ignite

WARWICK MEDICAL SCHOOL MAGAZINE

SPRING 2020

Warwick Health
Tackling global health challenges

Athena SWAN Silver award
How we achieved it and where do we go from here?

Saving lives
Improving public use of defibrillators

WARWICK
MEDICAL SCHOOL

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Foreword

Welcome to the first edition of our Warwick Medical School magazine, Ignite, for 2020.

It's an exciting time for the School as we will start celebrating our 20th anniversary later this year when our 2020 cohorts join us in the autumn. We opened our doors to our first (sixty-seven) medical students in September 2000 and we now have a thriving programme of close to two hundred students enrolling with us each year. We are so proud of our graduates who are among the top performers in the country for graduate outcomes. To become a Warwick doctor is something special indeed!

Still, we will talk more about our plans and celebrations in future editions. In this one you can look forward to; an interview with our Athena SWAN leads who tell us all about the WMS journey to achieving Athena SWAN silver and future plans for world domination and gold in four years' time. We learn about the important work of the Warwick Health Global Research Priority initiative that pulls together researchers from across the University to tackle key global health challenges.

We meet a group of Health Economists who have formed a new centre to help set priorities in healthcare. Our MB ChB students use their outreach work Teddy Bear Hospital to try to enable children to become more confident in a medical setting. A new student society Warwick Surgical Medtech tell us what they are all about and how we can get involved. We find out more about Assistant Professor Erin Greaves' research in the area of endometriosis and Research Associate and emergency doctor, Chris Smith, tells us more about his research into defibrillator use.

In short, it's a packed edition. We hope you enjoy it.

Left to right; Roulla Philippou, Michael Chappell and Lawrence Young

Warwick Health – Tackling global health challenges

Professor Lawrence Young,
Co-lead Warwick Health
Global Research Priority

Lawrence Young, Professor of Molecular Oncology and Pro-Dean (External Affairs), introduces us to the Warwick Health Global Research Priority initiative, which aims to bring together researchers from departments across the University to address key global health challenges.

Healthcare around the world is undergoing a revolution. Longer life expectancies alongside a global shift in the impact of non-communicable diseases require new approaches to diagnosis, treatment and prevention that are affordable and effective. This is the main aim of our recently launched Warwick Health Global Research Priority (GRP) initiative.

Recognising that transformational research and teaching takes place across disciplinary boundaries, Warwick Health builds on the University of Warwick's strength in multidisciplinary research and teaching, which is reflected in the breadth of health-related activity across campus. This ranges from the traditional disciplines in medicine and life sciences to innovative areas such as those related to engineering, business, the physical sciences, computer science and mathematics. Health is further represented in social sciences and humanities at Warwick. Bringing all this together provides an exciting opportunity to better respond to health challenges across the world.

Warwick Health also provides an important interface with a number of key external stakeholders including our local NHS Trust partners, other universities such as Coventry University and industry. We have identified five priority subthemes that bring together teams across different university departments.

1

Biomedical Engineering and Biotechnology

At the core of our Warwick Health GRP is 'Biomedical Engineering and Biotechnology', which is a major strength at Warwick and aims to improve and develop tools and technologies to enhance healthcare outcomes. Research in this area covers a broad spectrum of activities, from experimental analysis, systems modelling and data analysis to the creation and sustained use of devices through design and manufacturing. Our activities have had an impact in health monitoring, diagnosis and prognosis, in drug discovery and screening as well as in clinical intervention. Examples of this research include the use of modelling to support drug design and discovery, with very close involvement from leading pharmaceutical companies based in the UK through strong association with the Quantitative and Systems Pharmacology UK network (QSP-UK).

In addition, there is longstanding research at Warwick on medical devices and instrumentation, in particular sensor-based technologies used for the screening and diagnosis of a host of disorders from breath and other non-invasively collected samples, based on analysis of the presence of volatiles. This technology also has the potential to support the screening, diagnosis, monitoring and treatment of major health issues including cancer and diabetes. Sensor-based technologies are also integral components of healthcare technology assistance devices – a core research focus at Warwick that allows continuous monitoring of wellbeing using various measures and data analysis. These approaches have far-reaching consequences for the real-time monitoring of health in a broad range of applications including predicting the likelihood of falls in the elderly and continuous measurement of balance, motor control and heart rate variability linked to stress and sleep disorders.

This work is supported by excellent facilities such as the University's Gait Laboratory and similar motion capture equipment in WMG, where working together we aim to improve models of human motion to support orthotic and prosthetic design, rehabilitation and health in the workplace through posture analysis. There is strong interest and experimental activity in the 'trace metals in medicine' laboratory where emphasis is on analysis of the uptake of metallic elements in the brain allied to the onset and development of neurodegenerative disorders.

In addition, new research and laboratories are being established in the robust use and improved maintenance of medical devices in lower and middle-income countries, in association with the WHO.

These provide just a small snapshot of the research performed linked to the Biomedical Engineering and Biotechnology sub-theme. There will be a variety of events and funding opportunities made available to support and encourage new collaborative research activities.

2

Anti-Microbial Resistance

The 'Anti-Microbial Resistance' subtheme builds on our interdisciplinary research in this area with colleagues working on a variety of projects ranging from studying the spread and evolution of antibiotic resistance in bacteria to developing novel antimicrobials based on natural products.

An important aspect of our work is the use of predictive modelling and epidemiology to better understand the spread of infectious disease and the impact of vaccination. We have developed health economic models to assess whether any change in immunisation programmes is cost-effective. For instance, working with Public Health England and the Department of Health we constructed an epidemiological model for the spread of human papillomavirus (HPV) infection which influenced the Government's recent decision to vaccinate boys as well as girls to widen the protection against, not only cervical cancer, but also the mouth and throat cancers caused by HPV.

We have used state of the art informatics to establish an online resource for genome database of bacteria that infect our gut and this is being used as an open resource for the worldwide research community as well as public health departments requiring information to monitor outbreaks of infection.

3

Mental Health

The 'Mental Health' subtheme builds on the strength of psychology, behavioural science and wellbeing research at Warwick – activity that is at the international forefront of unravelling vulnerabilities underpinning mental illnesses, individual and systemic factors promoting mental wellbeing, and using evidence to improve care pathways for young people experiencing emerging mental ill-health.

We have complimentary expertise in psychiatry, psychology, epidemiology, philosophy, law, history, sociology, economics, politics, computer sciences, digital health, statistics, humanities and creative arts, supporting interdisciplinary projects that enable the bench-to-bedside translation. We have had particular success in improving youth mental health care pathways – especially early intervention in psychosis, which we pioneered and is now internationally considered a major achievement – through our research in needs of young people in mental health services, in the criminal justice system, in social care, as well as globally, in ethnic minority groups and lower-middle income countries.

We are developing innovative methodologies and increasing capacity in disciplines such as health economics, implementation science, public and patient involvement (PPI) in research, and the use of theatre and film in public engagement in science. We are also leading the transformation of mental wellbeing in the workplace, through our research in employment and mental health, economics of happiness, and the recent successful bid of funding from the UK government to pilot innovative ways to reduce levels of sickness absence and the number of people falling out of work due to mental health conditions across the whole Midlands.

4

Artificial Intelligence (AI), Digital Health and Big Data

The 'Artificial Intelligence, Digital Health and Big Data' subtheme recognises that digital health innovations are resulting in data being generated across many different sources and in many different formats. To manage and make use of this data for patient benefit, there is a greater need for systematic integration, analysis and modelling of large datasets in an automated manner. The ability to build models based on large amounts of historical retrospective patient data will enable researchers to detect patterns that may not be manually discernible and to predict onset and progression of disease.

This approach is supported by our role in the government's Health Data Research UK initiative in the Midlands, which is providing opportunities to work with colleagues at other universities and NHS trusts to develop the tools and technologies needed to unlock knowledge from complex and diverse health data – thereby addressing some of the biggest health challenges that we face in the UK today. Digital Health and AI themed research in this area will facilitate better diagnosis, classification, prevention and self-management of physical and mental health conditions. One example is the use of digital pathology and AI to diagnose cancer and to develop algorithms that can help to better personalise cancer therapy.

5

Improving the health of people around the world

Embedded in all these Warwick Health research activities is our commitment to improve the health and wellbeing of people around the world. We have a responsibility to ensure that our research has real impact and to do this we are building partnerships across the world through the Warwick Centre for Applied Health Research and Delivery. This has created opportunities to work with colleagues in Africa, India, Pakistan, Indonesia and beyond on a variety of projects including healthcare in slums, the management of leprosy, oral cancer, smokeless tobacco and gestational diabetes. There is also a focus on increasing research capacity in LMICs.

We have a responsibility to ensure that our research has real impact and to do this we are building partnerships across the world through the Warwick Centre for Applied Health Research and Delivery.

The Warwick Health GRP is creating exciting opportunities for us to work across traditional disciplinary boundaries to deliver meaningful healthcare interventions. It is providing an important focus for training at both the undergraduate and postgraduate levels and allowing us to build important partnerships to facilitate the translation of our research into real impact to improve health and welfare across the world.

Associate Professor Kirstie Haywood,
Professor Paramjit Gill, co-leads
Warwick Medical School Athena SWAN

How we won our Silver Athena SWAN Award

Warwick Medical School achieved its Silver Athena SWAN award in November 2019. Led by Kirstie Haywood and Paramjit Gill we are now on our journey towards a gold application in four years' time. We caught up with them both to find out more about our progress.

What is Athena SWAN for people who don't know?

Paramjit – Athena SWAN (Scientific Women's Academic Network) is a charter that was established by the UK Equality Challenge Unit (now part of Advance HE) in 2005 that recognises and celebrates good practices in higher education and research institutions towards the advancement of gender equality: representation, progression and success for all.

Kirstie – All members of the community are supported by the Athena SWAN initiative, it's not just related to gender. It covers all of the nine protected characteristics: age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, and sex.

Why did you get involved?

Kirstie – I had raised an issue a couple of years ago where I felt that there was lots of silo working in my research division and I came up with the idea of the C3 meetings; coffee, cake and catch up. These went really well, enabling interaction and engagement across our units. My Head of Division then suggested I should have a think about what I could do around Athena SWAN. At a point where the leadership was changing I wanted to ensure a woman was a co-chair and it seemed a good opportunity to get involved.

Paramjit – It was a really steep learning curve. We reached out to the University equality and diversity team who were really helpful and then to the School to see if people wanted to get involved. After some consideration of where we were at we felt that it would take around 18 months to get ourselves up to speed and ready to put in a submission for silver.

However, in January 2019 it became clear that there was more of an urgency to move forward to submission quicker than we had originally planned as one of our funding bodies required our School to hold an Athena SWAN (AS) Silver Award for the areas of work that they fund. We decided to go for it and had a two month window to make the submission, so it was all hands to the pump.

How did you get the submission together?

Kirstie – At the beginning, I went to a really valuable meeting supported by the Medical Schools Council where they shared tips for making good submissions, helped us to understand the barriers and challenges, where the quick wins were and the longer term vision.

From the start we wanted to reach out to the whole community. Looking at all the areas that needed covering it was quite clear we needed the expertise of those around us as we couldn't write it on our own.

However, at that time there was some negativity in WMS about Athena SWAN. It was perceived as something that 'someone else did' and there was little collective ownership. There were members of the community who thought inclusivity and diversity was important but didn't really know how to engage. Fortunately we were able to reach out to these colleagues and develop a diverse self-assessment team covering the key areas. We were also very lucky that we had an Athena SWAN reviewer working with us who knew the tone and content that was needed in order to get our key messages across. We all put in so many hours crafting our submission and it was a real team effort. It's fair to say the successful submission was well and truly fuelled by flapjack!

Paramjit – We also wanted to ensure that our leaders were listening so we made sure we had senior people involved from all research divisions within the School.

We quickly picked up on some fabulous areas of good practice which at the time weren't linked to Athena SWAN. It was great to know there were so many nuggets of great things going on already that we could draw out, celebrate and share as best practice, including in the Trusts.

What was the most difficult part of putting the submission together?

Kirstie – One of the hardest parts of the submission was accessing the data. We had an expectation that because Athena SWAN had been going for some time that there would be data at our finger tips but this wasn't the case. We had a great data team who were able to draw all of this together and work out the kinks and problems.

Developing an effective way to harness data is likely to be a beacon activity for us going forward so we can develop a dashboard for others to use. We know it's an issue for teams making submissions and we want to be able to help our wider university community to overcome this by building on existing systems.

Do you think you have changed opinions?

Paramjit – Yes, I believe that we have but there is of course more we can do. Now we have achieved the Silver Award we need to ensure that we have momentum on our journey towards gold so that people remain engaged. We also want to show colleagues how powerful it can be if they raise an issue and are prepared to get involved as we can tackle these things together.

What are your plans for the future?

Paramjit – We now need to deliver on our action plan and maintain leadership involvement. We need to make sure everyone is always on board and 'living' Athena SWAN principles as part of their daily working life. We can show where we are making a difference already and the hope is that will keep people on board and encourage new people to join us.

What you are most proud of?

Kirstie – The engagement of the full community within this initiative. We have been privileged to work with the most amazing people and hope we have demonstrated to them that they can have a say and believe in that process, and that we can go some way to help them to have a better working environment and career progression.

Natasha Bechman and Thomas Dale Maclaine, MB ChB students

How using technology in healthcare can help meet the clinical needs of our ageing population

Healthcare in the UK is arguably under greater pressures than ever before – waiting lists are longer, the population is ageing and at the moment, almost 100,000 jobs in the NHS are unfilled (including 40,000 nurses and 10,000 doctors). Changes to staffing, numbers of places in medical and nursing schools, and increased spending are some of the possible long-term solutions. However, we are facing these issues in our healthcare system here and now and improvements are needed to address them. This is where new, revolutionising technology comes in.

Technology in healthcare

The use of technology in healthcare settings isn't radically novel. The strategic adoption of technologies might support clinical needs that arise from staff shortages, bed pressures or other routine occurrences in hospitals. One example is the NHS pushing towards a paperless era, with patient results tucked away in the pocket of healthcare professionals, on a secure mobile device. This prevents the hours invested in digging dusty volumes out of a medical library, supports faster decision making, and omits the classic issues with reading illegible handwriting! However, commercial technologies often come with significant extra cost, and repurposing pre-existing tools almost always require refinement before they meet clinical needs.

Technology is gradually being integrated into all aspects of healthcare, which can be very supportive for patients or staff in the NHS. New innovations are often created, then shoe-horned into clinical settings with the hope of meeting its needs. In order for the clinical needs to be fully met, the clinical needs should inspire innovation to occur and not the other way around.

Warwick Surgical MedTech (SMT)

Warwick Surgical MedTech was developed in August 2019. Our ambition is to be the local solution to national unmet clinical needs. Warwick Medical School is host to the largest graduate-entry medical course in the UK, with future doctors having academic and professional backgrounds in sciences and arts and humanities. Warwick SMT is an organisation that utilises interdisciplinary team working to address unmet clinical needs, presented by current clinicians. We integrate the vast experience and diversity of our graduate-entry medical students with students throughout all other faculties across the University of Warwick to provide three main outputs:

MEDx: Warwick SMT's programme of TEDx-like talks, inspiring students throughout the University of Warwick to think about unmet clinical needs, new technologies and ways for anyone interested to make an improvement in our healthcare systems. We are working with TEDxWarwick to turn these talks into truly inspiring events for all of the University of Warwick community.

Innovation programme: Warwick SMT's programme of workshops, where students work in interdisciplinary groups to come up with a robust solution to unmet clinical needs, provided by local clinicians. We are currently working with University Hospitals Coventry and Warwickshire's Innovation Hub in order to ensure our innovation programme outputs are closely in-line with NHS requirements, for people who are interested in taking patient-facing ideas further.

Internships: Warwick SMT are developing collaborations and opportunities for students to gain skills in healthcare technologies, supporting academic and professional development in our future innovators. We are currently exploring internships in augmented reality laparoscopic simulation training for medical students.

Upcoming events

We are currently planning a schedule of events over 2020, including our introduction talks early in the new year, our first innovation programme and our official launch events, celebrating WMS' 20th birthday. We will be hosting talks with clinical entrepreneurs, surgeons, medically-oriented engineers and other inspirational people to really motivate our community of future innovators. We will also be running workshops on how to take innovative ideas for unmet clinical needs through to prototyping, and even preparing for trials.

If you would like to get involved in any aspect of our organisation, whether that's to speak at one of our events, join our innovation programme, or create or take part in one of our internships, please do get in touch at warwickSMT@gmail.com

Professor James Mason,
Health Economics

Helping set priorities in healthcare – introducing the Centre for Health Economics at Warwick

At the beginning of 2019, those working or interested in health economics came together to form the Centre for Health Economics at Warwick (CHEW), led by its first Director, Prof James Mason.

Left to right; Felicity Langer, Henry Nwankwo, Lazaros Andronis, Hema Mistry, Alastair Canaway, Mandana Zanganeh, James Mason and Mandy Maredza

Health economics is a relatively young but increasingly important discipline sitting at the interface between social and health sciences. While 'health' and 'economics' might seem disparate terms, many issues facing health care systems are fundamentally economic. How should resources be provided for an increasingly ageing population? How can we improve the efficiency of the National Health Service (NHS) without jeopardising access and quality of care? Which new expensive cancer drugs should be purchased and what other care will go unfunded as a consequence? Thus, health economists are tasked with helping governments at home and abroad to value and prioritise healthcare services and systems, using a specialised range of research methods and designs. We are also developing new approaches to incorporate wellbeing in economic evaluation.

CHEW helps the NHS to understand the value of new treatments, by contrasting evidence on their effectiveness and cost. We support the NHS and Warwick Clinical Trials Unit in evaluating new technologies, programmes and interventions in a wide range of fields. These include: social care, cancer, emergency and critical care, mental health, musculoskeletal disorders, rehabilitation, paediatrics and reproductive health. Sometimes these clinical trials involve old technologies being used in new ways and sometimes they are truly innovative. For example, rotator cuff tears of the shoulder are common, and sometimes irreparable leading to substantial pain and disability. The START-REACTS trial is evaluating a dissolvable saline filled balloon inserted surgically above the torn tendons to improve joint function, reduce pain and promote healing. The sensitive application of economic analysis within the NHS and the methodological challenges raised are a central theme for CHEW.

In the national context, Warwick Evidence help the National Institute of Health and Care Excellence (NICE) to assess the cost-effectiveness of new drugs seeking reimbursement. This includes detective work, assessing pharmaceutical company submissions to NICE seeking NHS funding, by critiquing and re-evaluating claims of effectiveness and cost-effectiveness. Often these assessments become negotiations helping the NHS to secure new drugs at an acceptable cost reflecting their value.

Abroad, CHEW has a growing international research programme, with particular interests in infectious diseases and mental health. We work with a number of overseas universities, policy-makers, and funding agencies, to help decide the best way to invest limited health care budgets and meet ambitious goals such as Universal Health Coverage. Recent projects include the NIHR Global Health Research Group on Psychosis Outcomes, where we are developing tools to measure the financial impact of mental illness on vulnerable households in India, and the STREAM trial, where we found that shortened regimens for drug-resistant TB reduced health care costs in Ethiopia and South Africa, and allowed patients to return to work much sooner.

We are interested in policy evaluation methods and their use in understanding and evaluating governmental decision making, which requires drawing on broad economic toolbox. An example of this is supporting the policy decision made this summer to cease importing blood products into the UK for young patients, reversing the preventative policy implemented following the identification of CJD in 1996.

CHEW is an emergent and growing Centre, learning together and exploring new themes: in essence we research the socioeconomic value of health and healthcare, looking at how the valuation problem varies with context and addressing the measurement challenges of impact identification and valuation.

For more information about CHEW please visit our website:

warwick.ac.uk/chew

Yasmin Omar, Iman Mustafa,
MB ChB students

Teddy Bear Hospital takeover

How can we help children to become more confident in a medical environment while also helping medical students to become more confident working with children? The Teddy Bear Hospital (TBH) Society run by our MB ChB students aims to do just that. Here, co-presidents of the society, Yasmin Omar and Iman Mustafa, tell us more about the group's activities and reflect on a recent event they held for 50 local schoolchildren.

Teddy Bear Hospital is a non-profit society at Warwick that is part of a national student-led initiative aiming to reduce health anxiety and nervousness about healthcare environments experienced by young children, and familiarise them with basic clinical concepts. At the same time, the society aims to encourage Warwick's medical students to fully enhance their ability to communicate effectively with children and their parents – a crucial skill required for future clinical practice, specifically for those of us aspiring to work in paediatrics.

Our branch runs approximately two Teddy Bear workshops across Warwickshire each month, focusing on children aged between 4–10 years old at various schools and clubs. Visits typically last 1–2 hours, depending on class size. The children are asked to bring in their 'poorly teddies', with our goal being to use the bears as a tool to provide a familiar perspective that the children can use to relate to their past and future healthcare experiences. Every session rotates through 7-minute stations (with at least one volunteer, and 5–6 children per station), including 'pawscriptions', anatomy and x-ray, healthy eating and exercise, surgery and scrubbing in, mental health and disability, plaster casting, and first aid and emergency.

Our ongoing work in the local community has proven extremely successful, and the positive feedback we've received inspired us to host the first ever 'Teddy Bear Takeover' at the end of 2019. The aim was to invite up to 50 local school children to the Medical School on a Saturday to run a large-scale Teddy Bear Hospital event. As this was the first event of its kind, the approvals process was extensive, including financial planning forms, risk assessments, incident prevention measures and more! However, thanks to the untiring efforts of our wonderful committee, we were able to gain approval early on. Flyers were sent out to all schools in the Warwickshire area, many of whom we have established a strong rapport with and who were more than happy to promote the event for us. Our volunteers were all medical students from the university, who were DBS cleared and trained beforehand.

Before we knew it, it was Saturday 16 November – TBH Takeover day! Our day began with a warm welcome from our trusty Teddy Bear, Beano (a willing medical student dressed in a giant teddy bear costume), who waved in our children as they arrived with parents at 9am. Children were placed into their designated group rooms based on age, and our friendly volunteers started the day with some fun icebreaker games.

We ran a total of four stations throughout the day, beginning with 'healthy eating and exercise'. Our volunteers utilised the eatwell guide to highlight important food groups, and set up exercise circuits for the children to monitor their heart rates. The next station was 'pawscriptions and plaster casting', where the children were familiarised with mock GP/hospital settings, as well as plastering broken bones (a very messy station!). Following this was 'Introduction to Anatomy and Surgery', where we discussed the various organs and systems of the body. The final station of the day was our newest addition, 'Mental Health, Disability and Wellbeing'. This station focused on how to handle negative feelings and why looking after our minds is so important.

After lunch, we had a visit from Tom, one of our first-year medical students who was previously a paramedic, who taught everyone about basic first aid and calling 999 in an emergency. The children were absolutely fascinated by Tom's uniform and had hundreds of questions about a day in the life of a paramedic. After that we were visited by the lovely Rosie, who was previously a geriatric nurse. The children loved hearing about the amazing work our NHS nurses do, and what their day-to-day activities consist of. The day ended with a demonstration by Dr Joanna Dawes, who taught the children about what their experience of visiting the GP might be like, and showed them some medical tools they may come across during their visit.

The overwhelming response we received post-takeover from both parents and staff at the Medical School was extremely humbling, with parents requesting multiple takeover days for the future, and some even claiming their children now want to be teddy bear doctors just like us one day! This event would not have been possible without our fantastic committee, who have been pivotal in the ever-growing success of the WMS branch of TBH over the past two years. We're extremely grateful for their hard work, as well as the enthusiasm and commitment from all our hardworking volunteers.

In light of the popularity of Warwick Teddy Bear Hospital amongst both medical students and the community, we're now looking to expand our society to the rest of the University of Warwick, allowing non-medical students to participate in our work. Additionally, as co-presidents of the National Teddy Bear Hospital Committee, we're currently planning on hosting the Annual Teddy Bear Hospital Conference at Warwick Medical School, where students and guest speakers from across the country will be invited to share their thoughts on the Teddy Bear Hospital initiative and Paediatrics.

We're also in the planning stages of the Teddy Bear Takeover 2020, which is already looking to be a much larger event than our first!

If you'd like to find out more about Teddy Bear Hospital and how to get involved, please don't hesitate to contact us at wmsteddybearhospital@gmail.com or find us on Instagram at @wmsteddybearhospital.

A PROFILE OF

Erin Greaves

Assistant Professor and endometriosis researcher

Erin Greaves is an Assistant Professor in our Division of Biomedical Sciences, splitting her time across Gibbet Hill and the Clinical Sciences Research Laboratories at University Hospitals Coventry and Warwickshire (UHCW). Here, she tells us about her lab's research which ultimately aims to help develop a non-invasive, non-hormonal treatment for endometriosis, a condition affecting over 176 million women worldwide.

Tell us a bit about your background

I did my undergraduate degree in Biomedical Sciences at the University of Bradford, which included a year working in industry in a genetic toxicology lab. However, I knew from quite early on that I wanted to become an academic researcher. I was particularly interested in reproductive health and in my final year my dissertation focused on male germ cell development. After graduation I went on to do a PhD at the University of Leeds in Developmental Biology, where I again focused on what had been the subject of my dissertation.

I loved my PhD but I was based in a cardiovascular unit so I wasn't exposed to very many people working in the same field. By the end of my time there I knew I wanted to work in a dedicated reproductive health department, so I targeted the University of Edinburgh as they had a world-renowned Centre for Reproductive Health. At the time they only had one postdoc position advertised, focusing on female reproductive health, specifically the function of the inner lining of the uterus (endometrium). Although initially I had wanted to continue studying male reproduction I found I really enjoyed the new line of research and never looked back – I was soon very glad I was working in women's health. The endometrium is a fascinating tissue!

After a year or two the group began working on endometriosis and I spearheaded this new work. I developed a unique model we could use to study the condition. Initially we began researching how endometriosis lesions attract nerve fibres; a key component of pain generation in the condition. It was then that I developed an interest in macrophages and how they can dictate nerve growth. Following my postdoctoral training I was awarded a prestigious Medical Research Council Career Development Award Fellowship to set up my own lab. I spent four more years in Edinburgh before coming to Warwick in May 2019.

What is endometriosis?

Endometriosis is a condition where endometrial-like tissue grows outside of the uterus, usually within the pelvic cavity. This can cause chronic debilitating pelvic pain and it's linked to infertility. Around 176 million women are affected worldwide; and approximately one in ten women of reproductive age in the UK.

Even though it's a common condition, until recently it wasn't well understood (we still have lots of gaps in knowledge!), with many women going years before being diagnosed. Fortunately today I think things are starting to change. There's a lot more awareness of the condition, partly thanks to work my former colleagues at Edinburgh did which brought together women affected, clinicians, policy makers and researchers to discuss the shortfalls in research, diagnosis and treatment of the condition.

What is your lab working on and how many people have you got in the team?

Our lab is investigating the role of macrophages in endometriosis. Macrophages are immune cells that are present throughout the body and are incredibly important for the healthy function of many tissues. However, dysfunction of macrophages is also associated with different diseases, including endometriosis. What we've previously shown is that macrophages are really important for promoting the growth of nerve fibres into lesions and play a key role in generating pain in endometrioses. We hope that by understanding more about macrophages in endometriosis, in the future we'll be able to target them therapeutically or modify them, with a long-term aim of developing a treatment.

My lab is based at CSRL at UHCW and currently I have five team members – two technicians, a postdoc, a PhD student and an Erasmus intern.

Why is your work important?

Ultimately we want to develop a new therapy that is non-invasive and non-hormonal. Currently there are only two gold-standard ways to treat endometriosis. Firstly, by removing legions during laparoscopic surgery. Unfortunately that's associated with a high rate of recurrence – approximately 50% of women who've had excision of lesions will have a relapse of symptoms within two years. Some women have to have several laparoscopies, which can then lead to further issues such as nerve damage and neuropathic pain.

The other treatment is by inducing a medical menopause, which is associated with unwanted side effects. Medical suppression of hormones has a contraceptive effect, which isn't ideal as many of the women who have endometriosis want to have children.

What are the next steps for your research?

We've just had ethical clearance to start collecting tissues from women who have endometriosis. There are three subtypes of endometriosis and we'll be studying the tissues to try and figure out exactly how these subtypes differ. No one really knows how endometriosis develops and it's been postulated that these three types of lesions could have different developmental origins, and therefore may well respond differently to different drugs. We're hoping that we'll know more about this in 3–4 years' time.

What do you most enjoy about working in research?

I love the freedom it gives you, and the fact you can be creative and develop your own ideas and hypotheses. I also enjoy the variety of people you get to work with – it's a very stimulating environment. I've particularly enjoyed coming to Warwick; it's progressive and has quite a different outlook on things compared to other universities.

What advice would you give to students or those at the start of their career who are keen to progress in academia and research?

I think if you're convinced you want to stay in academia and become a group leader it's very important to start CV building very early in your postdoc career and finding ways of showing you have the potential to generate ideas independently and attract funding. Team science is also important - find good collaborators that you work well with. I had an amazing mentor who was always suggesting ways of improving my CV – for example by going for early career awards, applying for travel grants and submitting abstracts for presentations at international conferences.

I think it's also important to find an advocate, which I think is quite different to a mentor. During my postdoc, one of my clinical collaborators was a fantastic advocate who would introduce me to other senior researchers at events and started putting me forward for invited talks at conferences he was involved in organising. Once you've done a few it becomes easier to get involved in more. Finding someone like that to support you can make such a difference.

Chris Smith,
Clinical Research Fellow,
Clinical Trials

Improving the use of public access defibrillators

A&E doctor Chris Smith is currently approaching the end of his NIHR-funded PhD at WMS looking at improving the use of public access defibrillators. We met with him to find out more about his research, why defibrillators are so important and how we can all help in the event of an emergency.

Tell us a bit about your research

My PhD is all about improving use of public access defibrillation in the response to out-of-hospital cardiac arrest. I've been looking at a volunteer mobile app called GoodSAM, which is available in seven of the 10 ambulance service areas in the UK (although unfortunately not the West Midlands at the moment!) The app can be used by anyone who's been trained in CPR. If there's a 999 call reporting a cardiac arrest, an alert will be sent out via the app so that people within a certain distance will be informed about it and invited to help. Part of the app shows where your nearest defibrillators are located. My work has been focused on looking at how effective the app is, whether people attending those affected are taking defibrillators with them, and the reasons why or why not. The results should be published later this year.

Why are defibrillators so important?

The two key things which make a difference to someone's survival after a cardiac arrest are CPR and defibrillation. These are both things that can be done by members of the public. On average you might have to wait 7 – 8 minutes for an ambulance, and that's after the decision has actually been made to call for one. If nothing happens in those first 10 minutes, a patient's chance of survival are very low – in fact with no intervention your chance of survival goes down by about 10% each minute. Out-of-hospital cardiac arrest survival in the UK is only around 7 – 8%. If you do CPR and use a defibrillator before an ambulance arrives you at least double the chance of the person surviving.

In my work in A&E I've seen many examples of cardiac arrest patients sat in the room fully conscious thanks to being attached to a defibrillator – but I've also, sadly, seen many examples of patients passing away after having a cardiac arrest close to a defibrillator but no one had used it. Only around 3% of out-of-hospital cardiac arrest patients have a defibrillator used on them. About 60 – 65% receive CPR from a bystander.

The main reason is fear of the unknown – they're not familiar enough with them. There's still a feeling that you should wait until an expert comes along. The truth is you can't get it wrong. It's much more risky to not take action on someone suffering a cardiac arrest than taking action on someone who doesn't need it!

You've been involved in training Warwick medical students in CPR and with defibrillators – how has that been going?

It's been going really well! Over the last year and a half we've brought a CPR training scheme for students over from the University of Birmingham, which is what I was involved in previously when I was a student. It's called RMD Warwick and it's a peer-led CPR and defibrillator training scheme which is endorsed by the European Resuscitation Council. We've trained 14 student instructors from our second and third year medics here at WMS and they are now delivering a course themselves to mostly first year medical students and students from the School of Life Sciences. We piloted it last year and are rolling it out with some funding from the Medical School and the WPH Charitable Trust. We're hoping to have trained a further 150 students at Gibbet Hill over the coming year.

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We've also been involved in training staff here at the Medical School and on main campus as well as the local community. Last year on National Restart a Heart Day we went out to a school in Kenilworth and delivered training to 300 Year 7 students along with four of our MB ChB trainees and some volunteers from a local charity, Kenilworth Heartsafe.

How can people find out more about their local defibrillators and how to use one?

It's really important to know where your nearest one is (and if you're responsible for one, make sure it's registered with the local ambulance service). At the University of Warwick, all of the campus defibrillators are listed on the interactive campus map, which you can find on the website.

There's a national database that is going to be coming online this year called The Circuit, funded by the British Heart Foundation. You should be able to see where your nearest ones are on that. In the event of an emergency, the 999 operator would be able to tell you where the nearest defibrillator is as well.

In terms of learning how to use one all you need to do is pick it up and switch it on and the defibrillator will talk to you and guide you through what you need to do. The decisions around whether to shock or not are taken by the defibrillator, not you. However it's useful to see what they're like in a non-emergency situation so you can become familiar with them. Courses are great if you're able to go on one, but there's also an app called Lifesaver, which provides some interactive training – it teaches you CPR and shows you how to use a defibrillator. This could be a great introduction for people who haven't got the time or confidence to go to a course. Search for 'Lifesaver Mobile' on your app store.

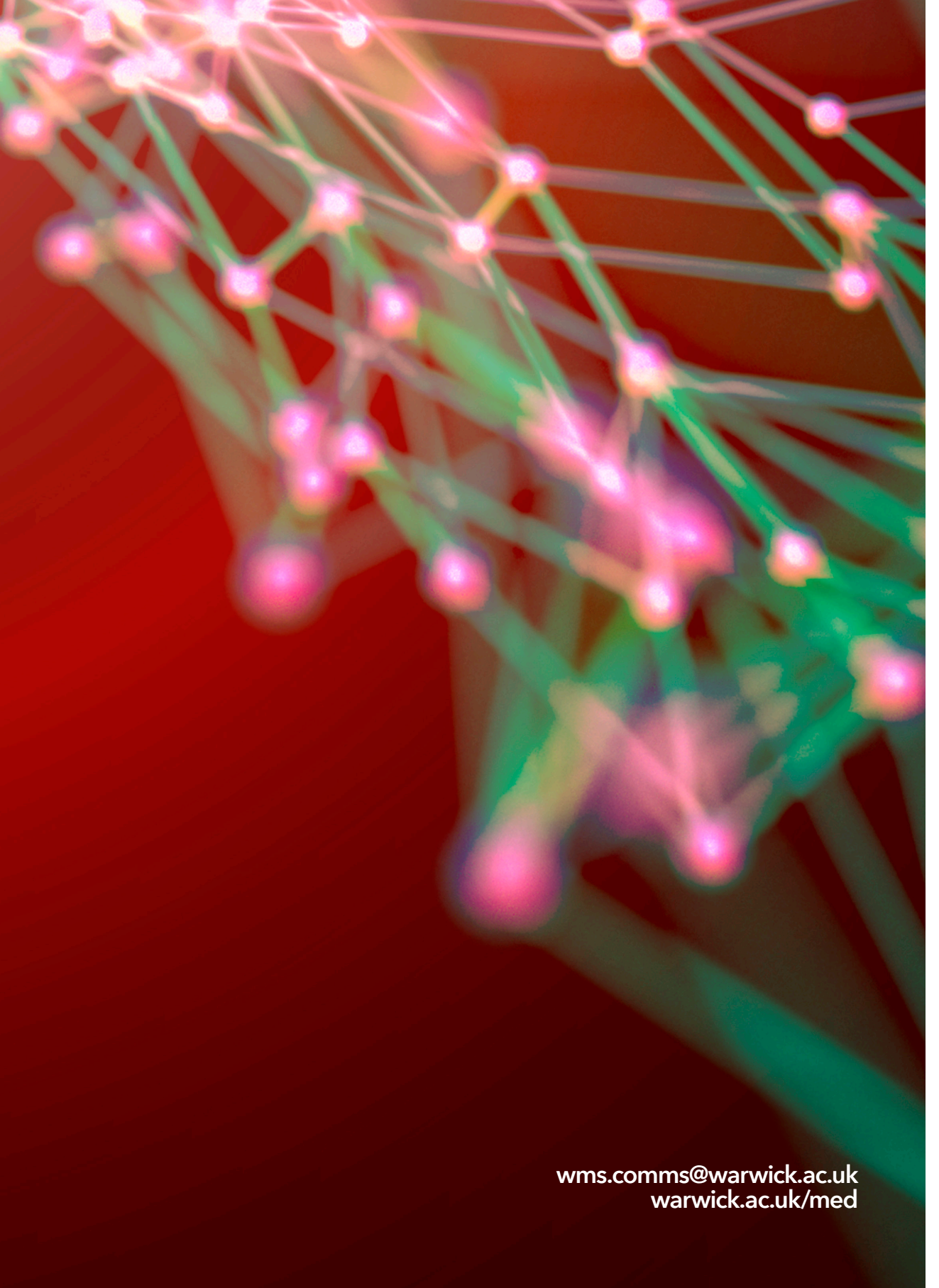
What should you do if you see someone having a cardiac arrest?

If you see someone having a cardiac arrest there's really nothing you can do that will make things worse. Call 999 and then if you know how to perform CPR, start that as soon as possible. If you don't know or aren't sure, the call operator should be able to guide you through it and they will also have information about where the nearest defibrillators are, so try and get someone to go and get one for you.

When it comes to the defibrillator the only real decision you need to make is to use it in the first place – once you've switched it on, it's the machine that makes the decisions, so you don't need to worry about that.

What have you got planned next as part of this work?

I've just received funding from Resuscitation Council UK to look at drone delivery of defibrillators, so I'm starting to work on that and am planning to do some simulation studies on the Warwick campus, hopefully in late summer or early autumn. The University has been really supportive and we're about to start looking at the best locations for this to happen. We'll be inviting anyone who hasn't had formal CPR training in the last five years to be a participant in the study so we can test a couple of ways of delivering the defibrillator to them. Look out for more information over the coming months!



wms.comms@warwick.ac.uk
warwick.ac.uk/med