

April 2020 – March 2024



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Executive Summary: Emergency Medicine Research Oxford (EMROx)

This document outlines the work of Emergency Medicine Research Oxford (EMROx), the key research organisation for Emergency Medicine research in Oxford University Hospitals NHS Foundation Trust.

Established in 2010, the main goals of EMROx are to foster and develop Emergency Medicine research activity and infrastructure across the full translational spectrum, from basic science to clinical implementation and evaluation. The EMROx team has an exemplary record in research delivery, contributing to over 70 studies at OUH over the past 14 years, with frequent recognition for high recruitment rates and delivery of complex trials. More recently the team has developed its own track record in research leadership and design, receiving over £1.5 million in grant funding and forging academic partnerships with key organisations in the Oxford academic ecosystem, as well as industrial and clinical stakeholders. This growth and activity has been reflected in a multitude of high impact presentations and publications, and a significantly elevated profile within the UK Emergency Medicine research community and beyond.

Primary Objectives April 2020 – March 2024

- Increase the income brought into OUH through EMROx activities; increase average income from research activity by 100% by 2024
- Establish senior academic posts for EMROx members and support the delivery of Emergency Medicine research at strategic level
- Expand the EMROx team and support more clinical staff to take part in research activity, increasing the number and turnover of studies, including expanding the number of phase 1 pilot studies
- Diversify and increase funding streams, to include the National Institute for Health and Care Research Clinical Research Network, industry, academic and charitable grants.
- Continuing to support research activity and training for ED staff at OUH and build on research collaborations and relationships with stakeholders in Emergency Medicine research across the region, including Oxford University and academic institutions and other established Emergency medicine research centres.

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Emergency Medicine Research- challenges and opportunities

Emergency Medicine is a clinical specialty unparalleled in its breadth and unpredictability. Every year, Emergency Departments in the UK treat an increasing number of patients with a broad range of clinical conditions, from trivial to life-threatening, often in time-critical scenarios under extreme service pressures.

This clinical environment presents a significant opportunity for research, offering access to a large and enormously varied patient cohort who are often undergoing intensive management at a critical time point in the course of their illness. Similarly, the substantial workforce of a modern Emergency department with its extensive and varied skill mix, and the hitherto relative lack of a solid evidence base for many of the current interventions and systems of care together offer a fertile environment for innovation.

The complex case-mix and significant day-to-day operational pressures of the Emergency Department however demand a highly focussed and pro-active approach towards research, which in turn requires significant resources and organisation, and this can only be achieved through research activity which is embedded in the clinical space and processes of the Emergency Department.

Introducing EMROx- <u>Emergency Medicine Research Ox</u>ford

EMROx (Emergency Medicine Research Oxford) is an award-winning and rapidly expanding research group based in the Emergency Departments of Oxford University Hospitals NHS Foundation Trust. Initially established in 2010, its primary objectives are to initiate, develop, co-ordinate and promote Emergency Medicine research activity and infrastructure across the full translational spectrum, from basic science to clinical implementation and evaluation.

The OUH Emergency Departments are sited in two locations – the John Radcliffe Hospital (the Tertiary Referral and Major Trauma Centre in Oxford), and the Horton General Hospital (a District General Hospital located in Banbury). Together, the two departments are visited by approximately 200,000 patients per year, encompassing the full range of clinical settings and patient presentations associated with modern Emergency Medicine.

Successfully rising to meet the challenges of the past few years has led to a period of unprecedented growth for EMROx. In this document we present an account of our recent development in terms of infrastructure, activity and output, and outline our future strategic goals and aspirations.

The EMROx Team

EMROx has a dedicated and rapidly developing workforce. Virtually all our staff have worked as clinicians or administrators in the OUH Emergency Departments prior to joining the team, which offers EMROx a considerable depth of clinical and operational insight into the practical and strategic challenges surrounding Emergency Medicine research.

Recent years have seen our team continue to grow and diversify, and our core delivery team of highly skilled Research Nurses is now supported by a full-time Research Assistant and a part-time administrator, with a number of fully funded Research Fellows leading and supporting a variety of projects in the EMROx workstreams.

At a senior level, we have a number of Emergency Medicine Consultants with funded research time via various grants and Fellowships as part of their work portfolio. Crucially, leadership from the team as a whole has led to a cultural shift in the Emergency Department in favour of research activity, with a substantial increase in engagement from the wider Emergency Department workforce in terms of participant recruitment, and study design and implementation.



EMROx Team members (left to right top row first): Sally Beer²; Alex Novak, RCEM Associate Professor; Dr Tanya Baron¹; Jose Martinez³; Tine Panduro³; Martina Iorio³; Karen Dineen³; Ralph Houët⁴; Alexis Espinosa²; Matt Davies¹; Roger Magalano³, Tinelly Sambo³

1 Consultant in Emergency Medicine, 2 Senior Research Nurse, 3 Research Nurse, 4 Administrator

EMROx Team Structure

The EMROx workforce consists of:

- 1 Director/Lead Consultant (3 PAs)
- 3 EMROx Consultant Research Associates
- (2 with funded NIHR CRN Research Fellowships (3-4 PA))
- 3 current and 2 previous EMROx Research Fellows (0.25 WTE)
- 1 Lead Research Nurse (1.0 WTE)
- 1 Senior Research Nurse (1 WTE)
- Research Nurses (3.0 WTE)
- Assistant (1WTE)
- Administrator (0.4 WTE)



EMROx Senior Team

Professor Alex Novak, Director of EMROx



Alex is a Consultant in Emergency Medicine and Ambulatory Care at Oxford University Hospitals NHS Foundation Trust and has been the Director for Emergency Medicine Research Oxford (EMROx) since early 2020. He has a number of strategic research roles, including Chair of the Thames Valley Emergency Medicine Research Network (TaVERN) and the NICE Diagnostics Advisory Committee. He is a member of the Royal College of Emergency Medicine (RCEM) Research Committee and was awarded RCEM Principal Investigator of the Year in 2020 and RCEM Associate Professor in 2023. He has a broad portfolio of research projects, including an interest in the evaluation of AI-assisted imaging in acute healthcare settings, and is Chief Investigator for several ongoing trials in this area.

Professor David Metcalfe



David has recently been appointed as Associate Professor of Emergency Medicine and NIHR Advanced Fellow within the Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences at the University of Oxford, the first senior academic appointment in the specialty. He was previously a Fulbright Scholar at Harvard Medical School and UCB Prize Fellow at the University of Oxford, and currently holds an NIHR Advanced Fellowship. His research aims to improve the early diagnosis of high-consequence emergency conditions and the effectiveness of clinical pathways in the acute setting.

Dr Vishakha Erasu Prasad



Vishakha started her association with EMROx as a Research Fellow and has recently been appointed as Consultant in Emergency Medicine in Oxford. She is Principal Investigator for a number of studies in the department and is currently working on a Cochrane Review of pharmacological agents in the treatment of bleeding due to major trauma. She is the current Consultant Lead for the Oxford School of Emergency Medicine Conference.

Dr Aqib Hafeez



Aqib is an Emergency Medicine Consultant and has been involved with EMROx since receiving NIHR Green Shoots funding in 2019. He is a senior member of the study team for the Cochrane Review of Resuscitation in Blunt and Penetrating Trauma and acts as local Principal Investigator for a number of trials including REPHIL, ASPIRED and Draft-CASP.

Dr Nicholas Richens



Nick is a RCPCH-trained Consultant in Paediatric Emergency Medicine with special interests in Clinical Research, Medical Education, Point of Care Ultrasound, Child Safeguarding, and Quality Improvement. He is an Honorary Senior Clinical Lecturer at Oxford University and a Teaching Associate at Green-Templeton College, Oxford.

Dr Deon Louw



Deon is a consultant in in the Emergency Departments of OUH. In early 2023 he received NIHR funding to complete the Greenshoots programme. As a member of the EMROx team he has contributed to the delivery of research at OUH, both as PI and through involvement with the EMROx PPI group. As a member of the RCEM mental health subcommittee, Deon has a particular interest in developing mental health research in emergency medicine.

Sally Beer



Sally is the Lead Research Nurse for Urgent and Emergency Care, with responsibility for overseeing research teams in Emergency Medicine, Adult and Neuro Intensive Care, Anaesthesia and Acute General Medicine.

Sally's career spans 40 years in Intensive Care and Emergency Medicine. She coordinates the ACE-CROC research oversight group (for Emergency, Critical and Acute Care). She was also a member of the Covid Research Review Group during the recent pandemic.

Alexis Espinosa



Alexis has worked in the research team for the last 9 years and is the Senior Research Nurse for EMROx. She has acted as a Co-Investigator on the E-MAGED study and was the local PI for the Q-ASPIRED study. Alexis has extensive experience in research delivery and recruitment, managing data and the research processes required to manage the team's output and efficacy. Under her guidance, the team have been top recruiters to multiple studies.

Former Senior Team Members

Dr Tanya Baron



Tanya Baron is a Consultant in Emergency Medicine at Oxford University Hospitals NHS Foundation Trust and a NIHR Clinical Research Fellow (2021/2). Tanya was awarded NIHR/CRN Green Shoots funding in 2019. She has jointly created and chairs the AcuteCare Patient and Public Involvement and Engagement group.

Her interests lie across the spectrum of research related to Emergency Medicine and particularly in ensuring greater representation and inclusivity in research from all patient groups accessing the service.

Tanya has now returned to Scotland, where she continues to champion research in her local Emergency Department.

Dr Matt Davies



Matt is an Emergency Medicine Consultant at Oxford University Hospitals NHS Trust. Having completed a NIHR Academic Clinical Fellow training programme in Emergency Medicine, he was awarded a doctoral research fellowship by the NIHR and RCEM to study the effect of implementing trauma systems.

Matt's research interests include trauma epidemiology, trauma systems and injury prevention. He has recently been awarded a NIHR/CRN Research Fellowship post for 2022/23 and is a Principal Investigator for the STEDI2 and DENS trials.

Matt has left Oxford, and works in Bermuda where there are sunnier, blue skies.

Dr Charlotte Brown



Charlotte is an Emergency Medicine and PEM consultant. Charlotte has supported numerous Paediatric studies within the ED and is member of PERUKI.

Charlotte has also moved to work nearer her home.

Core Delivery Team

The EMROx Core Delivery Team currently consists of 5 research nurses, some who work clinically alongside their research roles, a Research Administrator and a Research Assistant.

The team manage the day-to-day delivery of a portfolio of research projects across the Adult and Paediatric Emergency Departments and affiliated specialities. This includes screening all Emergency Department attendances, approaching and consenting willing participants, collecting the required data, and following up recruited participants. Interdisciplinary collaboration is key to this work, and a significant part of the team's time is spent working closing with other departments such as theatres, laboratories, blood transfusion and surgical specialties.

Investment in skills has meant that the team can now take on additional responsibilities within the research process, including Data and Trial Management. We aim to provide opportunities for individual development and training, and the team are encouraged to undertake activities such as educational courses and attendance at relevant conferences, locally and abroad including submission of posters and presentations.

EMROx Research Fellows

Over the past 2 years EMROx has established a series of 1-year Research Fellowships, each with 25% dedicated time for research activities. A total of 5 Fellowships have been awarded by interview, with four fellows having completed their fellowships and one extending the fellowship to an additional year. They have used their time for a broad range of research activities, including designing, leading and supporting a number of trials and infrastructure projects, and undertaking systematic reviews.

EMROx Team successes



Vishakha Erasu Prasad, EMROx Research Fellow

Vishakha is a Senior Clinical Fellow in Emergency Medicine and was the first EMROx Research Fellow to be appointed in 2020. In addition to supporting research across the Emergency Department, her primary focus has been to lead a Cochrane Review of Pharmacological interventions for the Treatment of Bleeding Following Blunt and Penetrating Trauma. This is nearing completion, and Vishakha has extended her fellowship to work on a forthcoming NIHR multicentre trial exploring the use of antidepressants in preventing Post-Traumatic Brain Injury Depression.



Jose Martinez, EMROx Research Nurse

Jose worked in the Emergency Department for 3 years before joining the research team in 2016. He was the first nurse in the EMROx team to act as a local Principal Investigator for a study and is now working as the Trial Manager for the Simulation Training in Emergency Department Imaging 2 (STEDI2) study alongside his role as an EMROx Research Nurse. Jose has a personal interest in the psychological impact of trauma and presented on the subject at the American Emergency Nurses Association Annual Conference in 2020.

Key Strategic Aims:

- Increase total number of paid research hours, and total number of staff with paid research time by at least 50% within the next 5 years
- Support the development and career progression of early and mid-career researchers e.g. through externally funded Research Fellowships
- Encourage our clinician researchers to become research leaders through experience and training, and the attainment of awards and relevant higher qualifications
- Expand and diversify research team to include administrative staff, e.g. Data Analyst/Statistician, Trials Manager, Grants and Finance Officer

Funding and Finances

In recent years the funding for EMROx activities has been predominantly sourced from the NIHR CRN, which has financed the following:

- Salaries for 4.5 WTE Research Nurses annually
- Fellowship (50% WTE) for three Consultant 2018-2022
- Green shoots funding for 3 Consultants and 1 Registrar 2019-20
- Green shoots funding for one consultant in 2023

Further sources of income for individual projects have included:

- NIHR Research Capability Funding to cover additional nursing resource, consultant salary, fellowship and administrative support
- Industry partnerships
 - National Consortium of Intelligent Medical Imaging (NCIMI)
 - SBRI (Small Business Research Innovation) grants
 - TRL (Transport Research Laboratory)
 - Perspectum Diagnostics
 - Abbott Diagnostics
 - Oxford CCG

In order to reduce dependence on the CRN for research nurse funding, EMROx has actively diversified the funding streams by collaborating with other investigators and continues to explore opportunities and collaborations to ensure the sustainability of its income base. In recent years, research nurses are increasingly funded by income from previously completed studies.

Successful Grants (Co-/Lead Application):

- 2023 RCEM Research Grant Serum neurobiomarkers in Cauda Equina Syndrome (£10k)
- 2022-24 Inequalities and Accident and Emergency Waiting Times (£491k)
- 2021-22 Report and Image Quality Control (SBRI) (£365k)
- 2021-22 NIHR Research Capability Funding (OUH) (£19k) for Research Fellow
- 2020-21 Report and Image Quality Control (SBRI) (£100k)
- 2020 BRC3 Research Capability Funding (£150k)

Further expansion and development of EMROx is critically dependent on increasing, sustaining, and diversifying revenue, and this will be a key strategy focus for the future.

Key Strategic Aims:

- Increase average annual income from research activity by 100% over next 5 years
- Continue to diversify funding streams outside of NIHR CRN, including industry, academic and charitable grants
- Develop a steady income base to support paid research time for Emergency Department clinicians

Education and Training

Education of the Emergency Medicine workforce is crucial to its development as an academic specialty and is a central part of the EMROx strategy. Several initiatives have been implemented in recent years to increase the engagement of ED staff in research activity and to more firmly establish the department as a training centre for clinical research. These include the following:

- Increasing senior staff engagement through the adoption of Co- and Associate Principal Investigator roles for clinical trials taking place in the department
- Increasing the engagement of staff groups not previously heavily involved in research e.g. NMAHPs
- Developing Research Fellowships for training and non-training grades who wish to become more actively involved and accredited in research
- Embedding basic research activity and accreditation (e.g. GCP training) into non-training middle grade appraisal processes
- Expanding the annual Oxford School of Emergency Medicine Conference to allow the presentation of regional projects and posters, and increasing the research content of the main presentations
- Hosting Oxford Academic Health Science Network events to share innovations regionally
- Developing undergraduate and early career research engagement, with supervision of projects and Special Study Module opportunities

Key Strategic Aims:

- Expand the proportion of Emergency Department staff actively engaged in research activity and training
- Support the career development of existing staff, including the attainment of higher research degrees
- Link closely with allied organisations (NIHR CRN, Oxford University) to maximise the utilisation of training opportunities for the Emergency Department workforce
- Establish accessible ground-level educational opportunities (e.g. webinars) to engage the junior workforce
- Support attendance and presentations at conferences at local, national and international level

Posters

- Iorio M, Panduro T, Sambo T. Introducing Medical Students to Clinical Research Delivery: A Pilot Study in the Emergency Department Research Team. Poster. European Society of Emergency Medicine Congress, 18-20th October 2023, Barcelona, Spain.
- Faisal M, Schmid A, Panduro T, Tejos M, Espinosa A, <u>Metcalfe D</u>, Novak A. Role of serum biomarkers in suspected cauda equina syndrome. Poster. Royal College of Emergency Medicine Annual Scientific Meeting, 26-28th September 2023, Glasgow, UK.
- Hanxiao L, Novak A. Can low recruitment to the Duration of External Neck Stabilisation (DENS) trial be explained by reducing CT scanning of older patients in the emergency department? Poster. Royal College of Emergency Medicine Annual Scientific Meeting, 26-28th September 2023, Glasgow UK.

Communication and Publicity

We continue to prioritise research communication and publicity, both internally in the ED and externally to the Trust, allied organisations and wider public. These include:

- Presentations at multiple national and international Emergency Medicine conferences
- <u>www.oxfordemergencymedicine.com/research</u> a webpage to present and promote EM research activity and provide a link to useful online resources
- Active engagement with X (@EMROxResearch) to publicise research-related activity and engage with relevant organisations and individuals
- Strong contribution to the administration and content of the annual Oxford School of Emergency Medicine Conference (<u>www.osemconference.com</u>)

Key Strategic Aims:

- Increase presence at national and international conferences, with allocated funding to support staff attending such events
- Continue to develop website and increase social media profile and engagement
- Enhance internal communication to wider Emergency Medicine workforce and affiliated partnership specialties and organisations

Patient & Public Involvement (PPI)

Leads: Dr Tanya Baron and Sally Beer

Patient and Public Involvement (PPI) is increasingly recognised as a critical aspect of research design and implementation. Most governing research bodies now recommend early and sustained engagement with PPI representatives from an early stage in all study designs and grant applications. In partnership with ACUTECare Oxford, EMROx has led the development of a dedicated Patient and Public Involvement group. This group meets at regular intervals over the course of the year and has been integral to the design of a large proportion of the studies led by the department.

Key Strategic Aims:

- To place patient and public involvement at the heart of research activity in Oxford Emergency Medicine Research
- To develop and diversify the Emergency Medicine Research PPI group in Oxford to reflect the demographic range and breadth of patient presentations in the Emergency Department
- To identify and establish links with existing PPI groups in other regions and specialties

Partnerships and Allied Organisations

EMROx has forged a number of key relationships over the past years, reflecting both its position as a facilitator of collaborative research, and the large number of local and national institutions which act as key stakeholders in Emergency Medicine research. Main collaborations are listed below, along with a summary of our scope of engagement:

National Institute of Health Research (NIHR)

- Affiliated to the Thames Valley Injuries Trauma and Emergency Care Group, part of Division 6 of the National Institute for Health and Care Research Clinical Research Network (NIHR CRN) Thames Valley and South Midlands
- Key funding source for EMROx staff Research Nurses
- RCF funded Senior Research Fellow 2019-20
- EMROx teams represented in the Oxford Medtech and In Vitro Diagnostics Co-operative
- Affiliates with the NIHR Emergency Medicine Incubator

Royal College of Emergency Medicine

- Alex Novak is on the RCEM Research Committee and an NIHR/RCEM Associate Professor of Emergency Medicine
- Engage with events e.g. Clinical Studies Group, Annual Scientific Conference
- Trainee Emergency Research Network (TERN)
- Awards and nominations

TaVERN – Thames Valley Emergency Research Network

• See page 15

Kadoorie Trauma and Emergency Care, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS), University of Oxford

- Locus of Emergency Medicine within the University of Oxford
- Membership of Trauma and Emergency Care Senior Team
- Academic origin of several trauma-orientated trials

Paediatric Emergency Research in UK and Ireland (PERUKI)

- Oxford University Hospitals is a registered PERUKI site (<u>www.peruki.org</u>)
- Contribute to paediatric emergency medicine trials, affiliated to the national organisation

Key Future Aims:

- Continue to develop a dynamic and innovative research culture across a range of partnerships
- Strengthen and expand academic links with Oxford University and other academic institutions
- Create and strengthen links with other established Emergency Medicine research centres

Thames Valley Emergency Medicine Research Network (TaVERN)

The Thames Valley Emergency Medicine Research Network (TaVERN) is a regionally orientated organisation connecting all five Thames Valley Emergency Departments, which aims to foster and develop Emergency Medicine research activity across the region. The network helps them coordinate their activity with the aim of expanding the regional research infrastructure and increasing the efficiency and scope of recruitment to NIHR portfolio studies, plus developing original local research projects.

Participating Hospitals:

- Milton Keynes University Hospitals Emergency Department
- Oxford University Hospitals Emergency Departments
- Royal Berkshire Hospital Emergency Department
- Stoke Mandeville Hospital Emergency Department
- Wexham Park Hospital Emergency Department

Key Projects:

STEDI 2 – This multicentre NIHR portfolio trial evaluates the accuracy of Emergency Department clinicians in interpreting CT Head scans and explores the potential to improve this through online training. STEDI2 is funded in partnership with a RAIQC, an OUH spinout company through a Small Business Research Initiative (SBRI) grant and represent the first fully-fledged NIHR portfolio trial to have been developed and delivered through TaVERN.

GE Critical Care Suite Pneumothorax Reader Study – This flagship National Consortium of Intelligent Medical Imaging (NCIMI) study was delivered using clinician readers co-ordinated through TaVERN. It evaluated the impact of using Artificial Intelligence Image Analysis via the GE Critical Care Suite on the ability of clinicians to detect pneumothoraces on plain chest X-Ray.

COVID CXR – This multicentre study measured the diagnostic accuracy of ED clinicians in detecting COVID CXR changes on plain CXR, and assessed the impact of introducing online learning to enhance this performance.

EMROx and COVID - 19



In March 2020 EMROx found itself thrust into the frontline of COVID-19 research, working to deliver a large number of key national priority studies at the core of the research response to the pandemic. The team adapted to become an integral part of the Acute Care COVID Task Force which co-ordinated COVID trial recruitment across the acute sector in the Trust, engaging in daily collaborative meetings with NIHR CRN colleagues to maximise effectiveness, and participating in a range of strategic committees across the Trust and University aimed at managing both COVID and non-COVID studies.

This intense period of research demand ultimately served to strengthen EMROx as an entity within the Oxford research ecosystem, galvanising its activity and developing strong and collaborative links deep within the Trust, NIHR, University and BRC. Brief summaries of some of the key studies undertaken are outlined below:

CATALYST

CATALYST was a randomised phase II proof of principle multi-arm multi-stage trial designed to guide the selection of interventions for phase III trials in hospitalised patients with COVID-19 infection. The EMROx research nurses delivered this challenging trial, recruiting over a third of participants nationally for the first phase-2 study undertaken in the Emergency Department in the midst of the pandemic.

Key Publication:

Fisher, B *et al*: Namilumab or infliximab compared with standard of care in hospitalised patients with COVID-19 (CATALYST): a randomised, multicentre, multi-arm, multistage, open-label, adaptive, phase 2, proof-of-concept trial. *Lancet Respir Med* (2022); 10: 255–66.

FALCON-C19

Facilitating AcceLerated Clinical Evaluation Of Novel diagnostic tests for COVID-19 (FALCON-C19). One of the key Urgent Public Health trials, FALCON-C19 was the main platform trial for the evaluation of COVID-19 diagnostic technology. Using innovative approaches to workforce and recruitment strategy, EMROx's efforts led to Oxford being the second-highest national recruiter for the trial, with over 300 patients.

Outcome: Multiple evaluations provided to companies and Government departments.

Sepsis Immunomics (COMBAT)

The GAinS investigators: application of an integrated immune-omic approach in sepsis. This study was recruiting suspected sepsis patients before the pandemic and was rapidly amended to include Covid patients. Recruitment was impressive, consenting extremely ill patients, coordinating taxis to transport samples between hospital and laboratory sites, medical students who helped with taking samples and waiting for taxis, coordinating with laboratory capacity – already at capacity supporting vaccine studies.

Key Publications:

COvid-19 Multi-omics Blood ATlas (COMBAT) Consortium, 2022, Cell 185, 916–938 March 3, 2022, ^a 2022 The Author. Published by Elsevier Inc. <u>https://doi.org/10.1016/j.cell.2022.01.012.</u>

Ahern, D.J., Ai, Z., Ainsworth, M., Allan, C., Allcock, A., Ansari, A., Arancibia - Cárcamo, C.V., Aschenbrenner, D., Attar, M., J Kenneth Baillie, Barnes, E., Bashford-Rogers, R., Archana Bashyal, Beer, S., Berridge, G., Beveridge, A., Bibi, S., Tihana Bicanic, Blackwell, L. and Bowness, P. (2021). A blood atlas of COVID-19 defines hallmarks of disease severity and specificity. medRxiv (Cold Spring Harbor Laboratory). doi: https://doi.org/10.1101/2021.05.11.21256877.

CURIAL

Real-world evaluation of AI driven COVID-19 triage for emergency admissions: External validation & operational assessment of lab-free and high-throughput screening solutions.

The CURIAL project was based on the use of an AI algorithm to detect the presence or absence of COVID-19 infection using patient's routine blood results. A pilot study was conducted in the Emergency Department of the John Radcliffe, using point of care devices to obtain early blood results which reduced the time in reaching a prediction of Covid illness. This project was facilitated by the use of a team of medical students (coordinated and supported by the EMROx team) who collected samples and processed them in the ED.

Key Publication:

Soltan A, Yang J, Pattanshetty R, Novak A, Yang Y, Rohanian O, Beer S, Soltan M, Thickett D, Fairhead R, CURIAL Translational Collaborative, Zhu T, Eyre D, Clifton D. **Real-world evaluation of Al-driven COVID-19 triage for emergency admissions: External validation & operational assessment of lab-free and high-throughput screening solutions.** (2021) Accepted for publication: Lancet Digital Health.

REDKITE

A comparison of clinical sample collection methods to detect influenza virus, SARS-CoV-2 and other respiratory pathogens rapid testing modalities including whole genome sequencing.

Key Publication:

Lumley SF, Richens N, Lees E, Cregan J, Kalimeris E, Oakley S, Morgan M, Segal S, Dawson M, Walker AS, Eyre DW, Crook DW, Beer S, Novak A, Stoesser NE, Matthews PC. **Changes in paediatric respiratory infections at a UK teaching hospital 2016-2021; impact of the SARS-CoV-2 pandemic**. *J Infect*. 2021 Oct 29:S0163-4453(21)00540-5.

Calprotectin

In a cross-specialty collaboration with Acute General Medicine and Biochemistry, EMROx took part in the validation of a novel Gentian assay for calprotectin, an inflammatory marker, hypothesised to act as a prognostic marker for COVID-19. Through innovative approaches to recruitment and processing, an extremely high volume of samples (>1000) were identified and processed in the space of month, leading to a rapid evaluation of the biomarker.

Key Publication:

Mentzer, Alexander & James, Tim & Yongya, Mirak & Cox, Stuart & Paddon, Kevin & Shine, Brian & Bowen, Jordan & Novak, Alex & Knight, Julian & Fullerton, James. (2021). Serum calprotectin is not an independent predictor of severe COVID-19 in ambulatory adult patients. Journal of Infection. 84. 10.1016/j.jinf.2021.11.017.

PRIEST

Pandemic Respiratory Infection Emergency System Triage

Using a team of data managers and non-clinical volunteers supervised by EMROx staff working remotely due to Covid restrictions, the EMROx team trained and co-ordinated data collection for this Urgent Public Health study.

Key Publication: Goodacre S, Thomas B, Lee E, Sutton L, Loban A, Waterhouse S, et al. (2020) **Characterisation of 22445 patients attending UK emergency departments with suspected COVID-19 infection: Observational cohort study**. PLoS ONE 15(11): e0240206. https://doi.org/10.1371/journal.pone.0240206.

ISARIC4C

Coronavirus Clinical Characterisation Consortium.

This study collected extensive data on all Covid presentations to hospital during the pandemic.

Key Publication: Please see https://isaric4c.net/ for multiple publications

COVID CXR

A study to measure the impact of online training in improving the accuracy of ED staff in identifying COVID on plain Chest X-Ray.

Key Publication: currently under review.

ATOMIC2

A multi-centre open-label two-arm randomised superiority clinical trial of Azithromycin versus usual care In Ambulatory COVID-19 (ATOMIC2).

Key Publication: Timothy SC Hinks, Lucy Cureton, Ruth Knight, Ariel Wang, Jennifer L Cane, Vicki S Barber, Joanna Black, Susan J Dutton, James Melhorn, Maisha Jabeen, Phil Moss, Rajendar Garlapati, Tanya Baron, Graham Johnson, Fleur Cantle, David Clarke, Samer Elkhodair, Jonathan Underwood, Daniel Lasserson, Ian D Pavord, Sophie Morgan, Duncan Richards A randomised clinical trial of azithromycin versus standard care in ambulatory COVID-19 – the ATOMIC2 trial

The Lancet Respiratory Medicine doi: 10.1016/s2213-2600(21)00263-0.

Research Themes

EMROx activity is organised around a number of key research themes, often in collaboration with allied clinical specialties and academic groups, as outlined below.

Major Trauma, Transfusion and Critical Care

Theme Lead – Vishakha Erasu Prasad

This has been a key aspect of the EMROx research output, accounting for a significant proportion of successful trial recruitment, with large numbers of patients recruited on time and on target. Productive working relationships have been firmly established with partners in Haematology, and the advent of flagship NIHR trials such as CRYOSTAT-2 and UK REBOA have heralded a new phase of collaborative research with key stakeholders across all the Major Trauma Centres.

Current Projects:

- ACIT acute coagulopathy in trauma *PI: Prof Simon Stanworth*
- ORIF operative rib fixation vs supportive management PI: Dr Francesco Da Chiara
- RAIDS Road Accident In Depth Studies Local Collaborator: Dr Matt Davies
- Cochrane Review of Resuscitation in Major Trauma Lead Author: Vishakha Erasu Prasad
- SWIFT A Multi-Centre Randomised Controlled Trial of the Clinical and Cost-Effectiveness of Pre-Hospital Whole Blood Administration versus Standard Care for Traumatic Haemorrhage -*PI: Dr Oli Hawksley*
- TAP A Prospective, Multicenter, Randomized, Double-Blind, Placebo-Controlled Large Simple Trial Evaluating the Use of BE1116 (4-Factor Prothrombin Complex Concentrate [Kcentra[®] / Beriplex[®]]) to Improve Survival in Patients with Traumatic Injury and Acute Major Bleeding Predicted to Receive a Large Volume Blood Product Transfusion - *PI: Dr Iain Edgar*
- COMITED Conservative Management in Traumatic Pneumothoraces in the ED PI: Dr Laura McCrae
- CONSEPT Conservative vs. Standard Care for Primary Spontaneous Pneumothorax PI: Dr Eslam Abdelrehem
- STOP-D Sertraline to prevent post-TBI depression PI: Dr Vanessa Raymont
- SIS Spinal Immobilisation Study PI: Dr Edward Norris-Cervetto
- EVIS Early vasopressors in Sepsis PI: Deon Louw

Completed Projects:

- MP4OX artificial blood substitute in haemorrhage (commercial study)
- CRYOSTAT1 early high dose cryoprecipitate in major trauma (feasibility)
- E-FIT early fibrinogen concentrate in major trauma haemorrhage
- i-TACTIC treatment algorithms in trauma induced coagulopathy
- CRASH3 tranexamic acid in isolated head injury
- HALT-IT, Trigger role of tranexamic acid in Gastro-intestinal bleeding
- RE-VERSE AD efficacy of idarucizumab in reversing dabigatran
- ORANGE presentation/outcomes of bleeding associated with oral anti-coagulants
- AIRWAYS 2 supra-glottic devices for airway management in out of hospital cardiac arrest
- PARAMEDIC mechanical vs manual chest compression in out of hospital cardiac arrest
- PARAMEDIC2 role of adrenaline in out of hospital cardiac arrest

- NOPAC topical tranexamic acid in epistaxis
- RePHILL resuscitation with Pre-hospital blood products
- CRYOSTAT 2 early high dose cryoprecipitate in major trauma (all UK MTCs)
- UK REBOA Trial resuscitative endovascular balloon occlusion of the aorta PI: Dr Alex Novak

Key Collaborators:

- Prof Simon Stanworth, Dr Nicola Curry (Haematology)
- Dr Susan Brunskill, Dr Lise Estcourt (NHSBT Systematic Review Initiative)
- Dr Rafiuddin Patel, Dr Suzie Anthony (Interventional Radiology)
- Prof Jan Jansen (Director of Research, Division of Trauma & Acute Care Surgery, Director, UAB Center for Injury Science)
- Prof Marion Campbell (Aberdeen Centre for Evaluation, University of Aberdeen)

Key Publications:

- Jansen, J.O., Hudson, J., Cochrane, C., MacLennan, G., Lendrum, R., Sadek, S., Gillies, K., Cotton, S., Kennedy, C., Boyers, D., Ferry, G., Lawrie, L., Nath, M., Wileman, S., Forrest, M., Karim Brohi, Harris, T., Lecky, F., Moran, C. and Morrison, J.J. (2023). Emergency Department Resuscitative Endovascular Balloon Occlusion of the Aorta in Trauma Patients with Exsanguinating Haemorrhage. JAMA, [online] 330(11). doi:https://doi.org/10.1001/jama.2023.20850.
- Erasu V, Novak A, Gibbs VN, Champaneria R, Doree C, Hafeez A, Moy R, Sandercock J, Brunskill SJ, Estcourt LJ. Pharmacological interventions for the treatment of bleeding in people treated for blunt force or penetrating injury in an emergency department: a systematic review and network meta-analysis. Cochrane Database of Systematic Reviews 2022, Issue 6. Art. No.: CD014600. DOI: 10.1002/14651858.CD014600.
- Erasu, V. and Novak, A. (2020). No role for tranexamic acid in the treatment of acute gastrointestinal bleeding. BMJ Evidence-Based Medicine, 26(6), p.bmjebm-2020-111498. doi:https://doi.org/10.1136/bmjebm-2020-111498.
- Hafeez, A and Novak, A 2020). Epinephrine should continue to be used in the treatment of out-ofhospital cardiac arrest. BMJ Evidence-Based Medicine, 26(6), p.bmjebm-2019-111318. doi:https://doi.org/10.1136/bmjebm-2019-111318.
- Baron, T. and Novak, A. (2020). **Tranexamic acid in acute traumatic brain injury**. BMJ Evidence-Based Medicine, 26(6), p.bmjebm-2019-111319. doi:https://doi.org/10.1136/bmjebm-2019-111319.
- Gibbs VN, Champaneria R, Novak A, Doree C, Palmer AJR, Estcourt LI. **Pharmacological interventions for the prevention of bleeding in people undergoing definitive fixation of hip, pelvic and long bone fracture: a systematic review and network meta-analysis.** *Cochrane Database of Systematic Reviews* 2022.
- Curry N, Foley C, Wong H, Mora A, Curnow E, Zarankaite A, Hodge R, Hopkins V, Deary A, Ray J, Moss P, Reed MJ, Kellett S, Davenport R, Stanworth S (2018) Early fibrinogen concentrate therapy for major haemorrhage in trauma (E-FIT 1): results from a UK multi-centre, randomised, double blind, placebo-controlled pilot trial. *Critical Care* 22(1):164.
- Novak A, Stanworth SJ, Curry N. (2018) **Do we still need cryoprecipitate? Cryoprecipitate and fibrinogen concentrate as treatments for major hemorrhage** how do they compare? *Expert Review of Hematology.*; 11(5):1-10.
- Gulati D, Novak A, Stanworth SJ. (2018) Common Haemostasis Issues in Major Bleeding and Critical Illness. *Clinical Medicine* 18(4):320-323.

Presentations:

- Metcalfe D, Perera Y, Raitt J, Poole K, Lewinsohn A. Non-invasive versus arterial pressure monitoring in the pre-hospital critical care environment: a paired comparison of concurrently recorded measurements. Oral presentation. European Society of Emergency Medicine Congress, Copenhagen, Denmark. 13-16th October 2024.
- Vidart V, Maton S, Maxwell E, M, Metcalfe D, Broughton W, Rahman SM. Team-based simulation training in safer pre-hospital emergency anaesthesia (PHEA): a pilot educational project. 5th Annual Celebrating Trauma Research in the Thames Valley, 11th May 2022, Reading, UK. 3rd prize presentation.
- Erasu Prasad, V. Pharmacological Agents in the Management of Major Haemorrhage Due to of Blunt and Penetrating Trauma. Presented RCEM ASC Belfast October 2022.
- Metcalfe D. Improving hip fracture outcomes using routinely collected health data. Oral presentation. British Orthopaedic Association Annual Congress, Hunterian Lecture, 21st September 2021.

Posters:

- Shah A, Metcalfe D, Judge A, Griffin XL. The impact of NICE treatment guidance on outcomes following severe open tibial fractures. Poster. British Orthopaedic Association Annual Congress, 19-21st September 2023, Liverpool, UK.
- Pusok AM, Prasad V, Novak A, <u>Metcalfe D</u>. Survival following emergency resuscitative thoracotomy for trauma: a systematic review. Poster. European Society of Emergency Medicine Congress, 18-20th October 2023, Barcelona, Spain.

Future Aims:

- Continue strong track record of collaborative research in this area
- Develop consistent output with Systematic Review Initiative
- Enhance working relationship/output with Critical Care, Trauma and other key departments within the Major Trauma Centre

Imaging and Early Diagnostics

Theme lead: Prof Alex Novak

Summary:

The technological diagnostic landscape is being transformed through a number of innovations, including point-of care diagnostics and Artificial Intelligence-led image analysis. Oxford has become a major world centre for medical imaging research, due to the pairing and partnership of clinical and engineering expertise with close industry links, including the establishment of the National Consortium for Intelligent Medical Imaging (NCIMI) in 2018, supported by the Government's Industrial Strategy Challenge Fund which accelerated the evaluation of AI-led imaging diagnostics. The trust has a strong track record of collaboration with companies at the forefront of Point-of-Care Testing technologies and this is a key area of inquiry, both in terms of technological capability and the impact on disease management and healthcare pathways.



Current Projects:

- Simulation Training in Multicentre Imaging 2 (STEDI 2) multicentre NIHR portfolio trial to evaluate feasibility and potential impact of CT head interpretation by ED clinicians
- AI-REACT Multi-Case, Multi-Reader Study to evaluate the impact of AI-enhanced imaging on the accuracy of frontline clinicians in detecting abnormalities on CT Head
- ACCEPT-AI Prospective Trial to evaluate the impact of AI-enhanced imaging on CT Head prioritisation in the Emergency Department
- Pilot study to evaluate the potential utility of serum biomarkers of neurological injury in Cauda Equina Syndrome
- Whiplash evaluation of the ability of radiological biomarker of neck injury to predict chronic pain
- FRACT-AI Evaluation of impact of AI-enhanced imaging on fracture detection by clinicians on plain x-ray

Previous Studies:

- GE Critical Care Suite Multi-Case, Multi-Reader Study to evaluate the impact of AI-enhanced imaging on the accuracy of frontline clinicians in detecting pneumothoraces and Endotracheal Tube Placement on plain chest X-ray
- Whiplash- evaluation of the ability of radiological biomarker of neck injury to predict chronic pain
- Early MRI in Acute Gallstone Disease (E-MAGED) in write-up
- Imaging in Elderly Chest observational study in write-up
- Frailty Response Unit see publications below
- BEST 2 NIHR multicentre evaluation of Siemens High Sensitivity Troponin POCT
- Calprotectin see EMROx and COVID-19
- CURIAL see EMROx and COVID-19
- FALCON C-19 see EMROx and COVID-19

Key Collaborators:

- Prof Fergus Gleeson, Dr Sarim Ather, Dr Edward Sellon (Radiology)
- Prof Gail Hayward, Dr Phillip Turner (NIHR Healthtech Research Centre in Community Healthcare)
- Prof Daniel Lasserson, Dr Jordan Bowen (Acute General Medicine)
- Prof Brian Shine, Ian Smith (Biochemistry)
- Prof Annina Schmid (Neurosciences)
- Prof Liza Keating, Dr Sarah Wilson, Dr Rick Body, Dr Sachin Mandalia (Emergency Medicine)
- Prof Charalambos Antoniades (Cardiology)

Key Publications 2020-4:

Lip G, Novak A, Goyen M, Boylan K, Kumar A, **Adoption, orchestration, and deployment of artificial intelligence within the National Health Service—facilitators and barriers: an expert roundtable discussion**, *BJR*/*Artificial Intelligence*, Volume 1, Issue 1, January 2024, doi.org/10.1093/bjrai/ubae009.

Vimalesvaran K, Robert D, Kumar S, *et al.* Assessing the effectiveness of artificial intelligence (AI) in prioritising CT head interpretation: study protocol for a stepped-wedge cluster randomised trial (ACCEPT-AI). *BMJOpen* 2024;14:e078227. doi: 10.1136/bmjopen-2023-078227.

Fu, H., Novak, A., Robert, D., Kumar, S., Tanamala, S., Oke, J., Bhatia, K., Shah, R., Romsauerova, A., Das, T., Espinosa, A., Grzeda, M.T., Narbone, M., Dharmadhikari, R., Harrison, M., Vimalesvaran, K., Gooch, J., Woznitza, N., Salik, N. and Campbell, A. (2024). Al assisted reader evaluation in acute CT head interpretation (AI-REACT): protocol for a multireader multicase study. BMJ Open, [online] 14(2), p.e079824. doi:https://doi.org/10.1136/bmjopen-2023-079824.

Coventry, L., Ilaria Oldrini, Dean, B., Novak, A., Duckworth, A. and Metcalfe, D. (2023). Which clinical features best predict occult scaphoid fractures? A systematic review of diagnostic test accuracy studies. Emergency Medicine Journal, 40(8), p.emermed-213119. doi:https://doi.org/10.1136/emermed-2023-213119.

Novak, A., Ather, S., Martinez, J., Baron, T., Triscott, S., Davies, M., Gulati, D., Ravi Shashikala, Wilson, S. and Keating, L. (2023). 2351 Multicentre randomised controlled trial to assess the impact of online training on CT head interpretation performance: the simulation training for emergency department imaging 2 (STEDI2) trial. Emergency Medicine Journal, 40(12), pp.872–873. doi:https://doi.org/10.1136/emj-2023-rcem.23.

Novak A, Lowe D, Newcombe V et al. **Royal College of Emergency Medicine Position Statement on Artificial Intelligence in the Emergency Department**. Royal College of Emergency Medicine. Published 15th December 2022.

Vasey, B., Novak, A., Ather, S., Ibrahim, M. and McCulloch, P. (2023). **DECIDE-AI: a new reporting guideline and its relevance to artificial intelligence studies in radiology.** Clinical Radiology, 78(2), pp.130–136.

Novak, A., Ather, S., Gleeson, F., Abdala, M., Beggs, M., Duggan, T., Amied Shadmaan, Gill, A., Gamble, O., Wrightson, J.M., Taberham, R., Barry, S.J., Ghelman, S., Cowell, G.W., James, A., Hallifax, R., Astley, K., Belcher, E., Maskell, G. and Ansaripour, A. (2023a). **Evaluation of the Impact of Artificial Intelligence-***Assisted Image Interpretation on the Diagnostic Performance of Clinicians When Identifying Pneumothoraces on Plain Chest X-Ray: A Multi-Case Multi-Reader Study*. doi:https://doi.org/10.2139/ssrn.4448597.doi:https://doi.org/10.1016/j.crad.2022.09.131.

Ridehalgh, C., Fundaun, J., Bremner, S., Cercignani, M., Young, R., Trivedy, C., Novak, A., Greening, J., Schmid, A. and Dilley, A. (2022). **Does peripheral neuroinflammation predict chronicity following whiplash injury? Protocol for a prospective cohort study.** BMJ Open, 12(12), p.e066021. doi:https://doi.org/10.1136/bmjopen-2022-066021.

Oldrini, I., Coventry, L., Novak, A., Gwilym, S. and Metcalfe, D. (2022). **Clinical predictors of fracture in patients with shoulder dislocation: systematic review of diagnostic test accuracy studies.** Emergency Medicine Journal, 40(5), p.emermed-2022-212696. doi:https://doi.org/10.1136/emermed-2022-212696.

Bahra, J., Ather, S., Wilson, S., Keating, L., Gulati, D., Banerji, A., Gleeson, F. and Novak, A. (2022). 1042 Improving the accuracy of frontline clinicians in detecting SARS-COV-2 on chest X-rays using a bespoke virtual training platform. Emergency Medicine Journal, 39(3), pp.252.1-252. doi:https://doi.org/10.1136/emermed-2022-rcem.18.

Novak, A., Cherry, J., Ali, N., Smith, I., Bowen, J., Ray, J., Black, J.J., Cornett, R., Taylor, S., Hayward, G. and Lasserson, D. (2022). **Point-of-care blood testing with secondary care decision support for frail patients.** Journal of Paramedic Practice, 14(2), pp.54–62. doi:https://doi.org/10.12968/jpar.2022.14.2.54.

Presentations:

- Novak, A. Multicentre randomised controlled trial to assess the impact of online training on the CT head interpretation performance of Emergency Department clinicians: The Simulation Training for Emergency Department Imaging 2 (STEDI2) Trial. European Society of Emergency Medicine Congress, 18-20th October 2023, Barcelona, Spain.
- Novak, A. Al-enhanced X-ray image analysis in the context of acute healthcare: The GE Critical Care Suite Pneumothorax Reader Study Japan-UK Joint Symposium on Stakeholder Involvement in Al in Healthcare. 22 March 2023.
- Novak, A. Al-assisted CT interpretation in the ED: qER MCMRS and prospective trial. European Congress of Radiology. 1-5 March 2023, Vienna, Austria.
- Novak, A. Artificial Intelligence Panel. RCEM Academic Scientific Conference 4-6 October 2022, Belfast, Northern Ireland.
- De Andres Crespo M, Zogg CK, Novak A, Metcalfe D. Early senior assessment and access to CT in an Emergency Department. Oral presentation. Royal College of Emergency Medicine, Virtual Annual Scientific Conference, 13-14th October 2020.
- Novak, A. **Research in a Hostile Environment**. Royal College of Emergency Medicine Academic Scientific Conference. 12-14 October 2020.

Future Aims:

- To establish long term Industry and academic partnerships based around the development and assessment of point-of-care testing through the NIHR MIC, OAHSN and other agencies
- To establish a research unit based around the development and evaluation of Artificial Intelligence-enhanced imaging in acute care pathways
- To place EMROx at the forefront within the UK for the evaluation of novel imaging techniques and point-of-care technology to improve patient experience and outcomes in the setting of the Emergency Department

Illness and Infection

Summary:

The broad range of collaborations in this theme is reflective of Oxford University Hospitals' status as a tertiary referral and academic centre for numerous clinical specialties. The central activities of Emergency Medicine have shifted and expanded considerably in past decades from their origins in Trauma and Orthopaedics to encompass the early management of a range of medical presentations and conditions.

Consequently, the EMROx portfolio continues to develop close working relationships with key specialties including Respiratory Medicine and Infectious Diseases.

Current Projects:

- BIOAID BioResource in Adult Infectious Diseases PI: Dr Alex Mentzer
- SEPSIS IMMUNOMICS PI: Dr Stuart McKechnie
- RAPID-I PI: Mr Giles Bond-Smith
- ABRA CI: Dr Sanjay Ramakrishnan
- PRONTO -PI: Dr Tanya Baron
- ASPIRED PIs: Dr Aqib Hafeez and Mustafa Alsahab
- EMERALD Haemostasis in acutely ill patients with advanced liver disease PI: Prof Simon Stanworth
- TILIA Tozorakimab in patients with viral lung infection PI: Dr Brian Angus

Completed Projects:

- PRONTO
- ABC Sepsis PI: Dr Ravi Pattanshetty
- AWARD, RAMPP, HI-SPEC, EURODEM (Respiratory)
- LEAK
- ENCEPH UK

Key Collaborators:

- Prof Ian Pavord, Dr Mona Bafadhel, Dr Sanjay Ramakrishnan (Respiratory)
- Dr Alex Mentzer (Infectious Diseases)
- Prof Julian Knight (Wellcome Centre for Genetics)
- Mr Giles Bond-Smith (General Surgery)
- Dr Peyton Davis (Emergency and Intensive Care)

Key Publications:

- Kwok AJ, Allcock A, Ferreira RC, Cano-Gamez E, Smee M, Burnham KL, Zurke Y-X, Emergency Medicine Research Oxford (EMROx), McKechnie S, Mentzer AJ, Monaco C, Udalova I, Hinds CJ, Davenport EE, Todd JA and Knight JC (2023). Neutrophils and emergency granulopoiesis drive immune suppression and an extreme response endotype during sepsis. Nature Immunology 24, 767-779.
- Metcalfe, D., Hoeritzauer, I., Angus, M., Novak, A., Hutton, M. and Woodfield, J. (2023). Diagnosis of cauda equina syndrome in the emergency department. Emergency medicine journal: EMJ, [online] 40(11), p.emermed–2023-213151. doi:https://doi.org/10.1136/emermed-2023-213151.
- Glover, S.J., Metcalfe, D., Erasu, V., Panduro, T., Gibbs, W., Paul, I., Novak, A., and Shanahan, T.A.G. (2023). Journal update monthly top five. Emergency Medicine Journal, 40(8), pp.614–615. doi:https://doi.org/10.1136/emermed-2023-213454.
- Jasdeep Bahra, Acharya, A., Ather, S., Benamore, R., Moreland, J.-A., Gulati, D., How, L., Rose, A., Miranthi Huwae, Wilson, S., Banerji, A., Manso, K., Keating, L., Barrett, A., Gleeson, F. and Novak, A. (2023). Improving the Accuracy of Emergency Department Clinicians in Detecting SARS-COV-2 on Chest X-Rays Using a Bespoke Virtual Training Platform. Research Square (Research Square). doi:https://doi.org/10.21203/rs.3.rs-2915171/v1.

- Christos Kotanidis, Xie, C., Donna Maria Alexander, Rodrigues, J., Burnham, K.L., Mentzer, A.J., O'Connor, D., Knight, J.C., Siddique, M., Lockstone, H., Thomas, S., Kotronias, R.A., Evangelos Oikonomou, Badi, I., Lyasheva, M., C Shirodaria, Lumley, S.F., Constantinides, B., Sanderson, N. and Rodger, G. (2022). Constructing custom-made radiotranscriptomic signatures of vascular inflammation from routine CT angiograms: a prospective outcomes validation study in COVID-19. The Lancet Digital Health, 4(10), pp.e705–e716. doi:https://doi.org/10.1016/s2589-7500(22)00132-7.
- Reschen, M.E., Bowen, J., Novak, A., Giles, M., Singh, S., Lasserson, D. and O'Callaghan, C.A. (2021).
 Impact of the COVID-19 pandemic on emergency department attendances and acute medical admissions. BMC Emergency Medicine, 21(1). doi:https://doi.org/10.1186/s12873-021-00529-w.
- Soltan, A., Yang, J., Ravi Pattanshetty, Novak, A., Omid Rohanian, Beer, S., Soltan, M., Thickett, D., Fairhead, R., Curial Translational Collaborative, Zhu, T., Eyre, D.W. and Clifton, D.A. (2021).
 Real-world evaluation of AI-driven COVID-19 triage for emergency admissions: External validation & operational assessment of lab-free and high-throughput screening solutions. medRxiv (Cold Spring Harbor Laboratory). doi:https://doi.org/10.1101/2021.08.24.21262376.
- Marta, Zogg, C.K., Novak, A. and Metcalfe, D. (2020). 171 Early senior assessment and access to CT in an emergency department. Emergency Medicine Journal, 37(12).
 doi:https://doi.org/10.1136/emj-2020-rcemabstracts.10.

Future Aims:

- Expand the number of collaborating specialties to reflect the full range of disciplines in the acute care sector
- Increase number of early-phase single-site studies in key areas such as infection, airways disease
- Establish the Emergency Department as a significant contributor in terms of study design and conception in key research areas of interest e.g. sepsis

Paediatric Emergency Medicine

Theme Lead: Dr Nicholas Richens

Summary:

Oxford is now a PERUKI site (Paediatric Emergency Research UK & Ireland), successfully recruiting to a number of nationwide Paediatric clinical trials. Children and adolescents represent a potentially difficult group to recruit into clinical trials, however the EMROx team have developed a track record of managing an increasing variety of clinical trials in the Paediatric Emergency Department setting. This is a relatively new area of research for the department, but successful recruitment has taken place into large RCTs. Links have been established locally with orthopaedics and general paediatrics to enable further studies to be identified.

Current Projects

- BACH-B - Breathing Assistance in CHildren with bronchiolitis (BACHb): a group-sequential twostratum multicentre open-label randomised clinical trial of respiratory support in infants with acute bronchiolitis – *PI Dr Nicholas Richens*

Completed Projects:

- DIAMONDS Diagnosis and Management of Febrile Illness using RNA Personalised Molecular Signature Diagnosis – is a five-year collaborative, multi-partnered research project that will develop a new molecular diagnostic test to provide rapid diagnosis of common infectious bacterial disease, as well as viral and inflammatory diseases – *PI Dr Stephane Paulus*
- CRAFFT A multi-centre prospective randomised non-inferiority trial of surgical reduction versus non-surgical casting for displaced distal radius fractures in children *PI: Dr Nicholas Richens*
- BronchSTART The Impact of the COVID-19 Pandemic on the Timing, Age and Severity of Respiratory Syncytial Virus (RSV) Emergency Presentations, a Multi-Centre Prospective Observational Cohort Study
- DIMPLES incidence of new Diabetes in children during Covid
- FORCE Forearm Fracture Recovery in Children Evaluation
- Travel Fever Is a rapid diagnostic test (RDT) alone enough to rule out malaria in children presenting to the Emergency Department (ED) with a tropical travel history and fever?

Key Collaborators:

- Dr Chris Bird
- Prof Dan Perry
- PERUKI

Key Publications:

- Bird, C., Hayward, G. N., Turner, P. J., Wasala, D., Merrick, V., ... Lyttle, M. D. (2024). Infections diagnosed in children and young people screened for malaria in UK emergency departments: a retrospective multi-centre study. *Paediatrics and International Child Health*, 44(1), 1–7. https://doi.org/10.1080/20469047.2023.2299576.
- Chris Bird, Gail N Hayward, Philip J Turner, Vanessa Merrick, Mark D Lyttle, Niall Mullen, Thomas R Fanshawe, for the Paediatric Emergency Research in the UK and Ireland (PERUKI), A Diagnostic Accuracy Study to Evaluate Standard Rapid Diagnostic Test (RDT) Alone to Safely Rule Out Imported Malaria in Children Presenting to UK Emergency Departments, Journal of the Pediatric Infectious Diseases Society, Volume 12, Issue 5, May 2023, Pages 290–297, https://doi.org/10.1093/jpids/piad024.
- Perry, D.C., Achten, J., Knight, R., Appelbe, D., Dutton, S.J., Dritsaki, M., Mason, J.M., Roland, D.T., Messahel, S., Widnall, J., Costa, M.L., Ahmad, R., Alcock, A., Appelboam, A., Armour, L., Bayreuther, J., Beynon, R., Brown, C., Cadman, E. and Darlow, N. (2022). Immobilisation of torus fractures of the wrist in children (FORCE): a randomised controlled equivalence trial in the UK. The Lancet, [online] 400(10345), pp.39–47. doi:https://doi.org/10.1016/S0140-6736(22)01015-7.

Posters:

- Singh A, Wade R, Metcalfe D, Perry DC. **Does this newborn have a dislocated hip? A systematic review and diagnostic test accuracy meta-analysis**. British Society for Children's Orthopaedic Surgery (BSCOS) Annual Conference. Leeds, U.K. 6-8th March 2024.

Future Aims:

- Establish Oxford as a leading PERUKI site in terms of recruitment
- Improve links with local academic Paediatric research groups to facilitate the development of original research projects

Minor Injury

Summary:

Minor injury represents a key part of the Emergency Department workload, but evidence for key clinical practices is often scarce, and hence represents a significant opportunity for future research. The John Radcliffe Hospital is well-served by on-site academic specialties including maxillofacial surgery, ophthalmology, plastic surgery, trauma, and Ear, Nose and Throat Surgery (ENT), which offers wide potential for future fruitful collaborations in improving care of these patients.



Current Projects:

- DRAFFT – distal radius fracture in elderly

Completed Projects:

- CRAFFT (see Paediatric Research)
- FORCE (see Paediatric Research)
- POEM Prescription Of analgesia in Emergency Medicine
- Utility of MRI in Suspected Scaphoid Injury
- DRAFT-CASP Distal Radius Acute Fracture Trial 3 Cast versus Splint- PI: Dr Aqib Hafeez

Key Collaborators:

- Prof Dan Perry, NDORMS
- Prof Matt Costa, NDORMS

Key Publications:

- Wilson, Sarah & Quinlan, Jane & Beer, Sally & Darwent, Melanie & Dainty, Jack & Sheehan, James & Keating, Liza. (2021). Prescription of analgesia in emergency medicine (POEM) secondary analysis: an observational multicentre comparison of pain relief provided to adults and children with an isolated limb fracture and/or dislocation. Emergency Medicine Journal. 38. emermed-2020. 10.1136/emermed-2020-209835.
- Sheehan JR, Wilson S, Quinlan J, Beer S, Darwent M, Dainty JR, Ezra M, Keating L. Prescription Of analgesia in Emergency Medicine (POEM): a multicentre observational survey of pain relief in patients presenting with an isolated limb fracture and/or dislocation. Br J Pain. 2020 Nov;14(4):211-220. doi: 10.1177/2049463719858513. Epub 2019 Jun 21. PMID: 33194185; PMCID: PMC7605060.

Presentations:

- Coventry L, Oldrini I, Novak A, Dean B, Metcalfe D. Which clinical features best predict occult scaphoid fracture? A systematic review and meta-analysis. Oral presentation. Royal College of Emergency Medicine Annual Scientific Conference, 4-6th October 2022, Belfast, UK.
- Oldrini I, Coventry L, Novak A, Gwilym S, Metcalfe D. Clinical predictors of fracture in patients with shoulder dislocation: systematic review of diagnostic test accuracy studies. Oral presentation.
 Royal College of Emergency Medicine Annual Scientific Conference, 4-6th October 2022, Belfast, UK.

Posters:

 Oldrini I, Coventry L, Metcalfe D. Clinical predictors of fracture in patients with shoulder dislocation: systematic review and meta-analysis. Poster. European Society of Emergency Medicine Congress, 15-19th October 2022, Berlin, Germany.

Future Aims:

- Increase Emergency Nurse Practitioner involvement in the design and running of clinical trials
- Connect with regional Minor Injury Units to improve data sets and increase population for study recruitment in minor injury trials
- Establish long-term collaborative links with relevant allied specialties, including Maxillofacial Surgery, Plastic Surgery, ENT and Ophthalmology

Future EMROx Aspirations

The previous pages aim to reflect the range and extent of EMROx activity to date and to demonstrate its substantial contribution to the growing body of evidence which will support future practice within the field of Emergency Medicine and beyond. EMROx is still at an early stage in its development however and is yet to fully realise its potential capability for leading and delivering research. Strategic growth and expansion in future years will enable EMROx to maximise both its impact on the field of Emergency Medicine research, and to harness the downstream benefits of these activities for staff and patients alike.

Broad aims for the future can be summarised as below:

- Embed research into routine clinical practice in the Emergency Department, and expand the turnover to maximise research opportunities for both staff and patients
- Expand and diversify the research workforce to maximise the efficiency and output of Emergency Medicine research in Oxford
- Increase the income directed towards developing research capacity within the department, both in terms of workforce and infrastructure
- Enhance links with allied specialties and research institutions to foster interdisciplinary research which extends beyond the traditional confines of Emergency Medicine
- Strengthen and develop links with various departments in Oxford University to encourage the development of high-quality academic output
- Support undergraduate and early-career Emergency Medicine researchers in order to build the research teams of the future
- Establish multiple senior academic posts in Emergency Medicine to reflect the breadth and scope of expertise within the department
- Establish Oxford as a major centre for Emergency Medicine research in the UK

EMROx Key Strategic Priorities 2024-27

- Expand the EMROx research workforce and secure a funding base to support clinical staff in research activity
- Increase and diversify funding streams and increase the level of income obtained through research activity
- Increase the successful completion and turnover of studies, along with the overall number of patients recruited across all projects, especially NIHR portfolio studies
- Increase the number of studies directly led by EMROx, including expanding the number of phase 1 pilot studies
- Increase the visibility and publicity of EMROx activity, including expanding the output of publications in high-impact journals
- Establish senior academic posts for EMROx members to foster the development of the organisation and support the delivery of Emergency Medicine research at a strategic level
- Establish, define and develop formal affiliations with academic institutions including the University of Oxford

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