

Institution: University of Sheffield
Unit of Assessment: A-02 Public Health, Health Services and Primary Care
1. Unit context and structure, research and impact strategy

We are motivated by a strong desire to conduct world leading research to improve the health and wellbeing of the population. We bring a diverse range of methodological expertise located in one large department to work alongside practitioners and users with direct experience of public health and health care. We collaborate successfully with disciplines across the University and with national and international researchers to address the big challenges facing health systems around the world. Our close and continuous engagement with stakeholders ensures our research is driven by the needs of policymakers, practitioners, and service users.

We have achieved sustained growth in research activity with **research income increasing by 74% from £40.5m in REF2014 to £70.4m** in this assessment period. We have consistently performed well in national competitions, winning major grants for large programmes of work, including SchHARR's NICE Technology Assessment Group (SchHARR-TAG), DHSC Economic Evaluation Policy Research Unit (EEPRU), NIHR's School of Public Health (SPHR), Yorkshire and Humber Applied Health Research Consortium (ARC Y&H), Research Design Service for Yorkshire and the Humber (RDS Y&H) and MRC System-science Informed Public Health Economic Research (SIPHER).

A distinctive feature has been the growth in knowledge exchange (KE), with annual income increasing to £2m from a combination of public and private sources, including 32 projects with Public Health England (PHE). **PhDs awarded grew by 150% from 44 in REF2014 to 110 for this assessment period.** Our PhD programme includes the prestigious Wellcome Doctoral Training Centre (DTC) in Public Health Economics and Decision Science whose renewal increased overall numbers to 35. During this time, we have had our Athena SWAN Silver Award renewed, recognising the importance we place on equality, diversity, and inclusion.

1.1 Research structure

This submission brings together expertise in four academic sections of the School of Health and Related Research (SchHARR), in the Faculty of Medicine, Dentistry and Health:

- Design Trials and Statistics
- Health Economics and Decision Science
- Health Services Research
- Public Health.

Our staff work together across the School in research centres to address complex challenges around our core research themes of 'Alcohol Policy', 'Urgent and Emergency Care', 'Clinical Trials', 'Health Technology Assessment', 'Global Health', 'Public Health' (includes health equity and inclusion, health and place, food and nutrition), 'Mental Health', 'Primary Care', 'Measuring and Valuing Health' and 'Complex Interventions'.

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1.2 Our achievements

1) Applied clinical research: key examples of our achievements include the growing CTRU, CURE and building clinical research capability in Sheffield:

- **Clinical Trials Research Unit (CTRU)** is an NIHR-funded registered trials unit growing from 37 to 67 staff over the assessment period with 39 studies including 36 CTRU-led trials funded from NIHR HTA, NIHR Public Health Research, Research for Patient Benefit (RfPB) and the MRC. Our research has delivered clinically important findings such as increasing word finding in people with aphasia after stroke (BiG Cactus; *Lancet Neurology*) and demonstrating results for diaphragm pacing for motor neurone disease and amyotrophic lateral sclerosis (MND/ALS) patients adopted by policy makers (Dipals impact case study). With the Medical Statistics group it has pioneered the development of methods for the reporting of adaptive designs for clinical trials. To support growth and diversification in clinical trials across Sheffield it has been agreed to fund three new posts over the next five years (one of which has been appointed).
- **Centre for Urgent and Emergency Care (CURE)** is the largest of its kind in the country with three clinical professors and securing over £10.2m during this assessment period. In close collaboration with the emergency department of the Sheffield Teaching Hospitals Trust, the Yorkshire Ambulance Service locally and emergency and urgent care services nationally, its work improves the delivery of care across the urgent and emergency system. Key work areas include performance metrics, waiting times and risk-adjusted mortality rates, methods for managing demand for urgent care, such as walk in centres, NHS 111 and reducing avoidable admissions, and delivery of specialist emergency care. Their research has also had a substantial NHS policy impact through work on ambulance performance measurement and standards (PGfAR PHoEBE project and NHS England Ambulance Response Programme, Nicholl, and Booth). Two current NIHR funded studies in progress are developing pre-hospital assessment or triage tools to help paramedics identify patients with major trauma (MaTTS) and sepsis (PHEWS).
- **Building capacity in applied clinical research:** the Clinical Research Academy was established to support Sheffield to build capacity to undertake high quality applied clinical research, with an expected increase in grant capture from the NIHR and other national peer reviewed funding programmes. Since 2015 we have collaborated with local NHS Trusts to support 15 aspiring clinical academics to spend a day per week in ScHARR. A total of 29 full research applications were submitted resulting in 22 successful awards, 10 as lead (including two HTA and one EME) and 11 as co-applicant (including one HTA, one HS&DR, two EME and three RfPB) generating 97 journal articles. The successful bids included two NIHR EME awards (£2.3m, Snowden and £2.5m, Lobo).

2) Developed the profile and impact of public health research: the growth in public health research is exemplified by SARG, SIPHER and the Evidence Synthesis Centre.

- **Sheffield Alcohol Research Group (SARG)** is an internationally leading centre for policy, epidemiological and economic research on alcohol with income of £7.6m, and an excellent example of how we work across disciplines (health economics and public health). The growing impact of SARG is demonstrated by its alcohol policy analyses, e.g. minimum pricing in Scotland (extended to cover the remainder of the UK, Australia, New Zealand and Canada) and the recent revision to drinking guidelines in the UK and Australia, as well as in its expansion from 12 staff and PGR students in 2014 to 28 in 2020. The Vice-Chancellor's Strategic Development Fund invested in a research manager to support developing their

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research strategy, external profile and moving forward, a Northern Alcohol Research collaboration (a network of academics, practitioners, and policymakers). We have also been studying the impact of the pandemic on specialist alcohol services (Holmes).

- **Systems Science in Public Health and Health Economics Research (SIPHER)** is a major investment (£5m) by the UK Prevention Research Partnership (UKPRP). Led by SchARR, it brings together researchers across six universities, three government partners at local, regional, and national level, and ten practice partner organisations. It is unique in assembling a broad set of skills (mathematical modelling, mixed methods research, data analytics, health economics) in an ambitious co-produced programme to evaluate interventions in four policy areas on health, well-being and inequalities.
- **Evidence synthesis** work funded since 2014 by NIHR to undertake projects to directly address critical priorities of policymakers via the PH Review Team and Health Services & Delivery Evidence Synthesis Centre. It uses innovative approaches to public involvement and co-production of outputs with a range of stakeholders, e.g. reviews of gambling-related harm and public health impacts of extending working lives, areas where recent trends may have a substantial impact on population health and inequalities in the absence of evidence-based interventions to mitigate future harm. In relation to COVID-19, we have contributed to Cochrane reviews on infection control (Booth), and ethical frameworks for COVID-19 testing (Dawson).

3) Internationalised our research: we have internationalised our research and raised its profile around the world through dissemination, translation, and adaptation to other settings. This is reflected in our research awards involving collaborators from 33 other countries and 132 international institutions. One third of our total outputs in this assessment period have international co-authors across 95 countries. There have also been 102 international KE projects completed or are ongoing. ECRs are supported to develop plans to enhance the international reach of their research with funding to develop and participate in collaborations with international partners.

4) Advanced methods research: the continued advancement of methods ensures our work is progressive and provides important staff development opportunities:

- **Measuring and valuing health** includes work on preference-based measures for calculating Quality Adjusted Life Years (e.g. valuation of EQ-5D, a new version of SF-6D), and developing condition specific measures and mapping between measures for use in economic evaluation (e.g. EQ-5D-5L to 3L mapping recommended by NICE). Seven new patient reported outcome measures have been developed including the Recovering Quality of Life (ReQoL) in mental health with over 150 free licenses granted to NHS users. Our staff have also led influential International Society for Pharmacoeconomic Outcomes and Research (ISPOR) task forces in three areas: 'Using utilities in CE models' (Brazier, 2019); 'Mapping studies' (Wailoo, 2017); 'Multi criteria decision analysis' (Thokala, 2014).
- **Statistics:** we have expertise in the use of Bayesian statistics in health economics ([CHEBS](#), Director: Stevens). The analysis and presentation of hospital mortality data resulted in an impact case study (Mortality Review). Our researchers have also led on the MRC guidance for benefit risk assessment and Consolidated Standards for Reporting Trials (CONSORT) guideline for adaptive designs (Dimairo). Since 2014 we have co-written MRC guidance for quantifying effects sizes (Julious, Walters) and placebo surgery trials (Nicholl) and pioneering methods for computing value of information measures where this has

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previously been infeasible, including a major contribution to the 2020 ISPOR Task force on Value of Information (Strong).

- **Public health economics** - SchHARR is world leading (with colleagues in the Engineering faculty) in modelling complex behaviours to explore the impact of interventions in public health for economic evaluation. Wellcome funded, and renewed, the first DTC in Public Health Economics and Decision Science (2016, 2020). The UKPRP funded SIPHER (see above) a hugely ambitious embedded programme of work with devolved local governments examining the complex interactions between policies and public health and the SPECTRUM programme on the activities of 'unhealthy commodities industries' focusing on health and economic impacts of tobacco and alcohol (Brennan). Our developments include novel methods for modelling social systems using computationally intensive agent-based simulations during the United States NIH-funded [CASCADE](#) Programme (Brennan, Strong, Vu).
- **Complex interventions:** we led the development of methods to evaluate complex interventions, including the publication of MRC-funded guidance on how to develop complex interventions (O'Cathain, 2019), co-authored highly cited MRC guidance on process evaluation (over 1,400 citations since 2015), published widely on the use of qualitative research with RCTs and co-authored new MRC-funded guidance on adapting complex interventions.
- COVID-19 had a major impact on priorities for, and delivery of, health research. We reorganised our research priorities to address the challenge of the pandemic, drawing upon our specific areas of expertise in analysis of large datasets, evidence synthesis, emergency department research and global health research. We have played an integral part in the [PRIEST](#) study - an observational cohort study to evaluate existing and develop new triage tools for patients attending the emergency department with suspected infection, and one of the NIHR COVID-19 priority studies. We have also examined the impact of the pandemic on modern slavery (Such).

1.3 Our strategic objectives

1) Develop capacity in health data analytics/informatics: we invested in a Chair in Health Data Analytics in 2018 (Bath), held jointly with the Information School to drive forward the development of advanced analytical skills capability and capacity, leading a cross-University group on Health Data Science and Analytics. This group informs the development of a secure and safe research data infrastructure facility for the University, which will meet our need for health research data storage. This benefits the whole School, including the Wellcome DTC in Public Health Economics and Decision Science, analysis of admissions data in emergency care (CURE) and public health research (e.g. SIPHER).

Mason and Bath have key roles in the Better Care Northern Partnership (2020-23), funded by HDR UK which we plan to use to create further opportunities for development in this area. An NIHR grant for a project looking at artificial intelligence for multiple long-term conditions is a recent success. Going forward a senior lecturer is to be appointed to enhance our capability to access and analyse large, linked NHS and population-level datasets for undertaking interdisciplinary clinical, health services and public health research.

2) Maximise links with the University's Flagship Institutes: our staff are developing new collaborative research programmes as partners in two of the University's Flagships (see REF5a), launched in 2019 - [Healthy Lifespan Institute](#) (Goyder and Brennan) and the [Institute for](#)

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[Sustainable Food](#) (Caton is associate director and co-lead of the 'Food, Sustainability and Health' pillar). Funding has been secured for projects focusing on the dual burden of disease in China (BBSRC/GCRF), childhood obesity in Ghana (GCRF) and understanding the benefits of home-grown food (EPSRC). These will help address major public health challenges utilising our public health, HTA and health economics experts with skills in complex systems science and mathematical/computational modelling. We will also harness mixed methods research, with the aim of expanding understanding of the complex mechanisms that drive population health.

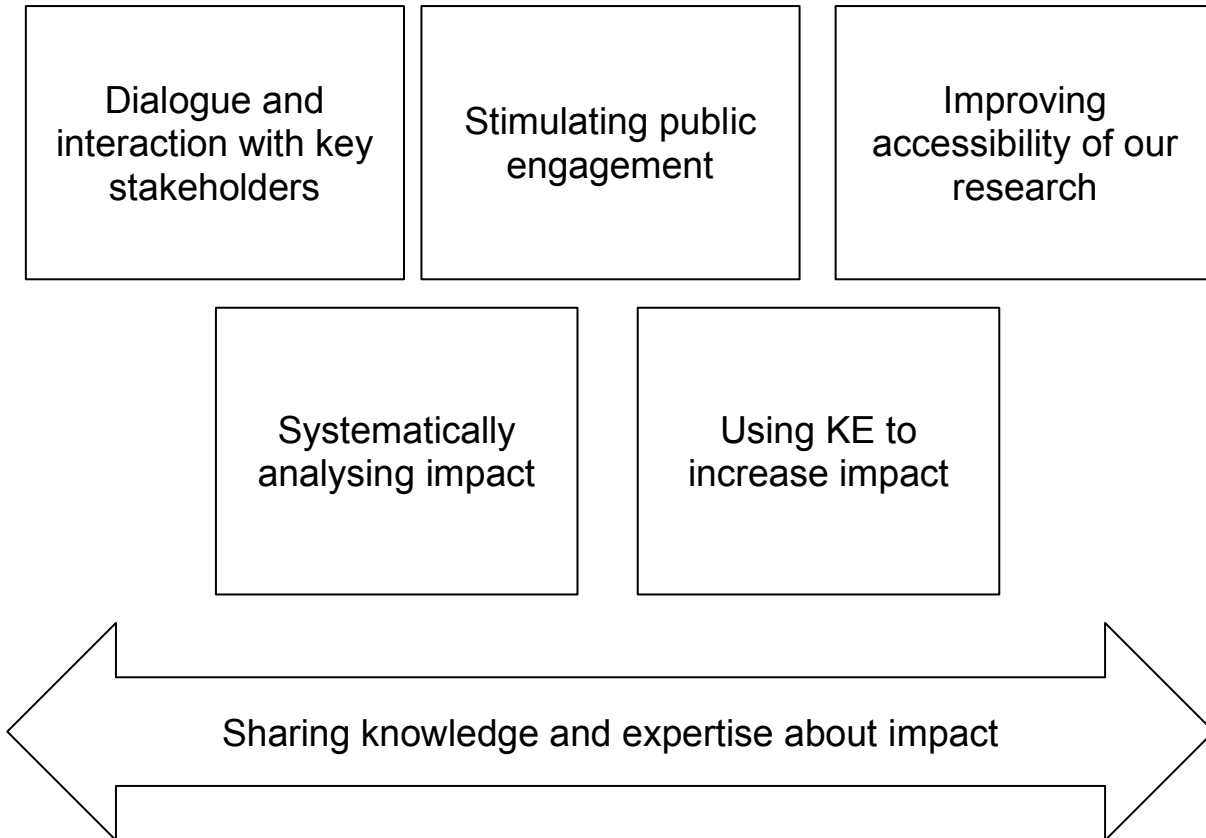
3) Develop mental health research into local and national priorities: mental health is a national priority and there is a recognition of underinvestment in infrastructure in the North of England for conducting mental health research. Our aspiration is to grow mental health research alongside related themes, such as urgent and emergency care, alcohol, gambling, and physical activity. We have an agreement with our local Mental Health Trust to establish the Sheffield Mental Health Collaborative (together with service users and local charities), to provide the support and capacity to increase NHS mental health research. The Trust has agreed to fund a researcher to develop mental health grant writing (0.6 FTE) and the University will fund an additional clinical senior lecturer.

4) Developing KE activities including our response to the industrial strategy challenge: our KE strategy for 2018-23 focuses on further developing KE partnerships with external global and national stakeholders and maximising the interplay of our high-impact research and KE activities. For example, we are looking to develop a KE-specific strategy alongside the investment in health data analytics/informatics and public health economic modelling. We will use our expertise from previous KE with stakeholders to respond to the Industrial Strategy Challenge Fund. An approved investment in two part-time deputy director posts enables the KE Director to focus on developing strategic involvement and further increase our research with private and public sector partners.

1.4 Enabling impact

Having a positive impact on health and health services has been the raison d'etre of ScHARR since it was founded 26 years ago. We have been at the forefront of the impact delivery for many years investing in resources before REF2014 to develop an impact infrastructure. An Impact Strategy Group facilitates activities, with an Impact Director to provide senior professorial leadership, supported by a deputy. The group provides coordination and implements our plans, working closely with the Faculty impact team.

Future strategy for impact



Dialogue and interaction with key stakeholders: we will continue to build upon and sustain our interactions with key stakeholders and partnerships to ensure research is relevant to their priorities. For example, the NIHR YH ARC has a strong focus on co-design and engagement with many impacts demonstrated locally, nationally and internationally in our [impact and legacy brochure](#). We have adopted a co-design approach with integrated knowledge mobilisation throughout the research cycle. This together with our work on [actionable tools](#) facilitates research evidence implementation through policy and practice. The NIHR RDS YH has co-led events and workshops with the NIHR Impact Lead, focusing on how public involvement can be utilised to maximise impact in research. Our model of collaborative research explicitly responds to knowledge users’ needs in order to produce research findings that are useful, usable and used. For example development of the ReQoL mental health measure (*Brit J Psychiatry*) was supported by input from 75 service users ensuring its acceptability. We share decision-making between knowledge users and researchers, with mutual learning and respect.

Stimulating public engagement with research: we have contributed to opportunities offered through the University’s [Partnerships and Regional Engagement programme](#) including creative exhibitions and workshops for the Festival of the Mind and International Clinical Trials Day, which have engaged more than 400,000 members of the public in recent years. We have launched a series of monthly online [mini master classes](#) on current health research topics to discuss issues with a wider audience. We have proactively sought opportunities to stimulate engagement with parliamentary routes to ensure that our research can be utilised to inform policy changes. This includes liaison with the [UK Parliament Knowledge Exchange Unit](#) to share opportunities for involvement and training, and to formulate responses to Select Committee and All-Party Parliamentary Groups enquiries (e.g. SARG, CURE). We have also initiated a parliamentary launch of research findings from the [ReQoL programme](#).

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Improving the accessibility of our research: we have worked with filmmakers to create videos and a documentary "[Making a Difference](#)" detailing our work in the NIHR CLAHRC YH and our impact locally, nationally and internationally.

Using KE to increase the impact of our work: we promote the impact of our work through substantial and vibrant KE activities led by an academic director and their KE business team that supports the procurement of public/private sector research opportunities from proposal development to contract award and management. We have a networking presence at key conferences to promote the impact of our work.

Systematically analysing the impact of our research: we will ensure systematic collation of evidence of impact to allow us to optimise the impact of future research. This evidence gathering will focus on our ongoing research themes and new priority areas and may include the following: the identification of guidelines drawing upon our research; the use of routine NHS and national audit data to demonstrate impact on health services; and the use of economic modelling to estimate the health gains and cost savings associated with our research.

Sharing knowledge and expertise about impact: we will continue to develop our knowledge around research impact pathways and assessment and share knowledge and practice.

Submitted impact case studies

All of our impact case studies are proven examples of co-production and integrated knowledge mobilisation, which are based on research arising from ongoing interactions with key stakeholders, including members of the public who have been involved in the design, delivery and management of our research.

Case study	Stakeholder engagement
Troponin testing: reducing hospital admissions for suspected heart attack	From working with clinicians and implemented through working with NICE Diagnostic Group
Mortality review: Using mortality review methods to improve care	Developed with DHSC and implanted by working with RCP and Y&H Academic health Sciences
Newborn screening: Changing national policy to expand the newborn bloodspot screening programme and to deliver economic benefits	From a close working relationship with the UK National Screening Committee, clinicians and the CLAHRC
Cancer screening: Refining the national bowel cancer screening programme to optimise population outcomes	Working closely with the DHSC and the UK National Screening Committee to inform policy decisions and implementation of bowel cancer screening.
Diabetes prevention: Shaping policy and implementation for Type 2 Diabetes prevention in the UK	Arose through close working with NHS England and PHE to determine the cost-effectiveness and effectiveness of the NHS Diabetes Prevention Programme (DPP).
DiPALS: Stopping the use of diaphragm pacing in MND/ALS patients	From collaborations with clinicians and NHS and directly resulted in halting/no-adoption of diaphragm pacing (DPS) in ALS/MND in the UK, Europe, and Canada

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1.5 Open research environment

We take our responsibility to ensure our research is open and reproducible seriously, working with University initiatives such as the Reproducibility Network. To ensure maximum discoverability of our research, we aim to put all outputs in White Rose Research Online, our shared repository with Leeds and York (green route). The 2,895 outputs deposited over this assessment period were downloaded 305,000 times. This is our preferred route, ensuring equity in publishing opportunities regardless of available funding; we also publish outputs in fully OA journals, or hybrid where required for funder compliance.

We created a group to explore avenues to open data that has led to, for example, the sharing of code using GitHub (Gillespie and Angus; Strong); sharing data from the [PRIEST study](#) (22,445 patients with suspected COVID-19) on the University's open data repository ([ORDA](#)); and data from [Lifestyle Matters](#) (randomised controlled trial of 288 patients evaluating an occupational therapy based intervention in people aged 65 years) on the UK Data Service repository.

We have increased our commitment to sharing non-journal outputs such as research protocols, posters, datasets, and grey literature on ORDA, which has led to around 39,000 views and 13,000 downloads. We have made our outcomes measures and their scoring algorithms accessible via a University [licensing site](#). These are free to academics and public sector institutions. Over 2,000 licenses have been issued for SF-6D and more than 200 for ReQoL. Where Information Governance arrangements allow, we make models publicly available via the open-access RShiny platform (e.g. [vascular service](#), [SAVI](#), [Park Run](#)) including access to the open-source code-base (e.g. [SAVI](#)).

Throughout this assessment period, we have hosted seminars, workshops and bite-size sessions on open data and sharing practices, research communications and open access, ensuring that all staff are knowledgeable of the importance of open research. We have hosted events as part of Open Access Week with showings of 'Paywall the Movie' along with Q&A sessions with University open research professionals.

1.6 Research integrity

Ensuring trust and confidence in the methods used and the findings of our research is fundamental to our reputation – we expect high professional standards from our research staff and ensure that the training and development opportunities that we offer facilitate this. We also ensure that our PGRs are accessing institutional training on research ethics and generating a data management plan for their research. We developed a 'Working Better Together' initiative, which specifies expected behaviours in five domains, including 'Encouraging a Culture of Integrity'.

Our Research Ethics Committee and Information Governance Committee have responsibility for developing and implementing local policies (based on comprehensive University policies), including delivering and ensuring participation in dedicated training, and identifying, investigating and addressing breaches, should these occur. Our Research Committee promotes a positive research integrity culture, seeking to build on existing standards, including 'Working Better Together'. They agreed a set of research integrity values and are working across the School to promote them. This includes best practice in research governance, and ethical approaches to authorship, inclusion, and openness, all of which are closely aligned to our core values and enshrined in our research strategy.

2. People

SCHARR is a collegial and supportive place to work and our success lies in our people. Enshrined in our vision is to be a strong, diverse, enterprising, and financially secure School with world-leading research groups; with equal opportunities for recognition, reward, and progression for all staff whatever their grade or role. We regularly review our staff development strategy with all staff and management.

2.1 Staffing and recruitment policy

We focus growth and recruitment in our strategic areas, e.g. during this assessment period we established and recruited to professorial posts in health econometrics, applied health data analytics, assistive technology and mental health. We are a research focussed department, with no undergraduate programmes but a thriving postgraduate taught (PGT) and research (PGR) community. Our environment is tailored to the achievement of research excellence and our staffing strategy reflects this.

- 90 submitted Category A staff (78.19 FTE) of which 43 have teaching and research contracts (37.35 FTE) and 47 research-specialist (40.84 FTE).
- 38 professors and readers, of which four are research-specialist, and 20 (53%) aged under 55.
- 24 (92%) senior research fellows are aged under 55.

Many of our research-specialist staff joined us as ECRs and have since successfully developed an independent research career. SCHARR is seen as an attractive place to work and we can demonstrate promotion of staff at all grades with 10 to professor, 10 to reader, 30 to senior lecturer/senior research fellow, and 31 to lecturer/research fellow from postdoctoral. We have also supported staff to extend or expand their roles and move from professional services to research contracts. We have examples of staff who joined us as ECRs and have progressed to professor (Tappenden, Wailoo, Cooper, Baird).

We have a thriving group of clinical academics who are jointly funded with health and social care organisations to provide important links with practitioners and policymakers, help to ensure the clinical relevance of our research, and promote impact. We also support clinical academic training, with NIHR-funded clinical lecturers, doctoral fellows, and academic clinical fellows. CURE is the leading national clinical academic centre for emergency medicine, with two NIHR Senior Investigators (out of three nationwide), three professors and two clinical lecturers.

2.2 Developing our staff (including ECRs)

We aim to provide a coherent and progressive training programme for all. As a result, our research specialist staff have been hugely successful over the years in terms of authoring peer-reviewed journals, winning competitive grants, and gaining promotion. Over half of submitted staff are externally funded independent researchers, reflecting the value we place on their contribution.

We have a joined-up staff development strategy, linking training and personal development, including the Staff Review and Development Scheme (SRDS), staff induction, mentoring, line management and reward and promotion processes. We support the institutional implementation of the Concordat to Support the Career Development of Researchers.

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Figure: how we operationalise the Concordat

Ensuring a supportive and inclusive research culture

- SchARR Researchers Group
- Working Better Together - developing self and others
- Flexible working for all staff
- Writing support

Ensuring researchers are recruited, employed, and managed to recognise their value and contribution

- Bespoke section level induction
- Objective setting with regular reviews
- Use of open-ended contracts for all researchers where possible
- Reward and recognition for research and impact

Enabling researchers to reach their full potential

- SchARR and Faculty mentoring
- Academic Career Pathways route for research specialist staff
- Access to training and development funds
- Key leadership roles open to all staff

Ensuring a supportive and inclusive research culture. Our line management culture and staff review processes ensure that institutional policies and practices are adhered to. Our 'Working Better Together' initiative (see 2.5 below) has focused on support for all staff, particularly around the integration of research-specialists, to encourage a positive, supportive culture and to tackle potential inappropriate behaviours as well as providing appropriate support for those reporting issues. The new behaviour around development of self and others' was generated primarily by research staff comments in the staff survey, and enshrines the importance of ensuring that staff can develop. We schedule writing weeks for all staff in January and July and Write Club sessions are offered every month, which attract mainly female ECRs. Courses on 'How to write a Paper' are held regularly and open to all.

Ensuring researchers are recruited, employed, and managed under conditions that recognise and value their contributions. We have an effective induction programme with a buddy system for new staff to ensure that they are integrated and aware of relevant policies and practices. Although there is no formal probation for research-specialist staff as there is for T&R staff, they set objectives at the start of employment which are followed-up regularly by their line manager, and formally through the mid-year and annual SRDS. We recommend that all research staff consider using a bespoke ECR form for their SRDS, as this ensures consideration both of their career development aims and their contribution in role.

We understand that precarity of employment is a significant stressor for our externally funded research specialists and have put in place mechanisms to increase job security through internal redeployment processes and using open-ended contracts to employ researchers wherever feasible. We have made considerable progress in moving staff to open-ended contracts, with the proportion increasing from 58% in 2013 to 79% in 2020 across all research fellow posts and above. The remainder are those who have held their contract for fewer than three years, the point at which fixed-term contracts are reviewed.

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We actively promote the University's Reward and Recognition Scheme amongst staff. This recognises positive achievements and contributions through modest quick turnaround financial and other awards, in addition to promotions and accelerated pay increases. The awards provide a flexible, responsive and transparent means of recognising and rewarding staff contribution. There have been 365 successful nominations since August 2017 (earliest data available) to 164 individuals.

Enabling researchers to develop their full potential by supporting their professional and career development. We are very actively involved in the University formal mentoring programmes, for example the 'Think Ahead' programme, enhanced by offering new staff the option of a mentor during induction.

We supplement University and Faculty staff development provision by providing training and development funds to enable all staff to attend courses, conferences, and meetings. ECRs are particularly encouraged to contribute to conferences, with our travel fund aimed primarily at them. Out of 176 grants, 73 (40%) were for ECRs, totalling >£48k since the fund was established in 2013. One example of success was an application to GCRF QR pump-priming awards. We encourage and support junior staff in developing successful bids with the use of a 'bid kit', and training on writing and costing grant applications. There are a wide range of University training opportunities available and weekly bitesize lunchtime sessions cover research-specific topics such as managing research data, research ethics and GDPR, altmetrics and communication and evidence reviews. In 2017, we successfully obtained funding from MRC to host one of ten national Skills Development Fellowship Programmes - in 'Population Health Systems Science and Decision Modelling' (PI Brazier). This currently supports three postdoctoral fellows to develop new skills in advanced quantitative methods.

Research-specialist staff undertake key management and leadership roles, with their time recognised through the Workload Allocation Model (WAM) and funded where appropriate. These roles provide excellent opportunities for professional development and we advertise them openly and encourage staff at all career stages to apply.

We conduct an annual survey to monitor staff satisfaction and identify any issues that are affecting staff development or performance. The Executive Group responded to the results of both this and the University survey with a 'this is what you said and this is what we did/will do' email to all staff. We identify staff development issues and appropriate remedial actions through additional questions in our annual staff survey and identify common areas where training or support for development is required.

2.3 Supporting and rewarding research and impact

Our research is undertaken primarily with the aim of having an impact on health policy and practice. Making a positive impact is part of our culture. We have a variety of ways of engaging and rewarding researchers in both research and impact related activities. The most explicit way is through the research criteria in the University's 'Academic Career Pathways' (income, PGR supervision and impact – see REF5a), the framework for driving promotions and accelerated increments (including professorial pay review) and is used to structure annual staff appraisal.

We draw upon University-wide HEIF funding, and public engagement funds to facilitate routes and activities to build impact. We recognise impact activities (both activities and membership of our Impact Strategy Group) through the WAM. Staff can use the travel fund to support impact-related activities. We provide on-going support and guidance through our Impact Strategy Group, including workshops, updates and one-to-one support.

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Study leave is accessible for all research active staff, regardless of contract type. Staff can apply for one semester of study leave for each completed period of seven semesters' service. In this assessment period 22 staff have taken study leave.

2.4 Research students

Over the assessment period, we have delivered on our objective to increase PGR numbers, with annual new registrations now averaging just over 20 per annum and with a cohort of 88 students. The number of doctoral degrees awarded increased by 150% from 48 in REF2014 to 110. We host a Wellcome Trust DTC for Public Health Economics and Decision Science (7 students p.a.), the winning (2015) and renewal (2019) of which was a key part of our strategy to increase PGR numbers. It is highly prestigious and attracts excellent quality applicants. Other funders, such as NIHR and MRC, have supported our PGRs across a range of pre- (and post-) doctoral schemes including NIHR Research Methods (4), NIHR Doctoral Fellowships (10), NIHR Clinical Doctoral Fellowships (1). In addition, the University and Faculty funded a further nine studentships in open competition and SchARR supported another 15, plus 7 fee waivers. Two PhD studentships have been match-funded by industry.

Our **future PGR recruitment strategy** is driven by our priority research areas, hence our strategic exploration of funding through Wellcome. In addition to NIHR and UKRI funding we plan to explore opportunities with 11 industrial partners with whom we have framework or master agreements. To achieve our ambition of growing our key research theme teams we aim to further increase PGR numbers and to continue to attract high-calibre candidates by offering studentships in our core research programmes (e.g. two each for EEPUR, ARC, SIPHER). To ensure transparency we have developed a set of criteria for reviewing studentship applications in an open and transparent way, with criteria including a wide variety of characteristics such as low income and underrepresented groups.

Our **PGR Committee** meets monthly to oversee student welfare. It is chaired by the Director for Postgraduate Research (Young), who also attends the Faculty PGR committee, and includes three PGR representatives. At least two staff supervise each student in supervisory teams. Progress review meetings are every 4-6 weeks, with a report including agreed future work/training targets. The supervisory teams report milestone targets to our PGR Committee in line with institutional guidance and we actively follow-up with PGRs falling behind target to provide support. We have a programme for potential new supervisors to shadow existing supervisory teams to gain experience. In this assessment period we have introduced an annual survey inviting PGRs to feed back on supervision quality. Average ratings are consistently 4 (out of 5) or above (agree or strongly agree).

We have our own additional and long-standing policies for the **support and development** of PGRs and doctoral training fellows. This includes access to specialist research advice (e.g. in health economics, statistics and information retrieval/literature reviewing), bespoke sessions organised by the PGRs research training officer, bespoke sessions for supervisors, personal and peer mentoring and regular review and development appraisals. PRES 2019 results showed that 97% of our students said that their skills in applying appropriate research methodology had developed during their research programme.

Professional development is an integral part of doctoral study. Supervisors and students are jointly responsible for undertaking a personalised research training needs assessment. The Faculty's Graduate School coordinates a Doctoral Development Programme (DDP) to deliver this. A wide variety of courses are available, delivering generic, transferable and specific research training

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skills, including modular courses given through our extensive PGT programmes, which also attracts students from across the University.

Our staff are encouraged to undertake a PhD and we strongly support PhD by Publication to widen access to those who have entered a research pathway following clinical or non-clinical professional careers.

2.5 Equality, diversity, and inclusion (EDI)

Our environment: we are committed to providing a supportive and inclusive research environment for our staff and students. As described in REF5a, the University is a leader in EDI. We work closely with the Faculty and University through our EDI Director (also a member of the Executive) and EDI Committee, which was established in 2014. In addition to working on University priorities, three ongoing task and finish groups have been established in response to staff feedback in our most recent departmental and University staff surveys, to address EDI in (a) leadership and management (b) senior female progression and (c) job security and inequalities. Our EDI committee has an 'open slot', where any of our staff or students can raise issues, such as exploring signing-up to the endometriosis friendly employer scheme, clarification of our maternity checklist in relation to fixed-term funding, and feedback to the University on the accessibility of standard templates and disability information.

Gender: we were one of the first departments in the University to be successful in obtaining an Athena SWAN Silver Award (2014). Our Athena SWAN action plan is focused on the improvement of gender balance, our seminar speakers and posters displayed across the school, and ensuring funding for staff to attend conferences. Since 2015, 105 academic staff have benefited from the University's flagship Women Academic Returners Programme, which gives women the opportunity to re-establish their research following maternity/adoption leave. Outcomes have included research papers, grant applications and attendances at conferences. SchARR has also adopted the 'Whyte Payment', which funds childcare for keep-in-touch days for staff returning from a period of parental leave.

SchARR good practice: our 'Working Better Together' group is a key feature of our commitment to provide a positive and more inclusive work environment for all, for example, by identifying specific 'Behaviours for Excellence' which underpin how we work better together – valuing others, working together, leading by example, communicating effectively; and more recently developing self and others.

Our longstanding flexible working policy (2013) helps staff to achieve a satisfactory balance between work and personal life. Since 2015, all but one application for a flexible working arrangement have been approved. In the 2018 University survey, 95% of our staff were happy to discuss flexible working with their line manager and we have a comparatively high proportion (42%) of part-time staff at all grades, the majority of which are female (73%). We ensure our promotions panel considers the impact of part-time working and career breaks when assessing research metrics.

All SchARR staff are required to complete online EDI training and members of our Executive Group, promotions panels and chairs of core committees undertake mandatory unconscious bias training. In addition to signposting staff and students to the range of University services for well-being and mental health, we have run mental health events for staff including sessions on mindfulness and meditation to promote well-being.

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2.6 Constructing our submission

We have large numbers of research-specialist staff across all grades. Those who meet the REF definition of an independent researcher have been submitted alongside our T&R staff. Selection and attribution of outputs was undertaken following the University Code of Practice, designed to reduce unconscious or other bias, and to fairly consider staff with protected characteristics. We also scrutinised the results of the equality impact assessment on output allocation and made changes where required. We have sent a strong message across the School that the REF is a collective effort and a substantial team of staff were involved in drafting this environment statement, led by the Dean (Brazier). All staff involved in REF decision-making have undergone the bespoke REF EDI training. We send a clear message that we do not use REF in review or promotion cases. We encouraged staff to disclose equality related circumstances and have submitted a unit reduction case.

3. Income, infrastructure and facilities

3.1 Income

Our strategic objective has been to achieve a stable and steadily increasing income, whilst increasing the diversity of funders. We aspire to grow in order to meet our ambitious goals going forward (see Section 1) and to diversify to provide longer-term security of funding and expand the range of research problems we address.

We have achieved a steady and sustainable growth in research income, **increasing by 74% from £40.5m in REF 2014 to £70.4m** in this assessment period. We achieved this by maintaining our key externally funded programmes and growing funding in our key strategic areas, whilst diversifying our funding sources (including UKRI, ISCF and GCRF funding and major charities).

A large part of our income derives from major, usually five-year, competitive grants (over £1m) for programmes of research: ScHARR TAG (NICE, £7.6m), NIHR RDS Y&H (£2.64m), MRC SIPHER (£5m), NIHR SPHR (£1.6m), NIHR CLAHRC Y&H (£5.2m), NIHR ARC Y&H (£2.5m) and EPRU 1 and 2 (£4.85m). At the same time, we have improved the diversity of funding with large increases in UKRI awards from £4.8m in REF2014 to £5.4m and charitable income from £1.0m to £2.4m.

3.2 Strategy for growth: developing the infrastructure

Our research is supported by a comprehensive infrastructure at School, Faculty and University level. Our Research Director is supported by a Research Committee, an Information Governance Committee, an Ethics Committee, a common open research policy, and an Impact Director. All report to the Executive chaired by the Dean.

Separate strategies are developed within the research groups and brought together to inform investment decisions, such as new posts (see below) and developing collaborations, and the organisational and operational infrastructure of the School. This includes a recognition of the importance of establishing a secure and safe data infrastructure beyond our current single study needs (e.g. CTRU trials) to a much larger facility for cross departmental working.

3.3 Organisational infrastructure

Our investment in research leadership (29 professors and 31 senior lecturers or senior research fellows) provides the capacity for producing competitive grant applications. Our interdisciplinary

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working, collaborative culture, and willingness to work with colleagues nationally and internationally, ensures we can respond to the changing funding environment.

We appointed new posts to align with our strategic areas for growth (see section 1), including a new chair in health informatics held jointly with the Information School (Bath) and a senior lecturer in nutrition (Ranawana) in line with the flagship Institute for Sustainable Food. There has also been a key research management post from an investment by the Vice-Chancellor's fund in SARG. Other planned posts included a senior lecturer in health informatics, a clinical senior lecturer in mental health, and senior statistician and quality assurance posts to support the CTRU.

We seek to grow our own research leadership. The majority of our professors have come through the ranks (18), including our research-specialist staff (5). An important part of staff development opportunities come from our research stimulation fund, outlined above, which is available to all staff, particularly ECRs. Recent outcomes have included successful bids to NIHR for fellowships (Ren and Pennington) and ESRC/NIHR for research funding as well as production of articles and applications to GCRF – including a recent application to the GCRF/Newton COVID-19 fund.

We encourage and train ECRs about impact through access to an impact internship programme. The RDS provides leadership on supporting researchers in planning impact at the design stage of the application. Integrating sessions on impact into Grant Writing Workshops and one-to-one support has helped researchers plan their impact pathway at the early stages.

3.4 Operational infrastructure

Research

Our Research Committee includes staff representatives at all levels, including ECRs. One member also sits on the EDI committee to ensure that strategies and operations are aligned. Administrative support for research, including bids, is organised into faculty-level research hubs. Our hub of three staff advise and support us across a broad range of tasks such as preparing applications. We also fund a specialist information resources team, in addition to University library, and computing facilities to input into research projects and systematic reviews and provide guidance and advice on publication.

We have a comprehensive research ethics review process for all students and staff conducting research involving human participants. We manage research governance procedures for all health research within the School, with the exception of clinical trials where the University manages the process. Our Information Governance Committee is responsible for the creation, dissemination and implementation of information governance policies and processes, which demonstrate that we can be trusted to maintain confidentiality and security. Our information governance policy applies to all staff (including students, emeritus, honorary, visiting, and short-term contract staff); who must complete (and pass assessments in) annual information security training. We fund a research fellow two days a week to support the work of this committee. Our robust processes enable us to handle health data from external sources (such as NHS Digital) and ensure we successfully pass relevant data security audits.

We host the NIHR Research Design Service for Yorkshire and Humber (RDS YH), a White Rose collaboration with Leeds and York, which supports researchers to develop and design high-quality research proposals for submission to the NIHR and other national, peer-reviewed funding competitions. We lead the NIHR RDS YH patient and public involvement forum, which consists of public members and health and social care professionals across the region. The group's core role is to advise on the development and delivery of, and to monitor progress, in all activities. We also

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host a part NIHR-funded and registered Clinical Trials Research Unit (Director: Cooper), which provides expert support for the development and conduct of clinical trials to the highest regulatory and scientific standards. It is a pivotal focus for the development of clinical trials within the South Yorkshire research community.

Our researchers (Burton, Mitchell, Dickson) support the only NIHR 'deep end' Clinical Research Network for general practices serving the most deprived 10% of the population. It provides PPI input to local and national studies and recruited patients to 15 studies between 2017 and 2020.

Impact

Our Impact Strategy Group facilitates impact activities across SchARR, and is chaired by a professorial Impact Director to provide senior leadership, supported by a deputy. The group acts as a focal point to coordinate and implement our plans, working closely with the Faculty impact team.

The University has supported our successful impact activities via the allocation of £42k from HEIF funds. We also make available internal funds to support staff in impact-generating activities including a research stimulation fund from 2016. Funds have been allocated to a total of 53 projects. We developed School-wide impact training, an impact toolkit, and on-going sharing of good practice through workshops and away days. We have continued to provide one-to-one support for embedding impact as part of new funding proposals.

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

The research that we undertake is highly collaborative, requiring multiple methodological approaches and engagement from stakeholders, both academic and in wider society. We engage across these areas from research design to dissemination and engagement.

4.1 Research collaborations***International collaborations***

Our process of internationalisation has drawn on our research strengths and reputation (e.g. in HTA methods) to develop our international collaborations and global networks. We also support staff spending study leave in centres of international importance and welcome international visitors.

One of our key areas of expertise is health technology assessment (HTA). We have a large programme grant to support the work and decision-making of NICE (SchARR-TAG is their largest Evidence Review Group), and our reputation in this field means that our expertise is much sought after. We have partnership arrangements in this area with other leading universities and institutions in Europe (Haute Autorité de Santé - France), North America (Institute for Clinical and Economic Review - a U.S. body styled on NICE) and Asia (Singapore Ministry of Health). Other examples include a collaboration with the University of Pennsylvania to undertake economic analysis of diagnostic strategies for acute coronary events, securing NIH funding to extend the application of our economic model to the U.S. and extending new-born screening collaboration in Bangladesh. Finally, we (Brennan; Strong) are founding members of the [Collaborative Network for Value of Information](#) methods research, alongside international partners from North America (Harvard, Stanford, Yale, Toronto), Europe (Cambridge, Bristol, Oslo, Twente) and Australia (Griffiths).

We are recognised internationally for our outcomes research, including work on key internationally adopted health-related quality of life measures (EQ-5D, SF-6D, CHU-9D) with international collaborators in the U.S. (Chicago), Australia (Flinders, Melbourne, Sydney), China (Tianjin) and

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the Netherlands (Leiden, Groningen). A recent example of a major international collaboration is the 'Extending the QALY' project (Brazier) to develop a new generic measure (EQ-HWB) funded by MRC and EuroQol Research Foundation in an Industrial Collaboration with colleagues across five countries (USA, Germany, Argentina, China, Australia).

We also have a growing portfolio of global health projects, working closely with colleagues around the world. We have focused on developing our links with international partners in selected countries, to influence key stakeholders (such as governments and health providers) to achieve impact in those countries. Success in this area includes the development of the Global Emergency Care Research network (GEM-CARN), led by Lecky, developing international collaborations based on our expertise in urgent and emergency care. Well-established partnerships with the University of Ghana School of Public Health and the Ghanaian University of Health and Allied Sciences have yielded successful grant income. Our long-term, established partnership with the non-governmental organisation PHASE Nepal continues to generate a number of successful research grants drawing on research collaborations in SchARR and across the University (Karki, Lee, Balen).

National collaborations

Our national and regional collaborations are extensive. We pursue important strategic alliances with universities and other bodies to deliver large programmes of work. For example, the SIPHER consortium with Leeds, Edinburgh, Sheffield City Council, Greater Manchester Combined Authority, and the Scottish Government. In the field of HTA, we lead the NICE Decision Support Unit (DSU), a collaboration with the University of Leicester and University of York, who we also collaborate with to provide the UK DHSCs Policy Research Unit for Economic Methods of Evaluation in Health and Social Care Interventions (EEPRU). We also contribute to other national initiatives, such as Health Data Research UK – the national institute for health data science.

Our collaborations with the NIHR and its partners, at a national and regional level, is extensive. We form part of the NIHR School of Public Health (together with the London School of Hygiene and Tropical Medicine, University College London, the universities of Cambridge, Bristol and Exeter, the FUSE collaboration in the north east and the LiLac collaboration in the north west) and, in the Yorkshire and Humber region, collaborate with the University of York and University of Leeds to deliver the regional NIHR RDS-YH, as well as the NIHR ARC with the universities of Leeds, Bradford and York. We therefore play a central role in the design and application of research in the NHS and social care services in our region.

We contribute to the Connected Healthy Cities initiative, a Government-funded programme that uses information and technology to improve health and social care services for patients across the North of England; the Northern Health Science Alliance (NHSA); and the Yorkshire and Humber Academic Health Science Network (YH-AHSN). We also work with others in our region to develop the next generation of researchers as an active part of the White Rose Collaboration (e.g. leading doctoral programmes).

Local collaborations

Internal (SchARR) collaborations: most of our large research programmes (e.g. MRC SIPHER, NIHR School of Public Health (SPHR), NIHR RDS-YH, and NIHR ARC Y&H) and many of our larger projects are School-wide activities, run jointly between sections within the School. There is a comprehensive cross-School infrastructure to support research and impact.

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University of Sheffield collaborations: we have many well-developed collaborations with colleagues across the Faculty and the rest of the University. We work closely with other departments: Medicine, Dentistry, Economics, Statistics, Geography, Psychology and Sociology, and the Faculty of Engineering. We support clinical trials and research studies with staff from across the Faculty of Medicine, Dentistry and Health and the local NHS trusts. We also have three professors who are joint appointments – Tsuchiya (Economics), Bath (Information School) and Dawson (Management School). Research centres, themes and projects also provide the opportunity for close interdisciplinary work, for example the SIPHER project, with the Faculty of Engineering (Department of Automatic Control and Systems Engineering). As discussed elsewhere, we are developing new collaborative research programmes as partners in two University's Flagships launched in 2019: the Healthy Lifespan Institute (Goyder and Brennan) and the Institute for Sustainable Food (Caton associate director and co-leads the research pillar "Food, Sustainability and Health").

Local NHS: we work in close collaboration with numerous NHS organisations, including hospital, community and ambulance service trusts, NHS Direct and other urgent care providers on national programmes and multi-centre trials and collaborations. We have jointly-funded posts in A&E medicine (3 professors) and mental health (1 professor), and host a half-time post funded by St. Luke's Hospice. Our Dean has been a member of the joint University and Sheffield Hospital Trust's Research Strategy Group. We have a strong collaboration with the Sheffield Clinical Commissioning Group, including membership of its R&D strategy group. The CTRU offers expertise to NHS collaborators in the feasibility assessment, design and conduct of trials in clinical, community and general practice settings. The RDS supports NHS researchers in developing and designing high quality research proposals. The Yorkshire and Humber ARC, and CLAHRC, before it provides a forum for developing research jointly with local providers, clinicians, and service users. NHS staff are regularly seconded to us for research, training, and career development.

The CLAHRC in Y&H was established in 2014 with an initial investment of £10m from NIHR, realised £14.6m in matched funds along with an additional contribution of £2.6m from industry. Funding was used to support a diverse range of projects including establishment of smoke-free mental health services, palliative care through collaboration with Sensory Technologies Ltd. and expansion in the range of diseases screened in newborn (impact case study: Newborn Screening) in collaboration with Great Ormond Street Hospital. We have had international reach with newborn screening implemented in Bangladesh while in Bangalore local women have been enabled to use a mobile diagnostic and screening toolkit, developed with support from CLAHRC YH, to screen for diseases in some of India's poorest urban areas.

An exciting initiative has been the Sheffield Mental Health Collaborative (SMHC), established in 2019, which is a formal partnership between the University and Sheffield Health and Social Care NHS Foundation Trust (SHSC), local healthcare commissioners, Sheffield City Council and voluntary sector partners in mental health research, teaching & learning and knowledge mobilisation.

These collaborations involve a genuine commitment from all sides, including the local Mental Health Trust investment in our staff (specifically grant writing capacity), the Clinical Research Academy (see above) and Research Capability Funding from the NHS into our Clinical Trials Unit to invest in research capacity.

Collaborative grants and outputs: these national and international collaborations have been hugely successful in terms of winning funding and producing outputs. The number of grants with other Sheffield colleagues was 179, and internationally was 73 out of a total of 520. Out of the 177 submitted outputs, 143 have co-authors from outside Sheffield and 47 (26%) have international co-

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authors from 22 countries. Many also have co-authors from Sheffield Teaching Hospitals and Services, and other Sheffield departments.

Academic visitors, honorary contracts, and joint appointments: our international collaborations frequently lead to academic visitors, who spend time physically located here. All staff are encouraged to generate these collaborations and in this assessment period we have hosted an average of five per year. These collaborations generate outputs, for example, work developed by Dr Romero from Brazil whilst visiting led to three papers on antenatal syphilis screening to inform policy making in Brazil. We also have an extensive list of honorary contracts with academics from other institutions, clinicians, and other partners (74). A number of our staff have joint posts with the NHS (including three clinicians), one working with a local hospice and one with a private company.

4.2 Impact: contribution to the economy and society

Our work is motivated by a strong desire to improve policymaking and practice through research and KE. Co-production is central to our research and involves such users as DHSC, NICE, NHS, patients, the public and industry. Our extensive local collaborations are described above. Mechanisms for ongoing stakeholder engagement include having end users on project steering groups, participation as co-investigators and careful dissemination of research to users.

Our reputation in contributing through impact is evidenced by the appointment of Mawson and Baird as senior advisers on the NIHR Impact Advisory Board and our hosting of two successful NIHR Knowledge Mobilisation Fellowships.

Contributions beyond our impact case studies

The breadth and depth of our contribution to the economy and society can be seen from our extensive range of impacts beyond the six impact case studies we are returning and our extensive KE activities in the public and private sectors. An initial survey of staff to identify potential case studies had over 40 completed questionnaires. We have produced a report showcasing the impact of our research: [SchARR's 20 years of making an impact](#).

A recognised area of impact is in HTA, where SchARR-TAG work has influenced NICE Guidance including three original appraisals. In RA for example, pharmaceutical companies were heavily promoting the use of biologics in a wider group of patients than had previously been recommended. It was anticipated that the additional annual cost of this strategy would be over £150m. Our research provided fundamental evidence for the NICE decision-making process and suggested that this money would generate greater patient benefits if used elsewhere in the NHS. NICE decided not to expand the use of bDMARDs and this resulted in a reduced use of bDMARDs in the UK. Our mathematical model has become the new benchmark for modelling RA and has been replicated in multiple subsequent company submissions to NICE. In another example, mandatory NICE guidance on bisphosphonates i(TA464) and non-bisphosphonates for osteoporosis impact on the treatment decisions of over 20 million people and promote the use of treatment in those where it represents value for money, and not in those where it does not, thus improving societal outcomes. The Fracture Liaison Service Database Annual Report indicates that the prescribing of bisphosphonates has increased since our work.

Contribution through KE

We have built strong external partnerships with key stakeholders from the public and private sectors including client-focussed consultancy and research (and professional skills capacity building). We have multiple global and national framework and master service agreements (MSAs)

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and long-standing working relationships with a broad range of partners within private, public and third sector organisations. Major formal partnerships include several global pharmaceutical industry partners, national public policy entities including PHE and third sector organisations including the Yorkshire Cancer Research Fund. The KE programme accounts for an average annual income of £2m, with its three largest customers being PHE (£2m during the assessment period), NHS England (£1m) and Novartis (£0.5m).

Our KE activity covers three broad themes: public health policy, global health through WHO and innovative work around rare diseases.

Public health policy decision making: we work in close partnership with public health policymakers to address specific policy questions including PHE's Health Economics, Specialist Provider and Screening Frameworks. We successfully won and completed 32 projects for them. This has included the development of commissioning support tools like the CVD prevention return on investment tool used by local public health departments to inform their investment decisions, which has had over 2,000 uses. Another example was research into optimising bowel cancer screening which directly informed the 2016 UK National Screening Committee recommendation to replace the guaiac occult blood test (gFOBt) with the Faecal Immunochemical Test (FIT) screening. Outside the frameworks we have used our strong KE infrastructure to apply core areas of our public health research portfolio to the specific requirements of multiple local, national, and international bodies. Examples include support for alcohol-related policy (including contributing to the Australian low-drinking guidelines), NHS Cancer Screening Programmes and NHS Diabetes Prevention Programme.

Global health: we regularly provide analytical consultancy services to the World Health Organisation (WHO) contributing to two WHO global reports including the Global Tuberculosis (TB) Report and the Global Report on Assistive Technology (GReAT) and to support the WHO Health Evidence Network (HEN) in the development of evidence synthesis reports.

Rare diseases: we work closely with patient groups and charities to develop tools to support the management of rare inherited conditions and to understand the impact they have on individuals and their families. Examples include the development of a quality-of-life tool for Duchenne muscular dystrophy (with a Duchenne's UK consortium) and modelling the screening and treatment choices for severe combined immunodeficiency. We have also applied our methodological expertise to provide advice and recommendations on policy decision-making processes in the area of rare diseases, including the use of multi-criteria decision analysis for orphan drugs and evidence review methods for the NHS Specialised and Highly Specialised Commissioning.

Contribution through intellectual property

Intellectual property sharing and commercialisation activities include a suite of health outcome instruments (eight, with another four being prepared) available through the University's [online licensing portal](#). Since August 2013, the SF-6D preference-based measure for calculating QALYs has sold 1,568 commercial licences that have been purchased globally generating more than £1.6m in royalty income. The SF-6D is also freely available to non-commercial bodies for use in research and policymaking (668 free licenses). The ReQoL for mental health has seen 205 free licenses granted, mainly to the NHS to support community mental health services.

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Engagement with diverse communities: patients and the public

We have a long-standing commitment to public involvement (PI) in research with a PI Lead and have established numerous PI networks, including Yorkshire and Humber Voices which is a regional network and brings together PI Leads from all parts of the NIHR infrastructure, charities, YH-AHSN and members of the public to share best practice, avoid duplication of effort and increase efficacy overall. Our PI lead led on the development of the National [RDS Brief Guide on Public Involvement](#) and we have a member of staff who sits on the NIHR Public Involvement Board (Baird). The brief guide focuses more on PI at the design stage of research and in developing grant applications with additional guidance on inclusivity, public members as co-applicants and the UK Standards.

Working closely with our local NHS Trusts we have contributed to the development of over 20 disease-specific public involvement panels, which researchers have access to when developing their research projects. We also work with a public involvement panel that represents a socioeconomically and ethnically diverse area of Sheffield and have been ground-breaking in developing public involvement in methodological research, where our panels have built-up expertise in evidence synthesis and economic evaluation.

We have worked hard to engage with under-represented groups. We successfully obtained INVOLVE and National RDS *Reaching Out Funding* for an exciting project using a community development approach to engage with gypsy and traveller communities (GTCs) within the region. This is a collaborative, regional project with input from CRN, CLAHRC, York Travellers' Trust and Leeds Gate Gypsy and Traveller Exchange. The approaches we are using have also been transferred to public health, social care, and global health research. To date our learning includes: the importance of creating spaces for informal, face-to-face discussions, including time to build individual and institutional trust in project timelines; the vital role community partners (e.g. charities) have in facilitating relationships; and developing appropriate approaches, positive change and empowerment within communities during the engagement process itself. The project has received national interest with invitations to contribute to an NIHR Academy webinar and the NIHR International Nurses Day. In line with the 'Working Better Together' standard we have also: [published in the final INVOLVE newsletter](#); contributed to 'A Practical Guide to Being Inclusive in Public Involvement in Health'; and shared learning regionally via the Voices Network and the national PI groups.

4.3 Contributions to the discipline

The contributions of our staff both to their disciplines and society are evidenced in many ways. Nicholl was awarded a CBE for contributions to health research; we have four NIHR Senior Investigators (Brazier, Goodacre, Walters, Mason); two NIHR Senior Investigator Emeritus (Brazier, Nicholl); Brazier and Nicholl have been elected as Fellows of the Academy of Medical Sciences, and Meier elected as a Fellow of the Academy of Social Science. In terms of the COVID-19 pandemic, our research environment has allowed us to support our staff to make an impact on SAGE sub-committees (Mason) and in supporting data to aid decision makers (Angus). We have also worked with a team from Lancaster University (Mason) to assess the [impact of COVID-19 on care homes and their residents](#).

The wider impact and appreciation of our staff and their work is also evidenced by the requests for their expertise at the highest national level: Foster and Holmes have been invited onto Cabinet Office Advisory Panels; there have been direct invitations to members of the Alcohol Group to provide evidence for Parliamentary enquiries (Holmes, Brennan, Angus); and as invited experts to provide advisory input into the Cross-Whitehall Trials Advisory Panel (Cabinet Office) (Cooper and

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Goodacre). It should also be noted that among these staff is one of our PGR students and ECRs (Alexis Foster). The findings of the REQoL project were launched in Parliament highlighting the reputation of SchARR and our staff.

The quality and reputation of our staff is further recognised by their appointment to very many national advisory bodies and committees. They have chaired 38 trial steering committees and 13 trial data monitoring committees and have been members of 20 other TSCs and 28 other DMECs. Since 2014, two have chaired (Goodacre - HTA, Cooper- RfPB and Baird - DSE) and 13 have been members of external research funding panels. There have been two members of the Academy of Medical Sciences Membership Committee and the panel for Senior Investigators Awards (Brazier, Nicholl). Nine members of staff have been or are currently members of NICE Technology Appraisal Committees, and one member of staff was the HTA expert on the NICE Interventional Procedures Advisory Committee (Carroll). These committees all produce guidance for clinical practice within the NHS. Other NICE Advisory Groups and panels have also appointed many members of our staff for their expertise (17 staff – one NICE Public Health Advisory Committee, three NICE Methods Guide Groups, four NICE Methods Working Parties, 11 other NICE Advisory Groups). Beyond NICE, the professional standing of our staff is also evidenced by appointments to a number of NIHR bodies, including the NIHR Advanced Fellowship Panel (Julious), NIHR Strategy Board (Baird), the NIHR PPI SLT (Baird), the NIHR Public Health Oversight Group (Baird) and the NIHR Academy Forum (Baird). Finally, Baird has also been appointed to the Industrial Strategy Challenge Fund (ISCF) Accelerating Detection of Disease Advisory Group.

The international reputation of our staff has also seen appointments to The National Rehabilitation Hospital for Ireland (Ariss); the International Advisory panel for Singapore's Health Care Agency (Wailoo); the International Clinical Trials Methodology Conference Scientific Committee (O'Cathain); the International Federation of Emergency Medicine Research Committee (Lecky) and led three ISPOR Task Forces on aspects of HTA (see above). We also have the President of the Kettil Bruun Learned Society (Meier). Luc De Witte is president of the Global Alliance of Assistive Technology Organisations (GAATO), Robert Akparibo (PH) is a member of the Worldwide Universities Network and a member of the academic platform for scaling up nutrition in Ghana, Rebecca Palmer (HSR) chairs the World Federation for NeuroRehabilitation communication disorder special interest group and is a member of the Trials in Aphasia Panel (TAP) within the international collaboration of aphasia trialists (CATs). Pete Dodd is a Global Fund modelling guidance group participant and a member of WHO TB impact estimation and measurement task force.

Since 2014, our staff have chaired six Conference Scientific Committees and given 17 keynote or invited lectures at national or international research conferences, and 31 people have had editorial roles on journals, and 25 have been members of journal editorial boards.