UNIVERSITY HOSPITALS BIRMINGHAM NHS FOUNDATION TRUST

BOARD OF DIRECTORS

THURSDAY 29 JULY 2021

Title:	**UHB Annual Research Report 2020 /2021**
Responsible Director:	**Tim Jones, Chief Innovation Officer**
Contact:	**Hilary Fanning, Director of Research Development & Innovation** **Jo Plumb, Deputy Director of Research Development**
Purpose:	The purpose of this paper is to provide an account of Trust Research Development & Innovation activity for 2020/21 to the Board of Directors
Confidentiality Level & Reason:	NHS CONFIDENTIAL - Board
Board Assurance Framework Ref: / Strategy Implementation Plan Ref:	BAF - SR13/18 - Failure to realise the opportunities and benefits of merger BAF - SR8/18 - Adverse impact of BREXIT on Trust innovation agenda BAF Choose an item. SIP - #1 Increase alignment of corporate and clinical services across UHB SIP - #18 Increase research and innovation activities associated with artificial intelligence SIP - #19 Standardise research and development processes across the trust
Key Issues Summary:	Research and Innovation activity during 2020/21 Impacts of Covid 19 pandemic on research and innovation activities in 2020/21
Recommendations:	The Board of Directors is asked to: **ACCEPT** this UHB research development and innovation activity report for 2020/2021. **RECEIVE** a UHB Annual Research and Innovation Report for 2021/22 in June 2022.
Signed: Tim Jones	**Date:** 20 JULY 2021

UNIVERSITY HOSPITALS BIRMINGHAM NHS FOUNDATION TRUST
BOARD OF DIRECTORS

THURSDAY 29 JULY 2021

UHB ANNUAL RESEARCH REPORT 2020/21

PRESENTED BY CHIEF INNOVATION OFFICER

1. Introduction

1.1 The purpose of this paper is to provide the Board of Directors (BoD) with an annual account of Trust research development and innovation activity in 2020/21.

2. Local Context

2.1 In March 2020 as the COVID-19 global pandemic escalated in the UK, DHSC and NIHR prioritised research activity (Urgent Public Health Research – UPHR) within the NHS to be directed towards COVID 19 research (Observational and Therapeutic Intervention trials), COVID 19 vaccine research (Early to Late phase trials), and research trials where there was no other treatment option for patients (that is, where research trial treatments were effectively standard of care).

2.2 At UHB, while the majority of research effort pivoted to deliver Covid 19 trial activity, 80 Clinical trials of Investigational Medicinal Products (CTIMPS) remained open to patients where there was no other treatment option; these included trials involving, Cancer, Haematology, HIV, Renal and Cystic Fibrosis patients.

2.3 In response to the Trust's requirement for assistance to support front-line services, over 200 RD&I staff volunteered for re-deployment to clinical areas such as ITU, ED, Covid wards, and corporate areas such as Occupational Health, Bereavement Services and management support to the site- based Senior Responsible Clinical officers.

2.4 The RD&I staff who remained in situ (58 staff across UHB hospital sites) constituted a cross-UHB site research delivery team, focussed on the set-up and delivery of Covid 19 trials, classified as Urgent High Priority Research (UHPR) by NIHR, and maintenance of non Covid 19 trials where no other treatment options were available to patients. Research delivery was further supported by a change to 24 x7 days a week hours of work, and the operation of an "on call" system across all nursing, pharmacy and senior management teams.

2.5 Locally, RD&I trial review, prioritisation planning and delivery was further supported by close collaboration with the Trust's Medicine Scientific Advisory Group (MSAG), and a cross-site team of Principal and Chief Investigators.

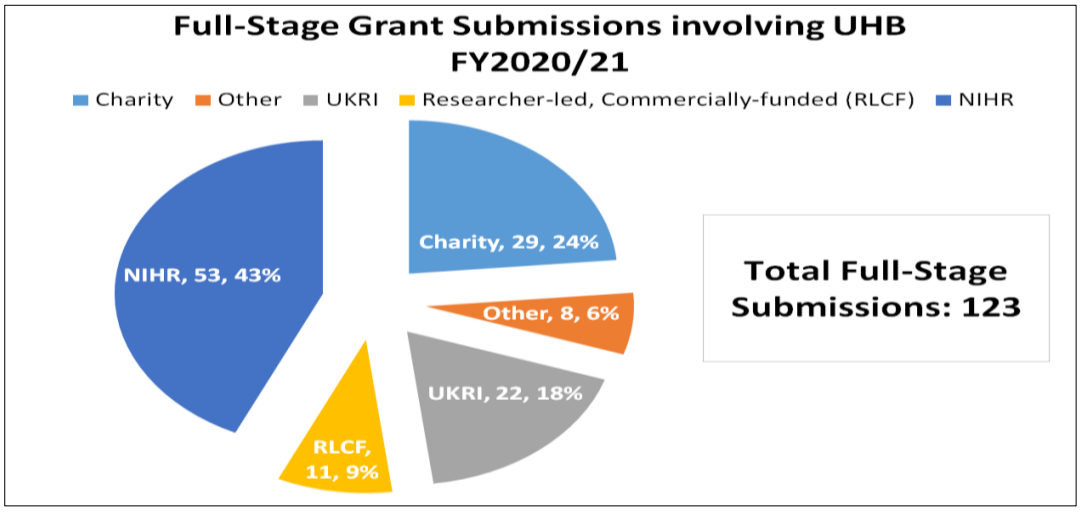
2.6 RD&I quality assurance staff supported the internal and external review of auditing and monitoring of research activities, throughout the pandemic by the rapid implementation of remote monitoring of our commercial and non-commercial research. This ensured our studies were compliant; keeping our patients, staff and the study sponsor staff safe.

2.7 RD&I research governance and management teams worked responsively to instigate rapid review and Trust authorisation across all our sites. This enabled UPHR and Covid 19 vaccine studies to be rapidly reviewed and authorised.

2.8 The Research Application Support Service (RAS) maintained the non COVID grant service activity in parallel with applications to NIHR/UKRI COVID-19 Rapid Response calls.

2.9 Figure 1 below provides a research funder profile for full stage applications submitted in 2020/2021.

Figure 1: Research Funder Profile for full stage grants submitted in 2020/21



3. Research Trial Delivery in 2020/21

3.1 UHB contributed to the International Severe Acute Respiratory and Emerging Infection Consortium (**ISARIC**) database. Initially this data was collected for all COVID-19 patients (suspected and confirmed). As of the 30/4/2021 UHB patient recruitment to this observational data trial was 7105 patients.

3.2 UHB patients were recruited to two of the three UPHR **Level 1a** (top priority) therapeutic studies. The third was a study for primary care services. These were:

- **RECOVERY** – the Randomised Evaluation of Covid-19 therapy trial, a platform study investigating different drugs, currently used for other conditions, to see if they have benefits for patients with Covid-19.
- **REMAP-CAP** Trial - a trial to determine whether various treatments are effective in patients admitted to ITU with severe pneumonia due to COVID-19. The treatments include antiviral medication, antibiotics and immune modulator therapies.

3.3 Evidence generated from RECOVERY has resulted in Dexamethasone introduced as standard of care in June 2020, Tocilizumab introduced as standard of care in January 2021, and more recently Regeneron, for treatment of patients with Covid 19.

3.4 UHB patients were also recruited to **Level 1b** UPHR COVID 19 therapeutic studies. These included;

- **RECOVERY RS** led by UHB's Prof. Gavin Perkins, with University of Warwick Clinical Trials Unit support .This was a clinical trial comparing different treatments that help with breathing in patients with COVID-19. Patients with COVID-19 were randomly assigned to a treatment group, either standard care or a type of oxygen therapy known as continuous positive airway pressure (CPAP), for up to 30 days. Findings from the trial, which are due to be announced imminently, will comprise an evidence base for which type of oxygen support is most effective at reducing admissions to ITU.
- **CATALYST** led by UHB's Prof.Tonny Veenith with University of Birmingham Clinical Trials Unit support. This was an early-phase platform trial testing a number of drug and cell therapies for their effectiveness in treating COVID-19.

UHB was the highest recruiting site nationally to these two studies.

3.5 UHB patients were recruited to **UKOSS** (Covid 19 Obstetrics and Gynaecology data study); **PAN-COVID** (Pregnancy and Neonatal Outcomes in COVID-19); **PERI-COVID** (Covid 19 infection in pregnancy and the newborn) and the all - speciality **GenOMICC** study undertaking the genomic analysis of Covid19.

3.6 UHB commenced the recruitment of healthy volunteers to the MHRA approved Oxford/AstraZeneca vaccine trial in May 2020 delivered by staff at our NIHR Clinical Research Facility (CRF). Between May 2020 and end April 2021, UHB has opened and fully recruited to 4 vaccine trials (phase 1 (early) to 3 (late)) within the CRF.

3.7 As the pandemic progressed in 2020/21, the focus of research also moved to trials investigating the long term effects of Covid 19 and the rehabilitation needs of patients. UHB opened as a site for the national **PHOS-COVID** study in 2020/21, and continues to recruit and follow up patients to this multi-arm study of the long term effects of Covid 19.

3.8 A **non-Covid 19 trial portfolio** was also maintained as described in 2.2

above. Over the course of 2020/21, where impact of Covid 19 on front line services reduced, and where available workforce and support services allowed, important opportunities for non-Covid research were taken.

3.9 Over 2000 patients continued safe non -Covid 19 Investigational Medicinal Product (IMP) therapy and follow up, supported by trial sponsors allowing remote safety visits and with IMP supply being couriered to patients at home.

3.10 The Inherited Metabolic Disease (IMD) research team recruited the **first global** patients to a Phenylketonuria study, with the NIHR Birmingham CRF being the first to administer this GMO infusion worldwide. This was a phase 1/2 Open-Label, Dose Escalation Study to Determine the Safety and Efficacy of BMN 307, an Adeno-Associated Virus Vector-Mediated Gene Transfer of Human Phenylalanine Hydroxylase in Phenylketonuria.

3.11 The NIHR SRMRC published its findings, that salivary biomarkers indicate concussion, from the SCRUM study (Study of Concussion in Rugby Union through MicroRNAs), pointing the way toward a first non-invasive clinical test for concussion using saliva. This work has wider applicability not only in sport but also to the military and healthcare in general.

3.12 In 2020/21 UHB recruited 12,908 participants into NIHR portfolio studies of which 7,795 were to Urgent Public Health studies. UHB was the largest recruiting Trust in the WM CRN region, and exceeded last year's recruitment (n=8,885).

3.13 The UHB research trial portfolio generally consists of observational (data/tissue collection) and interventional (therapeutic or service change) studies, typically with a 60 (observational):40 (interventional) split. During the Covid 19 pandemic, this ratio changed with the focus being on interventional studies to establish treatments and vaccines for Covid 19. The research trial portfolio historically has also been split between commercial and non-commercial research. During 2020/21 there has been less commercial research activity.

3.14 **Appendix 1** provides additional data on UHB patient recruitment to research trials in 2020/21.

4. Research Centres Activities in 2020/21 - Highlights

4.1 NIHR Trauma MIC and MD-TEC

MD-TEC became the designated device evaluation facility for the Government's National Ventilator Challenge. A consortium of UK technology and engineering businesses, from the aerospace, automotive and medical sectors, came together in response to the Covid 19 pandemic to address a national ventilator shortage. In collaboration with the Cabinet Office, the MHRA and industrial partners, NIHR Trauma MIC and MD-TEC contributed to the evaluation of novel ventilator designs to meet a high-level specification for a Rapidly Manufactured Ventilator System (RMVS). Over a four-month period, this involved evaluation of 50 prototypes of 12 novel ventilators. This

evidence fed into the review process informing the decisions regarding which ventilator designs were carried forward into production and ultimately used in patient care. The team also established a real-time remote communication system with ventilator manufacturers to help them with design and safety issues. The NIHR MIC Director, Prof Tom Clutton-Brock, was recognised in the Queens Honours list for this work.

4.2 **NIHR SRMRC**

In addition to publication of SCRUM findings (section 3.11 above), the NIHR SRMRC team evaluated ten international Major Injury triage tools intended for use to correctly identify patients in need of time-critical, life-saving interventions. This work identified the UK military's Battlefield Casualty Drills (BCD) Triage Sieve to be superior to the current National Ambulance Resilience Unit (NARU) Triage Sieve tool. The evaluation findings have been presented to the Major Incident Triage Task and Finish Group of the NHS Emergency Preparedness, Resilience and Response Clinical Reference Group (EPRR CRG) who have agreed our work will inform national policy to switch to the BCD tool, planned for 2022/23.

4.3 **NIHR Birmingham Clinical Research Facility**

4.3.1 During 2020/2021 the NIHR CRF became a hub for healthy volunteer Covid 19 trials. 1175 healthy volunteers were recruited through NIHR Birmingham CRF to Covid vaccine trials.

4.3.2 The NIHR CRF continues to provide a clinical hub for research activity, supporting all UHB hospital sites and our other research centres like NIHR Birmingham Inflammation-themed Biomedical Research Centre (BRC). The latter is best exemplified by NIHR CRF support to deliver: **CATALYST**, a phase 2 platform study for the treatment of severe Covid 19; **STOP-COVID**, a study targeting neutrophilic inflammation in severe Covid 19. Non- Covid 19 studies supported by the NIHR CRF included; **Twinss**, a CTIMP study for patients with Sjögren's Syndrome and **REFER**, a study determining treatment preferences early rheumatoid arthritis.

4.3.3 As an experimental medicine research facility, NIHR CRF prioritises experimental studies, delivered through patient research clinics. Through adoption of digital technologies we have continued to deliver these clinics in 2020/21. Two key metrics include:

- Telephone visits 826% increase on previous years
- Outreach visits 3893% increase on previous years

4.3.4 There has been expansion to the NIHR CRF research portfolio of under-represented specialties, less studied diseases and transitioning studies including rare conditions. Examples include the **Rango** study, a trial for rare gynaecological neoplasms and a paediatric study, **Exe-T1d**, a study to assess clinical phenotype, cell function and genetics of paediatric patients with extremely early type 1 diabetes.

4.3.5 The Cancer Research Team (CRT) now sit under the management

and governance structure of the NIHR CRF. This enhances cancer study delivery by providing a more flexible expert workforce.

4.3.6 During 2020/21, the NIHR CRF team changed their working practices in response to impact of the pandemic. They now hold an "on-call" phone, providing more flexibility for out of hours and weekend working, responding to all opportunities to recruit patients, day or night. This has resulted in more patients recruited out of usual working hours than in any other reporting year.

4.4 **Centre for Rare Diseases and the ITM Clinical Research Facility.**

4.4.1 April 2020 saw the closure of the Centre for Rare Diseases (CfRD) and the Institute of Translational Medicine Clinical Research Facility (ITM CRF). With the number of Rare Disease clinicians being deployed to support high capacity areas within the Trust, this initially resulted in the cancellation of all clinics held in the CfRD and research studies held in the ITM CRF being paused. The latter included the NIHR Bioresource for Rare Diseases and Tissue Bank studies. With this closure and the subsequent staggered re-opening of the CfRD and ITM CRF, members of staff were deployed to support front line services such as A&E, AMU and ITU and then re-opened clinical and research services as they returned.

4.4.2 CfRD staff supported the roll out and delivery of the Trust's staff antibody testing in addition to the **COCO** study for which UHB is the Chief Investigator site (Prof. Alex Richter). COCO is determining the immune response to SARS-CoV-2 infection in convalescent health care workers.

4.4.3 In common with the NIHR CRF, the CfRD and ITM CRF adopted use of video consultations during 2020/21. This enabled the CfRD to remain open during the tiered re-start and subsequent 2nd national lockdown, allowing clinicians to use their rooms for face-to-face, video, telephone consultations or a combination of all three as dictated by clinical need.

4.4.4 Whilst response to the pandemic did have a significant impact on the number of clinic attendances from April 2020 to February 2021, 8146 appointments across the various consultation modes took place alongside 895 research study visits in the ITM CRF (April 2020-March 2021).

4.5 **Midlands and Wales Advanced Therapy Treatment Centre (MW-ATTC)**

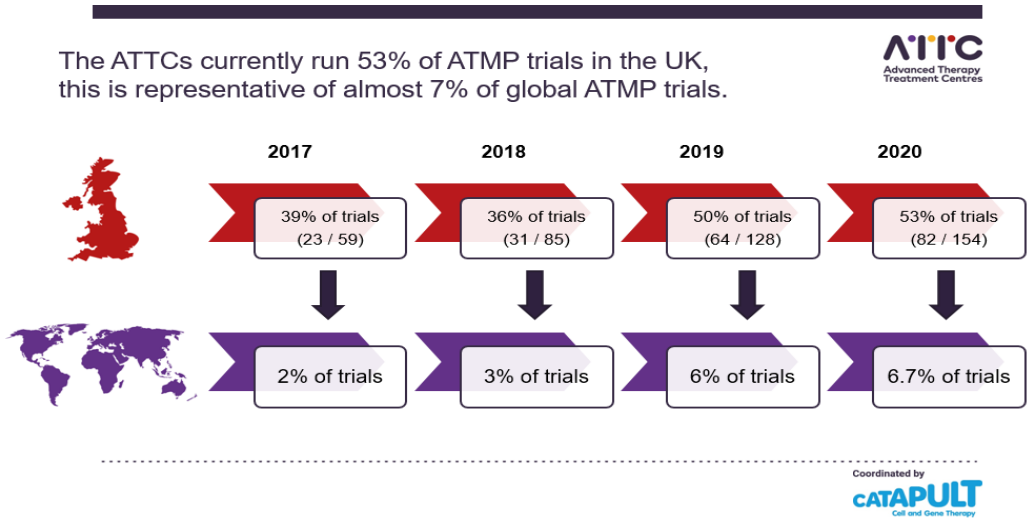
4.5.1 The aim of this Innovate UK funded, MW-ATTC is to enable UK advanced therapy companies to reach the clinical market, whilst simultaneously building clinical capacity regionally to deliver these breakthrough therapies to patients. It is one of three national centres.

4.5.2 An NHS Readiness Toolkit website was launched in June 2021.

This provides infrastructure information and guidance documents to NHS Trusts wishing to deliver cell and gene therapies (Advanced Therapy Medicinal Products (ATMP)). UHB has shared significant locally generated material to inform this national resource.

4.5.3 The annual Catapult ATMP clinical trials database (published in December 2020) reported that UHB delivers 33% of UK cell and gene therapy clinical trials and 2 % of **global** trials. Figure 2 provides a summary of ATMP trial activity delivered by the three national Advanced Therapy Treatment Centres.

Figure 2: National ATTC Trial Activity



4.6 NIHR Birmingham Biomedical Research Centre

4.6.1 NIHR BRC infrastructure enabled the deployment of a highly skilled workforce to support both the NHS frontline and a combined UHB Covid 19 research delivery team during the pandemic; enabling high levels of recruitment to research studies.

4.6.2 NIHR BRC was instrumental in the design and delivery of the phase 2 platform Covid study; CATALYST. The study data indicated that Namilumab demonstrated proof-of-concept evidence for inflammation reduction in hospitalised patients with Covid 19 pneumonia.

4.6.3 The NIHR BRC Diagnostics & Biomarkers theme, led by Prof. Jon Deeks, has led on Covid-19 diagnostic test evaluation both nationally and internationally. This team has made a significant national and international contribution to this field during the reporting period 2020/21.

5 Institute of Translational Medicine (ITM)

5.1 While for much of 2020/21 occupancy was low, the ITM now has more than 200 residents including UHB and UoB researchers, research professional support, and trainee researchers, from a range of scientific disciplines which include Medicine, Bio/Chemical Engineering, and Computer Science. It houses a cluster of programmes and centres such as NIHR BRC, NIHR SRMRC, Cancer Research UK, D3B, IUK MW-ATTC NIHR Global Surgery Centre, HDR-UK Midlands, HDR UK Pioneer, HDR UK Insight, WM AHSN, Global Maternal Health Research Centre, Scar Free Foundation Centre for Conflict Wound Research, MD TEC and NIHR Trauma MIC.

5.2 One of the core objectives of the ITM was to act as a catalyst for industry, academic and NHS collaborations. The ITM, and its resident research groups, have so far contributed to the creation of over 1000 jobs and the generation of over £300 million in investment from grants, donations and infrastructure awards.

5.3 The ITM service to support non-Clinical Trial of Investigational Medicinal Products (non-CTIMP) studies (Research FIRST), delivered by UoB staff, has seen a growth in income and workload over the 2020/21 period.

The ground floor of this facility was temporarily re-purposed to set up UHB'sCovid-19 Vaccination Hub, supporting vaccine delivery to our workforce.

5.4 **Tessa Jowell Centre of Excellence and BRAIN MATRIX**

5.4.1 Birmingham is the Chief Investigator (Prof. C Watts) site for the novel Tessa Jowell BRAIN MATRIX platform trial which is aimed at increasing opportunities for patients with brain tumours to try non-standard treatments. This study received full approvals and was activated in November 2020.

5.4.2 In March 2021, UHB was recognised as a **Tessa Jowell Centre of Excellence** for excellence in patient care. Part of the criteria for designation was the high standard of clinical trials that are offered to this patient group at UHB. This is a great achievement for UHB as it will strengthen and encourage further stakeholders to bring brain tumour research to UHB, increasing novel treatment opportunities for our patients

6. Healthcare Research Data Activity in 2020/21 - Highlights

6.1 The **HDR UK Midlands substantive hub** (Prof. Simon Ball) is now 4 years into its 5 year term of funding. It has delivered an increased number of collaborative partnerships across Birmingham, Leicester, Nottingham and Warwick. Collaborative work programmes are also being developed between the Midlands site, and the other five HDR UK substantive sites across the UK (London, Cambridge, Oxford, Scotland and Wales/NI.

6.2 **HDR UK PIONEER** is the health data research Hub for Acute Care (Prof. Liz Sapey). In 2020/21, PIONEER has;

- Supported more than £14m in research grant awards
- Delivered over 1,037 impactful interactions with patients and the public.
- Published 13 papers
- Supported 32 data.
- Processed 27 Data Sharing requests (18 internal and 9 external).

6.3 **DECOVID** is a PIONEER affiliated health data research collaboration between, UHB, UCLH, UCL, UoB, and the Alan Turing Institute. It was set up in May 2020, funded by EPSRC/Alan Turing Institute, to collect in-depth, longitudinal data from patients with a confirmed, suspected or at risk of a diagnosis of Covid 19. It comprises electronic health records for patients diagnosed with Covid-19, suspected of having or at risk of Covid-19 across two healthcare providers, including data of process, acuity, physiology, prescriptions, investigations, participation in research studies and procedures. These data are drawn from two of the most digitally mature hospitals within the UK (UHB) and University College London Hospital, (UCLH)), both of which saw a high number of Covid admissions in all waves of the Covid-19 pandemic in the UK. The DECOVID research database curates data from UHB and UCLH and then makes specific datasets available for studies aimed at improving understanding of and care provided during the Covid-19 pandemic. The research questions for which data are currently being analysed were identified by clinicians and informed by patient and public representative views.

6.4 **HDR UK INSIGHT** is the health data research hub focussed on eye health and associated conditions. In 20/21, INSIGHT has;

- Established a national and international profile for defining the international standards (accepted by the FDA and MHRA) for the conduct of AI clinical trials.
- Established a national and international profile for defining the concept of “health data poverty” as this relates to the use of data to develop data-driven technologies like AI

6.5 Both HDR UK PIONEER and INSIGHT, have undertaken a broad range of activities to ensure that the secondary use of data for research purposes is informed and evaluated by patient and public representatives. These activities have included patient and public engagement webinars, workshops, and training programmes. They have also included embedding Data Trust Advisory structures as an important component part of the decision-making process for access to healthcare data for secondary use. The work of these hubs has informed recommendations of the recently published HDR UK Green Paper concerning use of Data Registers. https://www.hdruk.ac.uk/news/uk-health-data-research-alliance-seeks-feedback-on-a-data-use-registers-green-paper/

6.6 **NIHR HTA DaRe2THINK** was funded in 2020/21 (Prof. Dipak Kotecha). This is a data-enabled randomized controlled trial that is fully embedded within

NHS Primary Care. The study is a collaboration between UHB, UoB and Clinical Practice Research Datalink (CPRD). DaRe2THINK will automatically screen over 10 million health records allowing the study to target site selection to maximise patient enrolment. The same system will enable automated 'no visit' follow-up, with e-consent, access to participants' electronic health records combined with patient reported outcomes via their personal electronic device.

This innovative trial design has the potential to completely change the clinical research landscape and is being nationally recognized as a leader in its field. It was recently referenced in the Department of Health and Social Care's Saving and Improving Lives: the future of UK Clinical Research Delivery.

6.7 **DEMAND**, (Data-Enabled Medical technologies And Devices) Hub is a collaboration between UoB and UHB, funded by the European Regional Development Fund which opened in July 2020. It is being set up to offer a range of commercial services and support to small and medium sized enterprises (SMEs) active in the digital sector.

6.8 **Project Inner Eye in Covid 19** is a UHB and Microsoft Cambridge Research team collaboration. This project was set-up to collaboratively develop a deep learning model which could identify and differentiate Covid 19 positive Chest X-Rays, from non Covid 19 Chest X Rays. As part of this project, UHB was the first site globally to utilise Microsoft's Azure Machine Learning image labelling tool.

7. Genomic Medicine Infrastructure

7.1 UHB hosted the West Midlands Genomic Medicine Centre (WM GMC), one of thirteen national centres in England, established to deliver the 100,000 Genomes Project. The WM GMC extension to contract ceased on the 31st March 2020 in anticipation of the creation of seven new NHS England/Improvement designated Genomic Medicine Service Alliances (GMSA). The provider selection process for the GMSAs was paused as a consequence of the emerging Covid-19 situation in March 2020, recommencing in August 2020.

7.2 UHB led a successful provider selection process for the Central and South (CAS) geography, and the CAS Genomic Medicine Service Alliance (GMSA) was confirmed as one of the seven super-regional partnerships, covering an area from the West Midlands, through Oxford and the Thames Valley to Southampton and the south coast, serving a population of around 12 million.

7.3 CAS GMSA has been awarded over £115,000 for Q4 20/21 infrastructure costs, and recurrent £1.2m infrastructure costs for the next three years. Nine of eleven business cases for 2020/21 have been supported by NHS England totalling over £213,000, with a further portfolio of business cases having been submitted on the 26 February

2021. This recent submission categorises a wide range of business case proposals into CAS GMSA prioritised projects, those that align to national priorities, and those that the CAS GMSA would seek to leverage funds to support from alternative sources.

7.4 NHSE/I has set seven national priorities, Lynch Syndrome, Monogenic Diabetes, Nursing and Midwifery, Sudden Cardiac Death, DPYD, Familial Hypercholesterolemia and Pathology. Complementing these national priorities, the CAS GMSA has prioritised a Primary Care Development Programme to enable equity of access and accessing poorly served groups by moving aspects of genetic diagnosis and care into the community, and a somatic Cancer Development Programme which would utilise the Genomic Tumour Advisory Boards (GTABs). Negotiation on the provision of resources to support these programmes is on-going with NHSE/I Health Education England.

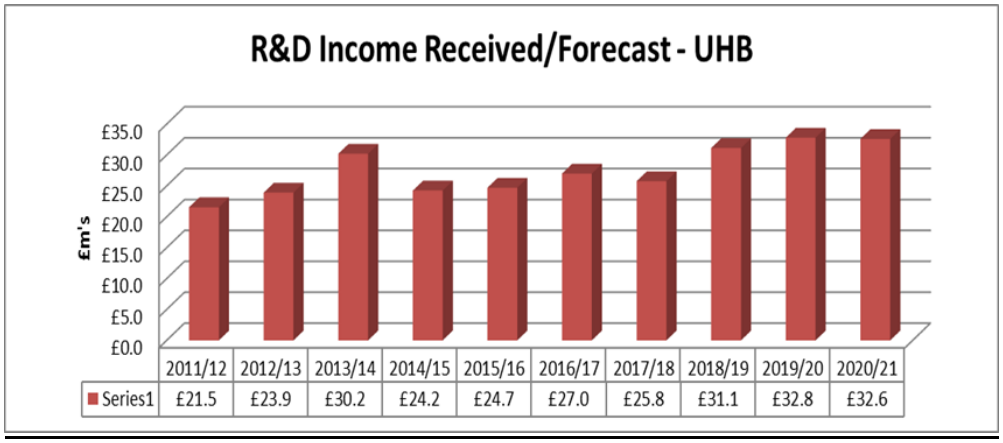
7.5 The **West Midlands Regional Familial Hypercholestrolaemia (FH) Cascade Screening Service, managed by the CAS GMSA** is a nurse-led primary care based service providing genetic tests to diagnose patients with monogenic Familial Hypercholesterolaemia. The delivery model has been adapted over 2020/21 to reflect the Covid 19 pandemic and the majority of consultations converted to virtual ones. The service was suspended for six months during 2020/21 to enable the nursing team to support Trust pressures as a result of Covid 19. However, during the year, the number of genetic tests undertaken only reduced by 30% compared to the previous year due to the adapted delivery model.

7.5.1 The service has been described nationally as, an exemplar model of a systems approach to the detection and management of familial hypercholesterolaemia, and is being replicated across other regions, supported by the West Midlands team. To date, in excess of 750 patients have been diagnosed with FH including asymptomatic ‘cascade’ cases (family members) the youngest being aged 5 months. Early identification of FH enables early intervention and access to treatment to reduce the risk of developing early cardiovascular disease and/or premature death.

8. Research Finance 2020/21

8.1 Graph 1 below provides a summary of research income received for financial years 2011/12 to 2020/21. While there are fluctuations year on year, the general trend is upwards. There has been a small decrease in total income of £0.2m between 2019/20 and 2020/21.

Graph 1: RD&I Income Received: 2011/12 – 2020/21



8.2 Income for 2020/21 has been adversely affected as a consequence of Covid 19, with pause of pre Covid 19 research trial to enable re-deployment of staff and focus on conducting Covid 19 research.

8.3 Commercial research income has been most affected due to the pause in commercially sponsored trials. However, due to new grants and contracts awarded in year, RD&I have generated an additional £2.9m in 2020/21 which has offset the loss of income elsewhere.

8.4 Of the total RD&I income for 2020/21, commercial and academic research trial income comprised £5.2m (a decrease of £2.1m (29%) from the previous year). Commercial trial income received in the period can vary from quarter to quarter depending on the number of patients recruited and the invoicing procedure agreed with the commercial sponsors. We are anticipating trial income to recover as studies resume in 2021/22.

8.5 RD&I was able to claim back loss of income from NHSE/I due to the impact on income generation as a direct result of Covid 19. RD&I claimed £5.3m loss of income and have ring fenced this to support speciality research teams in 2021/22 that may not generate sufficient commercial and academic trial income in year to meet their income targets for 2020/21.

8.6 **WM CRN Funding**

8.6.1 Nationally, funding to NIHR Clinical Research Networks (CRNs) decreased for 2020/21 with revisions to research capability funding (RCF) and amendments to the activity based funding model. CRN funding is allocated on the previous year's activity based funding model.

8.6.2 WM CRN income for UHB was £4.3m in 2020/21, an increase of £100k from 2019/20. This included non-recurring funding for 2 Research Scholars and 2 CRN Fellows as well as funding for Covid 19 vaccine studies.

8.7 For the 2021/22 financial year we are currently predicting that total research income will be around the same value as 2020/21 (£32m). However, we are yet to see the full impact of the pause of research and as such, the actual

income received may vary depending on our ability to return to business as usual.

8.8 In addition to current predictions, income may be increased in year, by notification of successful grant awards in 2021/22 for applications submitted in 2020/21. There may also be some realigning of income by NIHR so that grant income is not received in advance of need. Any negative financial risk to the Trust will be mitigated by an equivalent decrease in forecast expenditure.

9. Research Performance Indicators

9.1 There has been a shift in emphasis from number of patients recruited to trials as a metric, to research delivery performance metrics, defined as High Level Objectives (HLOs). NIHR now requires Trusts to monitor and meet these. HLOs are monitored as part of WM CRN oversight of research activity in NHS Trust sites.

9.2 During 2020/21, RD&I took the opportunity to introduce the use of EDGE (a Clinical Trial Management System, provided by NIHR) across all of its hospital sites. This process benefitted considerably from prior knowledge of use of this system on our HGS sites. Use of EDGE allows holistic oversight of research activity across all UHB sites, supports reporting of NIHR HLOs and other locally defined performance metrics via linked use of PowerBi (data visualisation and analysis tool).

10. Research Governance

10.1 Statutory Inspections

10.1.1 The Medicines and Healthcare products Regulatory Agency (MHRA) undertakes a cycle of inspections of organisations sponsoring clinical trials for compliance with the Clinical Trial Regulations. The cycle runs over approximately 3 years. The Trust was last inspected in February 2011 and so is now overdue an inspection. As of 19th July, no notification of a full GCP inspection has been received.

10.1.2 The MHRA undertook a statutory GCP inspection of the laboratories at Heartlands Hospital site on the 22nd – 23rd of October 2019. The report from MHRA was received on the 7th of April 2020. MHRA made 3 major findings relating to site management, record keeping/essential documents and archiving. Plans for corrective and preventative actions (CAPA) are in progress and an interim report has been provided to the inspectorate in Q2 2020/21. The CAPA plans have been reviewed by the GCP Inspectorate and are considered acceptable. MHRA recognise the impact of the COVID-19 epidemic on R&D departments and has confirmed that full completion of the CAPA is not expected until R&D capacity returns to complete this.

11. Research Governance Audit Cycle

11.1 Under normal circumstances, a schedule of routine study audits (100% of UHB Sponsored and 10% of UHB Hosted Trials) is implemented at the start of each financial year. These audits enable trend analysis (new and/or on-going) that may need corrective and preventative actions.

11.2 A routine audit and monitoring schedule was not implemented for the 2020/21 due to the pandemic and impact on workforce. Because of the fast pace at which Covid 19 trials were being implemented, a reactive approach was adopted to troubleshoot and resolve issues as they arose for individual trials. Non-Covid 19 trials have also been subject to review where compliance issues have been reported.

12. GCP Compliance and Serious Breach Reporting

12.1 A serious breach was reported on a UHB sponsored, non-interventional Covid 19 study which was related to patients who were deceased being sent documentation inviting them to participate in a study. Patient's families were sent letters of apology and the incident was reported to the relevant ethics committee. A CAPA was put in place by the QA team. The CAPA has since been closed prior to the study reopening.

12.2 A serious breach was reported on a non-UHB sponsored, academic non-Interventional Covid 19 study. Multiple issues were identified including but not limited to; sample chain of custody, research protocol and GCP non-compliance, delegation of duties, research documentation, patient consent process and PI oversight. A CAPA plan was opened by the sponsor and R&D QA team and the resolution of actions is currently ongoing at this time.

12.3 Two serious breaches were reported on the same academic Covid CTIMP trial. Both were reported due to the issues occurring at multiple UHB study sites. One related to IMP handling and the second was due to ineligible patients being recruited / randomised. A formal CAPA was not requested by the sponsor (UoB) but a local review was undertaken for the individual patients involved to ensure due diligence from a Trust perspective and specific actions put in place to avoid the issue reoccurring. No further action was taken by the sponsor. No patients were harmed due to any of the serious breaches occurring.

13. Patient and Public Involvement in Research (PPIE)

13.1 During 2020/21, research groups at UHB have responded to the

rapidly changing needs and priorities of health and care services. Effective, creative, and timely collaboration between and across our NIHR Infrastructures has ensured that Covid 19 research projects have benefitted from the unique insights and perspectives of patients, carers and the public throughout the pandemic.

13.2 The Birmingham BRC and ARC WM public involvement communities worked together to support research from Public Health England, facilitated by the Health Research Authority, on a project evaluating home antibody tests for Covid 19. Thirteen public contributors reviewed and provided feedback on the research design and documents that would be given to participants in the study. PPIE Leads collated and sent feedback to PHE within 48 hours.

13.3 To ensure researchers were able to incorporate meaningful public involvement into projects, PPIE Leads from NIHR ARC WM and NIHR SRMRC set up a Covid 19 Rapid Response PPIE Panel. Twenty experienced public contributors from established public involvement/patient groups and networks in Birmingham were recruited to respond to fast developing Covid 19 projects and urgent funding calls. Panel members all worked virtually and PPIE Leads provided dedicated support to them.

13.4 The NIHR Global Surgery Community Engagement (CEI) and Involvement Lead has collaborated with the NIHR to undertake a global health survey mapping CEI activity during Covid-19 and highlighting challenges/solutions. Further CEI work has involved working with a patient advisory group to generate accessible patient information booklets. This work is part of **CovidSurg** - a global collaborative capturing real-world data on patients undergoing surgery during Covid 19.

14. Building Academic Capability

14.1 UHB has continued to grow the number of staff holding NIHR Senior Investigator designation. There were eight staff with NIHR Senior Investigator awards in 2020/2021. These are among the most prominent and prestigious researchers funded by the NIHR and the most outstanding leaders of patient and people-based research within the NIHR research community. Senior Investigators are appointed from NIHR Investigators through competition informed by the advice of an international panel of experts.

14.2 The Trust also supports researchers to develop Chief Investigator capacity and capability across our medical, allied health professional and nursing workforce. In 2020/21, seven staff have been awarded NIHR WM CRN (Clinical Research Network) Research Scholar funding to develop Chief Investigator capacity at UHB and across the WN CRN. These staff are from a range of specialities, based in different UHB hospital sites, and include medical and allied health professional staff.

15. Impact of BREXIT

15.1 RD&I has contributed to local and national work during 2020/21 to determine risk and put in place mitigation strategies for a post-Brexit UK. There has been no significant adverse effect on UHB's research and innovation activities at this point. This is subject to on-going review.

16. Research Development and Innovation Workforce in 2020/21

16.1 During 2020/21 UHB's RD&I staff demonstrated adaptability, resilience and significant commitment to support their colleagues and our patients. The majority (80%) of RD&I workforce was re-deployed to frontline services at the start of 2020/21, returning in staggered fashion during the year, as pressures eased. Deployed staff were supported through regular contact with line managers, psychology-led "decompression" sessions and weekly staff welfare webinars. Over 2020/21, RD&I line managers have undertaken psychological first-aid training. RD&I staff have supported UHB and BSOL vaccination hubs, and a number took up the option to maintain ITU skills acquired by continuing to work regular shifts in ITU on return to RD&I.

16.2 Staff have been invited, as healthy volunteers, to participate in vaccine trials, providing early access. Over 22,000 UHB staff have participated in work, delivered by RD&I, to validate Covid 19 laboratory assay platforms, the data from which informed the government's scientific panel (SAGE) and DHSC decision-making.

17. Research Development and Innovation forward look for 2021/22

17.1 UHB RD&I activity in 2020/21 has been characterised by cross-site multidisciplinary working, and close integration with and response to, clinical service needs and imperatives.

17.2 In March 2021, the UK government released a report outlining a vision for the future of clinical research delivery. Shaped by the significant contribution of research during the Covid 19 pandemic, 'Saving and Improving lives: the Future of UK Clinical Research Delivery' calls for a more inclusive, patient-focused research ethic within the NHS, with a particular focus on data-driven research enabled by digital tools.

The report identifies 5 key themes for developing the future best practice of clinical research delivery:

- Embedding clinical research into the NHS
- Ensuring research is patient-orientated
- Ensuring research is streamlined and efficient
- A focus on research driven by data and digital tools
- Fostering a supported workforce with sustainable research practices

17.3 UHB RD&I is well placed to incorporate these into strategic planning and delivery for 2020/21.

18. Recommendations

18.1 The Board of Directors is requested to:

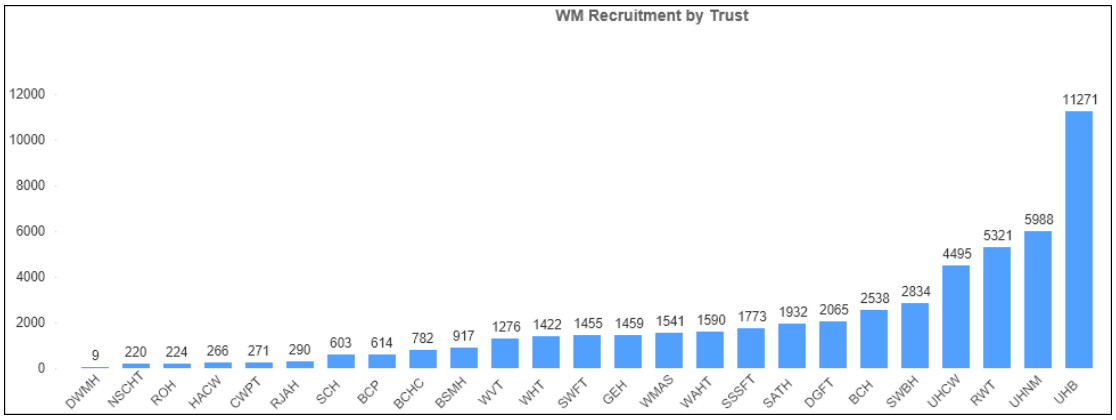
ACCEPT this annual UHB research activity report for 2020/21.

RECEIVE a UHB Annual Research and Innovation Report for 2021/22 in June 2022.

TIM JONES
CHIEF INNOVATION OFFICER
JULY 2021

Appendix 1: Research Activity Metrics

Figure 1: NIHR portfolio activity; NIHR West Midlands Clinical Research Network Data for 2020/21



Note:UHB was highest recruiting site in West Midlands

Figure 2: UHB recruitment by study types 2020/21

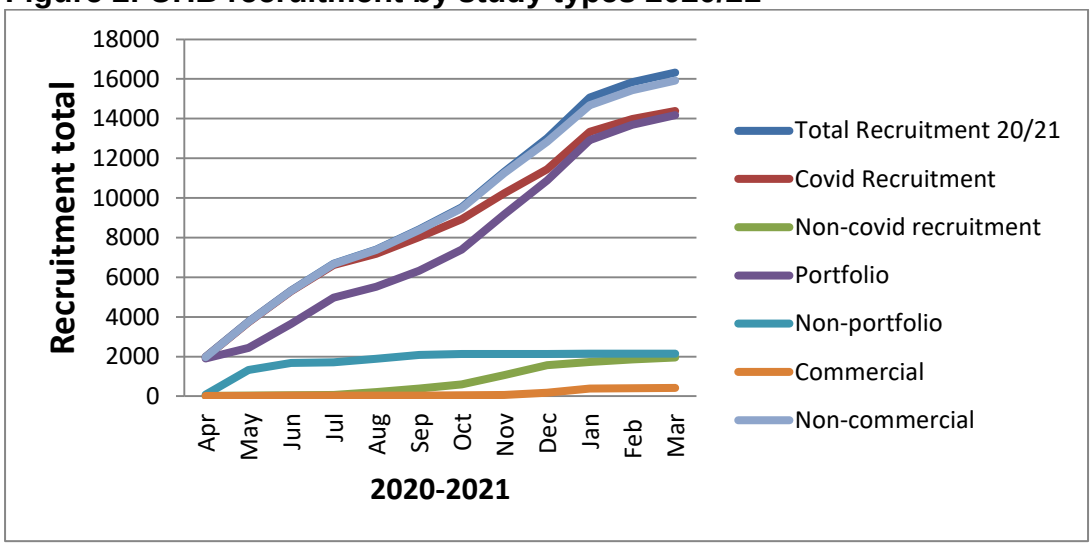


Figure 3: Interventional v Observational Trials in 2020/21

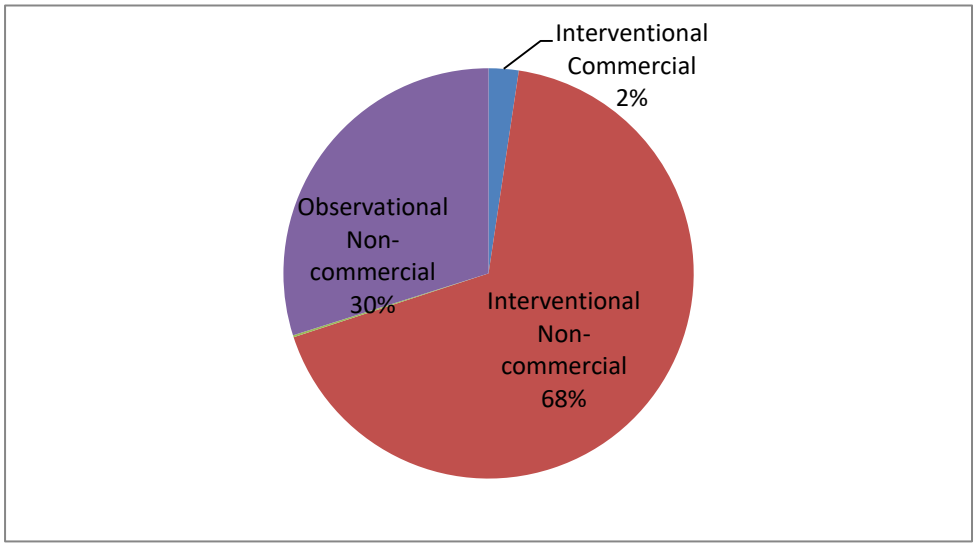


Figure 4: Recruitment to Covid 19 trials by speciality

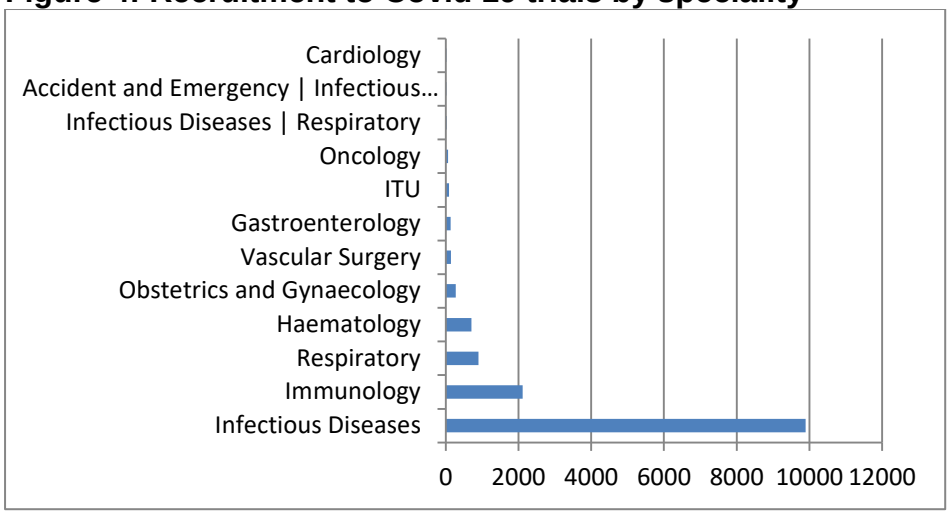


Figure 5: Recruitment to non-Covid 19 trials by speciality

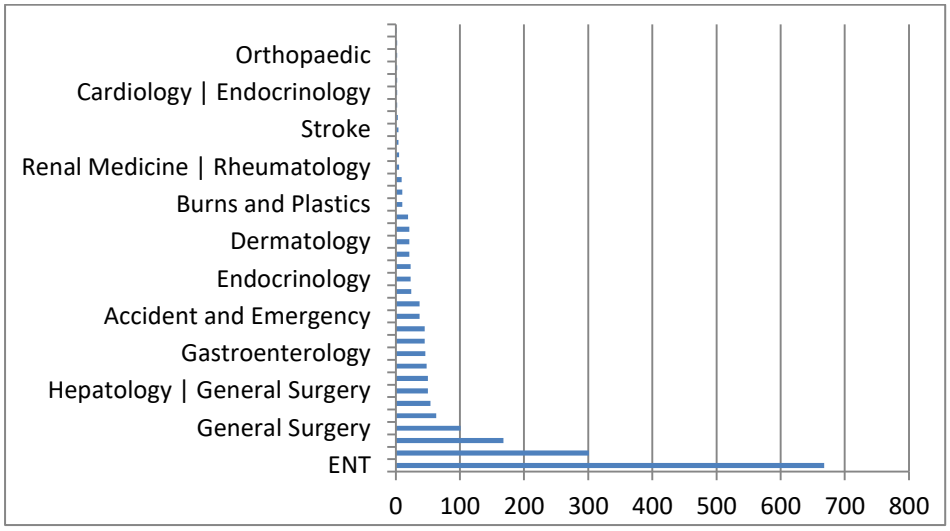


Figure 6: Recruitment per UHB hospital site