

Institution: University of Huddersfield
Unit of Assessment: UoA3
<p>1. Unit context and structure, research and impact strategy</p> <p>(i) Unit context and structure.</p> <p><u>Overview</u></p> <p>The University of Huddersfield's vision is to be an inspiring, innovative University of international renown. The University's Research Strategy has a primary vision of excellent research with impact contributing to important advances in human knowledge and significant improvements to global quality of life. To achieve this, thematic Areas of Strategic Research Importance (ASRIs) have been identified, including Health and Wellbeing, the principal focus of our UoA3 submission. The University's commitment to and confidence in this UoA is evidenced by its significant strategic investment during the current REF period and its ambitious plans for the next one.</p> <p>ASRIs embrace and promote interdisciplinary research and Huddersfield's Unit of Assessment 3 (UoA3) submission is joint between the Departments of Nursing & Midwifery and Allied Health Professions in the School of Human and Health Sciences (HHS) and the Departments of Pharmacy and Optometry in the School of Applied Sciences (AS). In our first submission to UoA3, in REF2014, 10.2 FTE staff were returned, most from the Department of Pharmacy. The current REF period has seen a significant step-change in the UoA's research activity, particularly in applied health, resulting in a five-fold increase (to 51.5 FTE) in staff classified as having significant responsibility for research (including 2 FTE Independent Researchers).</p> <p>The hallmark of our research in UoA3 is its interdisciplinary nature, enabling us to address research problems from a truly bio-psycho-social perspective. Our research extends from 'bench to bedside' and beyond, into community and global health. Joint working was already present in REF2014 (especially regarding skin/wounds); this has since been consolidated and expanded. This REF cycle has seen marked growth in our applied health research (now representing approximately half the submitted outputs, compared with fewer than five papers in REF2014).</p> <p>Our mission and aims are to foster a spirit of (co-)enquiry and partnership for innovation and change in response to challenging health issues and related social problems, to make a real difference to peoples' lives in organisations, services and communities internationally, nationally and locally. We are strongly committed to enhancing our research culture, fostering interdisciplinary research and engaging openly with relevant audiences.</p>

Research strategy is collectively developed, in the context of a common mission and aims, culture of collaboration and world-class shared facilities. Structures to ensure co-ordination (within the UoA and across the wider university) include ASRIs, Research Centres and Institutes, Associate Deans for Research and Enterprise and University Research and Enterprise Committee.

Organisation of Research in the UoA

Our research is structurally organised into the organisation-wide Institute of Skin Infection and Infection Prevention (ISlaIP) and School-based, interdisciplinary Research Centres, with embedded Special Interest Groups (SIGs); centres contributing to this UoA are highlighted in **bold**:

Research Centres (HHS)	Research Centres (AS)
Centre for Applied Research in Health (CARH)	Pharmaceutics and Drug Delivery
Applied Psychological Research (CAPR)	Biopolymer Research Centre
Centre for Cognition and Neuroscience	Pharmacology and Therapeutics
Centre for Applied Childhood, Youth and Family Research (CACYFR)	Pharmaceutical Policy and Practice
Centre for Citizenship, Identity and Diversity (CCID)	Chemical Synthesis and Design
None in Three	Cellular and Molecular Models of Disease
Applied Criminology and Policing Centre (ACPC)	Microbial Therapeutics and Infection Control

The Research Centres and Institute are 'engines' of research activity, promote research career development (e.g. all SIG leads in CARH are intentionally early or mid-career researchers) and provide a 'research home' for individuals (established researchers, early career researchers, ECRs and postgraduate research students (PGRs)) with common interests. The Department of Optometry was established in 2019 and, as critical mass through new academic appointments is achieved, establishment of an Optometry Research Centre is planned for the next REF cycle. Research Centres support each other, share ideas and collaborate. Establishing discrete Research Centres throughout this REF cycle has facilitated significant growth in activity/development of 'critical mass' in specialist areas (e.g. maternal and family health; mental health; public health; cancer; pharmacology and pharmaceutical policy), whilst promoting collaboration and interdisciplinary research. Individuals are primary members of a Research Centre/Institute related to their specialist area and can also affiliate with other Research Centres

within the UoA and the wider University. Notable examples of how this promotes interdisciplinary research include:

- ISlAlP (co-led by **Ousey** [HHS] and **Conway** [AS]) includes staff from HHS, AS, and the Schools of Art, Design and Architecture, ADA (Technical Textiles Research Centre) and Computing and Engineering (C&E) (Centre for Engineering Materials), leading to interdisciplinary projects and outputs (e.g. with **Goswami** [ADA], **Fleming** [C&E], **Walton** [C&E]).
- Research within the Pharmacology and Therapeutics Research Centre typically involves other Research Centres not specifically returned to UoA3, including Chemical Synthesis and Design (UoA8) and Cellular and Molecular Models of Disease (UoA5), resulting in publications in leading interdisciplinary journals such as *Angewandte Chemie*.
- The Wellbeing ASRI is co-led by **Caress** (HHS) and **Gorton** (AS) and the Health ASRI by **Babar** (AS) and **Roberts** (HHS).
- **Gorton** (AS) and **Rooke** (HHS) co-lead the Mental Health Research Special Interest Group (SIG) in CARH. Developed during the current REF period, this SIG and the Wellbeing ASRI are bringing together researchers with interests in mental health from across the university, including ADA (Centres for Health Histories and Urban Design, Architecture and Sustainability) and C&E (Institute of Railway Research; Centre for Artificial Intelligence in Mental Health). This is yielding exciting new collaborations, building on the work of ECRs (e.g. dementia and the built environment [lead **Rooke**] and suicide prevention [leads **Noonan** and **Gorton**]), which will be developed in the next REF cycle.

(ii) Achievement of strategic aims for research and impact.

In REF2014, our UoA3 research strategy sought to enhance the breadth and quality of our research, key aims being:

(A1) To develop a coherent group and to expand in areas with existing expertise and provide a coherent and critical mass of quality research activity

(A2) Developing high profile interdisciplinary research

(A3) To generate income from external funding sources to support substantive research

(A4) To generate high quality outputs from existing and new staff

Main achievements A1 and A2 – development of coherent groups, expanding expertise and increasing interdisciplinarity

The core component of **(A1)** was developing the UoA's strategic themes. These included: materials science; pharmacology and pharmacogenomics; societal changes and associated growth in long-term conditions; development of the health and social care workforce; innovations (including technological) in care provision; participation and involvement; prevention and support for physical and mental well-being. Development of these areas required significant focus on growing interdisciplinary research **(A2)**, a core theme throughout the pursuit of our strategy. To exemplify, research in the Skin Interface Sciences Group was identified in REF2014 as a key example of our interdisciplinary approach and, during this REF cycle, its activities have expanded, resulting in establishment of ISlAIP in 2015 **(A1 and A2)**.

Our applied science research has expanded and developed in new areas, basic and applied, including: biomarkers (for cancer, psychiatric disorders, neurological and neurodegenerative disorders), biopolymer research and its application to pharmaceutical and biomedical research, cancer biology and pharmacology, inflammation, pharmaceuticals and drug delivery and pharmaceutical policy and practice

Developing our applied health research has been a strategic focus during this REF cycle. We have achieved this through targeted appointments to support growth in agreed strategically important areas (e.g. maternal and family health [**Stacey, Darwin, Keely**] and mental health [**Tolchard, Rooke, Noonan, Doyle**]; supporting staff to undertake PhDs and restructuring CARH better to reflect current activity/areas of growth. **This has led to a step-change in the volume and quality of applied health research generated in the UoA**, as evidenced by the number of health-related staff and outputs returned and in our impact case studies.

Main achievements A3 – generating income

UoA3 research income (spend) in REF2014 was £1.2m. **Our income (spend) in this REF cycle has more than doubled, to £2.85M**. Key to this has been strategic development of our portfolio of sources of grant capture and reducing reliance on internal and local/regional funding streams. We have successfully achieved this, with funders during the current REF period including National Institute for Health Research (NIHR) (**Lucock, Caress**); EU (**Hargreaves, Bland and Prescott**), international government sources (**Stephenson**), UK Charities (**Smith, McHugh**) and industry (**Ousey, Blackburn, McHugh**).

Main achievements A4 - increasing the number of high-quality outputs

This aligns with Institutional strategic aims (UoH Strategy Map 2013-2018). We have actively sought within this REF cycle to better balance our portfolio of academic to professional journal

outputs. Additionally, we have made targeting top-quartile journals in specialist areas a strategic priority. Evidence of success is demonstrable, with staff publishing high quality outputs in journals such as Nature Chemistry, Angewandte Chemie, Chemical Science, BMJ Open, PLoS One, International Journal of Nursing Studies, Midwifery, Advanced Materials, Lancet Global Health, Lancet Oncology and Nature Microbiology.

As described in the Institutional Environment Statement, the University's Research Strategy commits to delivering excellent research with impact, providing direct economic and societal benefit for the communities we support. The UoA3 REF2014 impact strategy was to harness the interdisciplinary nature of our research to secure improvements in health and well-being and prevention of disease. Our impact strategy for the current REF cycle had four elements:

(E1) continue to foster an impact focus

(E2) maximise effectiveness of our collaborative network, further develop relationships and further invest in impact-enhancing advisory boards

(E3) effectively communicate our research to the public

(E4) recognise and reward staff excellence.

Main achievements E1 – fostering an impact focus

We have embedded impact training for all staff within each School through research away days, expert-led workshops and events run by R&E.

We have fostered and established strong partnerships with stakeholders across public, non-profit and for-profit sectors to ensure relevance, with our strong focus on applied research enhancing impact. Notable examples from our REF2021 suite of impact case studies include:

- **Astin's** work on optimising informed consent for patients undergoing coronary angioplasty, which has **impacted on policy, healthcare professional awareness and clinical practice**
- **Lucock's** work on preventing relapse and supporting self-management after psychological treatment for depression, which has supported service users and a wide range of health professionals, **enabling better self-management of common mental health problems**
- **Ousey** and **Conway's** work on management/prevention of wound site infections, which is **transforming wound management in a wide range of settings**
- **Bland** and **Prescott's** work on increasing patient safety using simulation-based learning (NESTLED), which has **enhanced practitioner confidence and yielded benefits for the commercial partner**

- **Ousey's** development of a national framework on tissue viability, which has **improved patient care and transformed healthcare practitioner education in NHS wound care services.**

Main achievements E2 – maximising effectiveness of collaborative network and developing relationships

During the current REF period, **we have cemented well-established international research collaborations and invested strategically to further foster these**, including through appointment of an Associate Dean International (**Simkhada** in HHS and **Elliott** in AS), thereby enhancing the global reach and relevance of our research. This is particularly well-illustrated by our wounds research. Work led by ISlAlP and involving academics in HHS (**Ousey**) and AS (**Conway**) has yielded greater understanding of the microbial properties of wound environments and subsequent development of effective antimicrobial wound dressings/therapies. This work is recognised internationally, for example through **Ousey** being elected in 2017 as Chair of the International Wound Infection Institute [IWII], an interdisciplinary inclusive society providing a global perspective on the latest developments in wound infection (See impact case study 'Informing Standards and Improving Patient Outcomes in the Prevention and Management of Surgical Site Infections'). **Ousey** and **Conway** are also members of the International Surgical Wound Complications Advisory Panel (ISWCAP) that produced a consensus document on early detection and prevention of surgical wound complications.

Strengthening our national and international research collaborations with leading academic institutions (QS300) and organisations has been a strategic goal, aligned with wider university Research Strategy, and has seen substantial growth during the current REF period (see Collaborations, section 4). Illustrative tangible outputs from our collaborations include:

- 12 co-authored outputs arising from joint projects in wound care with Queensland University of Technology, Australia (**Ousey**)
- four joint projects/outputs in the areas of mental health, cardiology and critical care with Monash University, Australia (**Stephenson**)
- two joint public health projects/outputs with the Indian Council of Medical Research and Indian Institute of Public Health Gandhinagar (**Simkhada**)
- two joint projects in the area of medicines management with Harvard University, USA (**Babar**)

We have succeeded in enhancing the national and international esteem of our research. Notable illustrations include:

- **Phillips** being invited to serve as an [expert witness](#), e.g. in patent cases and for the [Oncology Drug Advisory Committee meeting](#) of the FDA.
- Regular invitations to contribute to development of national and international clinical guidelines in such areas as obstetric ultrasound (**Stacey**); asthma (**Caress**); device-related pressure ulcers – highly topical in the current pandemic (**Ousey**) and advanced practice nursing (**Rogers**)
- Invitations to hold executive roles with professional leadership bodies, e.g. European Organisation for the Research and Treatment of Cancer, EORTC (**Phillips**) and International Council of Nurses (**Hardiker, Rogers**) and recognition by these (e.g. **Hardiker** receiving a Fellowship of the American Academy of Nursing in 2020 and the 2017 Virginia K. Saba Nursing Informatics Leadership Award).

Other examples of international reach include antimicrobial stewardship programmes in the Middle East and membership of the THRESHOLDS study group (**Al Deyab** and **Conway**); appointment as an advisor on Pakistan's National Medicines Policy, contributing to development/editing a National Medicines Policy (**Babar**) and membership of the International Association for Suicide Prevention (**Gorton**, Co-chair, Special Interest Group for 'Suicide Prevention in Primary Care').

Nationally and locally, we have leveraged long-standing partnerships to grow research and have developed many new partnerships during this REF period, across public, non-profit and for-profit sectors: [NHS partners](#) (Calderdale and Huddersfield NHSFT [CHFT]; Mid-Yorks NHSFT [MYFT]), South West Yorkshire Partnership [SWYFT] and Sheffield Teaching Hospital [STHFT]; [not-for-profit health providers](#), such as Locala; [hospices](#) (Kirklees, St Gemma's, Prince of Wales, Overgate and the Forget Me Not Children's hospice) and [local authority](#) (Kirklees Council). Research collaborations with [charitable partners](#) include Versus Arthritis (**Burton**); Cure Kids (**Stacey**); Asthma UK and British Lung Foundation Partnership (**Caress**) and Water Aid (**Jones**). We are a partner in the region's [Applied Research Collaboration](#) (formerly CLAHRC). **These enhance the relevance of our research, promote collaborative working and support knowledge exchange.** Illustrating our 'Civic University' commitment, we are working with Kirklees Council on their 'Current Living in Kirklees (CLiK) survey and exploring public health research opportunities arising from the 'Huddersfield Blueprint', a 10-year vision to modernise the town centre.

We are also making important contributions to research capacity and capability building in our local partner organisations. **During the current REF period, we have invested significantly in**

joint appointments, including four at Reader/Professor level, with CHFT (**Astin, Stacey**) and SWYFT (**Lucock, Doyle**), with **Lucock's** role as Associate Director of Research at SWYFT illustrating how well-embedded these are. We also have research-active lecturer-practitioners (e.g. **Atkin**, MYFT; **Bain**, STHFT); internship arrangements with CHFT; are working with MYFT to develop clinical-academic posts within their 'Future Nurse' initiative and are academic partners of Kirkwood Hospice, which is working towards Teaching and Research Hospice status.

We have developed strong research partnerships with businesses such as Laederal; Urgo Medical, Perfectus Biomed and Smith and Nephew, involving **collaborative projects/publications, investment in our research and knowledge exchange**. We have benefitted business development, e.g. through enhancing product end-user acceptability and efficacy. We now receive regular requests to consult from businesses, e.g. insurer Swiss Re (**Burton**) – now a Knowledge Transfer Partnership (KTP); Molnycke Health (**Ousey**); GlaxoSmithKline (**Caress**); Syngenta (**Merchant**) and from government (e.g. Department of Work and Pensions, **Burton**).

We have affiliates and honorary appointees, who serve in an advisory capacity. Prof Peter Timmins, former Executive Director at Bristol-Myers Squibb produces primary research outputs, as well as a quarterly Industry Update in Therapeutic Delivery. [Prof Frank Bowling](#) (University of Manchester) and [Dr Sarah Jarvis MBE](#) have recently been appointed as Honorary Professors. The ISlaIP advisory panel includes prominent academics - Professors Fiona Wood (University of Western Australia), David Leaper (Surgeon and former Co-Director of ISlaIP), Ojan Assadian (Medical University of Vienna), and Amit Gefen (University of Tel Aviv). Advice is provided on a number of issues, including impact, with additional contributions to staff mentoring and outputs.

Main achievements E3 – communicating our research to the public

During the current REF period, we have **built on existing strengths in stakeholder engagement and co-production to develop an active and vibrant public engagement programme**.

In alternate months, AS and HHS host a hugely popular public lecture/discussion forum series (up to 8 lectures each year); during the current pandemic, this has been maintained online, communicating our [pandemic-related research contributions](#) for example. We engage at university and UoA-level with the National Co-ordinating Centre for Public Engagement, NCCPE - **Waters** was an NCCPE National Engagement Ambassador - and participate in events including Café Scientifique and Pint of Science. In 2016 and 2017, the European Researchers Night 'Full STEAM' (**S**cience, **T**echnology, **E**ngineering, **A**rts and **M**aths) Ahead' event, funded by the European Union's Horizon 2020 research and innovation programme, attracted over 3000 members of the public to the University for each event. **Waters** is a STEM ambassador. The University also

facilitates external promotion of research through public engagement events and publications such as Discover, Fields and The Conversation.

Staff are encouraged to integrate strategies to maximise engagement with and use of research outputs by different audiences into their research. To support this we deliver training, for staff and PGRs, on writing lay abstracts and public engagement/involvement.

Members of the HHS core-funded Public Partnership Group are increasingly involved in the UoA's research, as advisors and collaborators. We have also created two 0.5 FTE Co-Director of External Engagement roles. Investment Business Development Officer and Director for Consultancy and Enterprise roles complement the centrally provided Research Development Manager role in facilitating partnership working and strategic research development.

Main achievements E4 – recognise and reward staff performance

Staff performance is recognised and rewarded through annual Personal Development and Performance Review (PDPR) meetings and internal conferment procedures. Assessment of impact features in PDPR and promotion processes; staff promotions during this REF cycle are detailed in Section 2. Institutional criteria for promotion have recently been revised (2019/20), to include a route specifically recognising excellence in knowledge exchange and enterprise. This facilitates recognition and reward of those whose research is more applied, with a focus on knowledge exchange leading to impact; this route has yielded two promotions to Professor in UoA3 – **Waters** (2019) and **Garside** (2020).

In summary, we have successfully implemented our research and impact strategy over the current REF cycle, leading to significant expansion in both volume and quality of our research, thereby enhancing its reach and impact. Through consolidating research structures and links with external stakeholders, we are well-positioned to deliver our strategy to produce high quality research and impact in the future.

(iii) Future strategic goals for research and impact

The next REF period promises to be exciting and productive for the UoA, as we capitalise on the very substantial gains made since REF2014. Strategic research aims for UoA3 in the next REF cycle draw on the successful research and impact strategy for REF2014, and align closely with University strategic aims for research (per the 2018/25 strategy map):

A1 Our Research Strategy will continue to focus on interdisciplinary research in areas of existing strength and new areas leading to impact upon patient welfare and society, with a strategic

goal of 15% of outputs being developed with research end-users by 2025 (in line with University strategy).

A2 We will continue developing infrastructure, through substantial development of core facilities and research laboratories, to enhance the research environment and culture. This will be primarily driven by **University investment of £45 million in a new building for the Health and Well-Being Academy**, which will be fully functional by 2025.

A3 Aligned with the University's strategy map, our aim is to improve the quality of research outputs (with 75% or more staff with significant responsibility for research achieving 3*/4* publications by 2025), increase our research and knowledge exchange income and develop strategic research collaborations with other world class academic institutions year on year (in line with organisational targets).

A4 We will continue to support and develop existing staff, alongside attracting new research active staff, with the aim of enhancing our 'critical mass' of research active academics and practitioners in mutually agreed strategic areas year on year.

Three key elements underpin these strategic aims: **(i) supporting people; (ii) supporting the research process and (iii) supporting engagement, evidence utilisation and impact.**

While we promote the channelling of our research activity through our established Research Centres and Institutes, **we also support relevant curiosity-driven research that lays the foundations for future research foci.** Consequently, in addition to our established research areas, new foci will feature prominently in our plans for the next REF cycle, particularly in the Allied Health Professions, notably Optometry (new Department established in 2018); Paramedic Science and Speech and Language therapy (new programme in development).

A key feature of our plans for the next REF cycle is creation of a **new National Health Innovation Campus, to be led by the University**, which will be accompanied by **organisationally unique strategic investment in infrastructure and facilities** to support creation in 2020 of the **Health and Wellbeing Academy (Strategic Director – Garside)** – see section 3 for further details

Whilst retaining our overall strategic approach to impact (**E1-E4** above), we will adopt the following principles to further strengthen our enabling environment for impact:

1. Engaging public stakeholders. Ensuring our research is accessible and understandable to our research users and beneficiaries;
2. Building meaningful and mutually-beneficial research partnerships. Promoting responsible research, adapting to changing contexts, and supporting the translation and two-way

transfer of knowledge and insight that comes from relationships built over time with our research users and beneficiaries;

3. Co-production. Encouraging and enabling opportunities for impact to be built into the co-design and co-creation of all our research, engaging with our research users and beneficiaries from the start, and building on and extending our expertise in using different approaches and methods for achieving impact;
4. Influencing. Building trusted relationships that maximise opportunities for change;
5. Evidencing impact. Facilitating an accurate assessment of our impact activities so that we may nurture and increase our knowledge exchange relationships (and support activities such as REF);
6. Recognition and reward. Nurturing colleagues by sharing good practice, and recognising and celebrating our impact achievements;
7. Strengthening capacity for impact. Actively recruiting academic staff known for generating impact beyond academia, ensuring widespread understanding of the concept of impact, and supporting all staff to engage in activities that facilitate the positive impact of our research.

Sustainable research with future impact is being fostered through both institutional support and the development of additional relationships established during this REF cycle. At the institutional level, support offered includes a centrally funded Impact Officer whose role is to advise academic researchers and school-based Impact Officers. As described in the Institutional environment statement, centrally funded impact training sessions have been provided to both staff and PGR students on a range of topics designed to embed impact into our research culture; this is augmented by additional School-level strategic investment in training from recognised impact experts (e.g. Fast-Track Impact's Mark Reed).

Looking to the future and the development of research projects with impact, we have established research collaborations and partnerships in such countries as Pakistan (**Babar** and **Ghori**); Jordan (**Al Deyab**); India (**Marshall**); Nepal (**Simkhada**); Zimbabwe (**Rooke**) and Sierra Leone (**Jones**). These activities are already informing policy and service provision in vital topics such as antibiotic stewardship, pharmaceutical pricing policy; water purification in South Punjab; development of maternal and child health services; care provision for people with dementia and disaster management, all of which have the potential to generate research with impact on global societies in the future. These relationships align with the UK Strategy for the Global Challenges Research Fund (equitable access to sustainable development of health and wellbeing), the University's internationalisation strategy and the UoA's strategic mission to contribute to improvement of health and well-being in developing and resource-poor countries.

(iv) Research Culture.

Open Research: As an institution, the University supports the principles set out in the [Concordat on Open Research Data](#) and is committed to open research and Open Access publication of our research. It has invested in systems to facilitate Open Research, including the Elsevier PURE management information system and a University Data Repository and content management system (Box). Additional central support comes from appointments to Open Access Manager and Research Data Management Officer roles, focused on improving information; assisting in delivery of mandatory central training for staff and students; supporting the wider open research strategy and assisting academic staff in making data open and accessible.

As a UoA that prides itself on its values in applied research that makes a difference, we seek to continually develop and nurture an open, collaborative research culture that embraces and engages partnerships with different external stakeholders, which in turn further nourishes and supports staff research interests. We achieve this through encouraging **an open collaborative culture within and across research centres, through a vibrant public engagement programme and through a strong commitment to user/public involvement and coproduction**. We actively pursue a policy of open access to our research where feasible and encourage staff to integrate strategies into research proposals to maximise engagement with and use of research outputs by research users and different audiences.

In other areas, staff are encouraged to circulate research outputs within their fields through email and social media as well as through platforms such as ResearchGate, with core-funded support for such sharing of research provided in HHS by a Research Marketing Co-ordinator. We encourage registering of projects on publicly available research databases, such as Prospero or ISRCTN before study commencement and, where appropriate, publish study protocols. Illustrative of our commitment to Open Research, the British Journal of Pharmacy was launched in 2016, published by the University of Huddersfield Press. This is a gold open access journal (with no article processing charges) whose aim is to publish original research papers, critical reviews and rapid communications on the latest developments in pharmacy. Several members of academic staff serve on the editorial board including **Conway** (Editor in Chief), **Merchant** (Deputy Editor-in-Chief) and **McHugh, Olajide, Ousey, Smith, Phillips, Ghori, Asare-Addo, Adeola, Babar, Hasan** (Editorial Board members). The journal is listed in Google Scholar and registered with cross ref and our plans are to register with Scopus, Pubmed and DOAJ.

Research Integrity: In the development and conduct of our research, we maintain adherence to high standards of research integrity. As an institution, we adhere to the UKRI developed Concordat on Research Integrity and ensure research is conducted according to appropriate ethical, legal and professional frameworks, obligations and standards. The institutional Code of Practice for Research, research ethics and integrity policy and reporting statements are publicly available on the University website. Within AS and HHS, research and integrity matters are co-ordinated by School Research Ethics and Integrity Committees (SREIC), responsible for implementing University policies and procedures in relation to research governance. In addition, each School has a nominated Research Integrity Champion (**Phillips**, AS; **McAuley**, HHS) whose role is to promote good research practice, ensure that the principles and relevant standards are embedded and local guidance is available to staff and students regarding the issue of research misconduct and the reporting thereof. Research Ethics and Research Integrity training for staff and PGR students is embedded into the induction programme and assessment of research ethics is an integral part of all research and enterprise grant applications. For research involving health, social and community care, ethics approval through the Integrated Research Application System (IRAS) is essential and guidance/peer-review is provided to staff, primarily through CARH. Research involving human tissues is conducted under the terms and conditions of the Human Tissue Act (human tissue licence number 12641) and compliance with the HTA is maintained through the Corporate Licence holder (Professor Liz Towns-Andrews), the Designated Individual (DI) (Dr Nik Georgopoulos) and Persons Designate (PD). The DI and PDs are SREIC committee members and HTA matters are a standing item on the committee's agenda. Research misconduct is taken seriously across the Institution and all matters pertaining to research misconduct for PGR students and research staff are pursued following Institutional guidelines.

2. People

(i) Staffing strategy and staff development:

Our staffing strategies are directed by the University's commitment to excellence in research, enterprise, knowledge exchange, teaching and learning. In order to support research and succession planning, recruitment and promotion of research staff at all levels is undertaken strategically to support the sustainability and growth of existing and agreed new priority areas of research excellence and in response to external policy and funding priorities. As well as ensuring teaching expertise across our curricula, we use new appointments and promotions, and visiting appointments as described in E2, to build critical mass in our Research Centres, to enhance interdisciplinarity, to develop research with impact and to strengthen our international networks. Underneath this overarching strategy, each of the Schools has specific and bespoke staffing requirements related to strategically identified areas of growth.

We identify, recruit and retain established independent researchers at Lecturer and Senior Lecturer level and exceptional research leaders at Reader and Professorial level, with an emphasis on existing and agreed new priority areas. Through strategic investment we have created 10 professorial (**Babar, Phillips, Siderov, Lucock, Astin, Tolchard, Hardiker, Caress, Simkhada, Doyle**) and 3 readership (**Turner, Stacey, Darwin**) positions specific to UoA3 during this REF period, significantly strengthening research leadership as well as attracting a number of early career staff (including **Adebisi, Al Deyab, Asare-Addo, Fulcher, Gorton, Mughal, Wu, Noonan, Rooke, Keely, Benham and Powrie**), senior research fellows (**Hasan, Ghori**) and a research fellow (**Manca**). **We have used our staffing strategy to strengthen existing areas of expertise and develop other areas to increase our research profile and enhance the engagement of existing staff with research.** For example, the strategic appointment of a professor (**Babar**) and a senior research fellow (**Hasan**), together with central support from the University Research Fund, provided a nucleation point around which research into pharmaceutical policy and practice crystallised. These appointments led to the creation of the Pharmaceutical Policy and Practice research centre and a significant increase in research engagement from staff. Similarly, strategic appointments have enabled establishment of six new research Special Interest Groups (SIGs) in CARH during this REF period: Maternal and Family Health (leads **Stacey** and **Marshall**); Mental Health (leads **Gorton** and **Rooke**); Palliative and End of Life Care (leads **Turner** and Ellis [UoA20]), Public Health (leads Azevedo [UoA24] and Snowden [UoA20]), Advancing Practice (lead **Rogers**) and Managing Acute and Long-Term Conditions (leads Wu and Harris [UoA24]), whilst strengthening the pre-existing SIGs (Sports, Exercise and Nutrition [colleagues within UoA24] and Spirituality and Compassionate Practice (lead **Rogers**)). **Our appointment of staff in strategically important areas of research has therefore significantly contributed to the growth of research across the UoA.**

Staff are required to hold or register for a Doctorate on appointment and REF-eligible appointments are made whenever possible. A total of 42 members of staff in UoA3 are currently studying for a PhD and 31 members of staff obtained their PhDs during this REF cycle. **This represents a significant investment by the Schools in individual and research capability development.** Furthermore, as many come from disciplines early in their development as research active professions (especially allied health professions), we are **actively contributing to research capacity and capability building** within these, by **attracting talented clinicians and supporting them to develop as researchers.** This strategic investment is yielding an emerging critical mass of doctorally prepared academic staff, thereby substantially increasing the number of research active staff in the next REF cycle.

We provide a supportive environment for staff returning from career breaks; for example, during this REF cycle we appointed three Daphne Jackson Fellows within AS, to support individuals returning to academic life following career breaks for caring/health reasons.

We seek to maintain a balance between senior staff and early- and mid-career researchers with high academic potential, which provides a supportive environment where ideas and encouragement can be given, resulting in the generation of outputs and ultimately impact. This also paves the way for succession planning within the UoA. Contract researchers at various grades (SRF, RF, RA) are appointed according to the needs of particular research projects and are supported in their career development. The University adheres to the principles of the UK Concordat to Support the Career Development of Researchers and is committed, as recognised by the European Commission's HR Excellence in Research Award, to implementation of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers. We support the development and career progression of ECRs and existing staff (mid-career researchers, emerging and established research leaders) through research training, mentoring (new policy recently developed) and coaching to support research career progression and by actively developing opportunities for staff.

Research training is delivered both locally and centrally (and mapped to Vitae); there is a clear interface to ensure coordination, consistency and quality. Initiatives available to provide research training, mentoring and support for staff within the UoA include one to one meetings with newly appointed staff to discuss research interests and expectations; provision of 'research buddies'; funding and supporting staff to undertake doctoral studies, one-to-one research career mentoring from a senior colleague, Research Away Days and peer support within the research SIGs/Centres/Institute (eg as 'critical friends' re publications / presentations / research proposals and via such activities as journal clubs). Internal peer review is mandatory prior to submission of all funding applications. Sabbaticals are used to support research productivity, notably **Ousey's** sabbatical to Australia and **Marshall's** sabbatical to pursue work in India. We also offer extensive provision of support for writing for publication, such as 'Shut Up and Write' sessions, facilitated 'Writing Retreats', writing skills training at different levels ('Getting Off the Blocks' and 'Moving from 2* to 3*') and a structured group coaching programme ('Write Your Paper in 12 Weeks'). **These initiatives have contributed to the very significant increase in the volume and quality of research outputs from the UoA in the current REF period.**

For newly appointed staff (and those who have recently completed a Doctorate) we offer a structured induction programme and we aspire to: one year of minimal teaching, tailored active research mentoring, plus a start-up financial package for consumables where applicable and priority over PhD scholarship student co-supervision. QR funding is used to provide PhD

studentships and strategically, these are awarded to (i) new staff typically within two years of appointment to help establish/support their research or (ii) established staff that have interdisciplinary research projects.

Over the current REF period, there has been **significant re-investment of QR funding used to seed projects (up to £5000/project), which must involve an ECR and to provide development opportunities**, such as conference/course attendance – for example, HHS provided £308K, supporting 100 individuals/projects since 2014, with £280K for similar in AS.

All staff are allocated time for research within the Workload Allocation Model and performance is monitored annually through the PDPR process. PDPR promotes, supports and celebrates excellence in research with an emphasis on researcher development and the establishment and monitoring of ambitious, but achievable performance targets around key research functions such as publishing. All academic and research staff in UoA3 are set research objectives within their annual PDPR.

Career development forms part of the PDPR process and staff development is strongly supported through a variety of ways including an annual promotion exercise, which is undertaken following institutional guidelines. Staff can be promoted to Professor, Reader, Principal Research Fellow, Principal Enterprise Fellow or University Teaching Fellow, following a matrix with minimum threshold criteria applied to teaching, research, management and leadership and enterprise pertinent to each route. Promotion to Professor and Reader requires evidence of sustained internationally recognised research with an established track-record of high-quality publications, sustained ability to win external funding and a track record of research leadership. During this REF cycle staff in the UoA have been promoted to Professor (**Smith, Waters, Garside**) and Reader (**Javid, Olajide, McHugh**) and **Asare-Addo** to SL. **Adebisi** and **Ghori**, who completed PhDs in 2014 are SL and SRF respectively.

A strategic aim of the University is to become the world's first institution led and managed by chartered managers. Therefore, to equip them with the knowledge and skills to become inspiring and effective leaders, staff in leadership roles are expected to work towards Membership/Fellowship of the Chartered Management Institute (CMI). In UoA3, we currently have 5 affiliates, 5 members and 4 fellows of the CMI. All eligible staff are encouraged to obtain teaching qualifications, particularly via the Higher Education Academy (HEA); in UoA3, we have 1 Principal Fellow, 6 Senior Fellows and 101 Fellows of the HEA.

We operate on the general principle that staff should retain autonomy over their research careers and should not feel compelled to pursue particular research agendas other than (i) to

generate high quality research outputs leading to impact upon society and (ii) train the next generation of research active scientists/clinicians to the highest standards. The University is committed to Vitae's Concordat to Support the Career Development of Researchers and the UoA provides a variety of mechanisms to ensure that staff are supported throughout their tenure. Our strategy is to create an inclusive research environment and culture where staff are able to achieve ambitious targets in a manner that is supportive. Looking beyond REF2021, strategic appointments in existing areas of strength and agreed new priority areas will continue to be made, reflecting the University's continued commitment to excellence in research, enterprise, knowledge exchange, teaching and learning as described in the University's (2018-25) strategy map.

(ii) Support for postgraduate research (PGR) students:

We foster a vibrant PGR community with close alignment to Research Centre themes and aspire to providing world-class PGR training and mentoring; the institutional Postgraduate Research Experience Survey (2019) data demonstrated a 86.3% PGR satisfaction with supervision (well above the national average). Research students are integral to our research activities and each School has invested heavily in this area. During this REF cycle, **68 PhD students have graduated (cf 4 in REF2014) with 88 students currently enrolled** on PGR (PhD) studies in UoA3.

Entry onto PGR courses is conditional on having a good first degree (at least an upper second-class honours) or good relevant Masters' degree (typically at distinction or merit with good research project marks). The primary focus on quality (and secondary focus on relevance and fit) for PGR recruitment seeks to maximise the chances of timely and successful completion. All prospective PGR students are interviewed by at least two academic staff, one of whom has to be a senior academic and if successful, assigned a minimum of two supervisors. The main supervisor must (i) have a PhD and (ii) be publishing at an internationally recognised standard (co-supervisors will normally have a doctoral degree but maybe new to supervision). Supervisors undergo initial training, with refresher courses every 3 years, covering PGR regulations and processes and EDI training to ensure that PGRs have a supervisory team with the necessary research experience and expertise. All project proposals undergo review for significance, rigour, feasibility and fit. Each year we offer highly competitive fee waivers and scholarships for exceptional candidates, reviewing how these might best be deployed across the Schools. We are a member of the University Alliance Doctoral Training Alliance (DTA) for Applied Science for Health, a programme that was launched in 2015 with the aim of 'understanding and promoting healthy ageing' and offer scholarships under this scheme, with three contributing to this UoA, under the supervision of **Ousey, Conway and Smith**. As indicated previously, a proportion of QR monies are used to create fully funded studentships across the full spectrum of research activity. Funding covers fees

and a bursary together with a comprehensive consumables budget depending on the nature of the project with AS and HHS contributing approximately £450,000 each to support studentships over the current REF cycle.

On enrolment, students undergo full induction, covering research culture, expectations of supervisors and students, PGR degree regulations, progression monitoring and research ethics/integrity. Training is predominantly delivered by each School, with additional support and on-line resources available at University level via the Graduate School. In common with training for staff, each element of the PGR training is mapped to the Vitae Researcher Development Framework to ensure coverage and to avoid duplication (with discipline-specific training at School level and transferable generic skills training at University level). Research Integrity and Research Ethics are fundamentally important and students are informed of the Concordat to Support Research Integrity and the consequences of non-compliance at induction. Additional information about support for students is available on our VLE and MS Teams (AS PGR and HHS PGR Teams) and peer support via the online PGR Student Common Room. There are dedicated PGR-only study areas across the campus (see infrastructure and facilities below).

PGRs are members of Research Institutes, Centres and Special Interest Groups and are encouraged to fully engage with activities, in order to ensure strong support from active researchers and opportunities for peer mentoring. PGR students are also encouraged and expected to attend (and deliver) research seminars (noted at progression points). Many PGR activities are student-led, including the PGR seminar series, PGR Society and annual PGR conference. We maintain meaningful pathways to consultation with PGR students and have PGR student representation both on SREC and the PGR committee.

With regards to development and progression, an 'open door' policy exists where students can discuss research informally, and formal meetings are held monthly with notes from both students and supervisors recorded in SkillsForge. PGR progress is monitored via the University Postgraduate Progressions Board and the management of PGR matters is overseen by the Director of Graduate Education (DoGE) in each School. Progression viva voce examinations are held after 9 and 21 months (full-time equivalent), requiring a report detailing progress and discussion of research plans with at least two other academic staff who are not formally involved in the project. For progression, the examiners must be satisfied that (i) the student has made sufficient progress intellectually (ii) data accrual is of sufficient quantity and quality to enable the thesis to be constructed and (iii) future plans for completing the research plan are realistic within the timescale of the studentship. Research training needs are also discussed at this stage together with any issues that the students may have with supervision. Three PGR Progression Boards are run each year to track PGR progression, viva outcomes, misconduct, suspensions and timeliness

of events. With regards to pastoral care both AS and HHS have experienced senior staff that act as pastoral mentors for PGRs, overseen by the DoGE. Any cases requiring specialist support are referred to the University's Wellbeing support service, which has dedicated PGR provision

We also support students to develop their research and teaching careers through (i) attendance and presentation at conferences (ii) publishing their research and (iii) contributing to undergraduate teaching sessions. With regards to conference attendance, students are encouraged to attend and present their research at one national and one international conference during their studies. Within this REF cycle, a total of 72 PGR students in AS and 101 students in HHS have received School funding to attend conferences. Prior to attending, students can gain experience either orally or via posters at the annual PGR conference and 3-minute thesis competition or in their research SIG. This gives PGRs an opportunity to showcase their research and receive feedback on the strengths and areas for improvement before they present their work externally. Intellectual property is also an important consideration; experienced supervisors guide students through this process and central University support is also available through Research and Enterprise to ensure that intellectual property is protected prior to disclosure.

We encourage PhD students to see research and teaching as symbiotic and of mutual benefit and to this end, we provide students with opportunities to gain teaching experience. For School funded students, this is mandatory and [Teaching Assistant Preparation Programmes](#) are available to all students. Teaching does not typically involve lecturing, instead predominantly being practical class demonstration, small group workshops/tutorials (with academic staff) and supervision of undergraduate projects.

Looking beyond REF2021, we have a number of initiatives to develop a pipeline for recruitment into Research Masters and PhD programmes. These include:

- new taught master's programs in pharmacy practice, drug discovery and allied health professions, such as paramedic science
- internships for staff from our partner organisations (particularly supported by **Astin** and CHFT)
- student-led clinics (the volume of which will increase with the establishment of the HWA) – led by **Tolchard** and building on his previous research – which expose our students to research
- development by **Garside** of a 'writing retreat' model to bring postgraduate taught (PGT) students and their supervisors together with the aim of co-producing publications and widening participating in a community of scholarly practice.

(iii) Equality and Diversity:

As described in the institutional environment statement, the University is passionate about equality, diversity and inclusion in all aspects of its business. The Institution has established the [University Equality, Diversity and Inclusivity Enhancement Committee](#) to oversee the implementation of University [EDI related policies](#), Code of Practice, frameworks and schemes for staff and students. In 2020, the University signed the Race Equality Charter (REC) and is working towards equal representation of women at most senior levels. Other examples of equality work include enhanced support for Black Asian and Minority Ethnic (BAME) students across the Institution (and within UoA3 specifically, the [position statement from PhSC](#) in Pharmacy). Demonstrating its commitment to supporting LGBT+ and disabled staff and students, the University is a [Stonewall Global Diversity Champion](#) member, which permits the implementation of the Workplace Equality Index and a Disability Confident Employer at Level 2, which covers the themes 'Getting the right people for your business' and 'Keeping and developing your people and was a signatory to the Mindful Employer Charter.

These and other institutional level policies (described in the institutional ES) impact upon the composition of committee structures and policy within each School. EDI profiles for committees is considered at the annual review of committee membership; for example, the composition of the Schools of AS and HHS Research and Enterprise committees are currently 10 male / 7 female in AS and 15 male and 19 female in HHS.

The University participates in Vitae's 'Every Researcher Counts' to improve equality and diversity for researchers within higher education and EDI is an important aspect of our commitment to the Concordat to Support the Career Development of Researchers and our HR Excellence in Research Action Plan. We constantly strive to create an inclusive and supportive environment for our researchers. In particular, we make considerable effort to maintain an excellent mentoring programme, abide by a Core Hours system, support career progression and applications for promotion, develop case-by-case enhanced maternity provision and support, in order to maintain research momentum, support flexible working, and provide access to women-only national initiatives such as the Advance HE Aurora scheme (12 staff have been on the Aurora programme since 2014).

Both Schools in the UoA are committed to equality and to increasing diversity at all levels and we take positive action to maximise the chances of recruiting, promoting and allocating the best person for any particular role. All new staff recruits are required to undertake training on diversity and on unconscious bias and our staffing policies support flexible working, career breaks and part-time working and we seek to accommodate carers' responsibilities whenever practicable.

The duties of those on parental leave are fully covered (also for some time after return, with accommodation of the needs of breastfeeding mothers).

We have long been committed to promoting gender equality in science, as evidenced by AS achieving Silver Athena SWAN status in 2018. Some staff act as internal consultants or critical friends to other Schools in their gender work. Many initiatives related to gender equality have been developed and trialled in as this UoA and then either rolled out to the whole University or shared with other Schools. The School's Athena SWAN committee expanded in 2018 to become the Equality, Diversity and Inclusion Committee, widening its remit to include all aspects of equality work, an approach later mirrored by the University, evidenced by the formation of the University Equality, Diversity and Inclusion Enhancement Committee (UEDIEC) which reports directly to Senate. HHS has recently appointed a dedicated Director of Equality, Diversity and Inclusion.

All staff involved in the UoA's REF2021 decision-making completed REF-specific Equality and Diversity training. Strictly following the University's Code of Practice, output selection was based first and foremost on the quality of each output, determined by internal and external assessors; ensuring that fewer than 5% of outputs were non-OA compliant and alignment with the Research Strategy and Futures detailed above. Where multiple outputs of equal scores were identified, choosing outputs to ensure diversity of staff was employed. An Equality Impact Assessment identified that, although the departments in this UOA have more females than males, more males than females were returned. A substantial number of recent appointments of pre-doctoral individuals from female-dominated clinical professions accounts for this. Anticipated staff PhD completions will improve the gender balance in the next REF cycle.

3. Income, infrastructure and facilities

Income:

As reported in Section 1, we have achieved our REF2014 strategic goals of increasing our research income (**from £1.2M to £2.852M**) and diversifying income sources. In the current REF cycle, health research funding bodies have been our main funders (£906K), with substantial contributions coming from UK Industry, Commerce and Public Corporations (£548K), UK Central Government Bodies/local Authorities, Health and Hospital Authorities (£507K), UK based charities (£241K) and Non-EU Industry Commerce and public corporations (£252K). Further increasing income generation is a key strategic goal for the next REF period. To achieve this, our strategy will be to target key funders (e.g. NIHR) – with appropriate support/training to maximise success; increase our number of research active academics (through strategic appointments and staff PhD completions); support the development of ECRs' research, including through allocation of studentships and applications to the Academy of Medical Sciences

(Springboard Champion: **Ousey**); increase our focus on research that generates impact and capitalise on the research structures established during the current REF cycle (ISlaIP and Research Centres).

Central bidding support is provided by Research and Enterprise (R&E). There is a clear, documented process in place to support grant applications, focused on maximising success. Central support for developing research grant applications and commercial contracts is available from dedicated Research Development Managers (RDM) and Business Development Managers (BDM) in both Schools. As indicated previously, all research grant applications led by UoA staff (that are not appropriately peer reviewed elsewhere) are subject to rigorous peer review (and budget setting) before submission to ensure that they reach a competitive standard.

To support commercial ventures, BDMs oversee all contract development, NDAs, liaison with the Legal department and IP protection, as well as maintaining familiarity with all aspects of available commercial funding and government initiatives specifically aimed to develop academic/commercial collaboration.

Through distribution of QR funding to Schools and via the University Research Fund (URF), the institution continues to invest in research through the provision of PhD studentships and funding to develop ASRIs. New ventures are supported internally by seed funding administered by central Research and Enterprise, the Collaborative Venture Fund. Promotion of international research partnerships is also key to the 2018-25 Strategy Map and central funding exists to support this.

Infrastructure and facilities:

Research facilities are located in both Schools. We currently have a broad range of dedicated research laboratories that house state-of-the-art equipment for pharmaceuticals, pharmacology, cell biology, analytical sciences, physiology and biomechanics, as well as excellent research-ready clinical facilities, including a simulation suite and podiatry clinic/operating theatre

PGRs have access to dedicated study areas, including the Elena Piscopia Suite, which contains dedicated computers, quiet areas, locked storage facilities, kitchen facilities and bookable interview rooms (for undertaking qualitative research interviews). PGR students can borrow encrypted laptops and audio-recording devices to facilitate data collection and analysis.

The University has excellent library and IT facilities, giving staff and PGR students access to subject information specialists (including with specialist subject expertise) and research-specific software (e.g. SPSS and NVivo).

We embrace information systems and processes that support research such as:

- the PURE research information management system and repository
- SkillsForge to support postgraduate research
- PRAMMS system for the (mandatory) internal peer review of research bids
- Microsoft Dynamics for contact management
- Dedicated pre- and post-award (PAPA) systems/functions
- Agresso for financial information.

We are actively working with the central University on a systematic approach to the management of research data (storage and sharing), including any commitment to open research data (see section 1).

The University provides central pre- and post-award functions and a named governance sponsorship signatory. This is augmented in the Schools, through provision of dedicated administrative support for research management and governance, including the PGR administrative and advisory function, performance monitoring, and event management.

Both Schools have continued to invest and strengthen our research facilities and infrastructure, with £3.3M invested in refurbishment and £3.75M in new equipment since REF2014 in AS and comparable levels in HHS. The focus leading up to REF2014 was the establishment of pharmaceuticals and this has been consolidated during this REF cycle with additional equipment and laboratory refurbishment. Since REF2014, further developments include the repurposing and renovation of teaching laboratories into pharmacology research laboratories and the expansion of our cell culture capability. This 'core facility' is supported by a dedicated URF-funded technician.

Other significant developments include the establishment of a cell imaging suite housed in the 3M Buckley Innovation Centre funded via a Local Growth Fund grant of £2.9M. These facilities are run by a dedicated research technician (Dr Jane Harmer). Our analytical and molecular biology capability has also increased and we now have excellent facilities for target identification, characterisation validation, pharmacogenomics, bioinformatics and metabolomics. In AS, we have also invested in novel technologies to support research in key areas including for example, the purchase of surface dissolution imaging (SDI2) and the Agilent seahorse XF metabolic analyser.

Both Schools operate on the basis that, where they have committed funds to support research, equipment and facilities are available to all members and use is not restricted to individuals or small groups. Research projects in UoA3 utilise all these facilities as required, but major

activities typically involve: NMR, X-ray diffraction and scanning electron microscopy, X-ray crystallography (the Diffractometer suite – containing 2 single crystal and 2 powder diffractometers as well as SAXS), analytical equipment (HPLC/MS, ICP/MS, thermal analysis, dynamic vapour sorption, Nanosight, Malvern ZS etc), automatic dissolution, surface dissolution imaging, the cell culture suite, flow cytometry and cellular analysis, real time PCR, confocal microscopy (as described above), infra-red imaging, fluorimetry, spectrophotometry, scanning electron microscopy, exercise physiology and gait analysis.

In 2010, AS was awarded a £2.3M ERDF grant which, together with matched funding from the University of £1.3M, enabled the establishment of IPOS (<http://ipos.hud.ac.uk>), a GMP accredited facility (licence number UK GMP 43253) and Agilent Centre of Excellence. IPOS provides analytical expertise to both external businesses and academics within AS and across the University and is a focus for analytical research with facilities including LC/MS, GC and GC-MS, ICP-MS, GPC-MALLS and ion chromatography. Across the University, we have excellent access to equipment in the School of Computing and Engineering including atomic force microscopy and infinite focus microscopy.

Looking beyond REF2021, the School of AS has substantially expanded its teaching laboratory space through the development of the [Joseph Priestly East](#) building. This includes an eye clinic to facilitate the training of optometrists and provide new opportunities for research. This work was completed in 2019 and as teaching moves to the new facility, this frees up space for the development of additional research facilities. This will include research space for Optometry as well as the expansion of research in pharmaceuticals and pharmacology. Our strategic aim is to further develop the infrastructure and facilities to support high quality research through, for example, the continued development of core research facilities, repurposing of teaching facilities into research labs and the refurbishment of existing laboratory space.

During the next REF cycle, the university will lead an ambitious project to establish a **new National Health Innovation campus**. Specific to this UoA, the **University plans to invest £45m in a new building to house the new Health and Well-being Academy (HWA) – its largest ever such investment - with additional investment in facilities**. This comes on the back of recent re-imagining of our simulation suite to create a state-of-the-art facility, accompanied by creation of dedicated strategic leadership (HWA Strategic Lead – **Garside**; Simulation Lead – **Prescott**; Clinical Skills Lead - **Bland**). The HWA will yield new, research-ready services, such as an expanded podiatry service and new physiotherapy and health assessment clinics, providing plentiful opportunities for impactful research, supporting our strategic goals for research and impact.

4. Collaboration and contribution to the research base, economy and society

Collaboration:

Collaboration with key stakeholders is at the heart of our working. It has been **an essential strategic element of our success in increasing the interdisciplinarity, reach and impact** of our research since REF2014, as illustrated in Section 1.

Our collaborative links with healthcare providers and HEIs span the globe, including North America, Europe, the Middle East, Africa, Australia and South Asia and South East Asia and include numerous QS300 top-quartile organisations (as illustrated in Section 1). The extent of our collaboration with international partners is amply reflected in the SciVal analysis of UoA3 outputs. Between 2014 and November 2020, **50.9% of our research outputs were co-authored with researchers in other countries**. Notable examples of our collaborative work include:

- Publication in June 2019 (by Elsevier) of the [Encyclopaedia of Pharmacy Practice and Clinical Pharmacy](#). This major contribution to the literature (4 volumes and 180 chapters), conceived and led by **Babar** (Editor-in-Chief), harnessed a series of articles from world leading scholars (over 300 authors from over 40 countries) in the field of pharmacy practice.
- Incorporation of ISlaIP as a sister organisation in the [World Union of Wound Healing Societies](#) (WUWHS), the aim of which is to improve patient-centred care by encouraging global cooperation in wound healing clinical practice, education, research and delivery of wound care. As the only University to be awarded this honour, it reflects the value placed on our research on the international stage.
- Development of a strategic partnership with the [Pakistan government and other Universities in Pakistan](#) to provide clean, affordable drinking water to the people of South Punjab.

Expanding our international reach is an integral part of our 2018-25 strategy map and through central University support, finances are available to enable academics to travel to leading QS300 institutions across the world with the aim of (i) promoting our expertise in Huddersfield to other Institutions and (ii) generating new research projects that will deliver high quality research outputs and impact.

On the national and local stages, we pride ourselves on the strength and richness of our partnerships across the Yorkshire and Humber region and the UK, as described in Section 1. Notable examples of how these collaborations are yielding tangible outputs and concrete benefits include:

Unit-level environment template (REF5b)

- (i) Research on stillbirth, led by **Stacey**, has contributed to the UK national stillbirth prevention initiative the 'Saving Babies Lives Care Bundle' and to a public health campaign on maternal sleep position led by the national charity Tommys
- (ii) Research by **Burton** and **Bartys** regarding the work/health interface, has yielded several influential reports to government in the [UK](#) (including incorporation into [HSE guidance on health problems in the workplace](#)) and [USA](#).
- (iii) **Astin's** recent work regarding noise reduction in hospitals has already impacted the design of two hospitals, whilst her work on informed consent has changed practice locally (at CHFT) and nationally (through the Department of Health), as well as being cited in international guidance (European Society of Cardiologists).

Within UoA3, promotion of interdisciplinary research and collaboration between colleagues within and between Schools, including sandpits and away-days, will be a key strand of our strategic approach in the next REF cycle, recognising that to be able to generate research that has impact on the health and wellbeing of patients, teams of researchers with different expertise need to be assembled to form 'wolf packs' as opposed to 'lone wolf' operations. Continued strengthening and evolution of ISlaIP and our Research Centres will support this and Special Interest Groups within the Centres will be supported to independence as discrete Research Centres over the next REF period (e.g. Maternal and Family Health and Sports, Exercise and Nutrition).

The University has an ambitious target of having 15% of outputs generated with end-users by 2025 (see Strategy Map). This is already a key strategic focus for both Schools in UoA3 and a number of end users are already engaged in our research, as described in Section 1.

Recognising the importance of these activities to enhancing the impact of our research, we aim to normalise patient and public involvement across our applied health research portfolio (including from the Public Partnership Group (PPG). Partly as a result of this, HHS has invested in additional capacity for the PPG, in the form of a Development Worker. We will build on the training and dissemination activities already offered to increase awareness of researchers of the support available for involving end-users, for example through closer working with the regional NIHR RDS.

Contribution to the research base, economy and society:

All staff in UoA3 are committed to providing service to the wider Health-related, Pharmacy, Pharmaceuticals and Pharmacology research communities, economy and society. Section 1 (E1-E3) demonstrates our achievements and how these inform and direct our strategy. Staff with significant responsibility for research (and many who have yet to achieve this) are involved in such activities as peer reviewing for journals and grant awarding bodies, contributing to local,

national and international conferences (as reviewers and through committee memberships), in advisory or executive roles for professional organisations and through consultancy, including for businesses and policy makers. Illustrative examples are given below:

Editorial positions: Editorial board positions include: Journal of Biomaterials (**Smith**), Drug Delivery Letters (**Smith**), Research in Social and Administrative Pharmacy (**Babar**), Science Technology and Development (**Babar**), Journal of Pharmaceutical Policy and Practice (**Gorton, Hasan, Babar** is Editor-in-Chief), Neuroscience letters (**McHugh**), Sage Open Nursing (**Caress**), Evidence Based Complementary and Alternative Medicine (**Olajide**), Informatics for Health and Social Care (**Hardiker**, Editor-in-Chief 2010-2020); Health Care Sciences and Services (**Merchant**), British Journal of Pharmaceutical Research (**Larhrib**), British Journal of Pharmacology (**Phillips** until 2016), Cancer Drug Resistance (**Phillips**), Pharmaceutics, Journal of Microencapsulation (**Conway**). Additionally, members of UoA3 have edited special issues in journals, including Advances in Wound Dressings and Materials in Pharmaceutics (**Conway**).

Plenaries and invited lectures: External recognition of our work is evident in the growing number of invitations to speak at national and international events. During the current REF period there have been 174 invited presentations across the UoA, of which eight were keynote or plenary lectures and five were invited public lectures.

Committee/working group membership and expert advisory roles: Academic staff in UoA3 are active members of/hold executive roles in a wide-range of committees and working groups, including in field-leading organisations such as UK Society for Biomaterials (**Smith**), International Surgical Wounds Advisory Panel (**Ousey**, Elected Vice President, Sept 2019-present) International Medical Informatics Association Nursing Informatics Working Group (**Hardiker**, UK Representative, 2018-present). They are also active on grant awarding panels, for such bodies as the National Institute for Health Research (**Caress**, NIHR Research for Patient Benefit Programme Yorkshire and North East panel, 2019-present).

Our contributions to specialist task forces and advisory groups include the International Task Force on Palliative Care for Prisoners, supported by the European Association for Palliative Care (EAPC) (**Turner**, Co-Chair, 2017-2021); International Think Tank on Gambling Policy, Research and Practice (**Tolchard**) and Industrial Injuries Advisory Council (IIAC) (**Burton** - public appointment by Secretary of State for Work and Pensions)

UoA members are very active in provision of expert advice to policy makers and leading international organisations, notable examples being HM Government Department for Work and Pensions (**Burton**, Expert Advisor, 2014-present), World Health Organisation (**Babar** -

independent expert on commissioned systematic review/evidence informed guideline development re pharmaceutical pricing policy; **Al Deyab** - consultant on projects designed to strengthen antimicrobial stewardship and 'hands on' training for antimicrobial consumption in Jordan) and the World Bank (**Babar** – consultant on projects involving pharmaceutical system evaluation and medicines pricing policy in Bangladesh).

Conference organisation: UoA staff have been actively involved in conference organisation, notable examples being: Organising committee member for Global Conference on Pharmaceutics and Drug Delivery Systems, 2017 onwards (**Larhrib**); European Association of Clinical Pharmacology and Therapy, 2019 (**Javid**); APS Industrial Insights conference (**Waters**); Joint Pharmaceutical Analysis Group annual conference (**Waters**); Phytochemical Society of Europe conference, 2018 and 2020 (**Olajide**); International Medical Education Conference, Malaysia 2016 and 2017 (**Hasan**); JoPPP conference on Pharmaceutical Policy and Practice Research, Malaysia since 2019 (**Babar**); Annual Winter Meeting of the Pharmacology and Molecular Mechanism Group of the EORTC throughout this REF cycle (**Phillips**); 1st through the 4th UK Hydrocolloids Symposium (**Smith**); Conference Chair, International Conference in Skin Integrity and Tissue Viability, since 2016 (repurposed as Wounds Week in 2020 and 2021 to meet Covid restrictions) (**Ousey and Conway**).

Response to the Covid-19 pandemic:

SARS-CoV-2 has had a major impact on society and like other Universities in the UK, we have (i) supported our local health care providers (ii) supported national and local testing facilities and (iii) published and disseminated research and expert opinion via academic journals and social media. In the early stages of the pandemic, AS donated its entire stocks of PPE to Huddersfield Royal Infirmary. In HHS, many of our Health students have been out on placement since the beginning of the pandemic providing front line support to our local Trusts and patients. Similarly, podiatry students and HSS staff maintained service provision throughout the pandemic to ensure that the most at-risk patients/public who use our campus facility received the care they needed. AS contributed a ThermoFisher 7500-Fast PCR machine towards the national Covid testing effort. Locally, we had a significant role in establishing a rapid Covid-19 testing facility. A diverse portfolio of pandemic-related research has been conducted across the University, with UoA3 contributing the vast majority of this. Projects have included critically evaluating the effectiveness of corticosteroids and other medications for treating Covid patients (**Merchant, Babar, Hasan**), the role of pharmacists in the treatment of Covid-19 (**Babar**), impacts on those required to 'shield' (**Caress, Stephenson, Powrie**), BAME communities (**Simkhada**) and pregnant women (**Keely**); health professional resilience (**Rogers, Hemingway, Garside, Jones**); effects of Covid on work ability (**Burton**). **Rogers'** work has been submitted in evidence to the Department of Health and Social Care, whilst **Burton's** has underlined development of the Society of

Occupational Medicine's post-Covid return to work toolkit. **Caress** is an invited member of a national policy advisory group and **Hardiker** of the Chief Nursing Officer's Covid nursing research group. An International COVID-19 Research and Evidence Synthesis Group lead by **Hasan**, in collaboration with academics and practitioners globally, published over 50 papers between March 2020 and November 2020 with the mission of providing evidence-based data and analysis to inform practice and address the paucity, and often misleading, information around the virus and pandemic. A critical review of hand sanitisers (**Merchant**) published in June 2020, is the second highest downloaded paper in International Journal of Pharmaceutics (Jan, 2021 data).