



ANNUAL REPORT 2024

WITH YOU 100%

INTRODUCTION

Over the past twelve months, the Institute of Sport, Exercise & Health (ISEH) has seen much positive and exciting progress in advancing our clinical, academic and educational plans and work streams. It therefore gives us great pleasure to share the 2024 annual report with our team, our partners and our friends in order to showcase some of the excellent work that has taken place.

Over the course of 2024, the ISEH family has continued to grow with valuable new additions across our clinical, academic, and educational teams providing us with further expertise, knowledge, and capability to drive forward our workstreams. This is reflected in the overwhelmingly positive student satisfaction scores received from Undergraduate and Masters students at ISEH.

Working with UCL, we continue to develop and expand our educational faculty with Professors Courtney Kipps and Eleanor Tillet fronting the Sports MSc Programme, Associate Professor Hara Troulli leading the Performing Arts programme, and Associate Professor Flaminia Ronca leading our Undergraduate programmes.

Our academic and research programme has continued to blossom over the past year, with Professor Mark Hamer significantly growing his research team, and increasing the ISEH's academic contributions in the fields of population health and sport and exercise medicine. Colleagues from across the organisation have led on a range of exciting new research projects investigating different aspects of elite sport.

Professor Mathew Wilson continues to collaborate with the national governing bodies of football and rugby to establish a ground-breaking study investigating the effects of concussion on professional players in these sports. Dr Flaminia Ronca, Professor Mike Loosemore, and Dr Jo Blodgett have all had significant national media attention over the past year for their research exploring the health of female elite athletes; and Professor Mark Hamer and Dr Pinto Pereira's respective research into physical activity and population health has also sparked media interest.

The ISEH clinical services have expanded and improved with new specialist clinics established to better manage the needs of our patients. Along with these new clinics, we have appointed a number of new world-class clinicians to provide the highest quality of care, and to grow the clinical reputation of the ISEH.

The ISEH is based on a collaboration with our key partners, and it is pleasing to see that these relationships have only been enhanced over the past year, with partners working more meaningfully together across a range of ISEH-led projects. The UK Sports Institute has worked closely with HCA to improve the clinical services at ISEH for UKSI funded athletes, particularly due to the additional focus of the Olympics and Paralympics, UCLH are treating more NHS patients at ISEH than ever-before, UCL's courses at ISEH are going from strength-to-strength, and all ISEH partners have been collaborating across a range of research themes.

We are grateful to the entire team for their versatility, their resilience and their strong support, and we are grateful to all our partners for their vision and collaboration.

We hope that the brief snapshots that follow give you an insight into the outstanding clinical work, research, teaching, training and education that take place at ISEH.



Professor Fares Haddad
Director, ISEH



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ABOUT THE ISEH

The Institute of Sport, Exercise & Health (ISEH) was established in 2013 with a £10m grant from the Department of Health as a major legacy project from the 2012 London Olympic Games.

The ISEH's vision is to help people achieve their full potential through leading active & sporting lifestyles, and will achieve this through providing excellence in the treatment, research and education of sports injuries & illnesses to support elite sport and improve the physical activity of the nation.

To support this aim, the ISEH's objectives are to:

- Provide high quality sport & exercise medicine clinical treatment and an excellent patient experience for people of all sporting abilities.
- Lead cutting-edge research to improve the treatment & prevention of sports injuries & improve the nation's health & physical activity
- Deliver high quality education to sport & exercise medicine students & healthcare professionals to enhance their care of people at all levels of sporting ability.

The ISEH is a partnership between UCLH (University College London Hospitals, NHS Foundation Trust), HCA Healthcare UK, University College London, the UK Sports Institute, and the British Olympic Association. It is also a founding member of the National Centre for Sport and Exercise Medicine (NCSEM).



KEY ACHIEVEMENTS IN 2024

This Annual Report details the good work that the ISEH has undertaken over the course of 2024. Below are some of the highlights of the Institute's key achievements this year.

CLINICAL ACTIVITY

The ISEH remains committed to providing high-quality, multi-disciplinary sport and exercise medicine clinics for both private and NHS patients. We continually seek ways to enhance our clinical services, leading to the introduction of new clinics tailored to patient needs. Our clinical pathways are consistently refined to ensure the highest standard of care for the maximum number of private and NHS patients.

- Over 8,100 NHS patient appointments have been held at The ISEH in 2024.
- During 2024 the ISEH has seen more private patients than any previous year.
- The ISEH Mobile Cardiac & Respiratory Screening service continues to grow, providing a unique specialised service to elite sports clubs across the UK and Europe.
- The ISEH supported a number of elite athletes with their preparations ahead of the Olympic and Paralympics Games in Paris.



RESEARCH

Academic research forms a large part of the work that the ISEH undertakes, and this year has been highly productive with significant amount of research outputs from our ISEH colleagues, with new novel projects being initiated, research funding being secured and a wide diversity of findings being published.

This year ISEH colleagues have:

- Produced over 90 peer-reviewed papers.
- Submitted a number of new research applications across a range of topics that align to the ISEH research themes in sport and exercise medicine and population health.
- ISEH colleagues have successfully secured a number of research grant approvals enabling ISEH to undertake some novel research studies over the coming years.
- Led a large number of research projects investigating outcomes in both elite sport and population health.

EDUCATION

Student numbers at the five UCL degree courses that are held at the ISEH have continued to increase over the past year, demonstrating the ongoing popularity and reputation of these courses.

Encouragingly, student satisfaction scores have also significantly increased, reflecting positively on the hard-work that the ISEH and UCL teaching staff have invested in ensuring that the quality of both teaching and student experience remains the core priority.

A large number of graduates from the ISEH courses have successfully been appointed to roles in elite sport or in other sport and exercise medicine fields, demonstrating the vocational relevance of our courses and the esteem and credibility that employers attach to them.



CLINICAL ACTIVITY

THE ISEH PRIDES ITSELF ON PROVIDING WORLD-CLASS CLINICAL CARE TO OUR PATIENTS

We provide excellence in the diagnosis, prognosis and treatment of sports injuries and illnesses to both elite athletes and exercise enthusiasts.

The ISEH offers private clinical care through our partner HCA Healthcare UK, but also provides public healthcare through NHS patient appointments from UCLH. We are proud that we provide and offer the same quality of medical care and clinical support for amateur and recreational athletes as we do for Olympians and world-leading sports stars.

The ISEH regularly reviews our clinical services to ensure that we continue to provide the highest quality care for our patients, along with new clinical services that meet the needs of both elite and recreational athletes. Over the past year we have optimised our clinical delivery to enable us to see more patients across both the private and NHS sectors at the ISEH than any previous year.

THE ISEH TAKES PRIDE IN DELIVERING CONSISTENT HIGH-QUALITY CARE & CLINICAL SUPPORT TO BOTH ELITE & RECREATIONAL ATHLETES, MIRRORING THE LEVEL OF CARE & DEDICATION WE OFFER TO OLYMPIANS.





NHS CLINICAL ACTIVITY

The ISEH takes pride in providing NHS patients with the same exceptional standard of clinical care, attention, and service throughout their journey from diagnosis to treatment and recovery, mirroring the level of care that elite professional athletes receive through our private care pathway at ISEH.

UCLH clinics take place at the ISEH on two mornings a week to treat NHS patients. Over the past year 8,100 UCLH (NHS) patient appointments were held at the ISEH, with over 2,100 of these appointments using the ISEH's excellent imaging facilities (MRI / Ultrasound / X-ray).

8,100

UCLH (NHS) patient appointments held at the ISEH*

2,100

imaging (MRI / Ultrasound / X-ray) UCLH appointments at the ISEH.*

*This data is accurate as of 25 September 2024

// I have received prompt, rigorous support from this clinic. Many thanks.... for being so thorough, attentive, and caring. **//**

5* NHS patient review, via Google.

PRIVATE CLINICAL ACTIVITY

The ISEH's private clinics are managed by HCA International, and throughout 2024 we have continued to work with our expert consultants in sport and exercise medicine and the multi-disciplinary teams to provide a world-leading service.

2024 has seen a record number of private patient appointments at ISEH across outpatient consultations, diagnostic imaging and ultrasound guided treatments, and physiotherapy treatment. Key growth areas over the past year include musculoskeletal medicine, complex concussion (including paediatric), sports cardiology and rehabilitation. We have further refined our service provision and work closely with the Princess Grace Hospital to provide a connected pathway for both elite and recreational athletes. Our portfolio of services includes:

- Musculoskeletal and Sports Injury Clinic
- Sports Respiratory Clinic
- Advanced Brain Health Clinic
- Rehabilitation
- Concussion Clinic
- Sports Podiatry Clinic
- Sports Cardiology Clinic
- Sports Psychology

The ISEH mobile cardiac and respiratory service continues to grow. Our clinicians have travelled to numerous men's and women's professional football clubs to provide cardiac screening for first team and academy players. This unique service sees the ISEH manage the entire patient pathway in the event of an abnormal ECG, organising follow-up testing that may include echocardiography, an exercise stress test and cardiac MRI, all on the same day. This rapid access to advanced testing ensures elite athletes are able to return to competition sooner and reduces the psychological burden of waiting.

The ISEH respiratory team supported a significant number of athletes prior to the Paris Olympics. Our one-stop shop approach to respiratory medicine includes continuous laryngoscopy during exercise (CLE) and/or eucapnic voluntary hyperpnea on the same day as initial consultation. These services allow our clinicians to better detect laryngeal obstruction and provides athletes with solutions to breathing difficulties during competition, whilst also reducing travel time and unnecessary administration for the athlete.

Our work in delivering the Advanced Brain Health Clinic has resulted in over 200 former professional rugby players and 100 former professional football players being seen at the ISEH in the past year. We also continue our partnership with the International Head Injury and Concussion Research Foundation (ICHIRF) providing diagnostic imaging support service to this important research project. The number of paediatric athletes accessing our complex concussion service grew significantly, and we have plans to develop this service line further in 2025.

Finally, we observed substantial growth in our ISEH elite concierge service, a service that provides 24/7 support to athletes and their families in accessing healthcare services quickly and efficiently. This year, the ISEH elite concierge service has helped hundreds of individuals and their families with a range of requests from booking urgent hospital appointments to providing medical screening during transfer windows.

// I was feeling very anxious but the Doctor I saw quickly put me at ease.... I was impressed & relieved. Reception staff were also helpful & polite. Great job! **//**

5* NHS Patient review, via Google



// Easy to communicate with, I was seen in a timely manner, dealt with in a professionally friendly manner and am totally satisfied with the consult and treatment given. Commend to all. //

5* Patient review, via Doctify.



// Great medical staff. Very nice and world class facilities //

5* Patient review, via Doctify.

CASE STUDY: THE ADVANCED BRAIN HEALTH CLINIC AT ISEH

The Advanced BRAIN Health Clinic (ABHC) at ISEH is a specialist pathway that offers a unique provision of clinical care combined with cutting-edge sports research for retired elite rugby and football players, who are assessed on three occasions over a four-year period for any time-related changes in brain health. Led by Prof. David Sharp and Dr. Richard Sylvester, the ABHC is delivered at the ISEH in partnership with Imperial College London, jointly funded by The Rugby Football Union, Premiership Rugby, and The Football Association. It also receives strong support from the Professional Footballers' Association and the League Managers Association.

During 2024, the ABHC has recruited 250 rugby players to the study, and reached our 100th footballer in May earlier this year. 45 rugby players were also welcomed back for their two-year follow up visit. Besides advanced imaging, biomarker analysis and neurocognitive assessment, the follow up visit at the clinic also includes a vascular health assessment and a cardiorespiratory fitness test, and we monitor physical activity and sleep behaviour remotely using state-of-the-art sensors and wearables.

Over the past year the ABHC clinical team have also been engaging with the wider community to communicate and discuss some of the preliminary research findings. During February's ISEH Annual Conference, Prof. Mat Wilson, Dr. Richard Sylvester, Prof. David Sharp and Dr. Neil Graham all spoke on a range of topics, including the latest approach to diagnosing and managing sports related concussion, traumatic brain injury imaging, and how concussion is related to dementia. Our first scientific paper on the ABHC study protocol, written by Dr. Karl Zimmerman with support from the study team, was published in April in the BMJ Open. In September, the preliminary research findings were presented by the study team at the 2024 meeting of the International NeuroTrauma Society. And with two scientific articles currently under peer-review, we will be disseminating further scientific insights from the ABHC in the months ahead.





CASE STUDY: RESPIRATORY HEALTH IN ELITE ROWING

Professor James Hull, ISEH Consultant Respiratory Physician, and Zander Williams, Pulmonary Exercise Physiology Research Fellow, provided clinical care and conducted research for British Rowing as part of their preparations for the Paris Olympic Games.

Published in the British Journal of Sports Medicine, the primary objective of the study was to assess the respiratory health of elite rowers in preparation for Olympic competition, examining the frequency and types of respiratory conditions they experienced. Specifically, the study aimed to evaluate the incidence of acute respiratory infections and chest wall injuries among the rowers and assess the overall respiratory health of the athletes.

The research findings identified that 81% of the rowers reported at least one respiratory issue, and over half had multiple problems. The most frequently reported issues included sinus problems, allergies, and breathing pattern disorders, with nearly two-thirds of the rowers experiencing a problematic cough during physical activity.

Both male and female athletes had similar rates of acute respiratory infections, but women exhibited a higher incidence of chest wall injuries. Additionally, younger rowers with larger lung capacities were more susceptible to chest wall injuries.

These elite athletes benefited from the support and treatment from ISEH's Sports Respiratory Clinic, a multidisciplinary team led by Professor James Hull, who collaborates closely with Respiratory Physiotherapists Julie Moore and Clare-Louise Chadwick. The team brings extensive expertise in sports respiratory medicine, drawing from their experience working with Olympic and professional athletes to help them perform at their peak. They also support individuals facing respiratory symptoms that limit their daily activities, helping them improve their day-to-day function and overall quality of life.

“ Undertaking breathing therapy at the ISEH has enabled me to improve my breathing in pressurised performance situations. The help and support of both the doctors and physios has given me confidence in my ability to keep my breathing pattern under control during races. This has given me the opportunity to perform to my full potential and I no longer feel like I’m held back by my breathing.... I would not have been able to achieve what I have this year without their help! ”

Olivia Bates, Team GB Rower

UK SPORTS INSTITUTE

As a key partner of the ISEH, the UK Sports Institute uses the ISEH and its facilities as an important part of its services in supporting the health and performance of Olympic, Paralympic and other elite athletes.

The UK Sports Institute and ISEH continue to work closely together in providing world-leading clinical and performance support services to aid elite athletes in their training and preparations for major competitions. Athletes from various Olympic and Paralympic sports accessed physiotherapy and sports medicine support at the ISEH during the past year, which proved crucial to medal success in the Paris 2024 Olympic and Paralympic Games. Medals in Diving, Boxing, Para Cycling, Powerlifting and Wheelchair Basketball are attributable to the care that elite athletes received at ISEH.

The close working relationships between the UK Sports Institute, ISEH and HCA UK continues to grow, with HCA consultants working closely with the UK Sports Institute's Senior Physiotherapist Emma Levy, who oversees the care and rehabilitation of a range of athletes, in conjunction with the sports' Chief Medical Officers.

Emma was one of a team of 8 Physiotherapists based at Team GB Headquarters in Paris, providing treatment and recovery support to numerous athletes throughout the Games. Professor Mike Loosemore, Chief Medical Officer for GB Boxing and GB Taekwondo in Paris, oversaw the medical care and well-being of athletes in the squads as part of his role for the International Olympic Committee.





EDUCATION

THE ISEH COURSES GO FROM STRENGTH-TO-STRENGTH WITH AN OUTSTANDING REPUTATION THAT ATTRACTS AND APPEALS TO STUDENTS FROM ALL OVER THE WORLD.



THE ISEH HOSTED FIVE UCL DEGREE COURSES IN 2024:

1. **MSc in Sports Medicine, Exercise & Health**
Now in its 16th year and with student enrolments for the course at capacity. This programme attracts candidates from all around the world and is one of the few Master's programmes in this field to train doctors and physiotherapists alongside other physical therapists and sports scientists thereby replicating the highly multi-disciplinary nature of the specialty.
2. **Intercalated BSc (iBSc) in Sport & Exercise Medical Science**
Highly sought-after degree for medical students which attracts applications from candidates throughout the UK. The programme continues to be very popular and attracts applications from both UCL students and students from other universities.
3. **BSc in Sport & Exercise Medical Science**
Now in its seventh year this degree grounds students with the knowledge and skills to help athletes achieve their performance potential and patients to optimise their health. The programme continues to be very popular, attracting students from all over the world.
4. **MSc in Performing Arts Medicine**
This unique and highly specialised course is in its 5th year of blended delivery with students arriving at ISEH in the spring-term for their practical workshops, oral presentations, and poster displays as well as opportunities to enjoy the ISEH facilities and experience this academic and research environment that supports their studies. Our graduates and staff had a vibrant presence this past year at the PAMA London 2024 Conference at UCL, with a high number of scientific presentations and workshops justifying once more the prime position that UCL and ISEH holds in the international scene of Performing Arts Medicine.
5. **MSc Orthopaedics**
This novel teaching programme in its fifth year, enrolls professional students who aspire to excel in orthopaedics and its allied sub-specialities such as surgeons, physiotherapists, sports practitioners, clinical researchers etc. Students receive both high quality learning, but also through this course have the potential for gaining high-end publications, international presentations and links to the top clinicians in the field.



SUMMARY OF 2024

Around 120 campus-based students rotate through the ISEH teaching suite and another 60 distance learning students join the teaching live online every week across the five sports medicine, sports science, and performing arts medicine degree courses at UCL. Student numbers continue to increase year-on-year, demonstrating the popularity and reputation of these courses.

Student satisfaction scores remain high, reflecting positively on the hard-work that the ISEH and UCL teaching staff have invested in ensuring that the quality of both teaching and student experience remains the core priority. ISEH's undergraduate courses scored 93% for student satisfaction on the National Student Survey (NSS), placing the programme 13% above the average sector score compared to other Russell Group universities.

A large number of graduates from the ISEH courses have successfully been appointed to roles in elite sport or in other sport and exercise medicine fields, demonstrating the vocational relevance of our courses and the esteem and credibility that employers attach to them. An ISEH Alumni Network has been created over the past year and will help to maintain strong links between the ISEH and graduates as they progress on their chosen career path.

“ What a wonderful year at The Institute of Sport Exercise & Health, a world-leading initiative collaboratively between UCL, UCL Hospitals, HCA Healthcare UK, UK Sports Institute, and the British Olympic Association. I would highly recommend this course to anyone who wants to pursue an exceptional career in Sports Medicine. The journey has just begun. ”

MSc Sports Medicine, Exercise & Health Student via LinkedIn

“ The BSc program opened doors to various research and teaching opportunities... it strengthened my interest for Sports and Exercise Medicine and medical education. ”

BSc Sport and Exercise Medical Science Student via LinkedIn.



ISEH ALUMNI NETWORK

This year, the ISEH launched an Alumni Network, bringing together a community of current and former students from both undergraduate and postgraduate programmes.

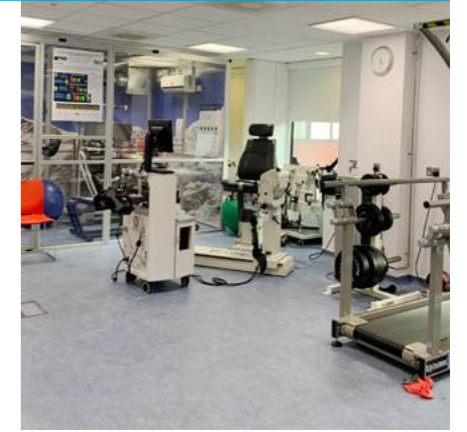
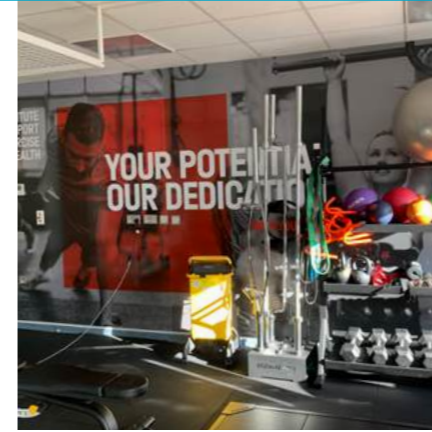
The ISEH Alumni Network offers members a regular alumni e-newsletter and serves as a platform for discussion, collaboration, and networking. It also facilitates resource-sharing between alumni and current students. The network provides updates on events, news, and research from ISEH, ensuring members stay informed and engaged, and that the ISEH continues to support and remain relevant to the alumni past their studies.

Alumni and students are also encouraged to share their own news, research, events, or work experiences to benefit others within the community.

RESEARCH

“ Our research over the last year continues to demonstrate impact across a range of key themes in sport and exercise medicine and population health as we influence and drive these fields forward. ”

Prof. Mark Hamer,
ISEH Chair of Sport & Exercise Medicine Research



Academic research forms a large part of the work that the ISEH undertakes, helping to progress our understanding across a range of research themes in sport and exercise medicine and population health.

2024 has been a highly productive year that has seen a significant amount of research outputs from our ISEH colleagues, with new novel projects being initiated, research funding being secured, and a wide diversity of findings being published. In addition, over the past year we have welcomed to ISEH a number of new colleagues to expand our research capacity.

The full extent of the ISEH's research outputs over the course of 2024 can be seen in the appendix at the end of this document; but in this section we provide a brief snapshot of some of the research activities that our ISEH colleagues have been leading on this year.

ELITE SPORT

A number of research projects undertaken at the ISEH focus on understanding and improving sporting performance in elite athletes. Below are just some of the elite sports research projects conducted through the ISEH during 2024:

- Respiratory Health of Olympic Rowers**
 Prof. James Hull led a study that assessed the respiratory health of elite rowers as they prepared for the Olympic Games. The study found that elite rowers often suffer from acute respiratory infections that can impact their health and performance, and produced a wide range of guidance to support the health of elite athletes.
- Rehabilitation Strategies for Injured Athletes**
 Dr Paul Read is running several projects on assessment strategies of lower limb neuromuscular control in both injured and non-injured athletes and enhancing the efficacy of return to sport assessment strategies following ACL reconstruction. Specific projects he is currently working on include: 1) enhancing decision making in the return to run process following ACL reconstruction; 2) The application of blood flow restriction training and preoperative rehabilitation to augment clinical outcomes following ACL reconstruction; 3) effects of ACL reconstruction on physical performance and kinetic movement strategies; 4) effects of early sport specialization on injury risk and movement competency; 5) quantification and trainability of deceleration to enhance performance and reduce injury risk.
- Female Athletes Injury Occurrence during Menstrual Cycle**
 Dr Flaminia Ronca, Dr Georgie Bruinvels and Dr Jo Blodgett led a novel study that found that elite female football players were more likely to experience a muscle injury in the days leading up to their period compared to when they were on their period. These findings have important implications in helping to better plan female athletes training programmes.

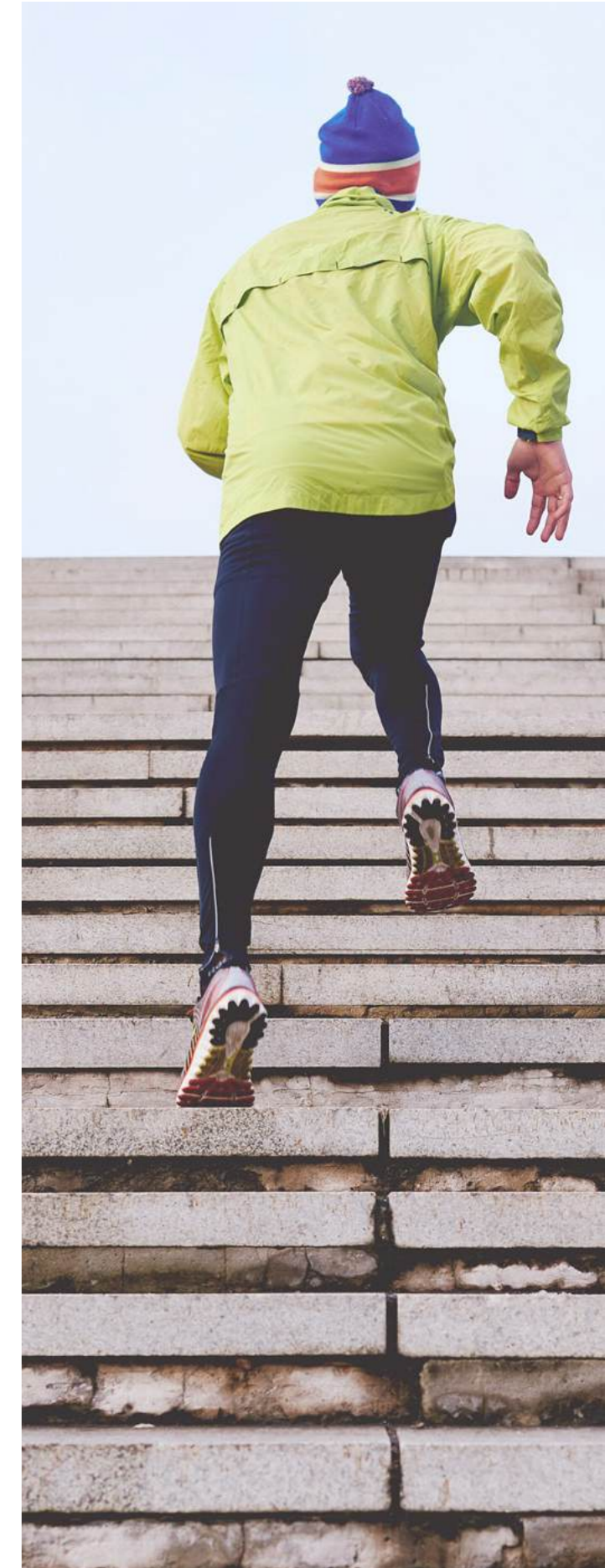


POPULATION HEALTH

The ISEH's research programme does not just focus on elite sport, it also importantly covers research themes that look to understand and implement learning to improve the broader population health. Below are just some of the research projects that ISEH colleagues have been leading on over the past year:

- Leadership of the UCLH Biomedical Research Centre**
 During 2024, Prof. Mark Hamer took leadership of the Obesity Theme within UCLH's Biomedical Research Centre. This aims to promote 'healthy lifestyles' for early prevention of major non-communicable diseases and obesity in the general population. This work will help inform the design and delivery of research that reduces inequalities and increases the reach and impact of diet and physical activity research into under-served populations. The team comprises clinicians and scientists with expertise in obesity, weight loss, physical activity, behavioural science, epidemiology, and nutrition.
- Improving Physical Activity in the General Population**
 Dr Snehal Pinto Pereira is leading a five-year project to better understand causes and consequences of variation in body composition, cardiorespiratory and muscular fitness. (Funded through MRC Senior non-clinical fellowship £1.6M). The main aim of her work is to understand how to maximise and maintain physical fitness levels in the general population, for as long as possible.
- Physical Activity's Impact on Work Productivity**
 Dr Flaminia Ronca is leading a two-year project to understand how nutrition, physical activity and mood interact with each other throughout a working day, and how these might impact productivity at work. Funded by The Compass Group (~£300k), the project will use novel digital approaches to capture daily fluctuations in behavior and mood, combined with non-invasive neuro-imaging techniques.

- Sedentary Lifestyles & Risk of Cancer**
 Prof. Mark Hamer is leading a project, funded by Cancer Research UK (~£589k), to examine the twenty-four hour physical behaviour spectrum and risk of cancer. Low physical activity, high sedentary behaviour, and inadequate sleep are risk factors for cancer, although our understanding of this relationship is limited. This study aims to examine the relationship between these behaviours and cancer incidence through a large observational study with participants wearing activity trackers.
- Physical Activity's Impact on Heart Disease**
 Dr Jo Blodgett and Prof Hamer have published several high impact papers from the international Prospective Physical Activity, Sitting and Sleep consortium looking at 24hr wearables data and cardiometabolic risk profiles.
- Physical Activity & Child Development**
 An important area of research at ISEH has been investigating the role of exercise in the physical and cognitive development of children. Dr Ronca, Prof Loosemore and their research teams have been working with a range of schools and charities, and their findings demonstrates the positive impact that physical activity has on the development of young people (see case study).
- Future Developments in Orthopaedic Surgery**
 Professor Haddad and his team have continued working on the introduction of robotics into orthopaedic surgery, including some randomised trials that were reported in the last year. The team also continue to lead the way with their work on personalised planning and personalised hip and knee arthroplasty surgery. The team also continues to lead on the evaluation and management of sports specific hamstring, quadriceps and groin injuries.
- Police Health & Fitness**
 Dr Flaminia Ronca's ongoing collaboration with the UK Police, in partnership with Joseph Warwick, has led to policy changes in fitness standards and training plans for specialist police forces. Police forces have implemented well-being strategies to support mental health and performance on the job for front line workers. Following multiple joint projects, Flaminia was invited to present her findings at Scotland Yard, and has been acting as a reviewer for the College of Policing, to help inform strategic decision making in performance, fitness and wellbeing policies in British law enforcement.
- Brain-Body Interactions Symposium**
 Dr Flaminia Ronca chaired the inaugural Brain-Body Interactions Symposium at UCL East, where the International Society for Exercise Neuroscience (ISENS) was launched. The symposium was funded by UCL and supported by the ISEH. The conference had 120 attendees from 18 different universities and 3 industry partners. Presenters attended from 14 universities, including 4 international institutions (Harvard USA, Japan, China, Lisbon).





RESEARCH GRANT FUNDING

Much of the ISEH's research programmes are dependent on successful grant applications and financial support through key partners and stakeholders. We continue to be immensely thankful for the ongoing support and the trust that our partners invest in ISEH.

ISEH colleagues have applied for over £10m in grant funding this year, reflecting over 10 applications, to a range of funders.

Below is a summary of just some of the financial support for research projects that ISEH colleagues have received from the following organisations in 2024:

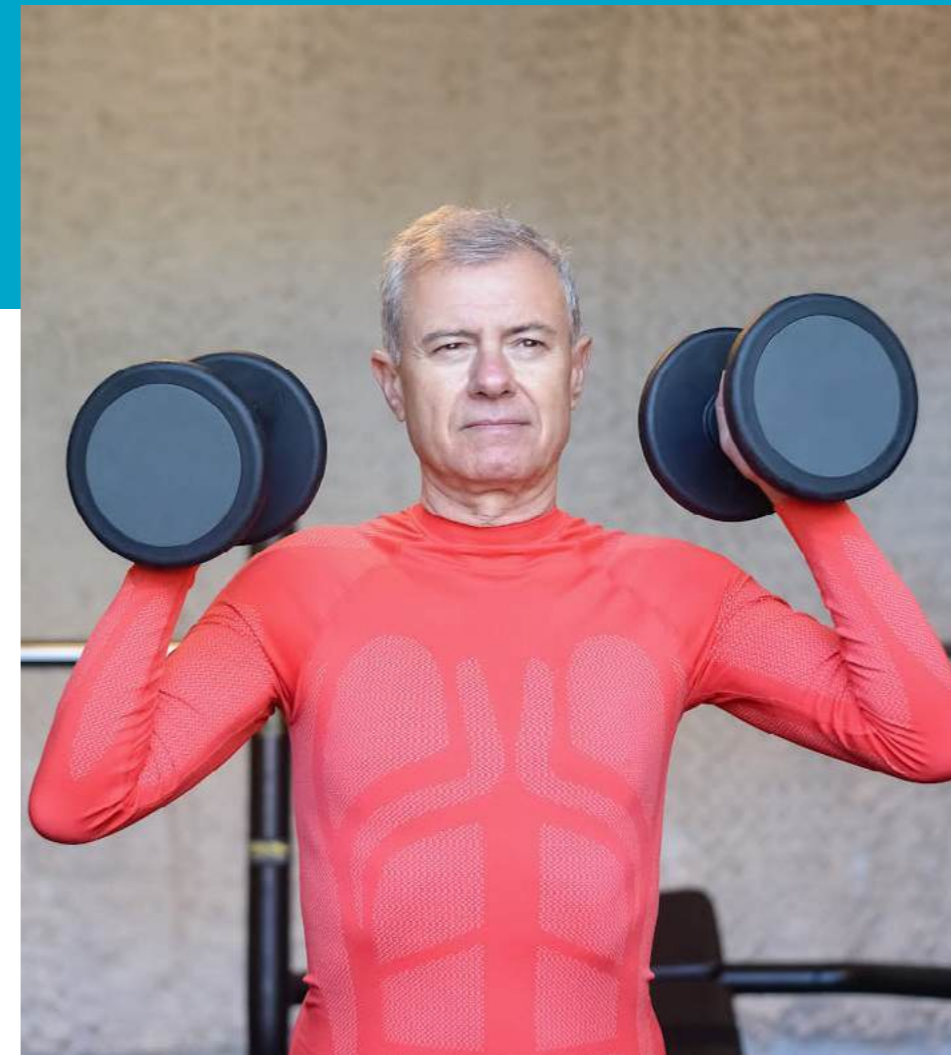
- Prof Hamer is leading the UCLH BRC Obesity research theme that has a grant of £284k. This work will research the impact of physical activity and lifestyle behaviours on obesity and associated conditions.
- Dr Pinto Pereira was awarded £1.6m for a 5-year MRC non-clinical fellowship to investigate the causes and consequences of variation in body composition, cardiorespiratory and muscular fitness.
- Dr Ronca's work researching 'Healthy bodies, Powerful minds' was awarded ~£300k from the Compass Group. This two-year project aims to understand how nutrition, physical activity and mood interact with each other throughout a working day, and how these might impact productivity at work.
- Prof. Hamer has been awarded a four-year grant of £550k from Cancer Research UK to lead the Prospective Physical Activity, Sitting and Sleep consortium. This will explore the twenty-four-hour physical behaviour spectrum and risk of cancer.

CASE STUDY: MAXIMISING AND MAINTAINING PHYSICAL FITNESS IN THE GENERAL POPULATION

In 2024, ISEH's Dr Snehal Pinto Pereira was awarded a prestigious Senior Non-Clinical Fellowship from the UK's Medical Research Council for £1.6million. The award will support the research of her team of researchers and PhD students over a period of five years at ISEH. The main aim of her work is to understand how to maximise and maintain physical fitness levels in the general population for as long as possible. Her multidisciplinary team will address this overarching aim using novel methodology spanning recent advances in data analytics, causal inference, and genetics.

Physical fitness is essential for disease prevention, maintaining mobility and independence. Therefore, maximising and maintaining physical fitness levels in the general population is essential to live long and healthy lives. The project will examine the three main aspects of physical fitness: body composition, aerobic fitness, and muscle strength. They are all affected by physical activity, and they all are associated with major diseases like cardiovascular disease and frailty. They develop and change over a lifetime, and, importantly, we can improve them to benefit health. However, evidence on these three components of fitness have mostly been generated in silos despite the fact that they are interrelated.

Dr Pinto Pereira's team will therefore study how these aspects of fitness are interrelated and how they affect health together, in the general population. The team hopes that their work will form part of the evidence base that will help fine-tune and update physical activity guidelines.





CASE STUDY: THE VALD APPLIED RESEARCH INITIATIVE

The VALD applied research initiative, launched in May 2023, continues with data collection at the ISEH, with over 300 patients in the trial so far. The study has expanded to a second site and now includes both NHS and private patients who have experienced ACL ruptures, as well as those diagnosed with knee or hip osteoarthritis.

The project has successfully established comprehensive normative data on movement, strength, and power characteristics at various stages of patients' recovery. Further analysis aims to determine whether pre-operative or pre-treatment assessments could effectively identify patients with favourable or unfavourable prognostic outcomes.

This research aims to enhance the precision of patient care, contributing to more informed and personalised treatment strategies, by providing patients and their multidisciplinary team with objective data around key physical qualities such as strength, movement, and power.

**UTILISING A MULTIDISCIPLINARY APPROACH,
ADDRESSING INJURIES AND PRE-OPERATIVE CARE,
LEADING TO A SEAMLESS TRANSITION BACK TO
SPORTS PARTICIPATION.**



CASE STUDY: THE ROLE OF PHYSICAL ACTIVITY IN CHILD DEVELOPMENT

The ISEH has developed highly valued partnerships with the charities Greenhouse Sports, Active Movement, and the Volunteers Foundation, as well as with the UCL Institute of Cognitive Neuroscience. These partnerships have enabled the ISEH to investigate the role of physical activity in supporting the physical and cognitive development of children.

The ISEH has developed highly valued partnerships with the charities Greenhouse Sports, Active Movement, and the Volunteers Foundation, as well as with the UCL Institute of Cognitive Neuroscience. These partnerships have enabled the ISEH to investigate the role of physical activity in supporting the physical and cognitive development of children.

Within this theme the research team are exploring the times of day when physical activity would be most beneficial, the most advantageous types of activity, intensity, and duration, and how the benefits of physical activity relate to other lifestyle factors such as body composition or socio-economic status.

The Active Movement project, led by ISEH's Prof. Mike Loosemore, supported 36 British schools in changing their teaching practice to incorporate movement during lessons. The results saw a significant reduction in child obesity, and the research findings have received significant national media coverage.

In collaboration with Active Movement, Dr Flaminia Ronca's team investigated the relationship between cognitive development and physical activity in primary school children. They established that active children have faster reaction times and fewer errors on tests of inhibitory control (children's ability to control their impulses). In other words, after controlling for body fat and socio-economic status, more active children exhibited better cognitive function. This is very promising, as it can aid the development of simple, low-resource school interventions to support brain development in young people.

The Volunteers Foundation Academy in Kenya, supported by Dr Ronca, changed their school teaching schedule to incorporate daily physical activity to support child wellbeing. The school saw an improvement in mental wellbeing and an increase in attendance following the intervention. They have since incorporated daily morning physical activity permanently into their schedule.

The charity Greenhouse Sports are leveraging our research findings on child brain-imaging, and cognitive and behavioural benefits of exercise in conversations with schools about timetabling breakfast and afternoon clubs. This project is headed by Dr Ronca with the support of Evie Watson. The initial findings demonstrates that 30 minutes of vigorous physical activity improve inhibitory control in children.

This collection of important work linking physical activity with improved child development has led to multiple invitations for Dr Ronca to present at Public Health England, organisations across the educational sector, and to the Directors of the Mental Health Network.

CASE STUDY: LONG COVID IN CHILDREN AND YOUNG PEOPLE

ISEH colleagues and PhD students have contributed to the initiation, running and completion of the Long COVID in Children and Young People study (The CLoCk Study). This is a study funded by the National Institute for Health and Care Research at £1.4 million. The study which started in 2021 and ending in December 2024, was set up to define Long COVID, determine the symptoms of Long COVID and determine how many young people suffer from Long COVID in England.

Throughout the project lifecycle, Dr Pinto Pereira and her PhD students Natalia Rojas and Emma Dhir-Hewitt have led on various elements on the project which includes over 30 scientific research outputs, patient and public involvement and multiple waves of data collection on over 30,000 children and young people. Their work has been featured in SAGE (Scientific Advisory Group for Emergencies) reports during the COVID-19 pandemic, news articles and podcasts and most recently in a commentary on what we know now on Long COVID and the challenges ahead that need to be addressed before the next pandemic in the Journal of the Royal Society of Medicine.



CASE STUDY: IMPACT OF EXERCISE ON BLOOD PRESSURE

New evidence from the ProPASS consortium, co-led by ISEH's Prof Mark Hamer and with ISEH's Dr Jo Blodgett on the research team, highlights that exercise is the most important daily activity for blood pressure.

The project has examined how different components of a 24-hour day are associated with systolic and diastolic blood pressure (BP) outcomes. The study used data from over 15,000 participants from the Prospective Physical Activity, Sitting and Sleep (ProPASS) consortium, an international research collaboration of cohorts using thigh-worn accelerometry devices (aka "wearables").

The team applied a novel technique called compositional analysis to break the day into six parts: sleep, sedentary behaviour, standing, light walking, brisk walking and exercise-like activities (e.g. cycling, running, hiking). This approach recognises that we cannot just look at one single behaviour, but rather must look at the full 24-hour day.

The study's main finding was that exercise was the single most important behaviour associated with lowering BP. Replacing as little as 5 min/day of any other activity with exercise demonstrated significantly lower systolic and diastolic BP. There was some evidence that increasing sleeping time or decreasing sedentary time had benefits, but a substantial amount of reallocation of time would be needed to yield beneficial impacts on BP.

CASE STUDY: THE MENSTRUAL CYCLES IMPACT ON INJURIES IN FEMALE ATHLETES

ISEH's Dr Flaminia Ronca, Dr Georgie Bruinvels and Dr Jo Blodgett led a FIFA-funded project to investigate how the menstrual cycle impacts sport-related cognitive processes as a determinant of injury risk. They identified that sport-related cognition fluctuates throughout the menstrual cycle in patterns that might relate to injury prevalence. Although this requires further investigation to corroborate this research, these findings have the potential to be hugely important in supporting female health.

This research had significant international media exposure, with over 650 mentions in global news media outlets across 35 countries. These findings had a number of positive responses, such as Eleanor Morgan (author of Hormonal) commenting on BBC Radio 4: "Such an important piece of work, it's generating lots of conversations in my practice [...] it cuts through the historical mythology around the subject [...] offering a genuinely new viewpoint."

// I thought the speakers were amazing and kept the information clear and relevant. Everything taught was helpful and easy to apply to my clinical work. //

Sports Therapist, via post course survey.

ISEH LEARNING

The ISEH prides itself on delivering world-class thought-leading educational events that provide sport and exercise medicine practitioners with high quality support and learning.

Our ISEH Learning courses and conferences, led by leaders in their field of sport and exercise medicine, blend theoretical academic knowledge with practical application in a sport and exercise setting. By providing hands-on relevant learning, we empower our learners to continue their professional development with confidence in applying their new skills in their professions.

This year ISEH Learning has delivered the following CPD courses and conferences:

January	ISEH Annual Sports Injuries and Sports Orthopaedics Conference: Optimising Brain Health in Contact Sports Athletes	Chaired by Prof Mat Wilson
January	ISEH Annual Sports Injuries and Sports Orthopaedics Conference: Hip and Groin Pain in the Athletic Population	Chaired by Prof Fares Haddad
March	Breathing to Win: optimising breathing performance in athletes	Prof James Hull, Julie Moore, Gwynn Wallace & Juliette Lloyd
June	ISEH Annual Sports Cardiorespiratory Medicine Conference	Chaired by Prof James Hull
September	Management of ACL Injury Rehabilitation: from pre-op to return to sport	Dr Paul Read, Dr Bruce Paton & Dr Richard Allison

// I have attended courses at the ISEH on various topics and I must say I am very impressed with the quality of the courses as well as the level of knowledge and professionalism of the lecturers. Great learning from the experts in the field both in person and online. //

Sports physiotherapist via Google

EVENTS

OUR EVENTS ATTRACT LARGE AUDIENCES FROM ACROSS THE SPORT AND EXERCISE MEDICINE COMMUNITY.

OTHER ISEH EVENTS IN 2024

In addition to the ISEH-led educational activities and courses, the facility has also been used to host a variety of other notable events over the past year, including:

- The International Conference for Performing Arts Medicine
- The National Conference for Sport & Exercise Medicine Undergraduates
- The London Physical Activity Network
- The British Patellofemoral Society

The quality and reputation of the venue, the central London location, and the proximity to key organisations such as UCL, UCLH amongst others makes it a good choice as a venue to host events and meetings.

As well as providing educational events, the ISEH also organises an annual run in London's beautiful Regents Park, encouraging hundreds of people to come and be active regardless of their age or fitness levels. This year saw over 300 people attend the ISEH Run in June, making it the most popular run the ISEH has ever put on!



// A great event planned with different distance options and a lovely route around Regent's Park in London! Roll on Summer! //

ISEH Run attendee via Instagram

// An awesome course for anyone with an interest in breathing pattern disorders and complex causes of breathlessness in athletes, including Exercise-induced laryngeal obstruction (EILO). //

Physio, sharing feedback about the ISEH 'Breathing to Win!' course via LinkedIn



CASE STUDY: INTERNATIONAL CONFERENCE IN PERFORMING ARTS MEDICINE

In July 2024, the first International Performing Arts Medicine (PAM) Conference took place with great success at the Cruciform Building at UCL, with the collaboration of PAM@UCL, the Performing Arts Medicine Association (PAMA USA) and the British Association for Performing Arts Medicine (BAPAM). Pre and post-conference events at the ISEH brought together our PAM@UCL department with the University of Johns Hopkins and the University of Western Australia in planning for the future of PAM education and research. Workshops in Dance, Circus, Acting, and Music Medicine, as well as international and diverse experts' panels, enriched the experience of 400 attendees from 30 countries.

MARKETING & COMMUNICATIONS

ISEH WEBSITE

The ISEH website plays an important role in showcasing the varied work of the institute to audiences in the UK and internationally. Over the past year, we've seen a 29% increase in website traffic compared with 2023, with an average of over 9,000 visitors per month.

Our commitment to producing regular, high-quality digital content has allowed us to highlight ISEH's comprehensive services and activities. This includes maintaining regular communication with a growing email subscriber base, further establishing our position as a trusted source within sports and exercise medicine.



ISEH SOCIAL MEDIA CHANNELS

Throughout 2024, the ISEH has prioritised the creation of relevant, informative, and high-quality content across various formats to engage with our current followers and attract new audiences on Instagram, Twitter, LinkedIn, and Facebook. Thanks to the expertise and involvement of our colleagues, we've developed educational content that not only resonates with our audience but also showcases our achievements and strengthens our credibility within the field.

Additionally, our interactive video content on Instagram featuring the ISEH team has been particularly well received, allowing us to increase our visibility, and showcase our expertise to more people interested in our work. The social media platforms serve as important entry points for individuals to discover more about the Institute and deepen their understanding of our services.

MEDIA

The ISEH has continued to attract a great deal of interest from a wide range of media outlets and has become a key point of contact for current media stories around sport, exercise and health. Below are some highlights from 2024:

- Female athletes more likely to get injured at certain points in their menstrual cycle (Dr Jo Blodgett) – [Learn more.](#)
- Women's mental agility is better when they're on their period (Dr Flaminia Ronca) – [Learn more.](#)
- Concussion in women (Dr Flaminia Ronca) – [Learn more.](#)
- Incorporating small bursts of exercise into your daily routine (e.g., from five minutes), may help lower blood pressure (Dr Jo Blodgett & Prof. Mark Hamer) – [Learn more.](#)
- Can wearable devices improve my heart health? (Prof. Mark Hamer) – [Learn more.](#)



LOOKING AHEAD TO 2025

2025 promises to be an exciting year as the ISEH delivers across a broad range of workstreams and new projects that contribute towards ISEH's aim of being a world-leading institute for sport, exercise and health, helping people achieve their full potential through leading active & sporting lifestyles.

The ISEH's clinical activity is going from strength-to-strength both in supporting elite athletes and sports organisations, but also in caring for recreational sports patients through both our private and NHS work. In 2025, we will continue to review and adapt our clinics to ensure that we are able to provide the highest quality of care for the optimal number of patients. We will also continue to explore and introduce new specialist clinical services, staffed by world-class clinicians, that best meet the needs and demands of our patients.

The ISEH's educational courses continue to grow in popularity, and in 2025 we will work closely with UCL and the ISEH teaching team to look at how we can continue to meet the increasing student demand for our undergraduate and postgraduate courses, whilst also maintaining the quality of teaching and student experience that ISEH is recognised for. The ISEH will also continue to work collaboratively with UCL in exploring new opportunities and partnerships in developing and improving our education provision, including delivering the ISEH Learning CPD course programme to provide excellent short courses to support sport and exercise medicine practitioners.

A strong commitment to research will continue to underpin all of the ISEH's excellent clinical and educational work in 2025. Over recent years, we have seen exciting progress across our research activities and we want to maintain and accelerate this momentum with more academic outputs and the delivery of a number of cutting-edge research studies that will grow understanding and knowledge in novel areas of sport injury and performance, exercise medicine and population health.

We are very excited about the opportunities to grow and develop the work of ISEH in 2025 and will continue to work in collaboration with a broad range of colleagues, partners and stakeholders on the journey to deliver the ISEH's vision of providing excellence in the treatment, research and education of sports injuries & illnesses to support elite sport and improve the physical activity of the nation.



APPENDIX

ISEH RESEARCH OUTPUTS IN 2024

The list below outlines the academic research outputs of the ISEH in 2024. The list primarily covers published peer reviewed papers.

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Charlie Pedlar	The association of range of motion, lower limb strength and load during jump landings in professional ballet dancers	Apr-24	J Biomech	doi: 10.1016/j.jbiomech.2024.112119.	Mattiussi AM, Shaw JW, Price P, Brown DD, Cohen DD, Lineham J, Tallent J, Attack A
Charlie Pedlar	Ankle mechanics during jump landings across different foot positions in professional ballet dancers	Jun-24	Sports Biomech	doi:10.1080/14763141.2024.2369913.	Mattiussi AM, Shaw JW, Price P, Brown DD, Cohen DD, Lineham J, Tallent J, Attack AC.
Charlie Pedlar	EEG-based neurophysiological indices for expert psychomotor performance - a review	Jan-24	Brain Cogn	doi: 10.1016/j.bandc.2024.106132	Morrone JM
Charlie Pedlar	Jumping Asymmetries and Risk of Injuries in Preprofessional Ballet	Jan-24	Am J Sports Med	doi:10.1177/03635465231218258. Epub 2024 Jan 22.	MacSweeney NDH, Shaw JW, Simkin GP, Price PDB, Mahaffey R, Cohen DD
Charlie Pedlar	Selective cortical adaptations associated with neural efficiency in visuospatial tasks - the comparison of electroencephalographic profiles of expert and novice artists	Jun-24	Neuropsychologia	doi: 10.1016/j.neuropsychologia.2024.108854	Morrone JM
Erin Rooney, Ying Lee, Prof. Mathew Wilson, Prof. Richard Sylvester, Prof David Sharp	Prospective cohort study of long-term neurological outcomes in retired elite athletes: the Advanced BiomaRker, Advanced Imaging and Neurocognitive (BRAIN) Health Study protocol	Apr-24	BMJ Open	10.1136/bmjopen-2023-082902	Zimmerman KA, Hain JA, Graham NSN, Del-Giovane M, Parker TD, Friedland D, Cross MJ, Kemp S,
Evelyn Watson , Cian Xu, Isabel Metcalf, Prof Mike Loosemore, MBE, Prof. Mark Hamer & Flaminia Ronca	Association between physical activity and inhibitory control in children	Feb-24	International Journal of Sport and Exercise Psychology	10.1080/1612197X.2024.2393303	Burgess, P., Boulton, H., Mohd Habib, S., Savage, P
Flaminia Ronca	Perimenopausal physical activity and dementia risk: A systematic review	Apr-24	Int J Sports Med	doi: 10.1055/a-2307-8122.	Simmons N, Rodriguez Ruiz M,

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Flaminia Ronca	Cognitive effects of heading in professional football: a systematic review	Sep-24	International Journal of Sports Medicine	10.1055/a-2409-0323	Patel, L., Tarafder, J
Flaminia Ronca & Prof. Mark Hamer	Body fat predictive of acute effects of exercise on prefrontal hemodynamics and speed. Neuropsychologia	Feb-24	Neuropsychologia	doi: 10.1016/j.neuropsychologia.2024.108805	Crum J, Ronca F, Herbert G, Carmona E, Jones I, Hakim U, Hamer M, Hirsch J, Hamilton A, Tachtsidis I, Burgess PW
Flaminia Ronca, Evelyn Watson, Prof. Mike Loosemore MBE	Decreasing sedentary time during lessons reduces obesity in primary school children: the Active Movement study	Feb-24	Obes Facts	doi: 10.1159/000536665	Burgess PW, Savage P, Senaratne N
Flaminia Ronca, Joanna Blodgett, Georgie Bruinvels, Prof. Mike Loosemore MBE	Attentional, anticipatory and spatial cognition fluctuate throughout the menstrual cycle: Potential implications for female sport.	May-24	Neuropsychologia	doi: 10.1016/j.neuropsychologia.2024.108909.	Lowery M, Raviraj M, Sandhar G, Symeonides N, Jones C, Burgess PW
Gus Morrison, Ben Ashworth, Paul Read	Test-Training Integration to Optimize Performance and Health in Baseball Pitchers: An Outcome Driven Approach	May-24	Strength and Conditioning Journal	10.1519/SSC.0000000000000834	
Hugh Montgomery OBE	Climate change and disorders of the nervous system	Jun-24	Lancet Neurol	10.1016/S1474-4422(24)00087-5	Sisodiya SM, Gulcebi MI, Fortunato F, et al.
Hugh Montgomery OBE	Enhanced CD95 and interleukin 18 signalling accompany T cell receptor V21.3+ activation in multi-inflammatory syndrome in children	May-24	Nat Commun	10.1038/s41467-024-48699-y	Zhang Z, Kean IRL, Dratva LM, et al.
Hugh Montgomery OBE	Final call: Climate change and us	Mar-24	J R Coll Physicians Edinb	10.1177/14782715241239085	
Hugh Montgomery OBE	Impact of nocturnal hypoxia on glycaemic control, appetite, gut microbiota and inflammation in adults with type 2 diabetes mellitus	May-24	J Physiol	10.1113/JP285322	Shepherd AI, James TJ, Gould AAM, et al.
Hugh Montgomery OBE	Integrated care policy recommendations for complex multisystem long term conditions and long COVID	Jun-24	Sci Rep	10.1038/s41598-024-64060-1	van der Feltz-Cornelis CM, Sweetman J, Turk F, et al.
Hugh Montgomery OBE	Mechanisms underlying exercise intolerance in long COVID: An accumulation of multisystem dysfunction	Feb-24	Physiol Rep	10.14814/phy2.15940	Jamieson A, Al Saikhan L, Alghamdi L, et al.

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Hugh Montgomery OBE	Potassium Supplementation and Prevention of Atrial Fibrillation After Cardiac Surgery: The TIGHT K Randomized Clinical Trial	Sep-24	JAMA	10.1001/jama.2024.17888	O'Brien B, Campbell NG, Allen E, et al.
Hugh Montgomery OBE	Prevalence of mental health conditions and brain fog in people with long COVID: A systematic review and meta-analysis	May-Jun-24	Gen Hosp Psychiatry	10.1016/j.gen-hosppsych.2024.02.009	Van der Feltz-Cornelis C, Turk F, Sweetman J, et al.
Hugh Montgomery OBE	Respiratory viral infection promotes the awakening and outgrowth of dormant metastatic breast cancer cells in lungs	Apr-24	Res Sq [Preprint]	10.21203/rs.3.rs-4210090/v1	Chia SB, Johnson BJ, Hu J, et al.
Hugh Montgomery OBE	The need for radical climate interventions: six years to secure humanity's 'liveable future'	Mar-24	Anaesthesia	10.1111/anae.16160	White S
Joanna Blodgett	Prognostic accuracy of 70 individual frailty biomarkers in predicting mortality in the Canadian Longitudinal Study on Aging	Jun-24	Geroscience	10.1007/s11357-023-01055-2	Pérez-Zepeda MU, Godin J, Kehler DS, Andrew MK, Kirkland S, Rockwood K, Theou O
Joanna Blodgett & Prof. Mark Hamer	Device-measured physical activity and cardiometabolic health: the Prospective Physical Activity, Sitting, and Sleep (ProPASS) consortium	Feb-24	Eur Heart J	10.1093/eurheartj/ehad717	Ahmadi MN, Atkin AJ, Chastin S, Chan HW, Suorsa K, Bakker EA, Hettiarachchi P, Johansson PJ, Sherar LB, Rangul V, Pulsford RM, Mishra G, Eijsvogels TMH, Stenholm S, Hughes AD, Teixeira-Pinto AM, Ekelund U, Lee IM, Holtermann A, Koster A, Stamatakis E
Joanna Blodgett & Prof. Mark Hamer	Relationship of device measured physical activity type and posture with cardiometabolic health markers: pooled dose-response associations from the Prospective Physical Activity, Sitting and Sleep Consortium	Jun-24	Diabetologia	doi: 10.1007/s00125-024-06090-y	Ahmadi MN, Atkin AJ, Chan HW, Del Pozo Cruz B, Suorsa K, Bakker EA, Pulsford RM, Mielke GI, Johansson PJ, Hettiarachchi P, Thijsen DHJ, Stenholm S, Mishra GD, Teixeira-Pinto A, Rangul V, Sherar LB, Ekelund U, Hughes AD, Lee IM; ProPASS collaboration; Holtermann A, Koster A, Stamatakis E
Joanna Blodgett & Prof. Mark Hamer	Socioeconomic gradients in 24-hour movement patterns across weekends and weekdays in a working-age sample: evidence from the 1970 British Cohort Study	May-24	J Epidemiol Community Health	doi: 10.1136/jech-2023-221726	Bann D, Chastin SFM, Ahmadi M, Stamatakis E, Cooper R
Joanna Blodgett & Prof. Mark Hamer	Device-Measured 24-Hour Movement Behaviors and Blood Pressure: A 6-Part Compositional Individual Participant Data Analysis in the ProPASS Consortium. Circulation	Nov-24	Circulation	DOI: 10.1161/CIRCULATION-HA.124.069820	Ahmadi, M. N.; Atkin, A. J.; Pulsford, R. M.; Rangul, V.; Chastin, S.; Chan, H-W.; Suorsa, K.; Bakker, E. A.; Gupta, N.; Hettiarachchi, P.; Johansson, P. J.; Sherar, L. B.; del Pozo Cruz, B.; Koemel, N.; Mishra, G. D.; Eijsvogels, T. M. H.; Stenholm, S.; Hughes, A. D.; Teixeira-Pinto, A.; Ekelund, U.; Lee, I-M.; Holtermann, A.; Koster, A.; Stamatakis, E.
Joanna Blodgett, Georgie Bruinvels, Charlie Pedlar	Injury Incidence, Severity and Type across the Menstrual Cycle in Female Footballers: A Prospective Three Season Cohort Study	Feb-24	Med Sci Sports Exerc	doi: 10.1249/MSS.0000000000003391	Barlow A, Williams S,
John Mitchell, Prof. Mark Hamer, Joanna Blodgett	Associations between psychological distress in adolescence and menstrual symptoms across life: Longitudinal evidence from the 1970 British Cohort Study	Jun-24	J Affect Disord	doi: 10.1016/j.jad.2024.03.069	Martins C

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Noel Pollock	Epidemiology of bone injuries in elite athletics: A prospective 9-year cohort study	Mar-24	Phys Ther Sport	10.1016/j.ptsp.2024.01.005	Kelly S, Waring A, Stone B
Noel Pollock	Menstrual cycles and the impact upon performance in elite British track and field athletes: a longitudinal study	Feb-24	Front Sports Act Living	10.3389/fspor.2024.1296189	Jones BP, L'Heveder A, Bishop C, Kasaven L, Saso S, Davies S, Chakraverty R, Brown J
Noel Pollock	The International Olympic Committee framework on fairness, inclusion and nondiscrimination on the basis of gender identity and sex variations does not protect fairness for female athletes	Mar-24	Scand J Med Sci Sports	10.1111/sms.14581	Lundberg TR, Tucker R, McGawley K, Williams AG, Millet GP, Sandbakk Ø, Howatson G, Brown GA, Carlson LA, Chantler S, Chen MA, Heffernan SM, Heron N, Kirk C, Murphy MH, Pringle J, Richardson A, Santos-Concejero J, Stebbings GK, Christiansen AV, Phillips SM, Devine C, Jones C, Pike J, Hilton EN
Noel Pollock, Prof Mathew Wilson	Fair and Safe Eligibility Criteria for Women's Sport	Aug-24	Scand J Med Sci Sports	10.1111/sms.14715	Tucker, R., Hilton, E. N., McGawley, K., Millet, G. P., Sandbakk, Ø., Howatson, G., Brown, G. A., Carlson, L. A., Chen, M. A., Heron, N., Kirk, C., Murphy, M. H., Pringle, J., Richardson, A., Santos-Concejero, J., Christiansen, A. V., Jones, C., Alonso, J. M., Robinson, R., Jones, N., Parker, M. G., Chintoh, A., Hunter, S., Senefeld, J. W., O'Connor, M. I., Joyner, M., Carneiro, E. M., Devine, C., Pike, J., and Lundberg, T. R.
Prof. Mark Hamer	Associations of the 'weekend warrior' physical activity pattern with all-cause, cardiovascular disease and cancer mortality: the Mexico City Prospective Study	Feb-24	Br J Sports Med.	doi: 10.1136/bjsports-2023-107612	O'Donovan G, Petermann-Rocha F, Ferrari G, Lee IM, Stamatakis E, Sarmiento OL, Ibáñez A, Lopez-Jaramillo P
Prof. Fares Haddad	A leap towards personalized orthopaedic surgery and the prediction of spinopelvic mechanics in total hip arthroplasty	Jan-24	Bone Joint J	10.1302/0301-620X.106B1.BJJ-2023-1319	Fontalis A
Prof. Fares Haddad	Allografts in soft-tissue knee surgery	Jun-24	Bone Joint J	10.1302/0301-620X.106B6.BJJ-2024-0081.R1	Al-Hourani K
Prof. Fares Haddad	Are the current minimal clinically important differences fit for purpose?	Oct-24	Bone Joint J	10.1302/0301-620X.106B10.BJJ-2024-0876	Clement ND
Prof. Fares Haddad	Full of sound and fury	Oct-24	Bone Joint J	10.1302/0301-620X.106B10.BJJ-2024-0056.R1	Luo TD, Kayani B, Magan A
Prof. Fares Haddad	Management of Bone Loss in Revision Total Knee Arthroplasty: An International Consensus Symposium	May-24	HSS J	10.1177/15563316231202750	Sculco PK, Flevas DA, Jerabek SA, et al.

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Prof. Fares Haddad	Polished tapered stems in total hip arthroplasty	Mar-24	Bone Joint J	10.1302/0301-620X.106B3.BJJ-2023-1475	Kayani B, Luo TD, Haddad FS
Prof. Fares Haddad	Robotic trials in arthroplasty surgery	Feb-24	Bone Joint J	10.1302/0301-620X.106B2.BJJ-2023-0711.R1	Khatri C, Metcalfe A, Wall P, Underwood M, Davis ET
Prof. Fares Haddad	Satisfactory 5-year functional outcomes following primary ACL reconstructions from the UK National Ligament Registry	Apr-24	Knee Surg Sports Traumatol Arthrosc	10.1002/ksa.12071	Gabr A, Mancino F, Robinson J, Hage W, O'Leary S, Spalding T
Prof. Fares Haddad	The bone trauma and soft-tissue injury classification system in total hip arthroplasty (BOSTI Hip)	Sep-24	Bone Joint J	10.1302/0301-620X.106B9.BJJ-2024-0529.R1	Kayani B, Wazir MUK, Mancino F
Prof. Fares Haddad	The current role of CT in total knee arthroplasty	Sep-24	Bone Joint J	10.1302/0301-620X.106B9.BJJ-2023-1303.R1	Mancino F, Fontalis A, Kayani B, Magan A,
Prof. Fares Haddad	The impact of a femoral stem collar on primary hip arthroplasty	Sep-24	Bone Joint J	10.1302/0301-620X.106B9.BJJ-2024-0353	Kayani B, Staats K
Prof. Fares Haddad	The impact of the European Union's Medical Device Regulation on orthopaedic implants, technology, and future innovation	Apr-24	Bone Joint J	10.1302/0301-620X.106B4.BJJ-2023-1228.R1	Staats K, Kayani B
Prof. Fares Haddad	Troubleshooting Robotics During Total Hip and Knee Arthroplasty	Jan-24	Orthop Clin North Am	10.1016/j.ocl.2023.06.004	Fontalis A, Hansjee S, Mancino F
Prof. Fares Haddad	Two-Dimensional Versus Three-Dimensional Preoperative Planning in Total Hip Arthroplasty	Sep-24	J Arthroplasty	10.1016/j.arth.2024.05.054	Fontalis A, Yasen AT, Kayani B, et al.
Prof. Fares Haddad, Ricci Plastow	Operative Repair of Hamstring Injuries From the Jackling Position in Rugby	Jun-24	Orthop J Sports Med	10.1177/23259671241246699	Thompson JW, Kayani B, Moriarty P, Stirling B
Prof. Fares Haddad, Ricci Plastow	Sex and gender in orthopaedic research	Feb-24	Bone Jt Open	10.1302/2633-1462.52.BJO-2023-0166	Mancino F, Kayani B, Gabr A, Fontalis A

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Prof. Fares Haddad, Ricci Plastow	Strong Correlation Between Standing Long-Leg Radiographs and CT Scans in Measuring Coronal Knee Alignment	May-24	J Bone Joint Surg Am	10.2106/JBJS.23.01092	Fontalis A, Luyckx T, Vanspauwen T, Moreels R, Mancino F, Raj RD, Winnock de Grave P, Putzeys P
Prof. Fares Haddad, Ricci Plastow	Robotic arm-assisted conversion of unicompartmental knee arthroplasty to total knee arthroplasty	July-24	Bone Joint J	10.1302/0301-620X.106B7.BJJ-2023-0943.R2	Mancino F, Fontalis A, Grandhi TSP, Magan A, Kayani B
Prof. Fares Haddad, Ricci Plastow	Factors associated with decreased length of stay following robotic arm-assisted and conventional total hip arthroplasty	Mar-24	Bone Joint J	10.1302/0301-620X.106B3.BJJ-2023-0569.R2	Fontalis A, Wignadasan W, Mancino F, The CS, Magan A,
Prof. Fares Haddad, Ricci Plastow	The Value of Computed Tomography Scan in Three-dimensional Planning and Intraoperative Navigation in Primary Total Hip Arthroplasty	Mar-24	Hip Pelvis	10.5371/hp.2024.36.1.26	Mancino F, Fontalis A, Magan A
Prof. Fares Haddad, Ricci Plastow, Dia Giebaly, Jenni Tahmassebi	A prospective randomized controlled trial comparing CT-based planning with conventional total hip arthroplasty versus robotic arm-assisted total hip arthroplasty	Apr-24	Bone Joint J	10.1302/0301-620X.106B4.BJJ-2023-1045.R1	Fontalis A, Kayani B, Haddad IC, Chambers A, Mancino F, Konan S
Prof. Fares Haddad, Sam Oussedik	The target may be the key to the outcome of knee arthroplasty	May-24	Bone Joint J	10.1302/0301-620X.106B5.BJJ-2024-0270	
Prof. James Hull	Clinical characteristics and impact of inducible laryngeal obstruction in the UK national registry	Jan-24	J Allergy Clin Immunol Pract	doi: 10.1016/j.jaip.2024.01.030	Haines J, Simpson AJ, Slinger C, Selby J, Pargeter N, Fowler SJ,
Prof. James Hull	Cough Reflex Hypersensitivity in CANVAS-associated Chronic Cough	Aug-24	Am J Respir Crit Care Med	10.1164/rcm.202405-0887RL	Hirons B, Cho PSP, Curro R, Rugginini B, Turner RD, Jolley CJ, Hadden RD, Cortese A, Biring SS
Prof. James Hull	Protecting respiratory health of athletes: an Olympic challenge	Jul-24	Lancet Respir Med	10.1016/S2213-2600(24)00183-8	Clemm H, Backer V, Koehle M, Mountjoy M, Schwellnus M, Olin JT
Prof. James Hull	Pulmonary Rehabilitation for individuals with persistent symptoms following COVID-19	Jan-24	CHEST	doi: 10.1016/j.chest.2024.01.029	Daynes E, Mills G, Bishop NC, Bakali M, Burtin C, McAuley HJ, Singh SJ, Greening NJ
Prof. James Hull	Respiratory problems in rowers: outcomes from a systematic assessment of an elite squad	Aug -24	Br J Sports Med	10.1136/bjsports-2024-108542	Williams ZJ, Jackson AR, Wootten M, Ranson C, Arnold L, Redgrave A

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Prof. James Hull	Feasibility of Continuous Bronchoscopy During Exercise in the assessment of large airway movement in healthy subjects	Apr-24	J Appl Physiol	. doi: 10.1152/jappl-physiol.00746.2023.	Williams ZJ, Orton CM, Garner JL, Chan LT, Tana A, Shah PL, Polkey MI, Semple T
Prof. James Hull	Point-of-care testing to detect respiratory infections in athletes: what is the role?	Jul-24	Br J Sports Med	doi: 10.1136/bjsports-2024-108539.	Schwellnus M, Valtonen M
Prof. Julie Greeves	Effect of acute resistance exercise on bone turnover in young adults before and after concurrent resistance and interval training	Feb-24	Physiol Rep	10.14814/phy2.15906	Koltun KJ, Sterczala AJ, Sekel NM, Krajewski KT, Martin BJ, Lovalekar M, Connaboy C, Flanagan SD, Wardle SL, O'Leary TJ, Nindl BC
Prof. Julie Greeves	Hormonal contraceptive use is associated with altered bone structural and metabolic responses to military training in women	Jan-24	Bone	10.1016/j.bone.2024.117012	O'Leary TJ, Izard RM, Tang JCY, Fraser WD,
Prof. Julie Greeves	Sex differences in iron status during military training: a prospective cohort study of longitudinal changes and associations with endurance performance and musculoskeletal outcomes	Feb-24	Br J Nutr	10.1017/S0007114523001812	O'Leary TJ, Jackson S, Izard RM, Walsh NP, Coombs CV, Carswell AT, Oliver SJ, Tang JCY, Fraser WD,
Prof. Mark Hamer	Device-Measured Weekend Catch-Up Sleep, Mortality, and Cardiovascular Disease Incidence in Adults.	Jun-24	Sleep	doi: 10.1093/sleep/zsae135.	Chaput JP, Biswas RK, Ahmadi M, Cistulli PA, Rajaratnam SMW, Hamer M, Stamatakis E
Prof. Mark Hamer	From movement to motivation: a proposed framework to understand the antidepressant effect of exercise	Jul-24	Transl Psychiatry	doi: 10.1038/s41398-024-02922-y.	Hird EJ, Slanina-Davies A, Lewis G, Roiser JP
Prof. Mark Hamer	Life-course social participation and physical activity in midlife: longitudinal associations in the 1970 British Cohort Study (BCS70)	Mar-24	Eur J Epidemiol	doi: 10.1007/s10654-024-01107-7	Tsoli S, Fancourt D, Sullivan A, Ploubidis GB, Kawachi I
Prof. Mark Hamer	The Effect of Using Anchored Wake Time to Derive 24-h Device Measured Circadian Physical Behavior Patterns	Jul-24	Scand J Med Sci Sports	doi: 10.1111/sms.14684.	Granat MH, Ahmadi MN, Stamatakis E
Prof. Mark Hamer & Joanna Blodgett	Comparing cadence-based and machine learning based estimates for physical activity intensity classification: The UK Biobank	Aug-24	J Sci Med Sport	doi: 10.1016/j.jsams.2024.05.002.	Wei L, Ahmadi MN, Hamer M, Blodgett JM, Small S, Trost S, Stamatakis E
Prof. Mathew Wilson	Health status and heat preparation at a UCI World Tour multistage cycling race	Aug-24	Journal of Science and Medicine in Sport	10.1016/j.jsams.2024.08.206	Périard, J., Tebeck, S., Stanley, J., and Girard, O.

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Prof. Mike Loosemore MBE	Hand Carpometacarpal Joint Instability in Elite Boxers: Injury Characteristics, Surgical Technique, and Outcomes	May-24	J Hand Surg Am	10.1016/j.jhsa.2022.07.021	Matharu GS, Bodansky DMS, Gatt IT, Delaney R, Hayton MJ
Richard Weiler	Periodic health evaluation in Para athletes: a position statement based on expert consensus	Oct-24	BMJ Open Sport Exerc Med	doi: 10.1136/bmjsem-2024-001946.	Pinheiro L, Verhagen E, Ocarino J, Fagher K, Ahmed OH, Dalton K, Mann DL, Weiler R, Akinyi Okoth C, Blauwet CA, Lexell J, Derman W, Webborn N, Silva A, Resende R
Richard Weiler	Ensuring football for all: a strategy for increasing inclusivity at The Football Association	2024	British Journal of Sports Medicine	DOI: 10.1136/bjsports-2023-107777	OH Ahmed
Snehal Pinto Pereira	"People don't have the answers": A qualitative exploration of the experiences of young people with Long COVID	May-24	Clin Child Psychol Psychiatry	doi: 10.1177/13591045241252463.	Newlands F, Lewis C, d'Oelsnitz A, Pinto Pereira SM, Stephenson T, Chalder T, Coughtry A, Dalrymple E, Heyman I, Harnden A, Ford T, Ladhani SN, Powell C, McOwat K, Bhopal R, Dudley J, Kolasinska P, Muhid MZ, Nugawela M, Rojas NK, Shittu A, Simmons R, Shafran R
Snehal Pinto Pereira	How clinically relevant are prostate cancer cell lines? A comprehensive characterisation and multiomics comparison	Mar-24	bioRxiv	10.1101/2024.03.20.585982	Ahmed Z, Mosabbir W, Tandon D, Cheema U, Loizidou M, Withington J, Moore C, Okoli U, Heavey S
Snehal Pinto Pereira	International Care programs for Pediatric Post-COVID Condition (Long COVID) and the way forward	Jan-24	Pediatr Res	doi: 10.1038/s41390-023-03015-0	Brackel CLH, Noij LCE, Vijverberg SJH, Legghe CL, Maitland-van der Zee AH, van Goudoever JB, Buonsenso D, Munblit D, Sigfrid L, McFarland S, Anmyr L, Ashkenazi-Hoffnung L, Bellinat APN, Dias NLS, Edwards A, Fashina T, Juraški RG, Gonçalves ALN, Hansted E, Herczeg V, Hertting O, Jankauskaite LN, Kaswandani N, Kevalas R, Krivácsy P, Lorenz M, Malone LA, McVoy M, Miller DW, Morrow AK, Nugawela MD, Oliveira CR, Oliveira PRS, Osmanov IM, Overmars IM, Painsil E, Prawira Y, Putri ND, Ramos RCF, Rasche M, Ryd-Rinder M, De Rose C, Samitova E, Jovanović TS, Say D, Scott JT, Shachar-Lavie I, Shafran R, Shmueli E, Snipaitiene A, Stephenson T, Ténai N, Tosif S, Turkalj M, Valentini P, Vasconcelos LRS, Villard L, Vilser D, Hashimoto S, Terheggen-Lagro SWJ
Snehal Pinto Pereira	Long COVID: what do we know now and what are the challenges ahead?	Sep-24	Journal of the Royal Society of Medicine	10.1177/01410768241262661	Newlands F, Anders J, Banerjee A, Blandford A, Brown K, Beale S, Bu F, Fong WLE, Gilpin G, Hardelid P, Kovar J, Lim J, Park C, Raveendran V, Shah AD, Shao X, Wong A, Stephenson T, Shafran R
Snehal Pinto Pereira	Post-Covid-19 condition (Long Covid) in children and young people 12 months after infection or reinfection	Apr-24	Scientific Reports	10.1038/S41598-024-60372-4	Nugawela MD, Stephenson T, Foret-Bruno P, Dalrymple E, Xu L, Whittaker E, Heyman I, Ford T, Segal T, Chalder T, Ladhani SN, Mensah AA, McOwat K, Simmons R, Shafran R, Buszewicz M, Crawley E, Garg S, Hargreaves D, Harnden A, Levin M, et al.
Snehal Pinto Pereira	Post-Covid-19 condition (Long Covid) in children and young people 12 months after infection with the Omicron variant: a prospective observational study.	Apr-24	Sci Rep	doi: 10.1038/s41598-024-60372-4.	Nugawela MD, Stephenson T, Foret-Bruno P, Dalrymple E, Xu L, Whittaker E, Heyman I, Ford T, Segal T, Chalder T, Ladhani SN, Mensah AA, McOwat K, Simmons R; CLoCk Consortium; Shafran R.

APPENDIX

NAME OF ISEH CONTRIBUTOR	TITLE OF PAPER	DATE	PUBLICATION	ADDITIONAL REFERENCING DETAILS	OUTPUT COLLABORATORS (Names of all other contributors)
Snehal Pinto Pereira	Prevalence and co-occurrence of cognitive impairment in children and young people	Jul-24	Brain Behavior and Immunity	10.1016/J.BBI.2024.05.001	Foret-Bruno P, Shafran R, Stephenson T, Nugawela M, Chan D, Ladhani S, McOwat K, Mensah A, Simmons R, Smith LF, D'oelesnitz A, Xu L, Dalrymple E, Heyman I, Ford T, Segal T, Chalder T, Rojas N, Pereira SMP
Snehal Pinto Pereira	Risk factors for complications after emergency surgery for paediatric appendicitis	Feb-24	Anaesthesia	10.1111/ANA.16184	Sogbodjor LA, Razavi C, Williams K, Selman A, Davenport M, Moonesinghe SR
Snehal Pinto Pereira	Using a novel methodology to map Post-COVID services for children and young people in England	Jul-24	BMC Health Services Research	10.1186/S12913-024-11283-7	Newlands F, Fox-Smith L, Balakrishnan S, Lord G, Chalder T, Dalrymple E, Ford T, Harnden A, Heyman I, Ladhani SN, Segal TY, Stephenson T, Whittaker E, Shafran R
Snehal Pinto Pereira & Natalia Rojas	Data Resource Profile: the Children and Young People with Long COVID (CLOcK) Study	Feb-24	Int J Epidemiol	doi: 10.1093/ije/dyad158.	Nugawela MD, McOwat K, Simmons R, Dalrymple E, Ford T, Garg S, Hargreaves D, Semple MG, Xu L, Shafran R, Stephenson T
Snehal Pinto Pereira & Natalia Rojas	Mental health in the COVID-19 pandemic: A longitudinal analysis of the CLOcK cohort study	Jan-24	PLoS Med	doi: 10.1371/journal.pmed.1004315.	Panagi L, White SR, Nugawela MD, Heyman I, Sharma K, Stephenson T, Chalder T, Dalrymple E, McOwat K, Simmons R, Swann O; CLOcK Consortium; Ford T, Shafran R
Snehal Pinto Pereira & Natalia Rojas	Prevalence and co-occurrence of cognitive impairment in children and young people up to 12-months post infection with SARS-CoV-2 (Omicron variant)	May-24	Brain Behav Immun	doi: 10.1016/j.bbi.2024.05.001.	Foret-Bruno P, Shafran R, Stephenson T, Nugawela MD, Chan D, Ladhani S, McOwat K, Mensah A, Simmons R, Fox Smith L, D'oelesnitz A, Xu L, Dalrymple E, Heyman I, Ford T, Segal T, Chalder T
Snehal Pinto Pereira, Natalia Rojas, Tom Norris	Developing survey weights to ensure representativeness in a national, matched cohort study	Jun-24	BMC Medical Research Methodology	10.1186/S12874-024-02219-0	De Stavola BL, Cortina-Borja M, Nugawela MD, Hargreaves D, Dalrymple E, McOwat K, Simmons R, Stephenson T, Shafran R,
Tom Norris, John Mitchell, Prof. Mark Hamer, Joanna Blodgett, Snehal Pinto Pereira	Does cardiorespiratory fitness mediate or moderate the association between mid-life physical activity frequency and cognitive function? findings from the 1958 British birth cohort study	Jun-24	PLoS One	doi: 10.1371/journal.pone.0295092	
Prof. Mathew Wilson	Prevalence of Coronary Atherosclerosis in Female Masters Endurance Athletes	Oct-24	American Heart Association scientific journals	doi.org/10.1161/circulation.124.069484	Papatheodorou E, Aengevaeren VL, Eijsvogels TMH, Alfakih K, Hughes RK, Merghani A, Kissel CK, Fyyaz S, Bakalakos A, Dey D, Finocchiaro G, Parry-Williams G, Torlasco C, Papadakis M, Moon JC, Sharma S.



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