41415-021-3283-6 http://hdl.handle.net/10026.1/17385

McColl E, Witton R, Tredwin C (2021) Pandemic progress BRITISH DENTAL JOURNAL Vol.230 Iss.9 10.1038/s41415-021-3035-9


Rajagopal S, Kelly A (2020) Shared Decision Making in Endodontics PRIMARY DENTAL JOURNAL Vol.9 Iss.10 10.1177/2050168420956303


Witton R (2021) Is social enterprise good for dentistry? BRITISH DENTAL JOURNAL Vol.230 Iss.10 10.1038/s41415-021-3020-1


Digital health


Appendix 2: Our Publications Awards


Milne-Ives M, Neil S, Meinert E (2021) The impact of digital educational interventions to support parents caring for acutely ill children at home and factors that affect their use: systematic review protocol JMIR RESEARCH PROTOCOLS Vol.10 Iss.6 10.2196/27504 http://hdl.handle.net/10026.1/17040


Norman A, Baptie G, Andrade J, Bacon A (2021) Virtually renovating the Trauma Film Paradigm: Comparing Virtual Reality with on-screen presentation of an analogue trauma CYBERPSYCHOLOGY: JOURNAL OF PSYCHOSOCIAL RESEARCH ON CYBERSPACE Vol.15 Iss.1 10.5817/CP2021-1-6 http://hdl.handle.net/10026.1/16736


Zamir S, Hennessy CH, Taylor AH, Jones RB (2021) Feasibility of school students’ Skype carers into the home for reducing loneliness and social isolation in Older People GERIATRICS Vol.5 Iss.4 10.3390/geriatrics5040090 http://hdl.handle.net/10026.1/16837

Zamir S, Hennessy C, Taylor A, Jones R (2020) Intergroup ‘Skype’ Quiz Sessions in Care Homes to Reduce Loneliness and Social Isolation in Older People GERIATRICS Vol.5 Iss.4 10.3390/geriatrics5040090 http://hdl.handle.net/10026.1/16837


Zamir S, Hennessy C, Taylor A, Jones R (2020) Virtually renovating the Trauma Film Paradigm: Comparing Virtual Reality with on-screen presentation of an analogue trauma CYBERPSYCHOLOGY: JOURNAL OF PSYCHOSOCIAL RESEARCH ON CYBERSPACE Vol.15 Iss.1 10.5817/CP2021-1-6 http://hdl.handle.net/10026.1/16736

Zamir S, Hennessy CH, Taylor AH, Jones RB (2021) Feasibility of mobile apps: Adding web-based technology to peer reviews of “Machine Learning for Risk Group Identification and User Data Collection in a Herpes Simplex Virus Patient Registry: Algorithm Development and Validation Study” JMIRX MED Vol.2 Iss.2 10.2196/28917

Alghamdi O, King N, Jones GL, Moens PDJ (2021) Effect of ageing and hypertension on the expression and activity of PEPT2 in normal and hypertrophic hearts AMINO ACIDS Vol.53 Iss.2 10.1007/s00726-020-02936-y


Frontiers in discovery science

Alghamdi O, King N, Jones GL, Moens PDJ (2021) Effect of ageing and hypertension on the expression and activity of PEPT2 in normal and hypertrophic hearts AMINO ACIDS Vol.53 Iss.2 10.1007/s00726-020-02936-y


Appendix 2: Our Publications Awards

Dentistry


Hanks S, Coelho C, Tredwin C, Watson H (2021) It is difficult to think about becoming what you have never seen”. Black students perceptions around a career in academic dentistry BRITISH DENTAL JOURNAL (BDJ). No DOI


Wittren R, McColl E, Tredwin C (2021) Students’ return to clinic BRITISH DENTAL JOURNAL Vol.230 iss.10 10.1038/s41415-020-2555-x http://hdl.handle.net/10026.1/16650


Medicine


Joshi LT (2021) Using alternative teaching and learning approaches to deliver clinical microbiology during the COVID19 pandemic FEMS MICROBIOLOGY LETTERS 10.1093/femsle/fnab103


Future ready workforce (including educational research)
Appendix 2: Our Publications Awards


Kushnir, I, Spowart, L (2021) University teacher development courses in the UK neoliberal higher education context EDUCATION IN THE NORTH Vol.28 Iss.2 10.26235/tqq-c515


Williamson G, Kane A, Clarke D, Jamison C, bunce J, McDowell C, Plowright H (2021) Collaborative Learning in Practice: videos to prepare students and staff NURSING TIMES No DOI http://hdl.handle.net/10026.1/16871


Other


Minton S (2021) A response to Dr Louise Taylor’s “Seeking equality of educational outcomes for Black students”: A personal account. THE PSYCHOLOGY OF EDUCATION REVIEW Vol.45 Iss.2 No DOI

Health across the life course

Childhood and adolescence (including maternity)


Akintomide H, Brima N, Mansour DJ, Shawe J (2021) Copper IUD continuation, unwanted effects and cost consequences at 1 year in users aged under 30 – a secondary analysis of the EURAS-IUD study THE EUROPEAN JOURNAL OF CONTRACEPTION & Reproductive HEALTH Care Vol.26 iss.3 10.1080/13625187.2021.1879783


Milne-Ives M, Neil S, Meine R (2021) The impact of digital educational interventions to support parents caring for acutely ill children at home and factors that affect their use: systematic review protocol JMRIR RESEARCH PROTOCOLS Vol.10.iss.6 10.2196/27504


Appendix 2: Our Publications Awards


Health services research

Hospital-based/specialist care


Edlmann E, McMahon C (2021) Balancing risks and benefits when recommencing oral anticoagulants after major bleeding THROMBOSIS AND HAEMOSTASIS Vol.121 Iss.8 10.1055/a-1520-2309 http://hdl.handle.net/10026.1/17237

Appendix 2: Our Publications Awards


Primary, community and social care


Byng R (2020) Should we can we, halt the rise in prescribing for pain and distress? BRITISH JOURNAL OF GENERAL PRACTICE Vol.70 Iss.698 10.3399/bjgp20x712217


Methodsological research


