



# IDEAL 2024 CONFERENCE PROGRAMME

Royal Society of Medicine, Max Rayne Auditorium,  
London, United Kingdom, W1G 0AE

3<sup>rd</sup> to 4<sup>th</sup> April 2024





# IDEAL Conference 2024

## Programme of Events

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## Day One – Wednesday 3<sup>rd</sup> April

<b>08:30 - 9:00</b>	<b>Registration and Coffee</b>	<b>Peter McCulloch GB</b>
<b>09:00 - 9:10</b>	<b>Welcome</b>	<b>&amp; Hani Marcus GB</b>
<b>09:10 - 10:10</b>	<b>Teaching IDEAL</b>	<b>Pedro Ramirez US</b>
09:10 - 09:40	The origins of IDEAL and study taxonomy	Joel Horovitz US
09:40 - 10:10	How to use IDEAL	Arsenio Paez CA
<b>10:10 - 12:50</b>	<b>Session 1: Evaluating Digital Surgery</b>	<b>Hani Marcus GB</b>
10:10 - 10:40	DECIDE-AI	Baptiste Vasey CH
10:40 - 11:10	Coffee break & Rapid fire presentations	
11:10 - 12:20	Free papers (Digital Surgery)	
12:20 - 12:50	IDEAL Robotics	John Hanrahan GB
<b>12:50 - 13:00</b>	<b>Sponsor Talk: The MPS Foundation</b>	<b>Adrian Jackson (MPS Foundation)</b>
<b>13:00 - 14:00</b>	<b>Lunch Break</b>	
<b>14:00 - 14:40</b>	<b>Rapid fire presentations (Innovations in general)</b>	<b>Hani Marcus GB</b>
<b>14:40 - 17:00</b>	<b>Session 2: Evaluating Global Surgery</b>	<b>Janet Martin CA</b>
14:40 - 15:10	IDEAL Global Surgery	Will Bolton GB
15:10 - 16:20	Free Papers (Global Surgery)	
16:20 - 17:00	Keynote: Impactful research in low resource settings: strategies, the truth, and moral dilemmas	Bruce Biccard ZA
<b>17:00 - 18:00</b>	<b>Networking, Drinks, and Nibbles</b>	

**Day Two – Thursday 4<sup>th</sup> April**

<b>08:30 - 09:00</b>	<b>Registration and Coffee</b>	
<b>09:00 - 10:00</b>	<b>IDEAL evaluation in the real world</b>	<b>Art Sedrakyan us</b>
09:00 - 09:20	Challenges of Implementation and Completion of Prospective Surgical Trials	Pedro Ramirez us
09:20 - 09:40	An Exemplar: FUTURE GB	Puneet Plaha GB
09:40 - 10:00	Augmenting IDEAL	Jane Blazeby GB
<b>10:00 - 10:20</b>	<b>Sponsor Talk: IDEAL Robotics in practice</b>	<b>Mark Slack (CMR Surgical)</b>
<b>10:20 - 13:00</b>	<b>Session 3: Evaluating Surgical Training</b>	<b>Hani Marcus GB</b>
10:20 - 10:50	The current landscape	Josh Burke GB
10:50 - 11:20	Coffee break & Rapid fire presentations	
11:20 - 12:30	Free papers (Surgical Training and Patient Education)	
12:30 - 13:00	IDEAL Surgical Training	Austin Koh GB
<b>13:00 - 14:00</b>	<b>Lunch break</b>	
<b>14:00 - 15:10</b>	<b>Sandpit session</b>	
<b>15:10 - 16:20</b>	<b>Roundtable: The Future of IDEAL</b>	<b>Peter McCulloch GB</b>
<b>16:20 to Close</b>	<b>Closing Remarks and Farewell</b>	

## Free Paper Presentations Schedule

### Digital Surgery

Wednesday 3<sup>rd</sup> April 2024

11:10 to 12:20

- 1. Proposed alleviation to the qualitative gap for early-stage innovation evaluation of surgical robotic systems as complex platforms**  
*Linn, Andrew; D'Adderio, Luciana; Harrison, Ewen*
- 2. Redefining the resection target for glioblastomas - an IDEAL Stage 0 and 1 study**  
*Price, Stephen; Mayrand, Roxanne; Cozzi, Francesca; Wan, Yizhou; Allinson, Kieren; Li, Chao; Fryer, Tim; Matys, Tomasz*
- 3. Development of a digital platform for the delivery of intraoperative language tests during awake craniotomy and for collaborative brain mapping (IDEAL Stage 0 - Systems Perspective)**  
*Jamjoom, Aimun; Veljanoski, Damjan; Ng, Xin Yi*
- 4. Development of Robotic Assisted Orbital Surgery using IDEAL Methodology – Phase 0 to 1**  
*Malik, Mohsan; Daniel, Claire; Faulkner, Jack; Uddin, Jimmy; Arora, Asit; Jeannon, Jean-Pierre*
- 5. Reducing the burden to deliver remote postoperative surveillance using machine learning for surgical-site infection (SSI)**  
*McLean, Kenneth; Sgrò, Alessandro; Brown, Leo; Buijs, Louis F; Gao, Junyi; Mountain, Katie E; Shaw, Catherine A; Drake, Thomas M; Pius, Riinu; Knight, Stephen R*

## Free Paper Presentations Schedule

### Global Surgery

Wednesday 3<sup>rd</sup> April 2024

15:10 to 16:20

- 1. Development and External Validation of the “Global Surgical-Site Infection” (GloSSI) Predictive Model in Adult Patients Undergoing Gastrointestinal Surgery**  
*McLean, Kenneth; NIHR Global Research Health Unit on Global Surgery and GlobalSurg Collaborative*
- 2. Comparison of informed consent for breast cancer surgery in the UK and the Czech republic and patients’ satisfaction with the process.**  
*Rezacova, Monika*
- 3. Improved Training and Understanding in Quality Improvement Methodologies Could Enhance Service Innovation in Malawi**  
*Esland, Joe; Molyneux, Samuel; Hackney, Rosemary*
- 4. Advancing Equity and the Responsible Use of Artificial Intelligence in Health by Building a Community of Practice**  
*Lang, Trudie; Zeeshan, Salvia; Mendoza, Bryain Maradiaga; Adjei, Prince; Dale, Adam*

## Free Paper Presentations Schedule

### Surgical Training and Patient Education

Thursday 4<sup>th</sup> April 2024

11:20 to 12:30

- 1. Objective Clinical Human Reliability Analysis as a model for assessment in Microsurgery Training as building block for a computer based assessment.**  
*Vishaal, Swamynathan; Francis, Nader; Boal, Matthew; Gorard, Jack; Ubhi, Harmony*
- 2. Patient and Public Perceptions of Simulation Training in Neurosurgery**  
*Burton, Oliver Edward; Starup-Hansen, Joachim; Moudgil-Joshi, Jigishaa; Williams, Simon; Koh, Chan Hee; Marcus, Hani J*
- 3. The Role and Use of Digital Simulation in Plastic Surgery Training: A Systematic Review**  
*Martin, Jessica; Rangaraju, Madhumintha; Alqalaf, Zaid; Izadi, David*
- 4. What are patients told about innovative surgical procedures? A qualitative synthesis of seven case studies in the UK**  
*Elliott, Daisy; On behalf of the Lotus study research team and clinical collaborators*
- 5. A tool for optimising shared decision making and informed consent for surgical innovation: Development and implementation of a core information set**  
*Hoffmann, Christin; Elliott, Daisy; Ochieng, Cynthia; Lawday, Samuel; Vallance, Abigail; Rooshenas, Leila; Main, Barry; Blazeby, Jane; Wheatstone, Pete; McNair, Angus*
- 6. Insights into surgical innovation, incremental learning and refinement in practice: a case-study of Aortic valve neocuspidization (AVNeo) with autologous pericardium (the Ozaki procedure)**  
*Macefield, Rhiannon; Scroggie, Darren; Coyle, Maeve; King, Anni; Hoffmann, Christin; Blencowe, Natalie; Blazeby, Jane; Caputo, Massimo; Avery, Kerry; Elliott, Daisy*



## Sandpit Presentations Schedule

Thursday 4<sup>th</sup> April 2024

14:00 to 15:10

- 1. How are modifications in surgical innovation reported? A systematic review of IDEAL-cited studies**  
*Olivier, James; Elliott, Daisy; Avery, Kerry; Blencowe, Natalie; Macefield, Rhiannon*
- 2. Staged versus Concomitant TAVI and PCI for the Treatment of Co-existing Aortic Stenosis and Coronary Artery Disease: A Systematic Review and Meta-analysis**  
*Shirke, Manasi; Wang, William; Welch, Joseph; Faisal, Farqhan; Nyugen, Kevin; Harky, Amer*
- 3. How can qualitative methods improve the design of safe, transparent, and efficient early phase studies of surgical innovation? The LOTUS study**  
*Avery, Kerry; Macefield, Rhiannon; Blencowe, Natalie; Coyle, Maeve; Hoffmann, Christin; King, Anni; Blazeby, Jane; Elliott, Daisy*
- 4. A systematic review and meta-analysis of tourniquet use during major lower limb amputation for complications of peripheral arterial disease**  
*Shea, Jessie; Smith, Elisabeth; Lyons, Megan; Fricker, Monty; Laloo, R; Bosanquet, David*
- 5. The Potential Role Of Computer Vision In Endoscopic Spinal Surgery**  
*Baxter, David; Snow, Peter; Louriero, Rui; Hawkins, Bruno; Mokauem, Michael; Yordanov, Daniel*

## Rapid-fire Presentations Schedule

### Digital Surgery

Wednesday 3<sup>rd</sup> April 2024

10:40 to 11:10

- 1. Machine Learning Feature Selection: Prognostic factors that affect overall survival and progression-free survival in endometrial cancer patients**  
Geng, Zhuowen; Cindy Nguik, Cindy
- 2. Robotic versus laparoscopic general surgery in the emergency setting: a systematic review**  
Anyomih, Theophilus TK; Mehta, Alok; Sackey, Dorcas; Woo, Caroline A; Gyabaah, Emmanuel Y; Jabulo, Marigold; Askari, Alan
- 3. Utilising Artificial Intelligence for Diagnostic Imaging in Orthopaedic Surgery**  
Bhuiyan, Zunira Areeba; Daniel, Akshatha
- 4. Robotic-assisted removal of a rare mixed epithelial stromal tumour of the seminal vesicle**  
Al-Gburi, Saleh
- 5. Advancements in Artificial Intelligence for Hydrocephalus Diagnosis: A Systematic Review**  
Sescu, Daniel; AlMamari, Rawan; Kaliaperumal, Chandrasekaran
- 6. How AI and machine learning are changing the game in prostate cancer management**  
Shaker, George Samir Habib

## Rapid-fire Presentations Schedule

### Innovations in general

Wednesday 3<sup>rd</sup> April 2024

14:00 to 14:40

- 1. A Systematic Review and Meta-Analysis of Synthetic vs Biological Patches in Congenital Diaphragmatic Herniae: Recurrence Rates and Adverse Events in Longer-Term Follow-Up Studies**  
*Kamal, Tasnim; Tyraskis, Athanasios; Fitchie, Angus; Ghattaura, Harmit; Lakhoo, Kokila*
- 2. Artificial muscles: the intersection between biology and technology**  
*Birmpas, Kyriakos*
- 3. The effectiveness of surgical intervention pertaining to painless foot drop caused by lumbar disc herniation: a systematic review and meta-analysis**  
*Wellington, Jack; Al Baaklini, Vera; Fanti, Andrea; Hasham Ali, Syed; Thayamanavan, Shivaranghan; Al Jishi, Alaa; Khoshhal, Morteza; Kotaich, Jana; Hamza, Amjad; Iqbal, Neelofar*
- 4. An audit to assess any significant drop in the hemoglobin level after partial nephrectomies**  
*Al-Gburi, Saleh*
- 5. Outpatient surgical referrals from primary care providers \_x005F\_x0001\_ for people experiencing homelessness: A chart review from Hamilton, Canada**  
*McDonald, Madeline; Huan, Peter; Hircock, Caroline; Pizzola, Christina; McIlveen, Marcie; O'Shea, Timothy; Lévis, Carolyn; Cadeddu, Margherita*
- 6. Crush injuries to lower limbs in a major UK trauma centre: A comprehensive observational study on mechanisms, injuries, management, and complications**  
*Rama, Essam; Jayawant, Saania; Zhang, James; Krkovic, Matija*
- 7. Surgical Management of Traumatic Aniridia using Scleral Fixation of Artificial Iris Implant - A Case Report in Ophthalmology**  
*Vilkelyte, Virginija; Coelho, Maria; Roberts, Harry*

## Rapid-fire Presentations Schedule

### Surgical Training and Patient Education

Thursday 4<sup>th</sup> April 2024

10:50 to 11:20

- 1. Enhanced recovery in cranial surgery (ERACraS) - A single-centre quality improvement study**  
*Abul, Mohammad H; Sescu, Daniel; White, Mark A; Robson, Michael; Ferguson, Jan; McDermott, Frank; Kaliaperumal, Chandrasekaran*
- 2. Improving the management of epistaxis as per ENT UK guidelines at St Mary's Emergency Department through targeted SHO teaching and an embedded Cerner Autotext: A Quality Improvement Project**  
*de Rohan, Celia; Gera, Ritika; Pankhania, Rahul*
- 3. Bridging Communication Skills Gaps in Surgery: A QIP and Closed-Loop Audit**  
*Kamal, Tasnim*
- 4. Accuracy of Axillary Ultrasound and FNA in breast cancer and avoiding unnecessary operations: a Closed-Loop Audit**  
*Kamal, Tasnim; Tayeh, Salim; Banks, Jamie; Spyrou, Yannis*
- 5. Analysis of Delays in Pathway causing Negative Clinical Impact: Time for Change**  
*Borra, Poojit; Lau, Jessica; Marla, Ananya; Parthiban, Sunil; Butler, Peter; Ponniah, Allan*
- 6. Assessment of male patients in triple assessment breast clinics after introduction of updated ABS guidelines – a quality improvement project**  
*Ko, Ina; Pagaki-Skaliora, Marina; Joshi, Meera; Rizki, Hirah; Hogben, Katy; Thiruchelvam, Paul; Leff, Daniel; Boland, Michael*
- 7. Optimising Cutaneous Abscess Management in General Surgery**  
*Dean, Lydia; Schulenburg, Edward; Bhakar, Ranjeet; Winch, Alice; Stan, Alexandru*
- 8. A full-cycle audit of 'Safe' Surgical handover practices out-of-hours (OOH) at a District General Hospital**  
*Bin Aizan, Luqman Naim; Shakoor, Zainab; Oldfield, Frances*

**9. Navigating the Landscape of Live Surgery: A Scoping Review on Safety, Impact, and Future Perspectives**

*Rama, Essam; Khanduja, Vikas*

**10. Artificial Intelligence in Virtual Reality Simulated Surgical Training**

*Daniel, Akshatha; Bhuiyan, Zunira Areeba*

## Conference Sponsors

### Featured Sponsor

#### CMR Surgical



CMR Surgical (CMR) is a global medical devices company dedicated to transforming surgery with Versius®, a next-generation surgical robot.

Headquartered in Cambridge, United Kingdom, CMR is committed to working with surgeons, surgical teams and hospital partners, to provide an optimal tool to make robotic minimal access surgery universally accessible and affordable. With Versius, we are on a mission to redefine the surgical robotics market with practical, innovative technology and data that can improve surgical care.

Founded in 2014, CMR Surgical is private limited company backed by an international shareholder base.



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## Conference Sponsors

### The MPS Foundation



A global not-for-profit research initiative The MPS Foundation is focused on addressing the challenges that the state and private sector medical and dental environments face through research. We are focused on non-clinical research and support research that has impact locally, nationally and globally.

Established in 2022 The MPS Foundation has already supported over 30 research projects in 7 different countries. We run an annual grant programme with calls for Expressions of Interest opening in March each year and closing at the beginning of May. We also work with partners to commission research and work collaboratively to identify solutions.

We also run research competitions for young and new researchers, initially these have been piloted for Foundation Dentists in the UK, Interns in Ireland and final year dental undergraduates in South Africa. However, it is anticipated that these will be widened.

The MPS Foundation's activities are focused on five key priorities:

- the impact of human factors on patient safety, outcomes and risk
- the impact of processes and delivery models on patient safety, outcomes and risk
- the personal and professional wellbeing of healthcare professionals
- the impact of digital integration and technology on patient safety, outcomes and risk
- the evaluation of teaching and learning innovations and impact on patient safety, outcomes and risk

The MPS Foundation is part of Medical Protection Society Limited (MPS), the world's leading member-owned, not-for-profit protection organisation. It seeks to help MPS's members and healthcare professionals navigate the challenges of modern practice and find innovative solutions to everyday problems.

To find out more about The MPS Foundation, its activities, programmes and the research it has supported please visit [www.thempsfoundation.org](http://www.thempsfoundation.org).



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## The Medical Defence Union



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YouTube <https://www.youtube.com/user/MDUVideo>

## Globus Medical



Globus Medical, a leading musculoskeletal solutions company is driving significant technological advancements across a complete suite of products ranging from spinal, trauma and orthopaedics therapies to robotics, navigation and imaging. Founded in 2003, Globus' single-minded focus on advancing spinal surgery has made it the fastest growing company in the history of orthopaedics. Globus is driven to utilize superior engineering and technology to achieve pain free, active lives for all patients with musculoskeletal disorders.

## Conference Team

### Conference Directors

**Mr Hani Marcus** FRCS PhD MBBS MA  
*London, United Kingdom*

Mr Marcus is an academic consultant neurosurgeon with a research interest in the development and evaluation of new devices that makes these keyhole approaches safer and more effective, including augmented reality, robotics, and artificial intelligence. He is also interested in research on the processes of device innovation and translation, and how these can be improved.

**Professor Peter McCulloch** FRCS MD MBChB MA  
*Oxford, United Kingdom*

Prof McCulloch is an Upper GI surgeon and pursues a research interest in patient safety in surgery alongside his work on IDEAL. Peter graduated from Aberdeen University and underwent surgical and academic training in Glasgow, before becoming Senior Lecturer at Liverpool University in 1992, and being appointed in Oxford in 2004. He developed an interest in Evidence- Based Medicine in the 1990s, and his interest in the difficulty of applying this to surgery led to the Balliol Conferences of 2007-9 where the concept of IDEAL was developed. He founded the IDEAL Collaboration in 2010 and remains the Chair.

### Conference Leads

**Mr Chan Hee (Austin) Koh** MRCS MBChB BMedSci(hons)  
*London, United Kingdom*

Austin Koh is a neurosurgical trainee currently undertaking a Cleveland Clinic London PhD fellowship at the UCL Queen Square Institute of Neurology. His research interests are in leveraging statistical techniques, machine learning, and technologies to enhance surgical training and to mitigate the variabilities in surgical outcomes.

**Mr John Gerrard Hanrahan** MRCS MBBS BSc(hons) AFHEA  
*London, United Kingdom*

John Hanrahan is an Academic Clinic Fellow in Neurosurgery at the London deanery with an interest in health systems research, surgical robotics, and the evaluation of healthcare technology. He graduated from King's College London and completed his foundation training at East Anglia, before undertaking his WEISS clinical research fellowship at the National Hospital for Neurology and Neurosurgery.

## Conference Administrators

### **Susan Sethi**

*London, United Kingdom*

Susan Sethi is the course Coordinator for the Queen Square Simulation Centre. The Centre is based at the National Hospital of Neurology and Neurosurgery, Queen Square, London. Her key role is to help organise simulation based training for the course directors and leads.

### **Crispin Boyd**

## Senior Conference Committee

### **Professor Jane Blazeby**

*Bristol, United Kingdom*

Jane Blazeby FMedSci is Professor of Surgery at the University of Bristol. She is director of the Royal College of Surgeons Trials Centre in Bristol and co-directs the Surgical and Orthopaedic Innovation theme of the Bristol Biomedical Research Centre. Jane collaborates with surgeons, methodologists, trialists and patient partners to design and deliver randomised controlled surgical trials and early phase studies. She enjoys developing and testing methodological innovations to improve study design and conduct whilst simultaneously evaluating surgical procedures. She is an emeritus NIHR Senior Investigator and has been involved in IDEAL since its inception in 2009.

### **Dr Joel Horovitz**

*New York, United States of America*

Dr. Joel Horovitz is the Senior Vice Chair and Director of the Division of General Surgery at Maimonides Medical Center in Brooklyn, NY. He completed both his residency and fellowship at McGill University. He has published extensively throughout his career. He is Associate Professor of

Clinical Surgery at The State University of New York. He is a member of the American Association for the Surgery of Trauma, the American Burn Association, the Association for Academic Surgery, the New York Academy of Medicine, as well as several other prominent organizations. He served on the IDEAL Council as the Education Lead. His institution has provided fellows for IDEAL studies and research in Oxford over the past decade.

### **Dr Janet Martin**

*Ontario, Canada*

Dr. Martin is Professor of Anesthesia & Perioperative Medicine and Epidemiology & Biostatistics at Western University in Canada where her research focuses on clinical trials, evidence implementation, policy development, and capacity-building in the field of global surgery, anesthesia and perioperative care. She recently served as co-director of the WHO Collaborating Centre for Global Surgery, Anesthesia & Perioperative Care, and as a WHO consultant for perioperative guideline development (Ebola Virus Disease, Perioperative Oxygen, Sepsis). Dr. Martin serves on the board of the NIHR Global Surgery Unit (University of Birmingham), and as Canadian Lead / Dissemination Lead for GlobalSurg and CovidSurg studies. In Canada, Dr. Martin supports priority-setting, research phasing, and policy development for drugs, devices, technologies and medical procedures in hospitals and government bodies. Recently, Dr. Martin was awarded the CADTH 30th Anniversary Medal for Health Technology Assessment.

### **Dr Arsenio Paez**

*Oxford, United Kingdom*

Arsenio is an IDEAL Council member and a clinical trials methodologist with an interest in study design and clinical trials methods in complex interventions. His DPhil research at Oxford in intervention fidelity in clinical trials was inspired by the IDEAL framework. His clinical background is in CNV genetic, neurodevelopmental and neurodegenerative disorders. He is interested in how IDEAL can be applied to trials that combine surgery, medical devices and biologics, such as advanced therapy medicinal products (ATMPs) in regenerative medicine and rehabilitation trials. He is interested in applying IDEAL to sleep medicine and behavioural neuroscience clinical trials.

### **Professor Pedro Ramirez**

*Houston, United States of America*

Dr. Ramirez is a Professor in the Department of Gynecologic Oncology & Reproductive Medicine at MD Anderson Cancer Center in Houston. He is the David M. Gershenson Distinguished Professor in Ovarian Cancer Research and Director of Minimally Invasive Surgical Research & Education. He is Chair of the Gynecologic Oncology ERAS Program. He has published 262 articles in peer-reviewed journals and 19 book chapters. He serves as Reviewer for 31 peer-reviewed journals. He is the

recipient of multiple awards including the Jack and Beverly Randall Prize for Excellence in Cancer Treatment at MD Anderson Cancer Center.

## Academic Committee

**Mr Danyal Zaman Khan** MRCS MBBCh BAO

**Mr Hugo Layard Horsfall** MRCS MBBS BSc

**Mr Simon Williams** MRCS MBChB(hons) BMedSci(hons)

## Logistics Committee

**Dr Jigi Moudgil-Joshi** MBChB BMedSci(hons)

**Dr Joachim Starup-Hansen** BMBS(hons)

## Creative Director

**Dr Talhah Chaudri** MBChB MRes

## Conference Chairs and Speakers

### Keynote Speaker

#### **Professor Bruce Biccard**

*Cape Town, South Africa*

Bruce Biccard is Professor and Second Chair in the Department of Anaesthesia and Perioperative Medicine at Groote Schuur Hospital and the University of Cape Town, South Africa. His research interests include perioperative medicine, perioperative outcomes and global surgery. He is a proponent of international collaborative research. He collaborates with the African Perioperative Research Group (APORG) which has delivered the African Surgical Outcomes Study (ASOS), the ASOS-2 Trial, the African Covid-19 Critical Care Outcomes Study (ACCCOS), and the African Surgical Outcomes Study in Paediatric patients (ASOS-Paeds). He is the co-Lead for the NIHR Global Health Group on Perioperative and Critical Care. Bruce recently published a book titled 'Safer surgery for Africa: Challenges and Solutions'.

### Chairs and Speakers

#### **Professor Art Sedrakyan**

*New York, United States of America*

Art Sedrakyan is Vice-Chair of IDEAL with focus on devices. He is a tenured professor at Weill Cornell Medicine and directs the Institute for Health Technologies and Interventions. He is a trained Cardio-Thoracic surgeon and a graduate of Johns Hopkins. He was a senior adviser at the FDA and the Agency for Healthcare Research and Quality. He is former Vice-Chair of Medicare Evidence Development & Coverage Advisory Committee (MEDCAC). He is a founding Co-Editor-In-Chief of 'BMJ Surgery, Interventions & Health Technologies' (BMJ-SIT). He has published over 250 manuscripts and received over \$30M in funding in the past 10 years as a principal investigator.

#### **Mr Will Bolton**

*Leeds, United Kingdom*

Mr Bolton is an NIHR Academic Clinical Fellow in Neurosurgery at the Leeds Centre for Neurosciences. He is an applied health and translational researcher with expertise in developing technologies for accelerating surgical care, including digital smart theatres and technology-enhanced post-op recovery. His experience spans immersive technologies, robotics, imaging, and AI. His PhD investigated using frugal innovation methodologies to develop surgical technologies for low-resource settings. This research resulted in the IDEAL Global Framework and the launch of

IDEAL Global, an initiative that aims to improve the development and evaluation of surgical innovation in low-resource areas.

### **Mr Josh Burke**

*Leeds, United Kingdom*

Josh is a General Surgery Registrar in Manchester, UK. He is a Bowel Cancer UK PhD Clinical Research PhD Fellow at The University of Leeds and has higher degrees in Health Research and Medical Education. He chaired the commission on The Future of Surgery: Technology Enhanced Surgical Training Report, is the Lead of Education for The Royal College of Surgeons of England Innovation Hub and is a Lecturer in Innovation on The Surgical Education MSc at the University College London, UK. He sits on the Robotics and Digital Surgery Committee for RCS England and is a Trustee of the CORESS UK Patient Safety Charity

### **Mr Puneet Plaha**

*Oxford, United Kingdom*

Puneet Plaha is a consultant neuro-oncology surgeon in Oxford with a specialist interest in brain tumours, especially endoscopic minimally invasive surgery and awake surgery. He is Lead of Oxford Neuro-oncology MDT and Lead for the Thames valley Cancer network for Brain tumours. He is Neuro-oncology chair for the SBNS. He has developed new techniques for minimally invasive endoscopic tumour resection. He has established advanced techniques for awake brain tumour surgery. He leads the Oxford surgical neuro-oncology research group understanding neural networks affected by brain tumours, looking into novel surgical modalities which make brain surgery safer, understanding immunotherapy for brain tumours and novel clinical trials for brain cancer.

### **Dr Baptiste Vasey**

*Geneva, Switzerland*

Baptiste is a surgical resident at the Geneva University Hospitals, Switzerland. He holds a DPhil in Surgical Sciences from the University of Oxford, where he was a Berrow Foundation Lord Florey scholar at Lincoln College. He wrote his thesis at the Nuffield Department of Surgical Sciences, where he led on the development of DECIDE-AI, a reporting guideline for the early-stage clinical evaluation of decision support systems driven by artificial intelligence. Baptiste obtained a Master of Medicine from the University of Zurich, Switzerland, and passed the Swiss Federal Medical Licensing Examination in September 2017. Following graduation, he was awarded one of the four Swiss Mercator Fellowships on International Affairs to investigate the potential of computer-aided decision support to improve access to appropriate healthcare in low-resource settings. His current research focuses on the life-cycle evaluation of AI-based technologies in clinical settings.



## Sponsor Speakers

### **Mr Mark Slack**

*CMR Surgical*

Mark Slack is a co-founder and the Chief Medical Officer of CMR Surgical. He is a Consultant Gynaecologist with a strong background in clinical and translational research.

Mark trained as a medical doctor and Gynaecologist in South Africa graduating with the Gold Medal for Obstetrics and Gynaecology for the Fellowship of the College of Medicine of South Africa. He has continued to pursue a combined clinical and academic career with a number of successful innovations in surgery and Gynaecology. In addition, he has a strong interest in basic science research.

He still practices clinical medicine and surgery in Cambridge as well as being on the staff of the clinical school of medicine of the University of Cambridge.

### **Adrian Jackson**

*The MPS Foundation*

Adrian joined MPS at the beginning of 2021 and initially led the project to design and create the MPS Foundation. In January 2022, Adrian was appointed the position of Head of The MPS Foundation.

Adrian has experience in leading research teams over a number of years and has produced research reports for a wide variety of audiences domestically and internationally, including Government and Government Departments.

He has over 25 years of experience in workforce development in a wide variety of areas, including healthcare. Adrian has worked in private, public, and not-for-profit organisations, including for charities. Adrian has a significant amount of experience in building and establishing new and innovative organisations and organisational functions, including setting up a UK-regulated awarding organisation and building a charity from inception. Adrian has worked internationally delivering contracts in Europe, the Balkans, the Middle East, and in China. Adrian has an MBA from the Open University.

## Accepted Abstracts

### Free Paper Oral Presentations

#### Digital Surgery

##### **Development of a digital platform for the delivery of intraoperative language tests during awake craniotomy and for collaborative brain mapping (IDEAL Stage 0 - Systems Perspective)**

*Jamjoom, Aimun; Veljanoski, Damjan; Ng, Xin Yi*

**Introduction:** Language mapping during awake craniotomy is the gold standard for maximising extent of resection while limiting language deficits. However, there is variation in the type and mode of delivery of language tests. Here we conduct a systems analysis for a digital platform (map-OR) which delivers intraoperative language tests during awake craniotomy.

**Methods:** Mixed methodology study including two scoping reviews, international survey, synthesis of development guiding principles and a risk assessment using Failure Modes and Effects analysis.

**Results:** 12 research articles describing 6 technologies which required a range of hardware components including virtual reality headsets and integrated multi-screen stacks. The facilitators and barriers of technology adoption in surgery were extracted from 11 studies. Of 37 awake craniotomy teams from 14 countries, 20 (54.1%) delivered their language tests digitally, 10 (27.0%) delivered tests using cards and 7 (18.9%) used a combination of both. Commonest devices were tablets (67.7%; n=21) and the commonest software used was Microsoft PowerPoint (60.6%; n=20). Four key risks for the proposed digital platform were identified, the highest risk being a software and internet connectivity failure during surgery.

**Conclusion:** This work represents a rigorous systems approach to the development of a digital platform for standardised intraoperative language testing during awake craniotomy and for collaborative brain mapping.

##### **Development of Robotic Assisted Orbital Surgery using IDEAL Methodology – Phase 0 to 1**

*Malik, Mohsan; Daniel, Claire; Faulkner, Jack; Uddin, Jimmy; Arora, Asit; Jeannon, Jean-Pierre*

**Purpose:** Orbital surgery benefits from instrumentation that offers gentle tissue manipulation with exceptionally high accuracy and precision. This is where robotic surgery offers an advantage. We aimed to evaluate a robotic-assisted surgical system's feasibility, safety and outcome in assisting periocular tumour clearance.

**Methods:** Pre-clinical (IDEAL phase 0) cadaveric studies were performed to optimise positioning,

setting and approach to anterior orbital resection using the DaVinci XI system (intuitive surgical). We proceeded to first-in-human (IDEAL phase 1), robotic-assisted resection.

**Results:** Four patients with advanced periocular tumours (mean age of 63 years) were included. One patient underwent simultaneous parotidectomy and lymph node clearance. Clear resection of the primary tumour was achieved in all patients. Patients were followed-up for at least one year, and three remained disease-free. One patient with pre-existing extra-orbital disease developed metastatic disease five months post-op. All patients preserved vision peri-operatively, with no patient suffered any adverse events related to the robotic device.

**Conclusion:** Our series highlights the potential advantage of three-dimensional optics, multi-directional instrumentation and motion scaling technology to achieve globe-sparing tumour resection in advanced periocular tumours. However, further robotic instrumentation development is required for orbital surgery.

### **Proposed alleviation to the qualitative gap for early-stage innovation evaluation of surgical robotic systems as complex platforms**

*Linn, Andrew; D'Adderio, Luciana; Harrison, Ewen*

**Introduction:** The IDEAL framework for the evaluation of surgical robotic systems (SRSs) emphasizes the need for new human factors research design. This observational qualitative study aims to assess variations in system utility and workspace analysis, when using the Versius SRS for colorectal surgery in Edinburgh, United Kingdom.

**Methods:** Observations of Versius SRS cases have been underway since April 2022, with a focus on identifying action patterns. Semi-structured interviews with key stakeholders spanning three perspectives: clinical, industry, and evaluation, are underway. Fieldnotes and interview data are being analysed using inductive thematic analysis to capture from the field intervention stabilisation most relevant to stage 2a and 2b IDEAL considerations.

**Results:** Three routine phases for robotic cases are identified: set-up, co-use, and debrief. Emerging thematic narratives reveal key failure mechanisms from set-up configurations, resulting in downstream flow disruptions and possible system abandonment. Potential solutions include dedicated set-up configuration templating, and SRS specific ergonomic descriptors in case reporting debrief.

**Conclusion:** Identifying three routine phases of robotic surgery facilitates context specific failure analysis and the discovery of operational challenge mechanisms. This research design provides a scalable model to further qualitative studies which aim to capture and describe human factors from the field.

**Redefining the resection target for glioblastomas - an IDEAL Stage 0 and 1 study**

*Price, Stephen; Mayrand, Roxanne; Cozzi, Francesca; Wan, Yizhou; Allinson, Kieren; Li, Chao; Fryer, Tim; Matys, Tomasz*

**Introduction:** Surgical failure of local control is a feature of GBMs. Resecting non-enhancing tumour improves survival. PRaM-GBM, a multicentre imaging biomarker study, has validated diffusion tissue signatures to predict sites of GBM progression. Using this data, we have undertaken an IDEAL Stage 0 study (to translate this biomarker into the OR) and a Stage 1 study to provide proof of concept of targeting non-enhancing tumours.

**Methods:** 8 patients underwent DTI imaging (predicting sites of progression), [C-11]-methionine PET (surrogate of tumour resected with 5-ALA fluorescence-guidance) and contrast-enhanced tumour. The q area outside increased PET uptake was taken as the surgical target. These regions were incorporated into image guidance, and biopsies were taken to confirm tumour presence (Stage 0 Study). Finally, the Stage 1 study – in a patient resection was extended into the q region.

**Results:** Stage 0 study developed the method of identifying residual tumour in patients intra-operatively. Biopsies confirmed these regions contained high-density tumours. Extended resection was deemed safe in 5 patients. A single patient with a non-dominant frontal lobe tumour safely underwent extended resection 2cm into the q region posterior to the enhancing tumour.

**Conclusion:** We have defined an imaging biomarker for non-enhancing tumours. Biopsies have confirmed it is tumour and demonstrated we can extend resection. Further studies to demonstrate efficacy are required.

**Reducing the burden to deliver remote postoperative surveillance using machine learning for surgical-site infection (SSI)**

*McLean, Kenneth; Sgrò, Alessandro; Brown, Leo; Buijs, Louis F; Gao, Junyi; Mountain, Katie E; Shaw, Catherine A; Drake, Thomas M; Pius, Riinu; Knight, Stephen R*

**Introduction:** Remote postoperative wound (RPW) surveillance has been shown to improve the delivery of care and minimise the harm to patients from surgical-site infection (SSI). We aimed to develop novel methods for automated assessment of remote postoperative wound (RPW) surveillance to reduce the burden of clinical triage.

**Methods:** This was a secondary analysis of two interventional studies on RPW surveillance. Adult general surgery patients could submit images of their surgical wound(s), and patient-reported outcome measures (PROMs) of SSI for 30-days postoperatively. A multi-input neural network (MNN) was developed to predict a clinical diagnosis of SSI within 48h based on symptoms and wound images. Performance was evaluated using area under the curve (AUC) and externally validated.

**Results:** There were 1540 submissions containing PROMs (48h SSI rate = 3.7%, n=57) and 2615 images (48h SSI rate = 3.1%, n=82). The MNN exceeded performance of the component models

within the external validation subset (AUC: 0.94, 95% CI: 0.89-0.99) and remained equivalent to clinician triage (AUC: 0.92, 95% CI: 0.90-0.94). Usage to screen out “low-risk” responses prior to clinical triage was estimated to reduce the staff-time required to deliver (6.3h vs 25.5h).

**Conclusion:** Automated assessment can be successfully deployed within RPW surveillance pathways to reduce the burden on staff to deliver without compromising care, and allow resources to be appropriately directed to those at greatest risk of SSI.

## **Global Surgery**

### **Advancing Equity and the Responsible Use of Artificial Intelligence in Health by Building a Community of Practice**

*Lang, Trudie; Zeeshan, Salvia; Mendoza, Bryain Maradiaga; Adjei, Prince; Dale, Adam*

The lack of an open community that promotes knowledge exchange and access to resources on regulations and training makes research and implementation of AI in health challenging. “Artificial Intelligence for Global Health (AI4GH)” convened by The Global Health Network is aimed towards achieving equity and maximising impact in the responsible application of AI in health. Central to AI4GH is an open-access, multilingual digital hub for the transfer of knowledge among health AI stakeholders and researchers. This hub provides access to AI resources and has a growing Community of Practice across the globe. Capacity building is supported by the regional coordinators, who amplify the project's reach and align its objectives with local health needs. A mixed methods study for identifying gaps in free training opportunities in responsible use of AI and mapping of resources is underway. Support for AI research projects in health, facilitating collaborations, and skills-sharing workshops have been implemented. By addressing the global imbalance in AI research and awareness, AI4GH ensures that the benefits of AI in healthcare, including surgery, are shared equitably. This approach fosters knowledge transfer and promotes the responsible integration of AI in the different health sectors. AI4GH's model is pivotal for advancing global health equity, ensuring that all health professionals, regardless of location, can access and leverage AI in health research to improve health outcomes.

### **Comparison of informed consent for breast cancer surgery in the UK and the Czech republic and patients' satisfaction with the process.**

*Rezacova, Monika*

**Introduction:** Informed consent is a concept accepted largely in the world, however its interpretation varies. Understanding the diagnosis and process of treatment should be a crucial part of doctor-patient relationship.

**Methods:** We have assessed 100 patients with a new breast cancer diagnosis (50 in each centre). We have compared the consent forms, risks mentioned to the patient and proposed surgery. A questionnaire was given to patients following the consent process to assess patients' satisfaction with information given and possibility of outcome change.

**Results:** In the UK, patients were given a surgical management plan with multiple potential risks listed on consent. Patients in Czech were given all possible surgical options without specific plan and only few complications. Patients in the UK were satisfied although some of them would appreciate fewer information on risks. Patients in Czech had trust in the doctor's decision however majority of them would appreciate the exact procedure proposed and more information regarding risks.

**Conclusion:** Although patients had very different experiences, the vast majority would like to hear the exact type of procedure that is being done and list of significant risks.

### **Development and External Validation of the “Global Surgical-Site Infection” (GloSSI) Predictive Model in Adult Patients Undergoing Gastrointestinal Surgery**

*McLean, Kenneth; NIHR Global Research Health Unit on Global Surgery and GlobalSurg Collaborative, -*

**Introduction:** Identification of patients at high-risk of surgical-site infections (SSI) may allow clinicians to target interventions and monitoring to minimise associated morbidity. We aimed to develop and externally validate a novel score to predict 30-day SSI following gastrointestinal surgery.

**Methods:** This was a secondary analysis of 2 independent prospective global cohort studies of adults undergoing gastrointestinal surgery: GlobalSurg-2 (development) and GlobalSurg-1 (external validation). The primary outcome was 30-day SSI, with two approaches explored: penalised regression (LASSO) and machine learning (XGBOOST). Final model selection based on prognostic accuracy and clinical utility.

**Results:** There were 14,019 (SSI=12.3%) patients for development, and 8,464 (SSI=11.4%) for validation. LASSO was selected due to similar discrimination to XGBoost (AUC: 0.74, 0.73-0.75 vs 0.74, 0.71-0.77), but greater explainability. The final score included 6 variables: country income, ASA, diabetes, and operative contamination, approach, and duration. Discrimination remained good on external validation (AUC: 0.73, 0.72-0.74), and demonstrated superior performance to external validation of all previous models evaluated within GlobalSurg or prior datasets.

**Conclusion:** The GloSSI score allowed accurate prediction of SSI with 6 variables routinely available at surgery across income settings. This can inform use of intra- and postoperative interventions to modify the risk of SSI, and minimise associated harm.

## **Improved Training and Understanding in Quality Improvement Methodologies Could Enhance Service Innovation in Malawi**

*Esland, Joe; Molyneux, Samuel; Hackney, Rosemary*

**Introduction:** Mzuzu Central Hospital (MZCH) has one orthopaedic surgeon for a population of 4 million. Coupled with its limited resources, this leads to long waits for surgery, which impacts the patient, surgeon, and hospital.

Whilst long term solutions will require financial investment, innovation in service provision – such as efficiency, timeliness, effectiveness, equity, and safety – can also help address these challenges.

**Methods:** Three UK orthopaedic surgeons visited MZCH. Processes and systems were observed. Semi-structured interviews discussing service improvement were conducted, responses were thematically analysed, and the staff were then questioned on these themes.

**Results:** Themes focussed exclusively on increasing resources, such as staffing and equipment. There were no responses that considered ways to improve their service by changing the systems within which they work. When questioned on this, staff cited a lack of awareness and training in quality improvement (QI) methodologies.

**Conclusion:** QI methodologies can help implement effective, enduring change. In the UK, these concepts are introduced early, are a mandatory component of clinical activity, and are central to improving the quality of the health service. Introducing this in Malawi could allow service innovation independent of financial constraints. Teams visiting similar environments may wish to promote awareness and training in QI methodologies to aide with local service innovation.

## **Surgical Training and Patient Education**

### **A tool for optimising shared decision making and informed consent for surgical innovation:**

#### **Development and implementation of a core information set**

*Hoffmann, Christin; Elliott, Daisy; Ochieng, Cynthia; Lawday, Samuel; Vallance, Abigail; Rooshenas, Leila; Main, Barry; Blazeby, Jane; Wheatstone, Pete; McNair, Angus*

**Introduction:** There are significant challenges in achieving high-quality shared decision making (SDM) and informed consent for surgical innovation. Evidence shows that patients' information needs are insufficiently addressed. We co-developed a core information set (CIS) to provide baseline information for consultation discussions between clinicians and patients offered novel surgical procedures/devices.

**Methods:** This study adhered to guidance for CIS and core outcome set development (COS-STAD) to

- (i) generate a provisional CIS from data sources (44 stakeholder interviews, 34 consultations, 213 studies, 58 policies) applying thematic content analysis,
- (ii) refine/agree CIS with stakeholders (patients, surgeons, anaesthetists, lawyers, ethicists, medical directors, SDM experts, regulators) using nominal group technique, (iii) conduct UK public consultation, (iv) implement the CIS nationally.

**Results:** A provisional CIS contained 8 themes/28 subthemes. Some 25 stakeholders refined/agreed a final 7-theme CIS covering what is 'new' about the procedure, conflicts of interest, reasons for the innovation, treatment alternatives, unknowns, surgeons' expertise, and governance. Public consultation (N=136) endorsed all themes. Industry collaboration will implement the CIS in digital consent platforms across 38 institutions.

**Conclusion:** An evidence-based CIS has been co-developed with key stakeholders and is the recommended standard to optimise SDM and informed consent for surgical innovation.

### **Insights into surgical innovation, incremental learning and refinement in practice: a case-study of Aortic valve neocuspidization (AVNeo) with autologous pericardium (the Ozaki procedure)**

*Macefield, Rhiannon; Scroggie, Darren; Coyle, Maeve; King, Anni; Hoffmann, Christin; Blencowe, Natalie; Blazeby, Jane; Caputo, Massimo; Avery, Kerry; Elliott, Daisy*

**Introduction:** Modifications and refinements are expected in the surgical innovation lifecycle and are a key characteristic of IDEAL Stage 2a. Little is known, however, about what happens in practice; how/why procedures are modified, the rationale for modifications and the learning gained. The ethnographic Lotus study follows new procedures/devices as they are introduced into NHS practice. Here we report on a cardiology case study (the Ozaki procedure).

**Methods:** Interviews with surgeons performing Ozaki procedures in one UK hospital over time, prior to/between patient cases. Topic guides explored experiences and reflections. Data underwent thematic analysis.

**Results:** 18 interviews with 5 surgeons were conducted (Dec 2019-June 2022) exploring n=20 patient cases. Technical modifications to the procedure were described as surgeons gained experience. Modifications to patient selection criteria (e.g., including abnormal valve anatomies) as learning/confidence grew were described. Rationale for modifications were broadly categorised as patient/anatomical reasons, learning from colleagues/the wider surgical community, and personal drivers (e.g., for perfection).

**Conclusion:** Qualitative data provides insights into surgical innovation and its incremental evolution during introduction into clinical practice. Examining how/why modifications occur facilitates shared learning and efficient innovation by helping to determine whether a procedure/device is ready for the next IDEAL stage of evaluation.

### **Objective Clinical Human Reliability Analysis as a model for assessment in Microsurgery Training as building block for a computer based assessment.**

*Vishaal, Swamynathan; Francis, Nader; Boal, Matthew; Gorard, Jack; Ubhi, Harmony*

**Introduction:** To show a feasibility in the application of the Objective Clinical Human Reliability Analysis (OCHRA) for microsurgical training by correlating the self-assessment Global Assessment Scale (GAS) scores and assessor scores with OCHRA scores.



**Methods:** 18 novice participants, with no prior microsurgery experience. They completed multiple training exercises on ex-vivo models. Microsurgical exercises were categorised as tasks and sub-tasks in the OCHRA, comparative evaluation against their GAS scores and assessor scores were done. Exercises were recorded and then reviewed. 4 exercises were observed by two OCHRA raters.

**Results:** There was a significant, positive association between OCHRA rater 1 and OCHRA rater 2 ( $r=0.837$ ). There was also a significant, positive association between GAS and Assessor scores ( $\rho=0.535$ ). Significant association seen between Rat Aorta End-Side GAS scores and OCHRA scores ( $\rho=-0.536$ ) and Chicken Artery End-End Assessor scores and OCHRA scores ( $\rho=-0.521$ ). No significant correlation between all the scores found in any of the remaining exercises.

**Conclusion:** OCHRA is a feasible model for assessment for novice training. Although there was a limitation with the time required to observe errors affecting the ability of the assessment tool in a live course. It could be used by external assessors at a later point in time. With more data collected, it can be used as a foundation for artificial intelligence and computer automated assessments and live feedback.

### **Patient and Public Perceptions of Simulation Training in Neurosurgery**

*Burton, Oliver Edward; Starup-Hansen, Joachim; Moudgil-Joshi, Jigishaa; Williams, Simon; Koh, Chan Hee; Marcus, Hani J*

**Introduction:** Simulation in neurosurgical training is widely accepted and utilised by UK trainees. Little is known about the perspectives of patients and the public on simulation training. This study sought to include patients as key stakeholders and to elucidate their views on different modalities of simulation and feedback.

**Methods:** This study was two-staged. The qualitative phase, a survey distributed to post-operative patients in a tertiary neurosurgical centre, identified key issues important to patients when considering simulation. Reflexive analysis was performed and emerging themes were used to design an online quantitative survey, identifying the relative importance of issues pertaining to simulation in neurosurgery.

**Results:** 17 patients responded to the stage 1 survey and 192 to stage 2. Emerging themes included access to simulation, cost, fidelity and supervision. Realism was the most important priority (166 agree/strongly agree) and physical models the most popular simulation modality (168 agree/strongly agree). 167/192 agreed with the use of simulation in neurosurgery. The public most commonly (68/192) supported their surgeon practicing with simulation 60% of the time.

**Conclusion:** The use of simulation in neurosurgical training is acceptable to most patients and most members of the public. Realism was of higher priority than cost or accessibility. More 'traditional' training methods (cadavers and physical models) are more acceptable than the use of extended reality.

## **The Role and Use of Digital Simulation in Plastic Surgery Training: A Systematic Review**

*Martin, Jessica; Rangaraju, Madhumintha; Alqalaf, Zaid; Izadi, David*

**Introduction:** Surgical training is undergoing a seismic shift in response to new technologies and training platforms. These changes have gathered pace since the COVID-19 pandemic, where decreased training opportunity, and increased ward-based work have cultivated a need for alternative teaching. This systematic review aims to evaluate use of digital simulation tools which use augmented reality (AR), virtual reality (VR), and 3-Dimensional Digital Simulation (3D-DS) in the training of plastic surgeons.

**Methods:** A systematic search using keywords related to plastic surgery training and digital simulation was conducted. Three independent reviewers evaluated all articles.

**Results:** Twenty-one studies were included, utilising either AR (n=10), VR (n=5), or 3D-DS (n=6). Digital simulation was consistently preferred to traditional methods, yielding superior results on cognitive and practical assessment. The assessment and replication of results was limited by heterogeneity, absence of control groups, sample size, and evidence supporting transferability to clinical practice.

**Conclusion:** Contemporary technology is underutilised in plastic surgery training. Digital simulation offers a pathway to improved proficiency, remediating lost training opportunities, and providing a valuable aide for trainees. Formal implementation requires a robust evidence base. Future research can validate this through the development of a standardised assessment tool and elucidating the transferability of skills acquired virtually to reality.

## **What are patients told about innovative surgical procedures? A qualitative synthesis of seven case studies in the UK**

*Elliott, Daisy; On behalf of the Lotus study research team and clinical collaborators*

**Introduction:** High-profile cases have prompted concerns about informed consent for surgical innovation, although little is known about current practice.

**Methods:** As part of the Lotus study, we followed seven case studies of surgical innovation being introduced into NHS trusts in the UK. Interviews with innovators explored intentions about discussing procedures with patients. Pre-operative consultations between clinicians and eligible patients were audio-recorded. Interviews with patients explored their views of the information provided in the consultation. Data were synthesised across case studies using thematic analytical methods derived from grounded theory.

**Results:** Interviews with clinicians demonstrated strong intentions to inform patients about the novel status of the procedure, although they acknowledged this could be challenging. Analysis of the consultations showed many patients were not informed when a procedure is innovative or given enough information about possible uncertainties or potential risks. Interviews with patients

revealed that many patients appeared to believe that the procedure was more established than it was and were optimistic about potential benefits.

**Conclusion:** Despite clinicians' best intentions, there was evidence of contradictions between clinicians' intentions to inform patients about the novelty of the procedure and their actual discussions with patients. Transparent communication is required.

## **Sandpit Presentations**

### **A systematic review and meta-analysis of tourniquet use during major lower limb amputation for complications of peripheral arterial disease**

*Shea, Jessie; Smith, Elisabeth; Lyons, Megan; Fricker, Monty; Laloo, R; Bosanquet, David*

**Introduction:** Intraoperative blood loss is a significant complication of major lower limb amputation (MLLA). However, tourniquet use in peripheral arterial disease (PAD) remains contentious. This meta-analysis assessed the effect of tourniquet use on PAD patient outcomes following MLLA.

**Methods:** EMBASE, Medline and Cochrane were searched. Inclusion criteria were any study design reporting outcomes of MLLA for PAD with and without tourniquet use. Papers were pooled using random effects meta-analysis.

**Results:** Six studies were included, totalling 921 patients. Postoperative Hb drop was significantly reduced for tourniquet patients (MD -0.55; 95%CI -0.80 to -0.31;  $P < 0.0001$ ). OR for requiring blood transfusion was 0.58 (95%CI 0.31 to 1.10;  $P = 0.10$ ) in the tourniquet versus non-tourniquet groups, whilst number of units transfused per patient were lower (MD -0.35; 95%CI -0.74 to 0.04;  $P = 0.08$ ). Operation length was significantly reduced in tourniquet patients (MD -8.69; 95%CI -15.95 to -1.42;  $P = 0.02$ ). There was no significant difference in surgical site infection (SSI) (OR 1.07; 95%CI 0.60 to 1.90;  $P = 0.82$ ), stump revision (SR) (OR 0.73; 95%CI 0.41 to 1.30;  $P = 0.29$ ), and death (OR 0.80; 95%CI 0.49 to 1.30;  $P = 0.36$ ) in the tourniquet versus non-tourniquet cohort.

**Conclusion:** Tourniquet use during MLLA significantly reduces blood loss and operative duration, with no significant difference in SSI, SR and mortality. Further RCTs are needed to generate higher quality evidence which may change practice.

### **How are modifications in surgical innovation reported? A systematic review of IDEAL-cited studies**

*Olivier, James; Elliott, Daisy; Avery, Kerry; Blencowe, Natalie; Macefield, Rhiannon*

**Introduction:** The IDEAL framework recognises the importance of modifications in surgical innovation, yet little is known about reporting standards. We investigated how IDEAL recommendations influenced reporting of surgical modifications.

**Methods:** Systematic searches for published studies reporting innovative surgical procedures/devices and citing the 13 main IDEAL papers were undertaken. Verbatim text describing modifications including contextual data were extracted and analysed inductively using thematic analysis.

**Results:** Of 1071 records screened, 104 papers were included (n=87 (83.6%) study reports; n=17 (16.3%) protocols). Modifications were reported in 76 (73.1%) studies, including changes to technique, patient selection and device design. Depth and breadth of modification reporting varied widely with variable emphasis on prior, current and future modifications. Of the total 104 studies, 62 (59.6%) were categorised as IDEAL stages 2a or 2b and most frequently involved urological innovations (n=38 (36.5%)).

**Conclusion:**

Reporting modifications is imperative for evaluating surgical innovation but could be enhanced. Findings from this review will inform the development of a framework for reporting modifications that will be tested and refined through qualitative interviews with innovating surgeons. This will complement the IDEAL framework and further promote shared learning, therefore avoiding the repetition of harmful/ineffective modifications and enhancing patient safety.

**How can qualitative methods improve the design of safe, transparent, and efficient early phase studies of surgical innovation? The LOTUS study**

*Avery, Kerry; Macefield, Rhiannon; Blencowe, Natalie; Coyle, Maeve; Hoffmann, Christin; King, Anni; Blazeby, Jane; Elliott, Daisy*

**Introduction:** The 2020 Independent Medicine and Medical Devices Safety Review raised concerns about surgical innovation. IDEAL recommends study designs based on innovation stage and whether modifications are occurring, but it is uncertain how to determine this. The LOTUS study examined how qualitative methods may inform surgeons' decisions about early phase study design.

**Methods:** The central LOTUS team collaborated with surgeon innovators on case studies, including uterine transplant, robot-assisted hip replacement, and autologous pericardium for aortic valve repair. Surgeon/patient interviews, consultation recordings, operative videos and surgeon meetings were used alongside standard data capture.

**Results:** Findings from 8 case studies (8 NHS trusts, 84 surgeon/71 patient interviews, 71 consultations, 41 videos) showed how LOTUS methods provided unique additional information to that routinely captured when studying innovation. This influenced decisions about patient selection, communication, pausing cases and next-phase study design. One surgeon commented how the methods helped them "reflect on my own practice and communication with patients". Data also informed development of NICE IPAC recommendations about a new procedure.

**Conclusion:** LOTUS methods elicit "hidden" views and generate previously undetected data of value to surgeons and regulators. Their further development, testing and implementation within

IDEAL studies will promote safe, transparent and efficient surgical innovation.

### **Staged versus Concomitant TAVI and PCI for the Treatment of Co-existing Aortic Stenosis and Coronary Artery Disease: A Systematic Review and Meta-analysis**

*Shirke, Manasi; Wang, William; Welch, Joseph; Faisal, Farqhan; Nyugen, Kevin; Harky, Amer*

**Introduction:** Aortic stenosis (AS) is one of the most common valvular pathologies. Severe coronary artery disease (CAD) often co-exists with aortic stenosis. The transcatheter aortic valve implantation (TAVI) and percutaneous coronary intervention (PCI) have been established minimally invasive alternatives to traditional surgical interventions. The data on the timing for the treatment of the two conditions is scarce. This review compares the clinical outcomes of the concomitant versus staged PCI and TAVI for the treatment of AS and CAD.

**Methods:** A systematic, electronic search was performed to identify relevant articles that compared outcomes of the staged versus concomitant approach for the TAVI and PCI. Data regarding mortality, length of hospital stay, stroke, infection were extracted and analysed.

**Results:** 7 studies were identified, enrolling 3,745 patients. The primary outcome was 30-day mortality (OR= 0.78, 95% CI[0.39, 1.57]). Secondary outcomes were length of hospital stay (MD=-4.74, 95% CI[-10.96, 1.48]), new-onset renal failure (OR=0.83, 95% CI [0.22, 3.13]), and intra operative blood loss (OR=0.83, 95% CI[0.32, 2.12]) were not statistically significant. New pacemaker insertion was statistically significant in favour of the concomitant approach (OR=0.78, 95% CI[0.63, 0.96]).

**Conclusion:** In conclusion, the concomitant TAVI + PCI approach is non-superior to the staged approach for the treatment of CAD and AS. This review calls for robust trials in the field to further strengthen the evidence.

### **The Potential Role Of Computer Vision In Endoscopic Spinal Surgery**

*Baxter, David; Snow, Peter; Louriero, Rui; Hawkins, Bruno; Mokauem, Michael; Yordanov, Daniel*

Endoscopic spinal surgery (ESS) is an effective technique to address a range of spinal pathologies. 70% of spinal procedures are performed endoscopically in Asia compared with less than 10% in the UK. Endoscopic techniques cause far less tissue trauma and blood loss compared with open surgery, which also increases the number of patients who can benefit to include the physiologically frail and obese. Furthermore, procedures can be performed as day cases which accelerates patient turnaround time and reduces the demand for inpatient hospital beds. This is particularly important, post-covid, as waiting lists remain long.

Despite these numerous benefits, adoption is limited. This is attributed to the considerable learning curve, unconventional training requirements, and lack of practitioners possessing ESS skills. Computer vision has the potential to overcome these caveats. Developing a machine

learning model that can identify the anatomical structures and surgical tools used in the surgery in real-time will reduce support rapid surgeon learning, reduce complications and create opportunities for related technologies such as surgical robotics. The model would provide immediate feedback to the surgeon about the surgical environment, enhancing surgical precision. This will improve patient outcomes, and lead to faster recovery times, increasing department capacity.

## Rapid-fire Oral Presentations

### Digital Surgery

#### **Advancements in Artificial Intelligence for Hydrocephalus Diagnosis: A Systematic Review**

*Sescu, Daniel; AlMamari, Rawan; Kaliaperumal, Chandrasekaran*

**Introduction:** With the emergence of artificial intelligence, particularly machine learning (ML), there is a growing interest in its potential application for improving hydrocephalus diagnosis across paediatric and adult populations.

**Methods:** We conducted a systematic review, searching databases including MEDLINE, Embase, Scopus, Web of Science, and Cochrane up to January 2024. A total of 505 papers were retrieved, with 43 meeting inclusion criteria.

**Results:** 32 publications focused on diagnosis of hydrocephalus in adults, the majority including normal pressure hydrocephalus, while 11 focused on paediatric hydrocephalus. ML models were predominantly employed for tasks such as ventricular segmentation and ventricular/intracranial volume analysis. Neural networks emerged as the most frequently utilised model. The median accuracy of ML models in various diagnostic tasks was 90.3% with an area under the curve of 0.94 for distinguishing hydrocephalus from non-hydrocephalus cases.

**Conclusion:** To our knowledge, this is the first systematic review that attempts to evaluate the important advances of ML in the diagnosis of hydrocephalus in both paediatric and adult populations. ML algorithms may enhance diagnostic accuracy, streamline workflow, and expedite clinical decision-making. As we explore the feasibility of integrating these models into routine clinical practice, further larger studies are needed to assess their utility and impact on hydrocephalus patient care and management.

#### **How AI and machine learning are changing the game in prostate cancer management**

*Shaker, George Samir Habib*

**Introduction:** Prostate cancer, a major global health issue, necessitates early and precise detection for effective management. Traditional diagnostic methods like DRE, PSA tests, and biopsies have drawbacks in accuracy and safety. Treatment choices for prostate cancer are intricate, balancing benefits and risks. AI and ML have become instrumental in overcoming these challenges, enhancing diagnosis, imaging, and treatment decisions in prostate cancer research.

**Methods:** A systematic literature review was conducted using PubMed, Embase, and Google Scholar, focusing on articles published from January 2016 to June 2021.

**Results:** Our review reveals AI and ML significantly enhance prostate cancer diagnosis and

management. AI and ML aid radiologists in identifying and characterizing prostate cancer in MRI scans with increased precision. For instance, Varghese et al. (2018) demonstrated high-accuracy prostate cancer classification using deep learning on MRI images. Shen et al. (2019) combined radiomics and machine learning to assess cancer aggressiveness on MRI. Beyond diagnosis, AI and ML refine treatment decision-making. Zhao et al. (2019) developed an ML-based decision support system to guide clinicians in choosing optimal treatments by analyzing patient and disease data against clinical guidelines and historical outcomes.

**Conclusion:** AI and ML are set to transform prostate cancer diagnosis and management, showing significant improvements in accuracy and efficiency in diagnosis, imaging, and treatment planning.

### **Machine Learning Feature Selection: Prognostic factors that affect overall survival and progression-free survival in endometrial cancer patients**

*Geng, Zhuowen; Cindy Nguik, Cindy*

**Introduction:** Endometrial adenocarcinoma, the sixth most prevalent women's cancer worldwide, with about 9,700 new UK cases annually. Machine Learning (ML) has been widely used across many fields, especially in medicine in predicting prognosis. This study aims to recognise key prognostic factors influencing 5-year progression-free (PFS) and overall survival (OS) rates in patients with endometrial cancer in West Yorkshire and select features that will be used in ML models to predict outcomes in endometrial cancers patients.

**Methods:** This is a retrospective analysis of 253 cases between 2017-2019. Cox regression was used to evaluate OS and PFS. Hazard Ratios (HR) with 95% Confidence Intervals (CI) were used to quantify risk.

#### **Results:**

For PFS, significant HR increases were observed for FIGO Stages 3 and 4, G3 Cancer (HR 7.51), Outer half myometrial involvement, Adjuvant Chemotherapy, Radiotherapy, Chemoradiotherapy, Serous type and Sarcoma type (HR 7.51). Higher BMI exhibited a correlation with improved survival. For OS, elevated risks were associated with FIGO Stages 3 and 4, G3 Cancer, Outer half myometrial involvement, Adjuvant Chemotherapy, Serous type, Sarcoma type (HR 9.77), Length of stay, and Age. Higher BMI displayed protective effects.

**Conclusion:** Our study provides a basis for ML model for prognosis estimation in patient with endometrial cancers.



**Robotic-assisted removal of a rare mixed epithelial stromal tumour of the seminal vesicle***Al-Gburi, Saleh*

**Introduction:** The occurrence of primary tumours in the seminal vesicle is rare. The types of tumours that can be found include adenocarcinomas, sarcomas, and mixed tumours. We report a rare MEST in a seminal vesicle in a 53-year-old, which was diagnosed using a multiparametric MRI scan after he had haematospermia. It was successfully treated with robotic-assisted removal.

**Methods:** A 53-year-old male presented with haematospermia, His multiparametric MRI scan showed a 4.2 cm septated cyst on the left seminal vesicle with enhanced soft tissue along the superior aspect, which is suspicious for seminal vesicle malignancy.

The patient had a successful robotic-assisted removal of the seminal vesicle that required only one day of admission and without documented complications. The diagnosis of a mixed epithelial stromal tumour of the seminal vesicle was confirmed after microscopy and immunohistochemistry examination.

**Results:** Mixed epithelial-stromal tumours are rare and predominantly benign neoplasms that typically originate from the urogenital tract. In males, it is exceptionally rare and is associated with a history of hormonal therapy, often coupled with managing prostate cancer.

**Conclusion:** MEST tumours are rare and associated with different symptoms that include haematospermia. It is usually diagnosed before surgery with an MRI or CT scan. We report a rare cancer that was successfully treated with robotic-assisted removal of the seminal vesicle.

**Robotic versus laparoscopic general surgery in the emergency setting: a systematic review***Anyomih, Theophilus TK; Mehta, Alok; Sackey, Dorcas; Woo, Caroline A; Gyabaah, Emmanuel Y; Jabulo, Marigold; Askari, Alan*

**Introduction:** Robotic general surgery, a cutting-edge technology, is increasingly used in elective general surgery, demonstrating advantages over laparoscopy in certain cases. While laparoscopy remains standard for common acute abdominal conditions, the role of robotic surgery is uncertain. This systematic review compares outcomes in acute general surgery for robotic versus laparoscopic surgery.

**Methods:** A PRISMA-compliant systematic search of MEDLINE, EMBASE, Science Citation Index-Expanded and Cochrane Library was conducted. Outcome measures were recorded for perioperative outcomes of emergency general surgery in laparoscopic versus robotic cases, and a descriptive analysis performed.

**Results:** Six articles, compared outcomes of robotic and laparoscopic procedures for cholecystectomies, ileocaecal resection, subtotal colectomy, hiatal hernia and perforated gastrojejunal ulcer repair. Laparoscopic bowel resection in inflammatory bowel disease patients had higher complications; for other operations, no significant differences were found. Operative

time showed no differences for cholecystectomies, but robotic approaches were longer for other procedures. Robotic cases had shorter length of stay, but associated costs were higher.

**Conclusion:** Perioperative outcomes for acute robotic surgery in selected general surgery conditions are comparable to laparoscopic surgery. Recommending robotic surgery in the acute setting requires a well-powered large population study for stronger evidence.

### **Utilising Artificial Intelligence for Diagnostic Imaging in Orthopaedic Surgery**

*Bhuiyan, Zunira Areeba; Daniel, Akshatha*

**Introduction:** In orthopaedic surgery, integrating Artificial Intelligence (AI) into diagnostic imaging is a significant breakthrough. This application, powered by advanced algorithms, enhances radiological accuracy in the identification of musculoskeletal conditions. This review will explore the benefits and limitations of the use of AI for diagnostic imaging in orthopaedic surgery.

**Methods:** Systematic searches were conducted on the Ovid MEDLINE and PubMed electronic databases to identify relevant studies for this review. The literature search utilised key terms and a strict inclusion and exclusion criteria was applied. The final studies underwent critical appraisal using the CASP tool.

**Results:** AI algorithms are able to analyse radiographic images with remarkable precision, identifying anomalies such as fractures and diagnosing conditions including meniscus injury and osteoarthritis. AI's ability to process vast datasets enables early detection, facilitating timely intervention. AI systems can operate tirelessly, optimising workflow efficiency. Limitations include algorithmic biases, emphasising importance of representative datasets, and challenges with rare or complex cases that require human expertise and clinical judgment.

**Conclusion:** Balancing technological integration and human input remains crucial to maximise AI benefits. Ongoing research is essential for unlocking the full potential of AI, ensuring advancements and improved patient care in orthopaedic surgery.

### **Innovations in general**

#### **A Systematic Review and Meta-Analysis of Synthetic vs Biological Patches in Congenital Diaphragmatic Herniae: Recurrence Rates and Adverse Events in Longer-Term Follow-Up Studies**

*Kamal, Tasnim; Tyraskis, Athanasios; Fitchie, Angus; Ghattaura, Harmit; Lakhoo, Kokila*

**Introduction:** We aimed to compare recurrence rates and complications of biological vs synthetic patches, for repair of congenital diaphragmatic herniae.

**Methods:** Studies from January 1st 1980 to April 25th 2020, with patients under age 16 and a minimum 6-month follow-up, were included from MEDLINE, Embase and Cochrane. Funnel plots

were generated for both biological and synthetic patch recurrence rates. Sub-group analysis was performed for recurrence rate at the 1-year time-point, and data were gathered on complication rates.

**Results:** 47 studies with 986 patients were included (226 biological, 760 synthetic). Funnel plot analysis demonstrated overall recurrence rates of 16.7% (synthetic), and 30.3% (biological). Sub-group analysis of synthetic (n=493) and biological (n=146) patches, showed recurrence rates of 9.9% and 26% respectively. The most common patch-types - PTFE and SIS – had 11.5% and 33.3% recurrence respectively. ABO rates ranged from 4%-29% (synthetic) and 7%-35% (biological), in studies that reported it. GOR rates ranged from 25%-48% (synthetic) and 21%-42% (biological). Pectus deformity rates were reported as high as 80% for synthetic patches.

**Conclusion:** Biological patches appear to have higher recurrence rates than synthetic patches, whilst musculoskeletal deformities are associated more with synthetic patches. Development of new patch materials e.g. Biodesign®, use of composite patches, and modifying technical factors may reduce recurrence and complication rates.

### **An audit to assess any significant drop in the hemoglobin level after partial nephrectomies**

*Al-Gburi, Saleh*

**Introduction:** Increased detection of small renal masses in the last two decades has led to a greater utilisation of partial nephrectomy. This audit aims to assess haemoglobin level changes in patients who underwent a partial nephrectomy.

**Methods:** From June 2014 to October 2023, a review was conducted of the electronic medical records of every patient who underwent partial nephrectomy treatment for a renal lesion at the Wirral University Teaching Hospitals. 295 patients were included in the final analysis.

A retrospective assessment of haemoglobin levels preoperatively and 1 day postoperatively involved 295 patients.

**Results:** The results showed that there was no significant drop in haemoglobin levels in most of the patients.

**Conclusion:** For most people with small kidney tumours, partial nephrectomy with preservation of the renal parenchyma should be considered instead of radical nephrectomy, which can lower kidney function and raise the risk of heart disease and death over the long term.

This audit confirms that partial nephrectomy is a safe procedure with minimal blood loss and without a significant drop in haemoglobin level in patients who had the procedure.

**Artificial muscles: the intersection between biology and technology***Birmpas, Kyriakos*

**Introduction:** This study explores the intersection of tissue engineering and artificial actuation systems, focusing on bioartificial muscles for potential applications in neurorehabilitation.

**Methods:** In the present paper, we are reviewing literature data from scholarly databases to document the multitude of emergent technologies for creating synthetic muscles for amputees and patients with myopathies.

**Results:** Tissue engineering strategies utilizing biomaterials present promising solutions. Two main approaches are discussed: implanting isolated muscle cells in vivo or developing functional 3D muscle tissue in vitro, and in situ tissue engineering utilizing biomaterials with cytokines or paracrine signalling cells. Efficient 3D skeletal muscle culture models, employing hydrogel-based and self-assembled techniques, are proposed to overcome the limitations of traditional 2D cell culture. Biomaterials such as collagen, fibrin, and hydrogels are explored to create a biomimetic muscle microenvironment, providing cues for rapid muscle development and function.

**Conclusion:** Bioartificial muscles, integrating tissue engineering and artificial actuation systems, present a promising avenue for neurorehabilitation. The study outlines the potential applications in addressing injuries and providing advanced models for research and drug testing. These advancements offer new horizons for enhancing rehabilitation outcomes and understanding the intricacies of muscle-related conditions.

**Crush injuries to lower limbs in a major UK trauma centre: A comprehensive observational study on mechanisms, injuries, management, and complications***Rama, Essam; Jayawant, Saania; Zhang, James; Krkovic, Matija*

**Introduction:** Crush injuries result from physical compression of muscles and may lead to crush syndrome, which describes the systemic manifestations of traumatic rhabdomyolysis such as acute kidney injury. Early fluid resuscitation and surgical intervention is key. This retrospective study aims to characterise such cases.

**Methods:** Patient with lower limb crush injuries were identified from an internal database. Non-crush injuries and patients under the age of 18 were excluded. Types of injuries, management, and complications were extracted.

**Results:** 27 patients were included. Patients were categorised into two groups according to site of injury above the talus (A) or isolated injury to the foot (B). The right leg (37%) was the most frequently injured site. Mechanisms included being run over by vehicles (37%) and being crushed by, between, or inside vehicles (29.6%). Fractures were the most common acute injuries (59.2%). Group A experienced a greater injury burden including fractures, rhabdomyolysis, and compartment syndrome. Fluid resuscitation was required in 63% of patients, 70.4% received intravenous antibiotics, and surgical management consisted of 58 operations. Systemic

complications such as sepsis and acute kidney injury were seen in group A but not group B.

**Conclusion:** Crush injuries in the non-disaster setting show distinct mechanisms and injury patterns. Those with crush injuries to the leg more closely resemble a patient cohort seen in the disaster setting.

### **Outpatient surgical referrals from primary care providers**

#### **for people experiencing homelessness: A chart review from Hamilton, Canada**

*McDonald, Madeline; Huan, Peter; Hircock, Caroline; Pizzola, Christina; McIlveen, Marcie; O'Shea, Timothy; Lévis, Carolyn; Cadeddu, Margherita*

**Introduction:** People experiencing homelessness (PEH) suffer from a high burden of surgical conditions and face many barriers to accessing care. Our aim was to describe the unmeasured and unmet need of surgical care through outpatient surgical referrals.

**Methods:** This is a retrospective review of electronic patient charts from the Shelter Health Network, a health care and social service organization serving PEH in Hamilton, Canada. The review spanned a two-year period from 2017-2018 and included referrals to all outpatient surgical services (except ophthalmology) and endoscopy.

**Results:** 167 surgical referrals were sent for 129 patients over the two-year period. The average age of patients was 46 years, and 95% had provincial health insurance. 95% of referrals resulted in a scheduled appointment, and 58% resulted in the patient seeing a surgical provider. Overall, 63 surgical procedures were proposed and 62% of these were completed. This completion rate was similar between minor and major procedures. Patient, provider and system factors contributed to patients not receiving care.

**Conclusion:** The vast majority of referrals resulted in a scheduled appointment, however half of PEH were seen by a surgical provider and just over half received a proposed surgical procedure. Barriers identified were divided into systemic barriers, provider barriers and patient barriers. This project was funded by the MacGIObAs Global Surgical Scholar Research Bursary, McMaster University, Canada.

### **Surgical Management of Traumatic Aniridia using Scleral Fixation of Artificial Iris Implant - A Case Report in Ophthalmology**

*Vilkelyte, Virginija; Coelho, Maria; Roberts, Harry*

This report details a case of a 78-year-old male patient who underwent insertion of a HumanOptics artificial iris (CustomFlex®) with scleral fixation following severe ocular trauma, leading to the complete loss of the iris (aniridia). The patient had a pre-existing scleral fixated intraocular lens (IOL) due to prior complicated cataract surgery.

**Case Description:** The patient with a background of angle-closure glaucoma underwent left

cataract surgery, encountering an unstable lens and vitreous prolapse, resulting in a vitrectomy and insertion of a gortex-sutured IOL in May 2021. A traumatic event in August 2021 affecting the same eye resulted in complete aniridia in the left eye which reduced the patient's vision to 6/30, and caused constant glare symptoms.

**Conclusion:** The patient underwent scleral fixation of the iris in September 2023. Due to the presence of the pre-existing sutured IOL sited approximately 2.8mm posterior from the limbus, the iris implant was fixated at 1.8mm posterior to the limbus. The surgery achieved excellent anatomical results and improved symptoms. However, there was a persistently high intraocular pressure(IOP)(maximal IOP = 50 mmHg) despite maximal medical management necessitating Ahmed valve implantation in November 2023. Visual acuity improved from 6/30 pre-op to 6/19 postoperatively and at last review IOP was 8 on no medications.

This report highlights the complexities and challenges faced in managing traumatic aniridia with an already in situ scleral fixated implant.

### **The effectiveness of surgical intervention pertaining to painless foot drop caused by lumbar disc herniation: a systematic review and meta-analysis**

*Wellington, Jack; Al Baaklini, Vera; Fanti, Andrea; Hasham Ali, Syed; Thayamanavan, Shivarangan; Al Jishi, Alaa; Khoshhal, Morteza; Kotaich, Jana; Hamza, Amjad; Iqbal, Neelofar*

**Introduction:** Since painless foot drop is an extremely rare presentation of lumbar degenerative disease, there is currently a paucity of evidence on management and outcomes which causes a lack of standardized treatment provided to patients. Our systematic review aimed to determine the effectiveness of surgical intervention concerning conservative management in patients with painless foot drop.

**Methods:** A systematic database search was performed across PubMed/MEDLINE and Cochrane Library, between October 2022 and January 2023. Only studies reporting on painless foot drop due to degenerative lumbar disease in adults were included. Foot drop was determined by assessing the Medical Research Council (MRC) power grade of foot dorsiflexion, specifically defined as a Manual Muscle Testing score of 3 or lower were included.

**Results:** 578 articles were screened and only 6 met the inclusion criteria. A significant association was demonstrated between the timing of the decompressive surgery (i.e., early decompressions performed better than delayed), MRC grade pre-operatively, and postoperative recovery. Relationships between age at surgery and higher rates of recovery could not be established.

**Conclusion:** This is the first systematic review to explore the outcome of surgical versus conservative therapy for painless foot drop. The findings of this systematic review indicate that the duration of foot drop weakness and MRC grade before intervention were strong predictors of surgical outcome.

## Surgical Training and Patient Education

### **A full-cycle audit of 'Safe' Surgical handover practices out-of-hours (OOH) at a District General Hospital**

*Bin Aizan, Luqman Naim; Shakoor, Zainab; Oldfield, Frances*

**Introduction:** To assess adherence to RCS 'Safe Handover' guidelines out-of-hours (OOH) within a general surgery department and identify areas in which handover practices can be improved.

**Methods:** 10 OOH surgical handovers were audited in September 2023 against RCS 'safe' handover guidelines. Results were analysed and presented in the local departmental audit meeting.

Presentation slides with our findings were circulated within general surgery and a handover template with key aspects of RCS handover guidelines was created, included in departmental inductions and placed on the handover table as a physical prompt. In November 2023 a further 10 OOH handovers were re-audited.

**Results:** Various aspects of the RCS 'safe' handover performance descriptors demonstrated significant improvement. The Patient brief (80% from 0%) and educational opportunities (80% from 0%) showed greatest improvement. Audibility of only one speaker (90% from 30%), rollcall performed (70% from 10%), clarity of patient management plans (90% from 50%), and awareness of on-call overnight consultant (80% from 30%) also improved.

**Conclusion:** Introducing a handover template during OOH general surgery handovers demonstrated improved adherence to RCS guidelines. Consistency is required to maintain both patient and doctor safety considering the frequent rotation of doctors. Educational opportunities were improved here and must be maximised following the European Working Time Directive (EWTD) and transition to shift-based working.

### **Accuracy of Axillary Ultrasound and FNA in breast cancer and avoiding unnecessary operations: a Closed-Loop Audit**

*Kamal, Tasnim; Tayeh, Salim; Banks, Jamie; Spyrou, Yannis*

**Introduction:** Breast cancer patients with abnormal pre-operative axillary ultrasounds (AUS), require lymph node (LN) fine-needle-aspiration (FNA). Our 1st cycle recommendation was that: patients who had abnormal LNs on AUS, with a normal FNA, should receive a repeat FNA or core biopsy (CBx). If this is abnormal, mastectomy and Axillary Node Clearance can be performed in one operation rather than two.

**Methods:** 149 vs 155 patients were included in 1st and 2nd cycles respectively. Patients without axillary surgery, lost to follow-up, or on primary endocrine treatment, were excluded. 1st cycle intervention included education and posters in the department to encourage use of repeat FNA/CBx.

**Results:** Our 2nd cycle demonstrated sensitivities of 74.5% and 60.0% for AUS and FNA

respectively (1st cycle sensitivities: AUS 78.0%; FNA 56.3%). Both cycles exceeded sensitivity standards set by the Royal College of Radiologists (AUS 50%; FNA 28%). 80/155 patients had FNA, of which 33 had confirmed LN metastases. 13/33 of patients with confirmed LN metastases in the 2nd cycle, had negative/inconclusive initial FNAs; 77% of these patients had repeat FNA/CBx confirming metastases, and so an additional 10 patients avoided a 2nd operation.

**Conclusion:** 1st cycle recommendations were successfully implemented, FNA sensitivities improved between cycles, and 10 unnecessary operations were avoided. In future, a shift towards CBx may further improve sensitivity/specificity of LN metastases detection.

### **Analysis of Delays in Pathway causing Negative Clinical Impact: Time for Change**

*Borra, Poojit; Lau, Jessica; Marla, Ananya; Parthiban, Sunil; Butler, Peter; Ponniah, Allan*

**Introduction:** Skin cancer rates in the UK are 250,000 annually and are due to increase by 60% in the next decade. This increased demand may lead to delays in treatment and adverse patient events. The objective of this study is to quantify delays and identify the main causes.

**Methods:** Over the last 10 years the skin cancer service has grown from 200 referrals/month to approximately 750. A deeper analysis of data from 2021 to 2023, consisting of 26,114 referrals to the Royal Free Hospital was conducted. Pathway breaches were collected prospectively and analysed using root cause analysis.

**Results:** 1326 referrals required treatment for suspected skin cancer. 657 patients breached the two week diagnostic wait. Results for the root cause analysis identified the main causes for delays as being: admin delay (26%), inadequate capacity (12%), medical delay (9%) and patient initiated delay (7%), etc. 87.9% of patients who missed the 31 day treatment target also missed the 2 week wait (2WW) target for their initial appointment.

**Conclusion:** Admin issues account for majority of pathway delay, notably within the 2WW referrals. Missing the 2WW target significantly increases the risk of a patient missing the treatment targets which may lead to clinical harm. Inadequate capacity in clinics cause delay in our pathway suggesting that the current infrastructure is not sufficient to meet patient needs. This analysis has identified the key issues which need to be addressed to optimise patient transit through the treatment pathway.

### **Artificial Intelligence in Virtual Reality Simulated Surgical Training**

*Daniel, Akshatha; Bhuiyan, Zunira Areeba*

**Introduction:** Artificial intelligence (AI) in surgical education aims to support performance assessment and provide feedback for surgical trainees. Virtual reality (VR) uses an interactive learning environment for novice surgeons, minimising the risk of potential complications from operating on patients without adequate training. Published studies have determined the effectiveness of incorporating AI in VR surgical simulation. The aim of this review is to explore the benefits of AI in surgical training.



**Methods:** A literature search was conducted using PubMed, ScienceDirect and Google Scholar using the terms ‘Artificial Intelligence’, ‘virtual reality’, ‘surgical training’ and ‘surgical education’. Strict exclusion and inclusion criteria were applied. The CASP tool was used for critical appraisal.

**Results:** The incorporation of AI into VR surgical simulation has helped add objective feedback to practice sessions. AI can measure kinematic data such as instrument trajectory and position, performance data such as bleeding and completeness of resection. The data processed can then be used to determine how well the surgery was done and to provide objective feedback for improvement. Limitations include the price of purchasing the equipment for VR and how augmented reality could be the cheaper alternative.

**Conclusion:** The incorporation of AI in VR simulation training has evident benefits, but further research is required before it becomes more accessible in surgical education.

### **Assessment of male patients in triple assessment breast clinics after introduction of updated ABS guidelines – a quality improvement project**

*Ko, Ina; Pagaki-Skaliora, Marina; Joshi, Meera; Rizki, Hirah; Hogben, Katy; Thiruchelvam, Paul; Leff, Daniel; Boland, Michael*

**Introduction:** Gynaecomastia represents the most common reason for male attendances to breast clinics in the UK. This study aims to evaluate concordance of clinical practice to national guidelines at a tertiary breast unit.

**Methods:** 2021 ABS Gynaecomastia guideline was utilised. Two cycles were conducted: Jun-Aug 2022, and Feb-May 2023. An educational intervention including development of a poster for clinical areas was implemented, with cycle 2 evaluating for improvements.

**Results:** Cycle 1 and 2 had 62 and 97 patients respectively. Both cycles showed similar documentation rates of P stage (1-65%,2-70%), medication history (1-71%,2-75%), alcohol history (1-27%,2-27%), recreational drug use (1-24%,2-34%), steroid use (1-21%,2-32%) and family history (1-66%,2-73%). In both cycles the majority underwent imaging (1-94%,2-97%). Gynaecomastia was the most common diagnosis (1-68%,2-64%), with 1 cancer diagnosis across both cohorts. 6% of cycle 2 vs 24% of cycle 1 underwent further secondary care investigations. More discharges from clinics were observed in cycle 2 (2-90%,1-63%). 17% of cycle 1 discharge letters gave variable advice for further GP investigations, whilst 33% of cycle 2 letters gave explicit advice in accordance with guidelines.

**Conclusion:** Post-intervention there was reduction in intra-departmental variability in investigation of gynaecomastia. Imaging rates remained high, with likely multi-factorial causality. Documentation rates did not significantly improve, which introduction of a proforma may address.

**Bridging Communication Skills Gaps in Surgery: A QIP and Closed-Loop Audit***Kamal, Tasnim*

**Introduction:** We initiated a comprehensive two-pronged QIP to 1) enhance skills and confidence of surgical juniors in navigating difficult conversations, and 2) improve documentation of post-operative patient and NOK discussions after ITU step-down to ward, in-line with NICE guidelines (CG83-1.13).

**Methods:** Between September and November 2023, interventions included developing a communication skills workshop with the local palliative care department, and introducing colored cards in paper notes to flag patients needing NOK discussions. Pre- and post-workshop surveys were completed by juniors.

**Results:** Between cycles, NOK discussion documentation rates improved from 36% (n=14) to 51% (n=15) for laparotomy patients; this also improved for ITU step-down patients, from 30% (n=10) to 50% (n=8).

Pre- and post-workshop surveys, utilizing a 1-to-5 scale, measured confidence levels of junior doctors for difficult discussions, with 13 and 9 respondents, respectively. High confidence scores (4 or 5) for different discussion types, were more frequently awarded post-workshop: DNACPR (31% vs. 89%), end-of-life (31% vs. 55%), emotionally-charged (31% vs. 78%).

**Conclusion:** Our interventions have improved confidence of surgical juniors when navigating challenging conversations. Our ongoing efforts include expanding our 'communication in surgery' workshop series, and a re-audit of NOK discussion documentation to objectively measure positive changes post-intervention.

**Enhanced recovery in cranial surgery (ERACraS) - A single-centre quality improvement study***Abul, Mohammad H; Sescu, Daniel; White, Mark A; Robson, Michael; Ferguson, Jan; McDermott, Frank; Kaliaperumal, Chandrasekaran*

**Introduction:** Our aim was to establish an Enhanced Recovery After Cranial Surgery (ERACraS) protocol for patients as part of a quality improvement project (QIP) with the intention of reducing hospital length of stay (HLOS).

**Methods:** This QIP was carried out in the Department of Neurosciences (DCN), Edinburgh, over two four-month periods. A total of 40 patients over 18 years of age undergoing elective craniotomy surgery under a sole neurosurgeon were invited to take part in this QIP.

**Results:** 19 patients received conventional perioperative care (pre-ERACraS group) during December 2021-March 2022, and 21 received care according to the novel ERACraS (ERACraS group) during June-September 2022. Regarding supra-tentorial surgery, there was a reduction of 73% in HLOS in the ERACraS group. No change was observed in infra-tentorial surgery. Overall, the ERACraS protocol reduced HLOS by 50% in cranial surgery.

**Conclusion:** The QIP data from ERACraS in our unit has shown that implementing ERAS protocols is

feasible. A reduction in HLOS has implications for patient morbidity, mortality, and quality of care. We endeavour to collect long-term data by collaborating with neurosurgical units across the UK and Ireland to validate its feasibility and sustainability as part of a major QIP in neurosurgical practice. This can be potentially adopted by neurosurgical centres across the globe in a safe and sustained manner.

### **Improving the management of epistaxis as per ENT UK guidelines at St Mary's Emergency Department through targeted SHO teaching and an embedded Cerner Autotext: A Quality Improvement Project**

*Gera, Ritika; de Rohan, Celia; Pankhania, Rahul*

**Introduction:** We aimed to improve the management of epistaxis at St Mary's ED. Our intervention was targeted teaching to St Mary's ED SHOs. We assessed concordance with ENT UK guidelines and clinician confidence pre-and post-intervention.

**Methods:** For this cycle, we used the QLIK Sense Database to search ED Encounters July-September 2023 for discharges marked 'epistaxis' or 'bleeding from nose'. Data was gathered to assess whether history and examination was documented according to ENT UK epistaxis guidelines. We subsequently delivered teaching to 9 SHOs emphasising the guidelines. Clinician confidence was assessed using surveys, and we repeated data collection for a one-month period following the teaching session.

**Results:** Pre-intervention data was collected from 20 patients; 75% had documented history and examination of the nose as per the guidelines. This improved to 90% for examination and 100% for history from a post-intervention data set of 10 patients. Before the intervention, 44% of clinicians felt extremely or very confident managing acute epistaxis, which improved to 78% post-intervention. There was a paucity of standardised documentation, and to address this we have created a Cerner autotext for the next cycle.

**Conclusion:** Our teaching session increased documentation of epistaxis history and examination as per ENT UK guidelines. It also improved clinician confidence in managing epistaxis. An autotext is being implemented into Cerner for the second cycle.

### **Navigating the Landscape of Live Surgery: A Scoping Review on Safety, Impact, and Future Perspectives**

*Rama, Essam; Khanduja, Vikas*

**Introduction:** Live surgical broadcasts (LSBs) have a rich history as an educational tool, but are not without patient safety concerns. In response, "as-live" surgical broadcasts (ALSBs) have emerged as an alternative. This scoping review aims to map out the literature surrounding live surgery.

**Methods:** A systematic search of PubMed, MEDLINE and Ovid Embase was performed. Primary

studies describing outcomes of live surgical interventions, surveys of audience members, and surveys of surgeons were included. Studies were classified into four categories: effects on patients, the impact on surgeons, the impact on the audience, and alternatives to live surgery. There was notable overlap between categories.

**Results:** 36 articles were included for analysis. 18 studies investigated patient outcomes after live surgery, 10 surveys assessed the impact on patients, and 8 surveys assessed the impact of performing live surgery on surgeons. 16 studies assessed the impact of live surgery on the audience.

**Conclusion:** The available literature would suggest live surgery is safe for patients. The majority of studies indicated comparable complication rates to routine procedures. However, ethical concerns and perceptions of patient risk among both surgeons and audience members were mixed. The educational value of live surgery was emphasised, but opinions on the future of live surgery differ, including preferences for live over as-live surgery and a potential shift towards simulation technology.

### **Optimising Cutaneous Abscess Management in General Surgery**

*Dean, Lydia; Schulenburg, Edward; Bhakar, Ranjeet; Winch, Alice; Stan, Alexandru*

**Introduction:** Abscesses are a very common pathology. There is significant variability in the management of abscesses, and thus no general cutaneous abscess NICE guidelines exist. This quality improvement project aimed to optimise cutaneous abscess management in one district general hospital.

**Methods:** Data was collected for ambulatory General Surgery patients with cutaneous abscesses in September 2023 by reviewing the Surgical Receiving Unit (SRU) discharge summaries. A department presentation and teaching session on abscesses was then delivered to General Surgery staff. Data collection was repeated in November 2023 to monitor for any improvement in abscess management.

**Results:** 51 patients were admitted via SRU with a cutaneous abscess in September 2023, and 37 in November 2023. A similar percentage had conservative management of the abscess (23% in September vs 22% in November), but there was an increase in I&D performed under LA (8% vs 19%) and decrease in I&D performed under GA (69% vs 59%). There was also an increase in the percentage of patients appropriately not started on antibiotics (73% vs 46%).

**Conclusion:** A department presentation and teaching session on abscesses delivered to staff can improve abscess management in general surgery, decreasing use of unnecessary antibiotics and general anaesthetics whilst maintaining patient safety. It is important to repeat this audit to monitor for consistent improvement.



