

Research Report 2020/2021



Executive Summary

“To be a centre of excellence for research, education and staff development”

Research is a key part of the Trust’s Five Year Plan and in 2020 the Research Strategy 2020-2025 was published bringing focus and direction. Within weeks Covid-19 hit and placed enormous pressure on the NHS. Although the pandemic was catastrophic and moved research into uncharted waters accompanied by several pivotal changes, there were benefits in that NNUH research was propelled towards the desired strategic outcomes. Still, against this backdrop, some ‘research as usual’ continued.

Advancing Strategic - Goal 1 *‘Embed a culture of research throughout NNUH creating an inspirational environment that is recognised nationally and internationally, which inspires future leaders of clinical research’*

- NIHR allocates Research Capability Funding (RCF) to NNUH on annual basis and in 2020/21 this was used to part to pump prime two new research projects¹. Researchers were invited to submit a proposal and following competitive review, two pump priming awards were made to nurture talent within the NNUH’s allied health profession workforce:

Helena Daniell (Physiotherapy): Development of a computerised musculoskeletal tailored intervention guide (MTIG) to support physiotherapists work with their patients to improve pain and function related health outcomes.

Eliza Tassone (Nutrition and Dietetics): Reducing the incidence of falls and fractures in stroke survivors.

- Despite clinical pressures, a number of individuals started post-graduate degrees and others continued or were awarded post-graduate degrees across different professions and specialties (for example MSc, MD, MRes and PhD). This is important for building research capacity within the workforce and for professional development, particularly for staff with career aspirations to work in clinical academic research.

¹ NIHR research capability funding (RCF) can be used to support key research infrastructure, to pump prime areas of research likely to lead to a future grant application and to support research teams in between grants.

Advancing Strategic Goal 2: ‘Consolidate and deepen the special partnership with the University of East Anglia and Quadram Institute Biosciences’

- NNUH sponsors (i.e. takes responsibility and liability for) 36 studies and clinical trials initiated by NNUH investigators and research led by investigators from the Quadram Institute Biosciences and the University of East Anglia. The Norwich Clinical Trials Unit (NCTU) manages 11 of NNUH’s sponsored research studies, the majority of which are multicentre Randomized Controlled Trials (RCTs) funded by NIHR with a combined grant total of £10.8m. Recently two large NNUH sponsored RCTs, supported by NCTU, received confirmation of funding (in excess of £1.8m) and are due to start in 2021/2022.
- The Clinical Research Facility (CRF, housed in the Quadram Institute as part of the NNUH, UEA and QIB partnership) marked its 2-year anniversary by releasing a promotional video. During the pandemic, clinical trials were transferred to the CRF from the main NNUH building allowing patients to continue treatment. UEA and QIB research studies continued as safety considerations and workforce capacity allowed. Having a state of the art CRF made it possible for NNUH to contribute to the Novavax vaccine trial.
- The Norwich Research Park (NRP) Biorepository (part of the NNUH, QIB, UEA partnership) underwent a period of change. Whilst collection of tissue samples was not possible during the pandemic, strategic development continued with new staff appointments and training (notably Professor Louise Jones as Director), delivery and implementation of the Arctic (robotic freezer) and Achiever (sample management database), development of the external webpages and implementation (by NNUH Digital Health) of CogStack (a healthcare records search platform). The NRP Biorepository team were nationally recognised for their contributions to Covid-19 Genomics UK Consortium (COG-UK) - rapid genome sequencing for public health surveillance.

Advancing Strategic Goal 3 ‘Develop sustainable strategic partnerships critical to the region and wider NHS’

- Development of relationships across the NRP continued and with strategic participation of senior NNUH staff in Boards such as NRP Science Development group and the Knowledge Exchange Group, developing NNUH’s role as an influential partner.
- NNUH continues to host the core Clinical Research Network Eastern team (managing a £20m budget covering Cambridgeshire, Norfolk, Suffolk and parts of Bedfordshire, Essex and Hertfordshire). NNUH’s own CRN funding 2021/22 allocation was £2,072,880.00. NNUH’s performance (using the primary indicator

of number of participants recruited) was 7753. This was 212% above target, the highest number recorded, achieved by highly focused management of CRN portfolio and adherence to NIHR's policy for prioritisation during the pandemic. Overall, research active Trusts in the Eastern region year recruited 1 in 40 of the population into research, with NNUH amongst the top 3 Trusts. Following the NIHR's prioritisation of research meant stopping most of NNUH's 'usual' research and in getting research started, NNUH experienced the same challenges as other Trusts in the UK.

NNUH is contributing to the Novavax study, the largest double blind, placebo-controlled COVID-19 vaccine trial to be undertaken in the UK to date. This was a milestone which was delivered at pace and scale with the CRF being used to capacity for the first time. There was external recognition of the achievement accompanied by high profile news coverage.

Advancing Strategic Goal 4: *'Be recognised as a leading NHS Trust in applying research and adopting innovation to deliver the best patient care and to benefit the wider NHS'*

- NNUH generated and disseminated a large body of new research knowledge. In 2020, 19 of the 276 peer reviewed papers published by NNUH researchers were in the highest impact and most widely read medical journals. Research publications covered a range of specialities (including oncology, gastroenterology, neonatal medicine, cardiovascular disease, radiology, diabetes and stroke) in collaboration with local academic partners and also national and international research groups.
- NNUH researchers were invited as expert speakers and chairpersons at regional, national and international conferences of professional and learned bodies and contributed as: research reviewers (charitable organisations, NIHR, office of the Chief Medical Officer); editors for peer reviewed journals; clinical advisors to learned bodies and commercial organisations.
- The efforts of NNUH's Digital Health team as part of the Norfolk and Waveney Sustainable Transformation Partnership has transformed the digital landscape, setting up a platform for future data science and population based research.



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Scope

The purpose of this report is to outline the research activity and evaluate its impact at the Norfolk and Norwich University Hospital NHS Foundation Trust (NNUH) during the 2020/2021 financial year. This document is a summary report which was presented initially to the Research Leads Group and the Research Oversight Board for review prior to wider circulation.

Information included in this impact evaluation has been collated from reports provided by Research Leads.

Background

NNUH recognises the importance of research and support research cross divisionally and at all levels of leadership throughout the organisation. Research is a key part of the Trust's Five Year Plan with one of the goals being:

“To be a centre of excellence for research, education and staff development”

Research Strategy 2020-2025

A major achievement was the publication of the Research Strategy 2020-2025 providing focus and clarity of direction for the organisation, its patients and its stakeholders and intended to position NNUH to take a leading role in driving research locally, nationally and internationally. The strategy was published in August 2020, having gained approval from the Hospital Management Board in February 2020 and shared widely with colleagues across the Norwich Research Park and was included in the CQC inspection.

'A five year research strategy had recently been adopted alongside the creation of two new senior research posts, a director of research operations and an associate medical director for research. The strategy was comprehensive and looked to build on previous research at the Norfolk and Norwich. It clearly identified that research was important as trusts with more research activity have better patient outcomes. Four achievable goals had been identified for the strategy and it was clear there was broad executive support for research within the organisation. Research sub committees fed into the Research Oversight Board which in turn fed into the HMB. Leaders in research were committed and passionate about the development of research at the trust'

CQC Inspection Report April 2020

This report will benchmark NNUH research activity and help assess progress against the strategic goals to:

- Embed a culture of research throughout the NNUH creating an inspirational environment that is recognised nationally and internationally, which inspires future leaders of clinical research.
- Consolidate and deepen the special partnership with the University of East Anglia (UEA) and the Quadram Institute Bioscience (QIB).
- Develop sustainable strategic partnerships critical to the region and the wider NHS.
- Be recognised as a leading NHS Trust in applying research and adopting innovation to deliver the best patient care and to benefit the wider NHS.

Research Governance

The Research Oversight Board is the pivotal point in NNUH's research governance framework. The Board oversees other research governance committees and also functions to advance the Trust's research capability, provide assurance of a solid and sustainable foundation on which to continue to build. During the year, in addition to the regular agenda items the Board has undertaken review of key areas:

- Management of the Clinical Trial accounts (which hold income generated by commercial research activity) leading to the creation of a fund to develop contracting, business development and finance services dedicated to Research and Development.
- Monitoring outputs from utilisation of the funding received from the NIHR Clinical Research Network upon which NNUH relies as a source of research income to support research delivery services, including pivotal changes to the research portfolio and deployment of staff to urgent public health studies during the pandemic.
- The Research Strategy 2020-2025 and its Year One Implementation Plan.
- The Quadram Institute Clinical Research Facility and the Norwich Research Park Biorepository (part of the partnership with University of East Anglia and the Quadram Institute Biosciences).

Developing Research Capability through Infrastructure Development

During the year, recruitment took place to two new posts (Contracts & Performance Manager, Finance Manager) crucial to the delivery of the research strategy through the provision of efficient and timely 'in house' services solely dedicated to research and development. The creation of these posts from internal funding enhances capabilities and moves away from reliance on funding from the Clinical Research Network (see Research Oversight Board above). The CRF Operations Manager and two Tissue Collection Officers for the NRP Biorepository also joined the team.

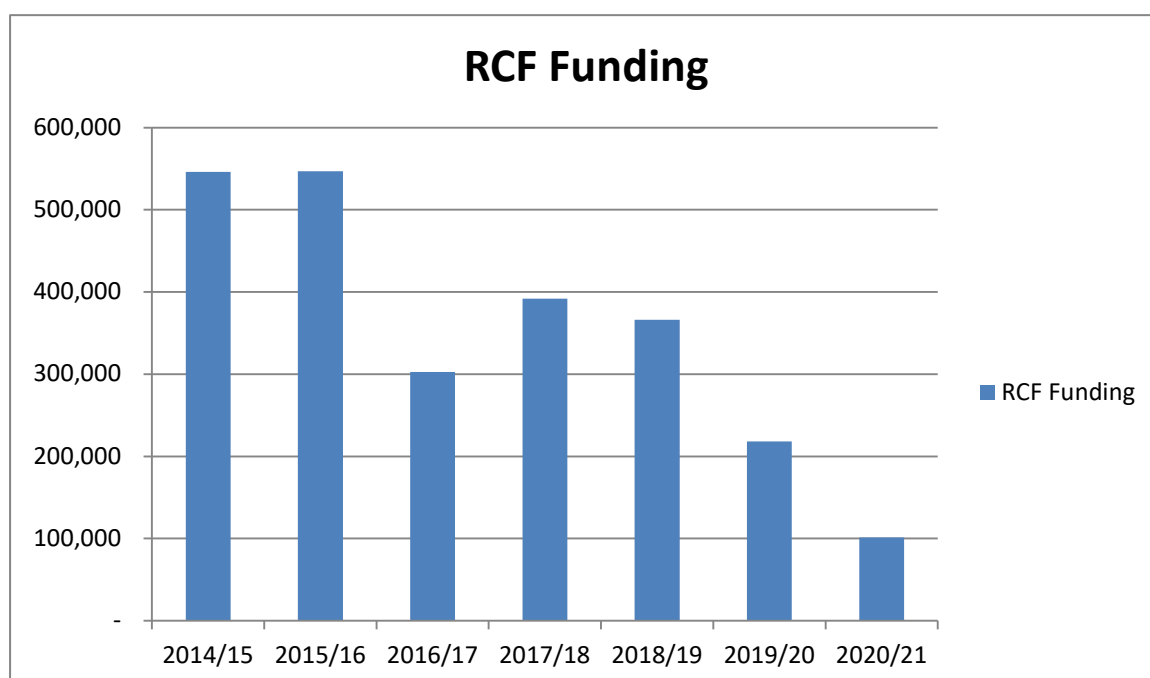
Goal 1 Embed a culture of research throughout NNUH creating an inspirational environment that is recognised nationally and internationally, which inspires future leaders of clinical research

Enhancing Research Capability

NIHR research capability funding (RCF) is allocated to NHS organisations that undertake NIHR research, to support new research (through strengthening future grant applications), providing bridge funding for NIHR faculty members falling between grants and help maintain research capacity and capability². The amount allocated per year to NNUH is determined by NIHR income in the previous year. The below graph shows NNUH's RCF funding allocation has reduced dramatically since 2014/15 as CRN and NIHR grant-related income has fallen against a general reduction in NIHR RCF nationally. The 2020-21 NIHR RCF allocation was £101,345, resulting in only two RCF awards being awarded, focused at progressing Goal 1, to nurture home grown research and talent.

RCF Recipients 2020/21 (These projects are in progress)

- Helena Daniell (Physiotherapy): Development of a computerised musculoskeletal tailored intervention guide (MTIG) to support physiotherapists work with their patients to improve pain and function related health outcomes.
- Eliza Tassone (Nutrition and Dietetics): Reducing the incidence of falls and fractures in stroke survivors.



² Each year researchers apply to the R&D department for RCF. Proposals are competitively reviewed by a panel and scored against criteria which include alignment with the Research Strategy 2020-2025. Successful applicants are expected to submit a progress report and use RCF funding to support research of no longer than one year duration that will lead to a successful NIHR grant application.

Grant income

NNUH was successful in securing research grants from:

AbbVieAction Arthritis

Alzheimer's Society

Big C

Breast Cancer Now

British Heart Foundation

Earle and Stuart Charitable Trust

Gwen Fisher Trust

Innovate UK

Intuitive Foundation

Medtronic

Ménière's Society

National Institute of Health Research

Prostate Cancer Movember

Wellcome Trust

Professional Development

Developing future leaders of research is a key part of the Research Strategy. Undertaking a post graduate research degree is important for individuals with career aspirations in clinical academic research and also important for patients.³ Mentors for these post-graduate students are drawn from experienced NNUH and UEA staff.

The Research Leads reports list individuals who have either commenced or completed an MSc, MD, PhD during 2020/21 (summarised in the table below) and includes research activity across many professions and specialties⁴.

	New	On-going	Awarded
PhD		5	4

³ Clinical academics work as the interface between research and clinical practice and are ideally positioned to ensure the delivery of evidence-based practice and highest quality care to our patients. Also, knowledge of the challenges facing patients helps inform research.

⁴ A comprehensive list is not possible during the pandemic year as not all research leads were able to return their annual report.

MSc / MD (Res)		7	2
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Goal 2 Consolidate and deepen the special partnership with the University of East Anglia and Quadram Institute Bioscience

During 2020/2021 NNUH opened 53 new research projects for recruitment of patients. Some of these research projects are 'hosted' on behalf of other organisations. For some studies and clinical trials NNUH acts as sponsor (meaning it takes responsibility and liability for running the research study) for 36 studies led by NNUH investigators, 2 studies lead by QIB investigators and 15 studies led by UEA investigators. During the pandemic we worked with the Norwich Clinical Trials Unit, Quadram Institute Biosciences and study sites to provide guidance to Chief Investigators and, as sponsor, to meet the research governance requirements.

Norwich Clinical Trials Unit

The Norwich Clinical Trials Unit (NCTU) is part of the UEA and was established in 2013 to provide an effective platform for the conduct of high quality clinical trials. NNUH works with NCTU to develop funding applications and on trial design, management, quality assurance, analysis and reporting.

NCTU is fully registered with the UK Clinical Research Collaboration (UKCRC). The relationship brings expertise in core research competencies such as medical statistics, health economics, data management, trial project management and delivery, quality control systems across a wide range of drug, device and complex intervention trials.

The close working relationship between NNUH and UEA is underpinned by the Joint Research Governance Committee, joint Standard Operating Procedures (SOPs) applicable to all health care research. Senior NNUH research staff are members of the NCTU Executive Committee and NCTU management staff are members of NNUH's Research Oversight Board.

At the time of this report a further 2 large NNUH sponsored RCTs, supported by NCTU, have received confirmation of funding and are due to start in 2021/2022. The additional grant award associated with these additional projects is in excess of £1.8m.

Quadram Institute

The Quadram Institute (QI) is a unique partnership between the Quadram Institute Bioscience, the UEA and NNUH. It is supported by a large grant from the

Biotechnology and Biological Sciences Research Council (BBSRC) which provides core funding for two key infrastructure resources of national importance i.e. Quadram Institute Clinical Research Facility (CRF) and the Norwich Research Park (NRP) Biorepository located in the Bob Champion Research and Education Building.

The Clinical Research Facility (CRF)

NNUH has responsibility and oversight of the CRF which provides a mixture of outpatient clinical and laboratory space as well as a food-preparation area for diet-related studies. It is one of 35 CRFs nationally and is an important part of research infrastructure as it provides a dedicated space specifically for research that does need to be carried out within the main hospital footprint.

The CRF has been utilised to host a number of research projects including collaborative projects between the UEA, QIB and NNUH. There are dedicated research clinics now running in the CRF offering care to patients enrolled in clinical trials across many specialities including: Haematology, Diabetes, Rheumatology and Cardiology.

In October 2020 the CRF marked its 2 year anniversary with its first promotional video highlighting research conducted at the CRF. During the pandemic the CRF maintained a COVID-secure work environment.

As NNUH restarts research activity post-COVID, work continues to identify research projects suitable to be carried out in the CRF.

Norwich Research Park Biorepository

The NRP Biorepository has been through a huge period of change with Professor Louise Jones being appointed as NRP Biorepository Director following the retirement of Mark Wilkinson. This year has seen significant investment from the BBSRC grant with a new robotic freezer (The Arctic) and the Achiever sample database going live in March 2020. Work continues to develop an external facing information website which includes some short films explaining the benefits of using human tissue in research, how tissue is collected and used. With funding from Breast Cancer Now which enabled the appointment of a new tissue collection officer, NNUH has become a collection site that contributes to the national Breast Cancer Now tissue bank. Senior research managers represent NNUH on the NRP Biorepository Strategy Board.

Recent developments in the NRP Biorepository include establishment of a new Biorepository Tissue Access Committee to oversee all research projects using the

NRP Biorepository ethical consent, including tissue/data request and first phase implementation of Cogstack data retrieval software.

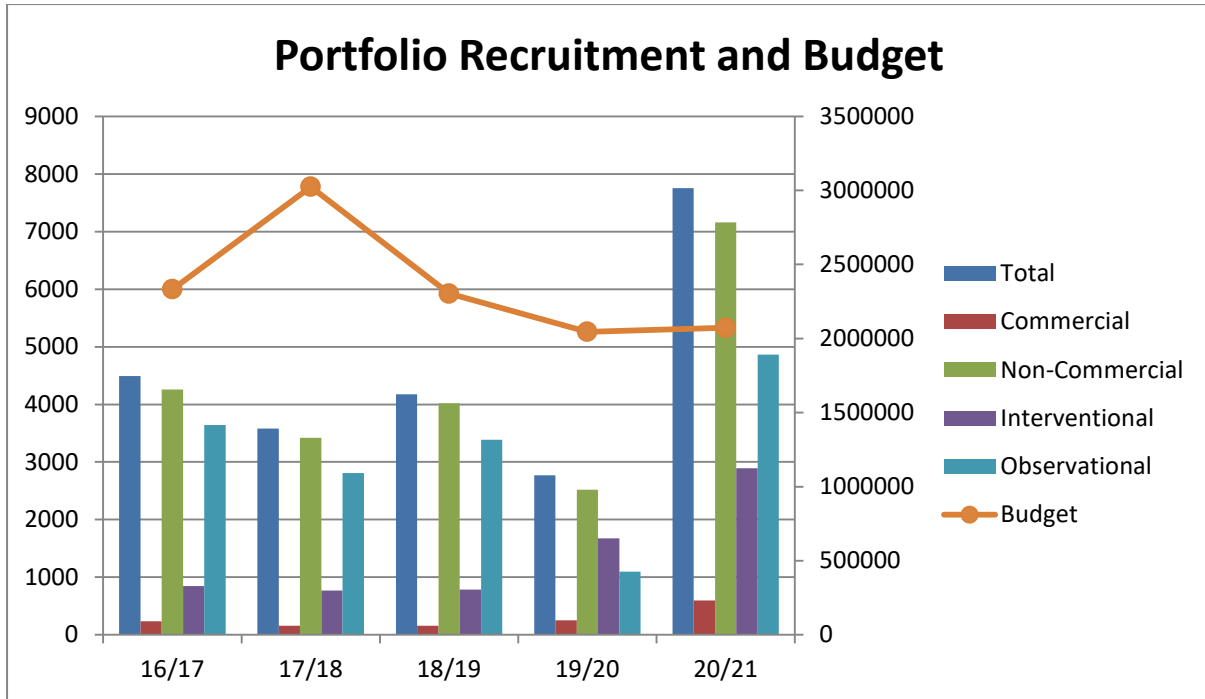
Goal 3 Develop sustainable strategic partnerships critical to the region and wider NHS

Norwich Research Park

We have continued to build relationships with partners across the Norwich Research Park. NNUH is represented at the NRP Science Development Group. With the appointment of senior research managers committed to being involved in committees of this type, we are moving NNUH from being a passive partner to one that is beginning to influence the academic objectives and collaborative opportunities towards delivering healthcare benefits including development of new programme initiatives such as infection research.

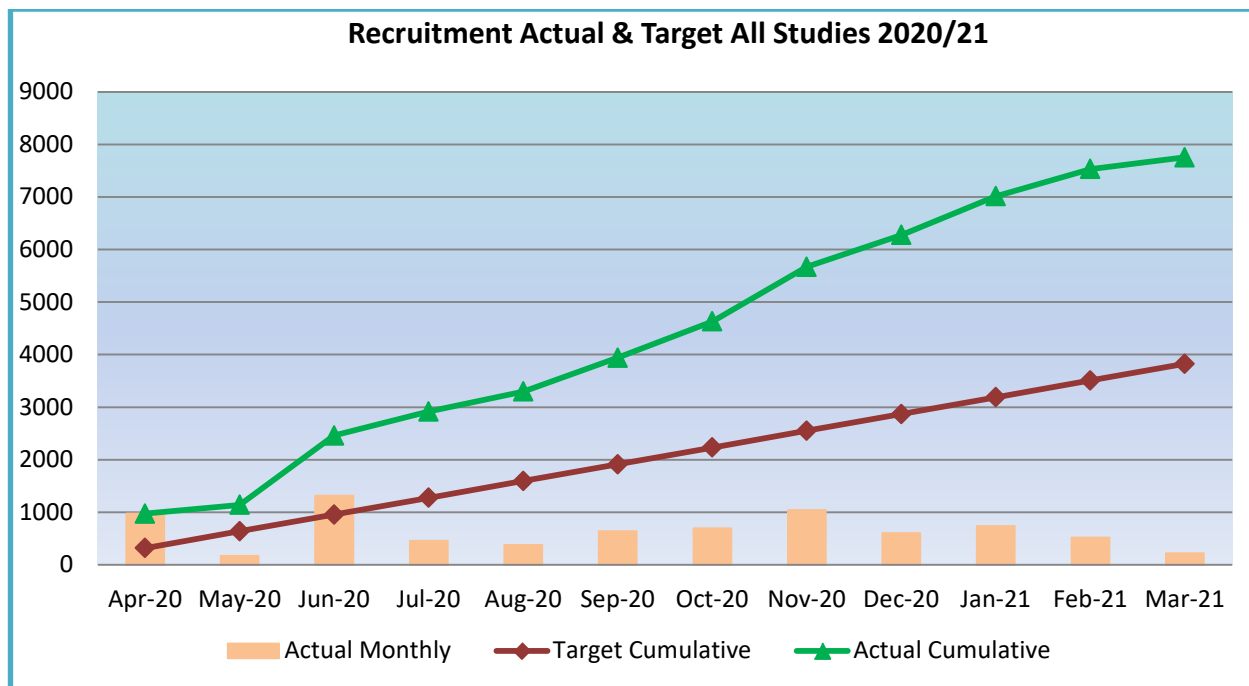
National Institute for Health Research (NIHR): Clinical Research Network (CRN)

NNUH hosts the core CRN Eastern team (covering Cambridgeshire, Norfolk, Suffolk and parts of Bedfordshire, Essex and Hertfordshire). CRN Eastern are responsible for allocating approximately a £20m annual budget across these partner organisations, funding which is intended to support delivery of studies adopted onto the CRN portfolio. The total funding received by NNUH from CRN for the 2020/21 financial year was £2,072,880. The annual NNUH funding allocation and performance (using participant recruitment as the key indicator) for the past three years is summarised below:



2020 was the Year of Coronavirus. The CRN allocation to NNUH funds the majority of research delivery staff at the hospital and we followed NIHR's national guidance for stopping 'usual' research and prioritisation of urgent public research during the pandemic. Many other research studies were paused or set up delayed due to staff being redeployed to assist on the pandemic clinical front line, suspension of many clinical services were suspended and patient and staff safety concerns.

Overall, research active Trusts in the Eastern region last year recruited 1 in 40 of the population into research with NNUH amongst the leading Trusts.



Performance in Initiating and Delivering Clinical Research

Recruitment onto CRN portfolio studies in 2020/21 was the highest recorded (see above). In response to the pandemic, NNUH delivered a high level performance on the **Novavax vaccine study** (2019nCoV-302) which was set up at unprecedented pace and scale and also on the **RECOVERY** and Randomised Embedded Multi-factorial, Adaptive Platform Trial for Community-Acquired Pneumonia (**REMAP-CAP**) Covid-19 clinical trials platforms. We also contributed to Covid surveillance through the **SARS-CoV-2 Immunity & REinfection Evaluation (SIREN)** study and together with Norfolk Community Health and Care NHS Trust was the only area in the East of England to contribute to the convalescent phase of International Severe Acute Respiratory and emerging Infection Consortium Clinical (**ISARIC**).

In the midst of lockdown, a global first was achieved for recruitment into a Phase 1 neonatal neuroprotective study with cannabinoids.

As part of the drive to achieve sustained improvement and performance in initiating and delivering clinical research at NNUH, a new committee was set up to review performance against 70-day target (a benchmark of 70 days or less from the time NNUH receives a valid research application to the time when the first patient is recruited to that study). The committee will oversee and monitor studies to improve processes and reduce delays in study set-up. The committee will also receive and review regular recruitment updates, which will help identify and remedy clinical trials at risk of failing to meet their initiation and recruitment targets within the study benchmarks. The committee will provide regular progress reports to Research

Leads. This is an important step towards strengthening our commercial trials portfolio.

Commercial Research Highlight

Novavax vaccine trial (NVX-CoV2373)

Although studies in other therapeutic areas were unavoidably constrained, the NNUH research teams successfully delivered the COVID-19 vaccine trial 'Novavax'⁵.

The Novavax trial was the largest double blind, placebo-controlled COVID-19 vaccine trial to be undertaken in the UK so far (15,000 participants across the UK). More than 500 participants took part in the trial at the NNUH's Clinical Research Facility at the Quadram Institute. This was a milestone for NNUH due to recruitment size (500 participants target), speed of execution (30 days) and research team capacity required (approx. 60 staff involved) and for the CRF which was used to capacity for the first time.

The outcome trial showed the vaccine had an efficacy of 89.3% in preventing Corona virus infections, in its Phase 3 clinical trial conducted in the UK the data are being considered by the Medicines Healthcare products Regulatory Agency.

The Novavax trial at NNUH was well covered in the in the local press.

⁵ Full title: A Phase 3, Randomised, Observer-Blinded, Placebo-Controlled Trial to Evaluate the Efficacy and Safety of a SARS-CoV-2 Recombinant Spike Protein Nanoparticle Vaccine (SARS-CoV-2 rS) with Matrix-M1™ Adjuvant in Adult Participants 18-84 Years of Age in the United Kingdom.



The Research team at NNUH's Clinical Research Facility which delivered the Novavax Vaccine Trial

Goal 4 Be recognised as a leading NHS Trust in applying research and adopting innovation to deliver the best patient care and to benefit the wider NHS

Generating and disseminating new research knowledge

Publications

Research should be carried out to the standard needed for the findings to be published in peer reviewed medical journals which have international readership and influence. Publication is the way that new research findings contribute to the body of knowledge. In 2020, 276 such papers were published by NNUH researchers reflecting the quality of our research. The publications cover a wide range of specialities including oncology, gastroenterology, neonatal medicine, cardiovascular disease, radiology, diabetes and stroke. They represent collaborative projects with UEA colleagues and also national and international partnerships. Of the 276 publications, 19 were published in the world's highest impact and most widely read medical journals including The Lancet, Nature, The British Medical Journal, New England Journal of Medicine and Journal of the American Medical Association.

Contributing expertise to professional bodies and the public

In addition to adding to the body of new knowledge through written peer review papers, NNUH researchers have been invited to make presentations as expert speakers and to chair specialist sessions at regional, national and international conferences of professional and learning bodies.

They have also contributed as:

- Grant reviewers for funding bodies including charitable organisations, NIHR and the office of the Chief Medical Officer
- Editors for peer reviewed journals
- Advisors, clinical experts and positions of responsibility to charities, National Institute of Clinical Excellence (NICE), NIHR-led national specialiaty groups and networks, the World Health Organsiation, academic institutions, Trial Management Groups and some commercial organisations
- Website development for teaching and as a clinical tool
- Guests on TV and radio (local and national)

Supporting innovation and protecting new technologies

For inventions, new technologies which are considered of high value are often protected through intellectual property rights. An example is the CAVA® project which is a multi-disciplinary collaboration between a surgeon at the NNUH, Mr John Phillips, and two researchers at UEA, Dr Jacob Newman and Prof. Stephen Cox. The goal of the project is to detect and diagnose dizziness automatically, and over the past two and a half years, the CAVA project team has designed, developed and produced a complete medical system for dizziness detection and diagnosis, consisting of a wearable medical device and associated computer algorithms. The system has been evaluated in a healthy volunteer trial, and the results obtained have allowed the researchers to apply a CE-mark to the device, a vital step towards its commercialisation and eventual adoption by the NHS.

Impact of Research at NNUH

It is important to evaluate the impact of research. NNUH is a teaching hospital and research excellence benefits our patients by changing clinical practice and improving patient experience. Our researchers are motivated by their research making a real difference to patients and wider public. Research at NNUH is mostly supported by public funds with the aim to maintain and improve the achievements in the health sector both in undertaking ground-breaking research of the highest quality and

building on this research to achieve demonstrable benefits to the wider economy and society.

In conclusion:

Clinical research has become a topic of public interest in a way no-one could ever have been predicted. The Covid pandemic catapulted the Research Strategy forward and the profile of R&D at NNUH was elevated, particularly in terms of embedding a culture of research, consolidating partnerships across the NRP and contributing to clinical trials of global importance. These achievements must be sustained and research embedded as part of everyday clinical practice across NNUH. Building on the research successes and lessons learned during the Covid pandemic, NNUH can create an environment conducive to high quality research and develop even closer links with new and existing commercial and academic partners.