

<b>Institution:</b> University of Nottingham	
<b>Unit of Assessment:</b> UoA2: Public Health, Health Services and Primary Care	
<b>1. Unit context and structure, research and impact strategy</b> The strategic aim and priority of the Public Health, Health Services and Primary Care unit in the current REF period has been the generation and growth of a dynamic, sustainable and interdisciplinary environment, which cultivates the ambition of our staff and students, and stimulates world-leading research into some of the most urgent health problems of our times.	
<b>1.1. Overview of unit context</b> This unit comprises colleagues in the Divisions of Epidemiology and Public Health (DEPH) and Primary Care (DPC) and the Nottingham Clinical Trials Unit (NCTU), situated within the School of Medicine in the Faculty of Medicine and Health Sciences, and includes 47 REF eligible staff. Research conducted across the unit shares the global aim of improving the health and well-being of individuals, patients and society.  Our research focuses on NHS priorities, employs diverse methodologies and is inherently multidisciplinary. Accordingly our research teams comprise of behavioural scientists, data scientists, epidemiologists, health economists, social scientists, statisticians and clinicians; with active collaboration with the wider University, other UK and international universities, NHS, charitable organisations and industry.  We have three broad research themes: lifestyle influences on health; epidemiology; and health of the public. We consider the active involvement of patient and public partners to be critical to the development of our research questions, the methods by which we answer them and our ability to maximise the reach and impact of our findings. Consequently, each of our research themes has their own active Patient and Public Involvement and Engagement (PPIE) groups which they draw on throughout the research lifecycle.  Our key achievements since the previous REF are highlighted in Table 1.	
<b>Table 1: Key achievements since 2014</b>	
<b>Outputs</b>	<ul style="list-style-type: none"> <li>Over 1080 peer-reviewed research papers.</li> </ul>
<b>Grant Income</b>	<ul style="list-style-type: none"> <li>£105 million: total amount awarded.</li> <li>£26 million allocated (section 3.1, Table 3).</li> <li>Major funding - leading or collaborating on: 10 NIHR Programme Grants for Applied Research (over £21 million).</li> </ul>
<b>Impact</b>	<p>Key areas of impact:</p> <ul style="list-style-type: none"> <li>Evidence underpinning development and implementation of UK tobacco control policies and practices.</li> <li>Evidence underpinning development and implementation of UK home safety equipment schemes for preventing child unintentional injuries.</li> <li>Development of a pharmacist-led IT-based intervention (PINCER) provided to over 25 million patients, demonstrating large reductions in hazardous prescribing.</li> </ul>

	<ul style="list-style-type: none"> <li>• Development of risk prediction tools for conditions such as cardiovascular disease and diabetes, used in general practices covering over half of the national population and recommended in several national guidelines.</li> <li>• Impact on several countries' national influenza management guidelines to recommend early antiviral use, and new WHO Europe guidance on the control and prevention of influenza in long-term care facilities.</li> </ul>
<b>Studentships</b>	132 postgraduate students supervised, including 68 new registrations within this REF period.
<b>University investment in new posts</b>	17 new academic posts.
<b>Centres &amp; units with new or continued funding</b>	<ul style="list-style-type: none"> <li>• NIHR Nottingham Biomedical Research Centre (BRC).</li> <li>• NIHR School for Primary Care Research (SPCR).</li> <li>• NIHR Patient Safety Translational Research Centre.</li> <li>• SPECTRUM (Shaping Public hEalth poliCies To Reduce ineqUalities and harM).</li> <li>• ARUK Pain Centre.</li> </ul>
<b>People</b>	Athena Swan Silver renewal (School of Medicine, 2019).

## 1.2. Unit structure

Our research focuses on three key areas of excellence and includes both fundamental discovery and interdisciplinary work. The integrated research of clinicians, statisticians, clinical trialists, data scientists and epidemiologists within the unit continues to deliver major breakthroughs for the benefit of patients and the public. The interdisciplinary nature of our research also builds a culture of reproducible and open research. Below we provide an overview of each theme.

### 1.2.1. Lifestyle influences on health

This theme is concerned with lifestyle determinants of poor health and health inequalities, with a particular focus on reducing tobacco and alcohol consumption. The work is led by the UK Centre for Tobacco and Alcohol Studies (UKCTAS) and the SPECTRUM research group. UKCTAS was established in 2008, with an initial focus on tobacco, and expanded with renewed funding of £4.3m in 2013 to include prevention of harms from alcohol. Building on the successes of UKCTAS, a new strategic partnership (SPECTRUM) was established in 2019 with a £5.9m grant from the UK Prevention Research Partnership. This collaboration led by the University of Edinburgh includes 10 other UK universities and Public Health Organisations.

Key research is on delivery of smoking cessation services and we have unique expertise on smoking in pregnancy, leading or contributing to trials of nicotine replacement therapy (NRT), e-cigarettes, financial incentives and text message support for stopping smoking in pregnancy.

*Key research achievements include:*

- The largest ever trial to examine effects of a physical activity intervention on smoking cessation in pregnancy. **BMJ 2015** doi:10.1136/bmj.h2145
- First trial to demonstrate effectiveness of a complex intervention including behavioural and pharmacological support and air quality feedback in reducing children's exposure to second hand smoke. **Tobacco Control 2018** doi:10.1136/tobaccocontrol-2016-053279
- The only randomised controlled trial of a smoking cessation intervention for pregnant women to collect outcome data on offspring. **Lancet 2014** doi:10.1016/S2213-2600(14)70157-2

### 1.2.2. Epidemiology

Our epidemiology research covers cancer, diabetes, gastroenterology, injury prevention, mental health, perinatal epidemiology and respiratory disease, with a strategic focus on:

1. Enhancing understanding of the burden and consequences of disease.
2. Understanding and predicting who is most at risk of disease.
3. Evaluation of risks and benefits of new and existing therapies and interventions.

We address these aims through expertise in diverse methodologies including the development and use of large e-health databases (e.g. QResearch, Clinical Practice Research Datalink (CPRD), Hospital Episode Statistics (HES)), randomised controlled trials and systematic reviews/meta-analyses. In particular, our UK primary care database research has achieved international recognition, with the unit being identified as the most productive internationally and three of our colleagues within the top 10 most productive researchers in this field worldwide (**BMJ Open 2016** doi:10.1136/bmjopen-2016-012785).

The theme includes the following research areas of international and national significance:

- **Primary Care Epidemiology:** Research includes developing and validating risk prediction algorithms and tools such as QRisk for predicting cardiovascular disease and QDiabetes for diabetes, which are recommended in national guidelines and used in the NHS Health Checks prevention programme in England. The group also investigates the safety of commonly prescribed drugs such as antidepressants, anticholinergic drugs and hormone replacement therapy. The group has published 16 papers in the BMJ since 2014.
- **Injury Epidemiology and Prevention:** Research includes evaluating effectiveness of home safety interventions in childhood; maternal mental health and injury in children; adolescent poisoning including self-harm and alcohol-related injury; developing and evaluating interventions to improve longer-term injury outcomes in working age adults and evaluating falls prevention interventions in older people.
- **Clinical Epidemiology:** Research in:
  1. Cancer: determining the risk of venous thromboembolism risk in cancer.
  2. Gastrointestinal disease: occurrence, natural history and consequences of inflammatory bowel disease; understanding the burden of chronic liver disease; predicting the occurrence and mortality of upper gastrointestinal haemorrhage.
  3. Perinatal health: drug safety in pregnancy; effects of maternal health on pregnancy outcomes; risk factors for congenital malformation and early life outcomes.
  4. Respiratory disease: understanding the progression of idiopathic pulmonary fibrosis, the effect of morbidities in COPD; optimising treatment for asthmatics; a birth cohort on the development of asthma in Cuba.

*Key research achievements include:*

- Development of the first cardiovascular risk prediction model (QRisk3) to include major risk factors such as serious mental illness, atypical antipsychotics, migraine, corticosteroids and blood pressure variability. **BMJ 2017** doi:10.1136/bmj.j2099 (awarded RCGP research paper of the year 2017: Category 2)
- Large multi-centre trial to test if quadrupling inhaler dose in asthmatics who start to deteriorate prevents exacerbations. **NEJM 2018** doi:10.1056/NEJMoa1714257
- Development of a new risk prediction model for venous thromboembolism in postpartum women. The model was acknowledged in NICE venous thromboembolism prevention

guidelines (NG89) and an online calculator has been produced (maternity-clot-risk.co.uk).

**BMJ 2016** doi:10.1136/bmj.i6253

- Demonstration that only 40% of diagnosed gout patients receive urate lowering within 5 years of diagnosis, also cited in recent EULAR guidelines. **JAMA 2014** doi:10.1001/jama.2014.14484 and doi:10.1136/annrheumdis-2016-209707
- Systematic review demonstrating that early introduction of egg and peanut foods to the infant diet was associated with reduced risks of egg and peanut allergy; this has informed UK and international guidance. **JAMA 2016** doi:10.1001/jama.2016.12623

### 1.2.3. Health of the public

The work of this theme seeks to advance the health of patients and the public in the UK and globally.

The theme includes the following areas:

- **Nottingham Clinical Trials Unit (NCTU):** The NCTU enjoys a national and international reputation for excellence in clinical trials. The Unit primarily conducts large, multicentre clinical trials to address questions of importance to the NHS.
- **Medicine Safety:** This group, which is part of the £6.7m NIHR Greater Manchester Patient Safety Translational Research Centre, identifies factors which increase the risk of medication errors. It has developed and evaluated interventions that reduce these risks (e.g. the pharmacist-led Pincer intervention is being successfully rolled out nationally).
- **Biobehavioural Health:** This research area examines how patient characteristics (such as mood, adherence) can be harnessed to influence disease and treatment outcomes. Its primary focus is on the development of psychological interventions to: (i) improve outcomes in diabetic foot disease; (ii) optimise effectiveness of influenza vaccination. It also carries out research on: (iii) identifying modifiable psychological and behavioural correlates of fertility; (iv) the mental health impact of the SARS-COV-2 pandemic.
- **Primary Care Stratified Medicine:** Research focuses on developing methods to identify patients' risks of future health outcomes, the stratification of interventions or treatments according to this risk and use of data science to achieve effective stratification.
- **Influenza group:** The Health Protection and Influenza Research Group (HPIRG) has research interests spanning a broad range of communicable diseases areas but specialises in respiratory virus infections, of which influenza is the key strategic focus.
- **Global Health:** Research and training is conducted to improve health in a wide range of diseases and social environments in 90 countries across the world. This includes studies of the aetiology of asthma and community interventions for acute psychosis in Africa, and respiratory epidemiology in Cuba. Research members are also part of the new Nottingham China Health Institute which includes a centre of excellence for systematic reviews and guidelines.

*Key research achievements include:*

- Large trial of the Family Nurse Partnership, a licensed intensive home-visiting intervention, among teenage mothers from early pregnancy until the child's second birthday. The programme remains in place following changes to improve efficiency. **Lancet 2016** doi:10.1016/S0140-6736(15)00392-X
- Demonstration that the FAMCAT algorithm significantly improves identification of patients with familial hypercholesterolaemia. **Lancet Public Health 2019** doi:10.1016/S2468-2667(19)30061-1

- Individual patient data meta-analysis demonstrating that treatment with neuraminidase inhibitor results in a significant reduction in mortality in patients admitted to hospital with influenza. **Lancet Public Health 2019** doi:10.1016/S2213-2600(14)70041-4
- First study to demonstrate that positive mood at the time of influenza vaccination is associated with enhanced effectiveness, with an effect size comparable to that seen for statins in the prevention of major cardiovascular events. **Brain, Behavior, and Immunity 2018** doi:10.1016/j.bbi.2017.09.008

### 1.3. Research strategy

We seek to deliver research on some of the most important health problems of our times by strategically focusing on and investing in our people and our collaborations, with a view to maximising research productivity, quality and impact.

- **‘Our people’** reflects our commitment to creating and sustaining a culture which encourages growth in ambition, excellence and capacity through:
  - Ongoing development of existing staff (personal and professional development): this is realised through a comprehensive programme of staff training and development, mentorship and a transparent and equitable approach to promotion (see section 2).
  - Core investment in new staff: this has resulted in new posts in public health (5 new posts), applied health methodologies (5 new posts in data science, epidemiology, health economics, Sport and Health Psychology and qualitative methods) and clinical trials (7 new posts).
  - Development of the next generation of leading researchers (e.g. through postgraduate research students (PGRs), fellowships): achieved through a year-on-year increase in PGR and fellowship numbers and a comprehensive training programme (see section 2).
  - A vibrant academic clinical fellow programme covering all years. This has allowed us to support 16 fellows in the current REF period.

Our work in these areas is further underscored by a commitment to delivering a working environment in keeping with the Athena Swan (Silver Award) charter, i.e. one which maximises opportunities for progression and success for all.

- **‘Our collaborations’** reflect our commitment to work with leading people, organisations and societies locally, nationally and internationally to ensure excellence in the research we lead and to enhance the impact of our research. In addition, we contribute and bring added value to research led by others (see section 4).
- **‘Research productivity, quality and impact’**: reflects our commitment to ensuring successful completion of major funded research programmes (e.g. centre grants, programme grants, multi-centre trials); continuing and growing our success in securing competitive funding; commitment to embracing and developing new methodologies, and striving for widespread dissemination and impact of research findings by reaching both academic and wider audiences (see section 1.4).

### Review of research plans in REF 2014

We have achieved our strategic aims stated in REF2014:

- a) Continued to secure long term funding including NIHR BRC, NIHR programme grants, and renewed CLARHC/ARC funding.

- b) Achieved renewed membership of the NIHR School for Primary Care Research, and consolidated UKCTAS growth.
- c) Successfully completed major funded research (see sections on research groups and impact).
- d) Increased our PGR community (from 117 in REF2014 to 132 students).
- e) Recruited nine new early and mid-career posts.

#### 1.4. Impact during assessment period

Our research has had impacts on health and welfare, benefiting patients and their families/carers, as well as the general population. It has achieved this through disease prevention, harm reduction, reducing health inequalities, realisation of NHS cost-savings and raising public awareness. These benefits have been delivered through changes to health policy and practice at international, national and regional levels.

Strategic support for impact is facilitated through several mechanisms. Examples include:

- Annual School of Medicine Impact Competition for researchers and PhD students (3 awards; £3,000; £1,500; £500). These awards promote awareness of impact, enable sharing of good practice in relation to maximising impact and provide investment for achieving impact.
- Impact workshops are provided for all early career researchers.
- Funding for impact includes external (RCUK) impact accelerator funds and internally funded schemes (Nottingham Impact Accelerator, Knowledge Exchange awards, Hermes Fellowships).
- Strategic appointments: The Faculty of Medicine and Health Sciences has appointed three research impact officers and the School of Medicine has created a new role of Research Excellence Manager; these roles jointly work to ensure that research in this unit is disseminated beyond academic spheres and translated into real-world change. We have also appointed two members of academic staff as Impact Champions (Kendrick, Tata) who develop impact activity through formal support for specific impact case studies, and cultural promotion of impact throughout the research lifecycle.

Our impact case studies were chosen to reflect the wide range of impact achieved through research within the unit. They cover impact on health policy, strategy, and guidelines; health service design and delivery; health service IT systems; health outcomes; practitioner training and development of implementation and dissemination resources. In line with our impact strategy, our case studies demonstrate proactive engagement with policy makers and organisations that can facilitate change across health and social care settings. This includes representation on national and international policy, guideline and strategy development groups and developing translational-related outputs specifically for policy makers. The final submitted case studies were chosen based on a series of independent reviews of the significance and reach of their impact and the strength of their supporting evidence.

#### Policy impacts

Notable policy impacts include:

- Our leading role in research promoting electronic cigarette use as a substitute for smoking underpinned a Public Health England recommendation in 2014/15 for tobacco harm reduction and the 2018 House of Commons Science and Technology Committee report on e-cigarettes.

- Our research on passive smoking led to new legislation in 2015 prohibiting smoking in cars with children.
- The 2017 Tobacco Control Plan for England recommends routine carbon monoxide monitoring as a component of NHS ante-natal care because our research shows that this successfully identifies women who smoke in pregnancy and, with appropriate support, nearly doubles their chances of quitting.
- Our research on smoking and stillbirth provided the key scientific evidence for an NHS 'care bundle', that has been associated with a 20% fall in stillbirths since 2016.
- Risk prediction algorithms developed by the Primary Care Epidemiology group are recommended in National Institute for Health and Care Excellence (NICE) guidelines on cardiovascular disease, hypertension, suspected cancer, osteoporosis, diabetes and multimorbidity.
- Our research on pandemic influenza (PRIDE study) provided important new evidence for the House of Commons Public Accounts Committee's 2014 decision to continue antiviral stockpiling and related guidance on use of antivirals for the treatment and prophylaxis of influenza from Public Health England (PHE), the US Centers for Disease Control and Prevention (CDC) and the European Centre for Disease Prevention and Control.
- Our pharmacist-led IT-based intervention to reduce clinically important medication errors in primary care (PINCER) is recommended in NICE guidance (NG5, 2015) and included in five NHS guidance documents.
- Our injury prevention research has influenced NICE guidelines and the 2018 National Accident Prevention Strategy recommendations on home safety, and PHE local authority guidance on injury prevention. There is evidence that this guidance has been used for local injury prevention strategies and home safety equipment schemes.
- PHE has developed a strategy to identify familial hypercholesterolaemia, with our approach to search primary care records recognised as a key approach.

### Impact on practice

Our research has changed practice at international, national and regional levels:

- Our smoking in pregnancy research has been cited in WHO and four NICE treatment guidelines (PH 1, 10, 26, 48), in European Tobacco Treatment Guidelines and national guidance from US, Norway, Greece, New Zealand and Australia. This research features prominently in National Centre for Smoking Cessation Training courses which are a compulsory part of UK smoking cessation practitioner training.
- Our work on indoor air quality in English prisons with the National Offender Management Service led to their decision to make all prisons smoke-free from 2016.
- A model of acute inpatient smoking cessation service provision demonstrated by our research was recommended by NICE and is now being implemented nationally.
- Emergency research during the 2009 influenza pandemic has widened practice recommendations in the UK for availability of antiviral treatment for all cases regardless of risk group, including early use for hospitalised cases.
- The QRISK risk prediction tools have been implemented into the UK GP clinical record system EMIS, which covers over 55% of GP practices and 30 million patients nationally. QRISK is incorporated in the national NHS Health Checks programme; over 6 million people in England received a check between 2013-2017.
- The QRISK lifetime cardiovascular risk model is used to estimate heart age on the NHS One You website, with the aim of acting as an incentive to make simple lifestyle changes.

- The PINCER intervention to reduce medication errors has been rolled out to 39% of English general practices, covering 40% of England's population, and over 25 million patient records have been searched to identify those at risk of medication errors.
- Our injury prevention research has underpinned international home visiting programmes, national and regional home safety equipment schemes, PHE practitioner guides, practitioner and commissioner resources and training provided to more than 500 health and childcare professionals.
- The FAMCAT tool for identifying familial hypercholesterolaemia has been implemented in nearly 800 general practices and the Academic Health Science Networks in Greater Manchester, East Midlands, Northeast Region, and Wessex are implementing pilot programmes.

### **1.5. Future strategic aims for research and impact**

#### **1.5.1. Future research strategy**

An independent external panel undertook a major research review of the School of Medicine in 2018. This fed into a revised research strategy, with the overall aim to further improve the quality, value and impact of our research as part of a University-wide transformational vision. The main strategic priorities and how we are addressing them are:

#### **Encourage ambition and grow research income to address the most pressing research priorities of the day:**

- Continue and grow our involvement in existing research centres. We have been successful in renewing our involvement in SPECTRUM (2019-2024) and NIHR School for Primary Care Research (2021-2026) and will be participating in the NIHR BRC renewal bid.
- Seek new opportunities in health data science research working with our Health Data Science Strategy (HDRUK) Midlands centre. Nottingham is part of the HDRUK Midlands hub, and our unit is collaborating with an HDRUK exemplar project with the University of Leicester.
- Consolidate and grow our research in Global Health, for example our involvement in the Nottingham China Health Institute.
- Integrate data science with trial methodology by establishing methodologies and processes to enable use of routinely collected health data, which may be an efficient and cost-effective means of obtaining data.

#### **Create a supportive culture that promotes shared priorities and a collaborative 'Team Science' approach:**

- Actively promote a culture of joint working, team research, and strong collaboration particularly between DPC and DEPH but also across the wider School of Medicine.
- Development of good recognition mechanisms for individuals and teams, such as through the new Nottingham Reward Scheme.
- Social/networking events which encourage team building.

#### **Support career growth:**

- Provision of a mentorship scheme and workshops to facilitate grant writing, high quality outputs and research ambition across all academic levels.

#### **Encourage partnerships and collaboration with NHS and international collaborators:**



- Improve global engagement including international research collaboration.
- Continue our strong linkages with key NHS organisations to facilitate our research (e.g. CLAHRC/ARC, EMAHSN, RDS).

### 1.5.2. Future impact strategy

Review of our Impact Strategy articulated in REF2014 demonstrates that we have built on successful knowledge exchange mechanisms, for example, through close working with AHSNs, working with policy makers to influence health policy, ensuring our research made major contributions to numerous NICE and PHE guidelines, developing NICE-endorsed implementation resources, developing practitioner training and through contributing to national and international guideline and strategy development groups (section 1.4).

We plan to continue to grow our impact culture through the following mechanisms:

- Annual appraisal processes will incorporate discussions on planning and developing impact.
- Continued development of our methods for co-design and co-production of interventions with end-users to maximise adoption and impact to ensure the research meets the needs of patients and the public.

Our future Impact Strategy is to:

- Continue improvements in outputs beyond academic publications, including translational-related outputs such as implementation tools, implementation workshops for stakeholders, practitioner training and dissemination of such outputs using a wide range of media.
- Maximise collaboration with organisations that can facilitate change across health and social care economies, such as AHSNs, ARCs, NHS England and NHS Improvement.
- Broaden our public health impact by moving towards a more cohesive approach of research collaboration between DPC, DEPH and NCTU.
- Sustain and grow our impact on health policy by increasing our representation on national and international policy, guideline and strategy development groups, developing translational-related outputs specifically for policy makers and proactively engaging with policy makers.

### 1.6. Research integrity and ethics

Research integrity and ethical considerations are central to all the research within this unit and supported through the University of Nottingham's endorsement and promotion of The Concordat to Support Research Integrity (2012). Training in research integrity, data protection and ethics is continuous for all staff and students, commencing at induction with regular updates occurring in response to changes in legislation and good practice. See institutional statement (section 2.4).

### 1.7. COVID-19 research

Our agility with respect to meeting external challenges is exemplified in our response to the COVID-19 pandemic. Our researchers worked rapidly to address emerging needs through leading or collaborating on research such as: the RECOVERY Trial, designed to evaluate potential treatments for people hospitalised with COVID-19; leading the COVID-19 Stress and Health study looking at the effect of COVID-19 on mental health in the community (doi: 10.1136/bmjopen-2020-040620); research developing an algorithm (QCovid) for predicting death and hospitalisation due to COVID-19 (**BMJ 2020** doi:10.1136/bmj.m3731).

## 2. People

'Our people' reflects our commitment to creating and sustaining a culture which encourages a growth in ambition, excellence and capacity.

## 2.1. Staffing strategy

Staff are key to our research strategy. This is reflected in our commitment to creating and sustaining a culture which encourages growth through a focus on ongoing personal and professional development of existing staff.

### 2.1.1. Recruitment policy

Our recruitment strategy seeks to ensure the sustainability and vitality of our research, as well a culture for success. Central to this is our commitment to ensuring a supportive and inclusive research community enriched through cultural and ethnic diversity. This is achieved in part through bespoke equality and diversity and unconscious bias training at all job levels.

### 2.1.2. Annual reviews

These focus on a constructive review of activities and achievements including outputs, research, quality of work, outreach, training, administration, and citizenship. Personal development and career aspirations/promotion are discussed, together with future objectives that link to University/School strategy. Culture and climate are embedded into the appraisal framework e.g. promoting equality, diversity and inclusion.

Our School delivers bespoke appraisal training for appraisers and appraisees. These are delivered every two years (90% satisfaction) and supported by a checklist developed as part of our Athena Swan Silver Award. The checklist and training have resulted in a demonstrable improvement in the quality of appraisals. Key highlights include increased discussion of career ambitions and access to career development opportunities. Our most recent School audit indicated that 92% of females and 89% of male respondents reported discussions on training and career development had taken place, compared with 80% of females and 75% of males in 2013. The School has additionally introduced Personal and Team Research Strategies to sit alongside appraisals for all research-active staff irrespective of career stage, to promote long-term planning for meeting research ambitions.

### 2.1.3. Promotions

Our university promotion criteria are signposted and published on the intranet. Availability of criteria and promotions-readiness workshops aid staff in planning, and line managers in supporting career development towards promotion. Our colleagues have enjoyed considerable promotion success, with 23 promotions since 2014, including 21 for female colleagues (Table 2).

<b>Table 2: Promotions since 2014 by HESA contract level</b>	
K0 to J0 (Research fellow to Assistant Professor)	6 Females/2 Males
J0 to I0 (Assistant to Associate Professor)	10 Females
I0 to F1 (Associate Professor to Professor)	5 Females

## 2.2. Staff development

**2.2.1. Training and development**

Colleagues can access a broad range of internal training courses and financial support for external courses through University, Faculty, School and Divisional funding.

Examples accessed by colleagues in our unit include:

- School of Medicine Grant Writing and Fellowship Course: to provide training and support for early career researchers. The course of 6 half-day sessions provides a route to independence, fosters collegiality and improves success rates for competitive research grant applications, particularly personal fellowships, and has seen 124 delegates trained across the School of Medicine from 2015-2019.
- Digital “PI Toolkit”: a suite of resources available to all staff and postgraduate researchers to help them develop, submit, and deliver research projects; highlighted by an independent panel in our 2018 School of Medicine Research Review as particularly beneficial for staff development and support.
- Widespread support for study design and data analysis is available through the NCTU and Research Design Service (RDS) East Midlands. A weekly Statistics Clinic with a School-funded external consultant is provided exclusively for research staff and PGR students.
- The Faculty has a dedicated Research Library team headed by a Senior Research Librarian, offering support including systematic reviews, open access support, advice, a review service for writing Data Management Plans/sharing data and a mediated-deposits service.
- School mentoring scheme open to staff of all levels and PGR students.
- Peer review of grants: this includes maintaining an expertise list, so early career researchers can find people best able to support them.
- Travel awards through School committees, providing matched funding to allow staff and PGR students to attend conferences and other networking events.
- Workshops and training events (including methods seminar programme, writing impact statements, intellectual property, research integrity, career optimisation workshops, leadership training).
- Divisional Research Away-days: annual events for research staff and PGRs designed in response to areas of need identified by colleagues. In this REF period they have covered topics such as Patient and Public Involvement, communication skills, writing for publication, promoting research in the media, working as a team, branding, designing infographics, participant recruitment skills.
- Annual events for PGR students informed by the students’ priorities have included career planning, thesis and viva preparation.

**2.3. Equality, diversity and inclusion**

Equality, diversity and inclusion, and unconscious bias training is mandatory for all staff. REF coordinators have also completed bespoke training in these areas. Our current staff consists of 57% female, with 23% of staff being black or other ethnic minority, and 4% of returnable staff having a documented disability by headcount. The Faculty and School have Equality and Diversity Committees to address equality, diversity and inclusion issues in all forms, with the School ring-fencing £35k per annum to support initiatives in these areas.

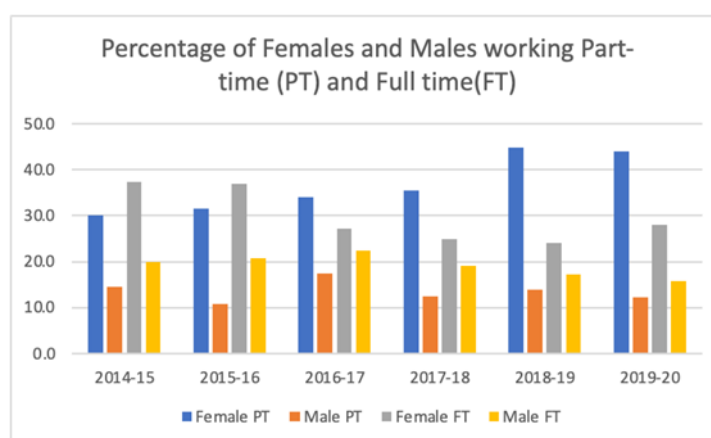
The School also engages with institutional initiatives for BAME staff including the ‘Stellar HE’ Leadership programme. In October 2019, the University hosted the “BecoME: BME Leaders in Healthcare Conference” to highlight journeys of black and minority ethnicity leaders in healthcare, to inspire future leaders in healthcare.

The School of Medicine was awarded an Athena Swan Silver Award in 2016, renewed in 2019, in recognition of our successful efforts to promote equality, diversity and inclusion in STEM and ensuring EDI and fairness remain core to our ethos and culture. Central to this is encouraging participation of women on influential committees that determine research strategy. Within our unit, women are represented on the School Research Committee, School Management Group, School Postgraduate Research Committee and University Senate. The School has introduced a shadowing scheme which has successfully increased female membership of decision-making committees, most notably in the School's Executive. The School supports a Contract Researchers' Forum including female-only workshops in support of ensuring opportunity for researcher career development.

At Divisional level we have an equitable gender split for our management committees (DPC: 59% female; DEPH: 67% female) and both Divisions are currently headed by women.

A high proportion of staff work part-time across all job families (Figure 1).

**Figure 1: Percentage of staff working part-time or full-time.**



Flexible working is offered to all staff, and a high proportion (>50%), including senior staff, take up this opportunity reflecting an embedded respect for life outside work.

#### 2.4. Ongoing professional development

- Training and support are available for all early career researchers and PhD students within the unit. For example, all PhD students are required to attend formal training courses to enhance their research skills and career development.
- All PhD students are encouraged to present at internal seminar programmes and attend conferences. They are also expected to present at School PGR events.
- All research active staff (including Academic Clinical Fellows/GP HEEM Fellows) and students are encouraged to attend and present at conferences, with over 230 people attending meetings over the REF period.
- The University of Nottingham provides staff development courses for all levels of staff including research skills development, career development, well-being and leadership.
- Divisions run monthly research seminar programmes with internal and external speakers. In addition, a methods seminar is held bi-monthly and longer 2-day seminars with external speakers on specific methodological areas are conducted.

- Early career researchers are encouraged to co-supervise student dissertation projects for their personal career development.

A key indicator of our development of PhD students is captured by the destinations of our students with 6 going on to lecturer positions, 12 to Postdoctoral research posts, 2 returning to clinical training, 1 returning to a government research post in their home country, and 4 going into public sector, charity or commercial research organisations.

### **2.5. Integration of clinicians and NHS-employed active researchers**

- Our colleagues have strong links with the NHS, with 17 tenured staff having ongoing clinical commitments within the NHS. We have also hosted 16 Academic Clinical Fellows and nine Honorary Academic appointments for staff working in the NHS during this REF cycle.
- Two Public Health Consultants provide academic supervision to public health registrars with Health Education England East Midlands.
- Staff in the unit provide training to the wider research community through bespoke courses, including statistics, clinical trials, public and patient involvement, and systematic reviews
- We deliver a vibrant academic clinical fellow programme covering all years. In the current REF period this resulted in the support of 16 fellows (DPC 10; DEPH 6)

### **2.6. Misconduct policy**

The University has relevant policies and procedures to respond to staff and research misconduct: Regulations of Academic Misconduct, Staff Disciplinary Procedure, Code of Discipline for Students and Fraud Policy.

### **2.7. Investment in research leadership**

There are a number of Leadership training opportunities including the Nottingham Research Leaders Programme (aimed at senior academics to support and advance high-level strategic research leadership roles and development), University of Nottingham Leadership and Management Academy (providing a wide range of online resources for performance management and personal diagnostics), and the Leadership Toolkit of models and methodologies. The University also provides opportunities for coaching and mentoring in addition to those provided within the School.

## **3. Income, infrastructure and facilities**

We strategically pursue a diverse funding model in which we seek both large collaborative grants (e.g. programme and centre grants) to maximise the quality, impact and reach of our research, whilst also ensuring we secure income streams which facilitate the development of early career researchers and provide essential early data to underpin larger funding initiatives.

### **3.1. Income**

In the current REF period, the unit has increased the total value of grants awarded to £105 million with £26 million allocated (Table 3). This reflects sustained income levels from UKRI funders, and increases in funding from NIHR and charities, including 10 Programme Grants for Applied Research.

<b>Table 3: Research income for Unit of Assessment by Sponsor</b>				
<b>All data £000</b>				
<b>Funder</b>	<b>Current REF period Total for period (Aug 2013 – Jul 2020)</b>		<b>Previous REF period Total for period (Aug 2008 – Jul 2013)</b>	
UK Research Councils	2,922.7	11.2%	2,512.6	10.8%
UK based charities	4,332.5	16.7%	2,124.9	9.2%
UK central government bodies, local authorities, health and hospital authorities (NIHR)	13,692.2	52.7%	6,368.5	27.4%
UK central government bodies, local authorities, health and hospital authorities (Ex NIHR)	2,189.9	8.4%	5,293.9	22.8%
UK central government bodies, local authorities, health and hospital authorities (RDEC)	448.4	1.7%	-	-
UK industry, commerce & public corporations	548.8	2.1%	482.9	2.1%
EU government bodies	538.1	2.1%	552.5	2.4%
EU industry, commerce & public corporations	91.1	0.4%		
EU other	3.9	-	-	-
Non-EU Other overseas industry, commerce and public corporations	597.3	2.3%	276.2	1.2%
Non-EU Other overseas charities	29.4	0.1%	135.8	0.6%
Non-EU Other	358.3	1.4%	5,462.5	23.5%
Other sources	230.9	0.9%	10.4	0.0%
<b>Total per Sponsor</b>	<b>25,983.5</b>	<b>100%</b>	<b>23,220.2</b>	<b>100%</b>

Through our strategic and collaborative approach, partnerships, infrastructure support, and pump priming, we have been successful in attracting major grants, with examples given below.

*Lifestyle influences on health:*

- Improving effectiveness of nicotine replacement therapy for smoking cessation in pregnancy through better adherence and adequate dosing. NIHR Programme Grants for Applied Research (PGfAR), 2017-2024, £2,383,264  
*The third NIHR PGfAR awarded to the Smoking in Pregnancy group; this focusses on improving adherence to nicotine replacement therapy (NRT) in pregnancy.*
- A comprehensive evaluation of the impact of recent English tobacco control policy using secondary data. Department of Health, 2017-2019, £457,137

*The first comprehensive evaluation of a range of national tobacco policies on smoking behaviours.*

- The effect of adding a personalised smoking cessation intervention to a lung cancer screening programme. Yorkshire Cancer Research, 2018-2021, £917,978  
*This study is evaluating effectiveness of a specialist smoking cessation service co-located within a community lung cancer screening programme.*

#### *Epidemiology:*

- NIHR Nottingham Biomedical Research Centre (BRC): Unit involvement in the Mental Health and Technology, Respiratory, and Gastroenterology themes. Overall funding for the University of £23.6m, 2017-2022  
*Aims to deliver patient-centred research in order to advance knowledge and improve health outcomes.*
- Multicentre Research Programme to Enhance Return to Work after Trauma (ROWTATE). NIHR Programme Grant for Applied Research, 2019-2024, £2,405,840  
*This research programme will develop and test a novel complex intervention to promote successful return to work after serious injury. It is a multidisciplinary research programme involving collaboration with five major trauma centres in the UK.*

#### *Health of the public:*

- Avoiding patient harm through the application of prescribing safety indicators in English general practices (acronym: PRoTeCT). NIHR Programme Grants for Applied Research; 2017-2023, £2,430,144
- Reducing the impact of diabetic foot ulcers on patients and the health service: the REDUCE programme. NIHR Programme Grant for Applied Research, 2020-2026, £2,531,202
- Cost-effectiveness of cascade testing for Familial Hypercholesterolaemia. NIHR HTA, 2016-2021, £840,042  
*This study will inform the approach to cascade testing for familial hypercholesterolaemia in the NHS.*

### **3.2. Infrastructure and facilities**

The University invests heavily in infrastructure to support research, including excellent IT facilities, research grant support, studentships and fellowships, training and high-quality accommodation. See also institutional statement (section 4.2).

#### **Public health and clinical data**

The School of Medicine has a Clinical Practice Research Datalink (CPRD) license, renewed annually throughout this REF period. This means that CPRD is available to researchers in the unit with and without access to funds (including PGR students). Researchers in the unit also make extensive use of the QResearch database which was originally established at the University of Nottingham. Access to these databases has resulted in influential new research during the REF period (see section 1.2.2).

#### **Open access, data sharing, and digital support**

Within this REF period, the University has invested significantly in Digital Research as part of its research vision. This includes a Research Information System (RIS) which supports delivery of open access, open science and research data management. An Open Access team at the University supports researchers in making their publications and data accessible to the broadest

possible base of end users and includes a mediated deposits service to facilitate archiving in the institutional repository. At unit level, over 95% of papers are deposited in the open access repository.

We have a dedicated Faculty Digital Research Specialist as part of the University's digital research team, bridging requirements between Information Services and research staff needs in terms of software, data collection and management, equipment, access to High Performance Computing services. Furthermore, the School has appointed two academic digital leads representing the digital needs of different geographical sites.

The University hosts an online digital research data repository which ensures that published data fulfil our stringent policies on data governance, preservation, accessibility and discoverability, aligned with funder and stakeholder requirements. The service enables researchers to publish, search, access and store research data and metadata.

### **Clinical database support**

The School led the introduction of the Clinical Database Support Service in 2019, established to provide a robust platform for researchers which actively promotes regulatory compliance. It provides specialist assistance in database design and data management, and training and access to REDCap database software. The service is uniquely designed to ensure that even smaller-scale projects maintain the same level of rigour as large multicentre clinical trials.

### **Research networks and centres**

This unit is part of the following research networks/centres which have all received strategic support, wholly or in part, from the University of Nottingham:

- **Nottingham BRC:** A £23.6m initiative funded by NIHR in 2017 focussed on Hearing, Gastrointestinal and Liver Disorders, Musculoskeletal Disease, Mental Health and Technology, Respiratory Disease and Magnetic Resonance Imaging. The BRC has been highly successful, recruiting 11,000 patients into clinical projects in its first year alone. Colleagues in the unit lead on and contribute expertise to each of these themes. Examples include establishing a bronchiectasis cohort to develop novel biomarkers of infection; identifying trends in antidepressant prescribing, polypharmacy and drug interactions; behavioural research examining patients' understanding of fluctuations in musculoskeletal pain; development of novel approaches to promote weight loss in patients with non-alcoholic fatty liver disease.
- **CLAHRC/ARC:** The NIHR East Midlands CLAHRC was awarded £10m from the Department of Health over five years (2014-2019). During this time it attracted a further £18m of matched funding from local NHS, academic and commercial partners to translate research findings into improved patient outcomes. In 2019, funding was secured for a further 5 years as the NIHR Applied Research Collaboration (ARC) East Midlands.
- **Nottingham Clinical Trials Unit (NCTU):** The UKCRC-Registered NCTU works with clinicians across the UK (e.g. Imperial College London; University of Leeds; University of Manchester; Nottingham University Hospitals; University Hospitals Birmingham). A small number of trials are run in collaboration with partners in Nigeria (University of Ibadan), Sweden (Skånes University Hospital) and Denmark (Nordsjaellands Hospital). NCTU has expertise in the core competencies required for design and conduct of high-quality trials including experienced trialists, trial management, data processing and statistical analysis.



Additional research areas include meta-analysis and methodological research to improve conduct of trials. During the REF period NCTU has expanded and secured dedicated space in accordance with its five-year plan, following a successful £1m bid to the University for infrastructure and posts.

- **NIHR School for Primary Care Research (SPCR):** DPC continues to be a key member of this strategic partnership of nine leading academic centres for primary care research in England. SPCR aims to increase the evidence base for primary care practice through high quality research and strategic leadership, and also build capacity in primary care through a well-established training programme. In this REF cycle, we attracted £1.9m for research projects and £1.26m in capacity building funding from the SPCR. In 2020, DPC was successful in retaining its membership in the renewed SPCR (2021-2026).
- **UKCTAS/SPECTRUM:** A network of 13 universities (12 in the UK, one in New Zealand), and in 2019 extended to include Public Health England, Public Health Wales, Health Scotland and two commercial companies, funded by the UK Clinical Research Collaboration. This consortium is a continuation of the original Nottingham-led work on tobacco, but the remit has been broadened to include unhealthy food and drink products (see section 1.2.1 above).

### Studentship support

The unit has benefitted from several University scholarship schemes. This includes matched funding for PhD studentships, Vice-Chancellor research excellence scholarships, and School of Medicine legacy studentships.

### Future plans for sustainability and growth

A key recommendation of the 2018 School of Medicine Research Review was to seek greater integration between our unit and other areas of the School undertaking applied health research. In part this is being achieved through our involvement in the centres described above. These centres provide fertile ground for collaboration across disciplinary boundaries. In addition, we strategically use the opportunities of these centres to sustain and grow our research.

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

Our research collaborations and networks play an intrinsic role in achieving our vision of enhancing the health and well-being of individuals, patients and the public.

### 4.1. Collaborations

Each of our three research themes have national and international collaborations which extend the reach and impact of our research. These collaborations are typically multidisciplinary, engage colleagues across the School of Medicine and wider University (e.g. Computer Science, Health Sciences/Nursing, Business School, Geography) and are multi-sector (e.g. NHS, charitable organisations, government bodies, commercial companies). We provide examples to illustrate the breadth and scope of our collaborations within each theme.

#### *Lifestyle influences on health:*

- **Clinical trial collaborations:** We lead or have collaborated on 8 trials related to smoking behaviour. For example, the ECLS trial (Early Cancer detection test – Lung cancer Scotland), the largest trial in primary care of a biomarker for early detection of lung cancer, reflects a multidisciplinary and multi-institution collaboration (Universities of Nottingham, Glasgow, Dundee, Strathclyde and Tayside Clinical Trials Unit, NHS Greater Glasgow and

Clyde, NHS Lanarkshire, NHS Tayside) which led to the successful recruitment and randomisation of 12,000 individuals at high risk of lung cancer.

- **International collaborations:** In response to the emerging epidemic in tobacco-related health issues in developing countries, we have established collaborations in India, Gambia, Nigeria, Ethiopia and Cuba, supported primarily by MRC funding totalling over £4m to date.

#### *Epidemiology:*

- **Enhancing our understanding of the true burden and consequences of disease.**

A key example is the collaboration with Aarhus University Hospital, Denmark. Initially funded by the University of Nottingham International Research and Industrial Collaboration Funding Scheme in 2015, this has led to submitted joint grant proposals, published joint papers combining English and Danish health care data (doi:10.2147/clep.s147535; doi:10.1016/j.jhep.2018.04.002) and joint supervision of a PhD student (Gronbaek). Most recently, the collaboration has resulted in a Novo Nordisk Foundation Borregaard Clinical Ascending Investigator award (P Jepson, 2019, £1.2m)

- **Maternal and child health.**

The Clinical Epidemiology group enjoys an active collaboration with researchers at the Karolinska Institute in Sweden. One key research area involved using UK and Swedish healthcare data to develop a risk model to predict which women develop venous thromboembolism within 6 weeks of childbirth. This work was published in the BMJ [doi:10.1136/bmj.i6253] and cited in the update of NICE guidelines on preventing venous thromboembolism in over 16s (NG89)

- **Evaluating the effectiveness and safety of interventions in injury research.**

The Injury Epidemiology and Prevention Research Group has a long history of successful collaborations on randomised controlled trials and systematic reviews of the effectiveness of injury prevention interventions, including with nine different universities and two charities, resulting in over £8m funding.

#### *Health of the public:*

- **Medicine safety:** This group led on a collaboration between five universities, Lincolnshire Community Health Services NHS Trust, and the East Midlands Academic Health Sciences Network (EMAHSN) for the large-scale rollout of a pharmacist-led, IT-based intervention (PINCER) to reduce medication errors across the East Midlands. This collaboration culminated in a £2.43m NIHR Programme Grant to determine the impact of primary care interventions such as PINCER on serious harm outcomes (with NIHR Greater Manchester Patient Safety Translational Research Centre colleagues). The collaboration has expanded to involve AHSNs across England as part of the national rollout of PINCER.
- **NCTU:** The majority of NCTU's research activity involves collaborations with multidisciplinary teams of researchers and clinicians to conduct clinically important high quality multicentre randomised trials and pilot/feasibility work in preparation for future large-scale multicentre trials. As well as national collaborations, the Unit collaborates internationally (e.g. POSNOC, axillary treatment in early stage breast cancer, Australia & NZ; iCORD, cord-clamping in LMIC; EXPONATE, STEPCARE, management of depression, Nigeria; FEED1-LMIC, feeding in preterm infants, India & Pakistan; AIMS, miscarriage management, Africa & Pakistan).

#### **4.1.1. Category C staff**

During this REF period we have worked closely with an outstanding group of 26 clinical, government and international colleagues with honorary appointments. These collaborations

have enriched our environment through facilitating primary and secondary research, contributions to over 95 outputs and joint supervision of PhD students.

#### 4.2. Networks and partnerships

Section 3 reviews networks and partnerships which have received infrastructure support from the University of Nottingham. Other external networks and partnerships include:

**Research Design Service (RDS) East Midlands:** RDS provides high quality funding advice and methodological support to researchers in our unit seeking funding for applied health research. Specific benefits of close collaboration with the RDS include provision of public involvement funds to inform development of applications, helping to build research teams and partnerships with other academic and clinical researchers, and provision of regular training events relevant to grant writing and NIHR funding streams.

**PRIMIS:** PRIMIS is a leading organisation in extracting knowledge and value from primary care data, helping to achieve better health outcomes across the UK. It produces effective and practical solutions to help people understand and use patient data held on GP IT systems. GP practices and the primary care organisations that support them can access a variety of products and services from PRIMIS enabling them to meet their varied data and reporting requirements.

*Examples of our work with PRIMIS:*

- PRIMIS is integral in the national rollout of PINCER, in partnership with AHSNs and the PINCER research team.
- The FAMCAT tool to identify familial hypercholesterolaemia in primary care has been embedded in primary care computer systems as a case-finding tool offered to general practices by PRIMIS. Over 800 UK general practices have installed FAMCAT, and we are working with 4 AHSNs across England to scale up implementation.

#### **Business, industry and public/third body sectors:**

- Collaboration with commercial partners:
  - The Biobehavioural Research group identified that positive mood at the time of influenza vaccination is associated with greater vaccine effectiveness. In collaboration with Rehab (a SME) funding for an MRC iCase studentship was secured which has supported the development of a novel digital intervention to promote positive mood in older people. The intervention is currently the focus of a clinical trial conducted in collaboration with Public Health England.
  - The Primary Care Stratified Medicine (PRISM) Research Group uses novel applications in machine-learning and prediction models in cardiovascular disease with electronic health records. This has created over £200,000 of funding opportunities and research investment from a leading UK lifestyle SME (Road to Health Group) and a major US global biotechnology Pharma partner AMGEN. One AMGEN funded study involves pooling data from cardiac centres across Europe, deriving and validating a new prediction model for secondary prevention of acute coronary syndrome.

#### 4.3. Patient and Public Involvement and Engagement (PPIE)

We have proactively pursued an increase in PPIE activity across our research. This is driven centrally by a School of Medicine PPIE working group which follows INVOLVE guidance. This

working group ensures that PPIE is promoted from the earliest stages of researcher training, including a PPIE module in the medical degree programme, training for PhD students, and a workshop devoted to PPIE in the School's grant writing course. We have national leadership in PPIE with Avery being a member of the NIHR PPI Senior Leadership Team.

Unit away-days and other events have focussed on PPIE. DPC, as part of their involvement in the NIHR School for Primary Care Research, follows Guidance for Reporting Involvement of Patients and the Public (GRIPP2). This helps promote diversity in our PPIE activities. We have been awarded funds from the NIHR School for Primary Care Research for developing systematic approaches to ensure diverse PPIE representation (£5k: 2020/21).

All NCTU's clinical trial applications, whether pilot/feasibility studies or large multicentre trials, engage with patient/public partners. This often means including patients as members of the multidisciplinary team of co-applicants, but also includes PPIE members in trial management groups and oversight committees. NCTU's National Advisory Group includes two PPIE members.

#### **4.4. Support for international collaboration**

The University of Nottingham is proud of its international reach, with campuses in Malaysia and China and offices and collaborations globally. The School of Medicine introduced a new role of Global Engagement Lead in 2015 to promote, monitor and assess potential for further international engagement. The School is an active member of the Universitas21 Health Sciences group which provides our students and staff with opportunities for collaborative research, information exchange, and sharing resources. It also facilitates research exchanges for students and staff. Colleagues in our unit have benefitted from Universitas21, facilitating study visits for students and staff between Nottingham and New Zealand.

The University of Nottingham launched an initiative in 2016 to address major public health challenges in China through research, education and training. Nottingham Health China facilitates interactions between UK and China based researchers and clinicians, contributing to the provision of healthcare education in China by providing high quality programmes tailored to China's healthcare sector needs and engaging with both the government and the Chinese private sector. Our new Nottingham Health China Institute, launched in November 2018 and led by colleagues in this unit, enables cross-campus multi-disciplinary work in evidence-based health care both in China and the UK. We have launched the GRADE centre in Ningbo to provide expertise on clinical guideline writing in China and internationally; this is only the 10th GRADE centre in the world.

#### **4.5. Relationships with key research users, beneficiaries and audiences**

##### **4.5.1. Policy and guideline development**

Each of our three research themes makes important contributions to the development of clinical guidance and health policy. Examples include:

##### *Lifestyle influences on health:*

- Two key reports have informed government policy on tobacco control. These reports are multi-author, multi-institution and led from Nottingham. Our research environment and

combination of clinical and public health skills made production of these reports uniquely possible in Nottingham:

- Tobacco Advisory Group of the Royal College of Physicians. Nicotine without smoke: Tobacco harm reduction. Royal College of Physicians, 2016.
- Tobacco Advisory Group of the Royal College of Physicians. Hiding in plain sight: Treating tobacco dependency in the NHS. Royal College of Physicians, 2018.
- Research along with a written report to the National Offender Management Service contributed to the decision for English prisons to go smoke free in 2016. (Letter from Prisons Minister Andrew Selous to Robert Neill MP, Chairman of the Justice Select Committee regarding smoking in prisons. 2015).

#### *Epidemiology:*

- An Injury Prevention Briefing (Preventing unintentional injuries to the under-fives: a guide for practitioners, 2014) was endorsed by NICE and available on their website linked to guidelines PH29/30. The Briefing is extensively cited in PHE's "Preventing unintentional injuries - A guide for all staff working with children under five years 2017" and in module 2 of the Institute of Health Visiting online training package (2015) on child accident prevention for health visitors.
- A series of Lancet Commission reports paved the way to bring early diagnosis of liver disease to the forefront of thinking. These reports are multi-author, multi-institution but the early diagnosis initiatives are pioneered from Nottingham:
  - Lancet Commission into Liver Disease in the UK 2018-present
  - Unacceptable failures: the final report of the Lancet Commission into liver disease in the UK. **Lancet 2019** doi:10.1016/S0140-6736(19)32908-3
 As a result, the Royal College of General Practitioners and NICE have published guidance on diagnosing liver disease using the novel Nottingham pathway as the exemplar:
  - NICE guideline on diagnosing liver disease (NG50).
  - RCGP/British Liver Trust Liver Clinical Priority Project (Commissioning Pathways Group) 2018- present.

#### *Health of the public:*

- The Medicine Safety research group have undertaken a considerable amount of work with NHS England and NHS Improvement, including:
  - a) NHS England and the Academic Health Sciences Network to facilitate the national rollout of our PINCER prescribing safety intervention.
  - b) NHS England on the creation of the Medication Safety: indicators for safer prescribing dashboard.
  - c) NHS Improvement to develop strategies for improving patient safety in primary care based on the findings of our DHSC-funded study on avoidable harm in primary care.
- Several colleagues contribute to NICE guideline development, informing clinical practice in areas such as atrial fibrillation (Tagger), familial hypercholesterolemia (Qureshi) and research recommendations in diabetic foot disease (Vedhara).
- Leading governance roles held by J Van-Tam:
  - Member of WHO pandemic committee (2019–current).
  - Department of Health, Deputy Chief Medical Officer (2017-22).
  - Member of SAGE (Scientific Advisory Group for Emergencies).

- Chair of NERVTAG (New and Emerging Respiratory Virus Threat Advisory Group) which advised the UK government on the threat posed by new and emerging respiratory viruses (2013-2017).
- Qureshi leads the disparities subgroup at Genome England with the remit to improve access to genomic services by underserved communities.
- Nellums has been a member of the Expert Consortium on Refugee and Migrant Health since 2018, the European Society for Clinical Microbiology and Infectious Diseases Study Group on Infections in Travellers and Migrants since 2016, and the American Public Health Association (APHA) Caucus for Refugee and Immigrant Health since 2012 (Chair 2018-to date).
- Montgomery is a member of Executive Group for Trials Methodology Research Partnership, advancing methodology, developing capacity and reducing research waste in clinical trials.

#### 4.5.2. Editorial boards, grant committees, and advisory panels

Colleagues across the unit are involved in several editorial boards, grant committees and advisory panels.

##### Editorial boards

Journal Name	Role
Addiction	Senior Editor (Coleman, 2011-current)
BMC Pregnancy and Childbirth	Associate Editor (Cooper, 2017-current)
British Journal of Dermatology	Associate Statistical Editor (Leonardi-Bee, 2017-current)
Cochrane Skin Group	Statistical Editor (Grainge, 2017-current)
Cochrane Diagnostic Test Accuracy	Editorial Team (Grainge, 2013-current; Leonardi-Bee, 2013-current)
Influenza and other Respiratory Viruses	Van-Tam <ul style="list-style-type: none"> <li>• Editor in Chief (2014-2017)</li> <li>• Senior Editor (2007-2014)</li> </ul>
Injury Prevention	Associate Editor (Kendrick, 2005-2019)
International Journal of Pharmacy Practice	Board Member (Avery, 2001-current)
International Journal of Environmental Research and Public Health	Guest editorship of special edition on Smoking Cessation in Pregnancy and Postpartum (Cooper, Orton, Campbell, 2019-2020)
Joanna Briggs Institute Database of Systematic Reviews and Implementation Reports	Senior Associate Editor (Leonardi-Bee, 2019-current) Associate Editor (Leonardi-Bee, 2018-2019)
Journal of Community Genetics	Editorial Board (Qureshi, 2017-current)
Nicotine and Tobacco Research	Deputy Editor (Langley, 2017-current)
PLOS Medicine	Statistical Methods Editor (Weng, 2019-2020)
PLOS ONE	Academic Editor (Ayling, 2017)
Public Health	Morling <ul style="list-style-type: none"> <li>• Co-Editor in Chief (2020-current)</li> <li>• Senior Associate Editor (2015-2019)</li> <li>• Associate Editor (2015-2016)</li> </ul>

Public Health in Practice	Co-Editor in Chief (Morling, 2019-current)
Thorax	Statistical Editors (McKeever, 2004-2015; Gibson, 2009-2017)
Tobacco Control	Associate Editor (Coleman, 2015-current)

### Grant Committees

Funder	Role
Cancer Research UK	<ul style="list-style-type: none"> <li>Vice Chair, Tobacco Advisory Board (Lewis, 2015-current)</li> </ul>
Department of Health Policy Research Programme	<ul style="list-style-type: none"> <li>Funding Committee Member (Kai, 2020-current)</li> </ul>
NIHR Health Services & Delivery Research (HS&DR)	<ul style="list-style-type: none"> <li>Funding Board member (Lewis, 2016-current)</li> </ul>
NIHR Health Technology Assessment	<ul style="list-style-type: none"> <li>Clinical Evaluation &amp; Trials Funding Board Member (Montgomery, 2015-current)</li> <li>Clinical Evaluation &amp; Trials Funding Board Member (Coleman, 2015-current)</li> </ul>
NIHR Programme Grants for Applied Research (PGfAR)	<ul style="list-style-type: none"> <li>NIHR Programme Grant Panel Member (Vedhara, 2010-2016)</li> </ul>
NIHR Research for Patient Benefit (RfPB)	<ul style="list-style-type: none"> <li>Funding committee member (Taggar, 2017-2019)</li> <li>East Midlands Regional Advisory Committee (Grainge, 2015-2018; Coleman, 2012-2015)</li> </ul>
NIHR School for Primary Care Research (SPCR)	<ul style="list-style-type: none"> <li>Board/Funding Committee Member (Kai 2016-Current; Avery 2009-2015)</li> <li>Training Committee Member (Qureshi, 2011- current)</li> </ul>
NIHR Health Technology Assessment Programme Clinical Evaluation & Trials Funding Committee	<ul style="list-style-type: none"> <li>Member (Montgomery, 2015-current)</li> </ul>
Yorkshire Cancer Research Advisory Panel	<ul style="list-style-type: none"> <li>Panel Member (Vedhara, 2016-2019)</li> </ul>

### Advisory panels:

- Weng serves on the CPRD Independent Scientific Advisory Panel (2017-current).
- Coupland is on the QResearch Advisory Board (2018-current).

## 4.6. Wider activities, contributions to research base, economy and society

### 4.6.1. Public engagement

Our outreach activities are multiple and varied with excellent and increasing participation. For example, an audit in 2015, revealed that 88% of female and 77% of male academics, and all levels of staff including PGRs in the School of Medicine engaged in public outreach. Outreach is recognised in appraisal, workload planning, and promotions. Engagement activities include public engagement, media, mentoring work experience students, and participation in the Wellcome Trust funded INSPIRE programme for medical students.

*Public engagement examples:*

- Smoking in Pregnancy group: stall at the University's Wonderfest in 2017, a large biennial community engagement event aimed at families, which attracts over 7000 people. Activities included 'What's your lung capacity?', 'What's your CO reading?', a smoking health related quiz and colouring sheets.
- Presentations at the Nottingham Pint of Science festival:
  - "E-cigarettes: Public Health's Friend or Foe?" May 2017 (Langley)
  - Psychology, Behaviour, and Immunity: "Can How We Feel Affect Our Body's Response to Vaccination?" May 2019 (Ayling)
  - Myth Busting: Trust Me, I'm a Doctor (of science) – "Unicorns are real and E-cigarettes cause popcorn lung!" May 2019 (Johnston, PhD student)
- Qureshi led an outreach event for school aged children in Nottingham urban areas for consideration of a career in medicine or allied health (2019).
- 30th Erasmus Darwin Memorial Lecture (LSES.org.uk): Thinking the unthinkable: Influenza Pandemic Preparedness and Response'. November 2018 (Nguyen-Van-Tam).

**4.6.2. Media engagement**

Colleagues across this unit work closely with the University's Press Office to ensure widespread dissemination of our latest research findings to the public. In this REF period, our research has resulted in extensive media interactions covering print and broadcast media. Examples include:

*Lifestyle influences on health:*

- Langley was interviewed and her research (Public Information Films) cited by high profile media including The Economist (January 2015) and on Radio 4 'You and Yours' (February 2015).
- Jones had media engagements with several radio stations, and the BBC News Website regarding his restarting smoking postpartum research.
- Murray's publication [doi:10.1136/tobaccocontrol-2017-054125] highlighting exposure of branded and unbranded tobacco imagery in a reality television programme led to considerable media interest and a positive change in that the 2018 show had no tobacco imagery in its broadcasts.

*Epidemiology:*

- Coupland's paper on risk of dementia associated with anticholinergic drugs [doi:10.1001/jamainternmed.2019.0677] had extensive media coverage (international newspapers, CNN News, BBC News website, BBC radio 4 news bulletins) across 27 countries, with an estimated reach of 413 million people and media value of £3.8m. It was the second most viewed paper online across all JAMA journals in one year from 2018 (over 250,000 views).
- A publication on trends in poisonings among adolescents [doi:10.1136/injuryprev-2015-041901] received considerable media attention, including the BBC Radio 4 Today Programme (May 2016) and BBC Breakfast. This study was reported by a total of 82 media outlets, with an estimated reach of almost 36 million people and media value of over £496k.

*Health of the public:*

- The Biobehavioural group's work on the effects of positive mood on influenza vaccination effectiveness [doi: 10.1016/j.bbi.2017.09.008] was reported by national and international



news organisations (e.g. The Times [Front Page] and other international newspapers), radio (including Today Programme, BBC radio 4), and television. The Advertising Value Equivalent of the Coverage was estimated to be over £4 million (Meltwater).

- Research on psychological interventions to promote wound healing [doi.org/10.1016/j.bbi.2016.11.025] was featured on All in the Mind (BBC Radio 4).

#### 4.6.3. Awards, prizes and fellowships

##### *Major awards:*

- Avery:
  - Winner of NHS70 Award for Midlands and East for the category 'Excellence in Primary Care' (2018). National competition from UK parliament to celebrate the 70th Anniversary of the NHS.
  - James MacKenzie Lecturer Silver Medal (2016) presented at the Royal College of General Practitioners Annual General Meeting; it is one of the highest honours in academic general practice to be invited to give the annual James MacKenzie Lecture.
- Britton:
  - British Thoracic Society Medal (2018): given for activity in relation to tobacco control, including chairing the RCP London's Tobacco Control Committee, leading many game-changing reports and helping to reduce smoking in the UK.
  - Royal College of Physicians President's medal (2018): for notable service to the College.
- Avery and Coleman:
  - NIHR Senior Investigator Awards. Awarded to the 'most prominent and prestigious researchers funded by NIHR and the most outstanding leaders of patient and people-based research within the NIHR Faculty' (2018-2023).
- Vedhara:
  - Fellow of Academy of Social Science (2015).

##### *Major prizes:*

- Coupland/Hippisley-Cox: RCGP research paper of the year 2017 (Category 2). BMJ 2017 doi:10.1136/bmj.j2099.
- Vinogradova: awarded best UK research paper published in the BMJ 2019 doi: 10.1136/bmj.k4810.
- Montgomery: Royal College of General Practitioners (RCGP) Research Paper of the Year Award - Cancer Category (2015) doi: 10.3399/bjgp15X684829.
- Morling: Health Service Journal Awards, Improving the Value of Diagnostic Services Award Winner - The Scarred Liver Project (research team award), May 2019.
- Weng - 2019 NAPCRG Pearl for the presentation entitled "A novel clinical algorithm to predict low density lipoprotein cholesterol (LDL-C) response for statin management".

##### *Fellowships:*

During this REF period, our unit has had 10 NIHR fellowships (£1.8m), two Cancer Research UK fellowship (£1.1m), an MRC Fellowship and a Royal College of Surgeons of Edinburgh Clinical Research Fellowship.