

The International Union of Basic and Clinical
Pharmacology Education Section



The second core concepts of pharmacology education workshop will be held at the Monash University Prato Centre (pictured) in Italy from July 10-12, 2024, see page 5 for more details.

Welcome to the second IUPHAR Education Section newsletter! I've had the privilege of working as Chair of the IUPHAR Education Section since 2022 and am delighted to have been re-appointed to the post. Many thanks to IUPHAR member societies for supporting my nomination. The section has developed significantly over the last few years, including a restructure of the organisation and remit to include oversight of both the Pharmacology Education Project and the Core Concepts of Pharmacology initiative. We have opened up section meetings to include the education leads from member societies, the PEP editorial board and the Core Concepts research team, which has brought a vibrancy and increased focus to the team. A new, transparent process to elect the new councillors who will serve until WCP2026 was developed, and the team oversaw the organisation of the WCP2023 IUPHAR Education Satellite meeting which welcomed over 100 educators from 22 countries to Glasgow. More recently we established working groups around communication, social media, networking and events and released our first newsletter in December. We ran the first of our online educator meetings in March – more details about this on page 6. Please send us your ideas for topics you would like to see covered in future online educator meetings, and we hope to see you at a meeting soon.

Professor Clare Guilding, Chair IUPHAR Education Section

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HAPPY 3RD BIRTHDAY TO THE VETERINARY EDUCATORS IN PHARMACOLOGY SPECIAL INTEREST GROUP (VEPSIG)

Educators teaching pharmacology in schools of veterinary medicine face similar challenges to pharmacology educators in other healthcare disciplines: the subject is taught by a mixture of specialists and non-specialists in the subject, the time set aside for pharmacology in the curriculum varies widely across vet schools, and the subject may be fragmented within a spiral curriculum or consolidated in a stand-alone module. Three years ago we decided to create a support network for our colleagues and co-founded the Veterinary Educators in Pharmacology Special Interest Group (VEPSIG). We wrote to regional veterinary pharmacology colleges in Europe, USA and Australia/New Zealand, and to the Journal of Veterinary Pharmacology and Therapeutics to announce the formation of VEPSIG and invite colleagues to join us. The inaugural meeting was held in December 2020 and our community has grown to a current membership of 67 educators in 21 countries.

VEPSIG Member Locations



VEPSIG aims to provide peer support, share ideas and best practice approaches for learning and teaching, and support and encourage pedagogical research in pharmacology. We hold monthly meetings, with start times rotated each meeting to facilitate global participation. We have a members forum hosted on the VetMedAcademy website. VEPSIG provides a space for social learning, where colleagues learn from more experienced others. Communities of practice can give educators a sense of belonging to a discipline, leading to comments such as this one from a VEPSIG member:

'I am soooo thrilled that this group has formed. For the first time in a long while, I feel like I have found colleagues that understand my professional frustrations and share in my successes.'

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HAPPY 3RD BIRTHDAY TO THE VETERINARY EDUCATORS IN PHARMACOLOGY SPECIAL INTEREST GROUP

CONT...

We include a pedagogical journal club within our meetings, and our discussions have touched on multiple aspects of learning and teaching, such as issues with integration into the curriculum, case-based learning, assessment and artificial intelligence. The Group has collaborated on multiple pedagogical research projects, the first of which is coming to conclusion and aimed for publication early in 2024. Our next project is to re-evaluate the pharmacology day-1-competencies (Werners and Fajt, 2021), especially in the light of competency based veterinary education.

We value interdisciplinary collaborations and very much appreciate the warm welcome we have received from the IUPHAR-Ed community. We encourage educators to play an active role in the various IUPHAR-Ed initiatives. Lastly, we call upon pharmacology educators from different healthcare professions, educators from connected disciplines and practitioners in the wider pharmacology community, to join our VEPSIG community. We strongly believe that we all bring unique insights to the discussion!

Martin Hawes

m.hawes@surrey.ac.uk

Arno Werners

awerners@sgu.edu

[READ MORE: Werners and Fajt \(2021\): What a veterinary graduate should know about basic and clinical pharmacology.](#)



Martin Hawes has recently joined the IUPHAR-ED Core Concepts of Pharmacology Research Team. Martin is a Senior Lecturer in Veterinary Pharmacology and Therapeutics at the School of Veterinary Medicine, University of Surrey, UK. Martin originally trained as a hospital pharmacist before moving to the pharmaceutical industry, where he spent 20 years in human drug discovery and development. In 2012, he took a career break to read veterinary medicine, and worked as a companion animal vet before joining the University of Surrey in 2018. Martin was awarded the British Pharmacological Society Student Choice Award for Excellence in Pharmacology Teaching in 2021 and the BSAVA Amoroso Award for Teaching in 2022. In addition to his part-time teaching role at Surrey, Martin is a Resident of the European College of Veterinary Pharmacology and Toxicology and Visiting Associate Professorial Teaching Fellow in Veterinary Pharmacy and Pharmacology at the Pharmacy School, Aston University, UK.



Arno Werners has recently been appointed as an IUPHAR-Ed Councillor. Arno is currently professor of veterinary pharmacology and toxicology and the assistant dean of academics at St. George's University School of Veterinary Medicine. He obtained his DVM degree from the Faculty of Veterinary Medicine, Utrecht University in 1999 and his PhD and board certification in 2005. He then completed a residency program in equine internal medicine before accepting a position at Prof. Clare Bryant's lab at the University of Cambridge in 2010. In 2011 he moved to St. George's, Grenada to head the pharmacology and toxicology section at the school of veterinary medicine. Arno obtained a Utrecht University teaching degree in 2009, a teaching certificate in higher education from St. George's University in 2017, a Master's in Education from St. George's University in 2019 and have been teaching basic and clinical pharmacology for over 20 years.

VETERINARY PHARMACOLOGY EDUCATION: CALL FOR PAPERS

Veterinary Pharmacology Education

Submission deadline: Sunday, 30 June 2024

The Journal of Veterinary Pharmacology and Therapeutics is currently inviting submissions for an upcoming Special Issue that will focus on the generation and implementation of Day One Competency-Based Veterinary Pharmacology Education.

The Competency-Based Veterinary Education (CBVE) framework is increasingly being adopted by veterinary schools across the world. The goal of CBVE is to develop graduates to be able to practice veterinary medicine with a defined level of proficiency. Pedagogical research relating to CBVE in the discipline of veterinary pharmacology is lacking. The goal of this special issue is to begin to plug that gap, to help educators design, implement and deliver competency-based programmes in veterinary pharmacology. Contributions relating to Day One competences in veterinary pharmacology are sought from both the education sector and from the wider professional community.

Topics for this call for papers include but not restricted to:

- Core concepts in veterinary pharmacology
- Competence development and implementation within veterinary pharmacology courses
- Identification and articulation of competences required for new veterinary graduates
- Identification of core knowledge, skills and attitudes which underpin competences
- Sequencing and progression in the development of competences
- Learning and teaching approaches to support development of competences
- Student success and perceptions of competence based veterinary education
- Assessment of competences
- Implementation of competency-based education for veterinary pharmacology within the curriculum

Guest Editors:

Martin Hawes

University of Surrey
United Kingdom



Arno Werners

St. George's University
Grenada



CORE CONCEPTS OF PHARMACOLOGY PROJECT



LINK TO CC PROJECT: <https://coreconceptspharmacology.org/>

1. IUPHAR-Ed Core Concepts of Pharmacology Quiz 1

Recruitment has now concluded with a total of 710 participants from 7 countries (Australia, Ireland, UK, Brazil, Kazakhstan, USA, Hong Kong).

PK quiz: 343 (in English) + 35 (in Portuguese) = 378

PD quiz 303 (in English) + 29 (in Portuguese) = 332

The quiz explored student understanding and misconceptions for the following Core Concepts:

Drug efficacy, Steady state concentration, Structure-activity relationship, Drug-target interaction, Drug tolerance, Drug bioavailability, Volume of distribution, Drug clearance

The student responses are now being analysed. The work will be submitted to the European Journal of Pharmacology as part of an education edition of EJP.

2. IUPHAR-Ed Core Concepts of Pharmacology Quiz 2.

Quiz 2 has now been approved by the Monash University Ethics in Human Research committee and recruitment is now underway.

Quiz 2 will explore student understanding and misconceptions for the following Core Concepts:

Mechanism of drug action, Drug target, Drug elimination, Drug interaction, Zero and first order kinetics, Drug half-life, Drug potency, Drug distribution

3. MCQ database

A database of 200 multiple choice questions has been collated and a group of experts has completed an analysis of the questions. This work is led by PhD student Adeladew Netere, and is currently being written up for publication.

4. IUPHAR-Ed Core Concepts of Pharmacology Workshop 2

The second workshop Core Concepts of Pharmacology will be held in Prato, Italy, from July 10-12. 23 participants from 8 countries will work together to develop resources and assessments for educators and students around the world.

Special thanks to IUPHAR for funding the venue costs for the meeting, and for IUPHAR-Ed Chair and Core Concepts co-lead Clare Guilding for securing the funding.

*Update by Professor Paul White,
Core Concepts Project Co-lead*



Members of the core concepts expert group connect online on a regular basis but are looking forward to the in-person workshop in Prato in July!

ONLINE MEETING TEAM UPDATE

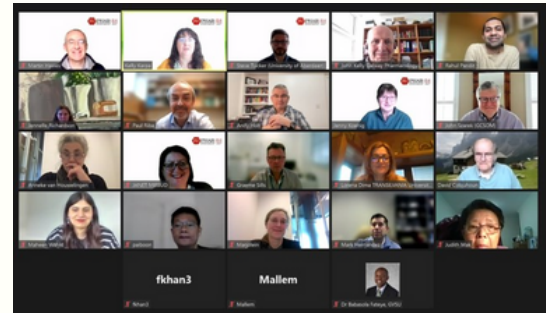
The inaugural IUPHAR Education Section Online Meeting Team event was held on March 12th! A special thank you to Anna-Marie Babey (University of New England, Australia) for her leadership on this initiative.

This activity had 4 primary purposes:

- to introduce pharmacology educators from around the world to each other to expand their network;
- to gain new insights and/or ideas to inform teaching practice;
- to provide an opportunity to identify like-minded individuals with whom educators can collaborate in the scholarship of teaching and learning; and
- to develop one or more education resources to enhance pharmacology teaching.

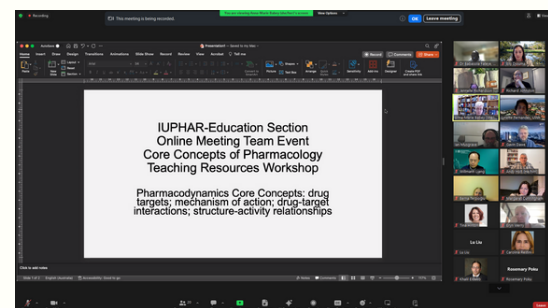
Pharmacokinetics - Tuesday March 12, 2024, 7-9 am EST

Twenty-seven pharmacology educators joined the IUPHAR Core Concepts of Pharmacology Teaching Resources Workshop on the topic of Pharmacokinetics. The session was organized by Jenny Koenig and moderated online by Martin Hawes. In breakout rooms facilitated by Kelly Karpa, Steven Tucker, Janet Mifsud, and Jenny Koenig, participants discussed and developed educational resources that emphasized active learning and re-purposing existing resources to support delivery of learning around 4 pharmacokinetic core concepts: volume of distribution, elimination, elimination half life and clearance. All groups agreed to continue discussions and collaboration around development of resources beyond the workshop.



Pharmacodynamics - Tuesday 12th March 2024, 1:00 – 4:00 Australian Eastern Daylight Time (GMT +11)

Nineteen pharmacology educators from 7 countries participated in the IUPHAR-Ed Online Meeting Team's Core Concepts of Pharmacology Teaching Resources Workshop on the topic of Pharmacodynamics. This session was organised and moderated online by Anna-Marie Babey. In breakout rooms facilitated by Gavin Dawe, Lynette Fernandes, Willmann Liang, and Carol Restini, participants worked collaboratively to create multiple-choice questions and practical laboratory activities for 2 of the pharmacodynamic core concepts, namely drug targets and mechanism of action. The attendees discussed how challenging it was to maintain focus on the core concepts, since these essential elements are often subsumed within clinical and/or research contexts. Participants were very enthusiastic about the opportunity to exchange ideas with pharmacology educators from around the globe, and expressed an interest in extending their interactions beyond both the workshop and the topic at hand.



Participants from all over the world participated in the inaugural IUPHAR Education Section Online Meeting Team event which aimed to generate teaching resources on core concepts of pharmacology.

AWARDS AND ACHIEVEMENTS



Congratulations to Maggie Cunningham (IUPHAR-Ed secretary) on her appointment to British Pharmacological Society (BPS) Honorary Fellow. Honorary Fellows are elected for life in recognition of sustained excellence and leadership in science, healthcare, and public service.

In recognition of International Women's Day which was on March 8, Maggie shares her journey around navigating life and career and what she describes as "Cumulative dosing of support and mentorship in pharmacology".

What is your current role and what do you enjoy most about your job?

I am currently a Senior Lecturer in Pharmacology at University of Strathclyde with a multidisciplinary research team which focuses on the molecular pharmacology of cardiovascular drug targets and drug-induced toxicities. My team also has parallel interests in advancing scholarship research within pharmacology in higher education using research-informed teaching through evaluating pedagogical practices. In 2023 I took over as the Director of the Biomolecular Sciences (BMS) Degree Programmes which has provided me with the opportunity to lead an excellent team of academic and teaching-focussed staff within Strathclyde Institute of Pharmacy and Biomedical Sciences (SIPBS). I was recently appointed as the Associate Dean (Learning Enhancement) for the Faculty of Science at Strathclyde. The best part about my job is the ability to combine fundamental pharmacological research at the bench alongside my education research interests as part of the different roles I have. My own pathway into academia has taught me the value of supporting others through making education accessible and inclusive so that others might find and follow their own ambitions.

Tell us about your career journey

I was inspired to pursue a career in science following an excellent experience during my modern apprenticeship at University of Glasgow where I was training to be a laboratory technician. I was only 17 years old when I started my apprenticeship back in 1999 however it was probably the most significant period of my life when it came to career decision making and development. Throughout that time, I was exposed to so many different careers in academia and experienced so many positive interactions with technical staff, PhD students, postdoctoral researchers, and academic members of staff who trained me and trusted me to work alongside them to support their research. This support and mentorship provided me with the confidence to apply to university, which I genuinely would never have considered without their influence. Due to the experiential learning and qualifications I gained as part of the apprenticeship, I managed to secure a place at University of Strathclyde as a direct entry Year 3 student on the BSc (Hons) Biochemistry and Pharmacology degree programme.



Colleagues from University of Glasgow during my apprenticeship period. Photo credit: Courtesy of Dr William Miller, University of Glasgow

It was at Strathclyde during my undergraduate when I met Professor Robin Plevin during one of the Year 3 pharmacology organ bath laboratories. Little did he know that after one lab of testing concentration-responses on guinea pig ileum, he was about to experience cumulative dosing of me over his career lifetime! It's almost the like the pharmacological version of Star Wars. The minute he opened his lab doors to me as an undergraduate summer student, I became his pharmacology padawan. I returned for more Jedi training as his PhD student and just when he thought he got rid of me when I moved to University of Bristol as a postdoctoral position, I bounced back to SIPBS at Strathclyde four years later in true phantom menace style as a Chancellor Fellow to establish my own 'empire'. As Yoda might say 'Robin is sick to the back teeth of me, he is'.

Another person who was tremendously supportive in my career, both at a time when I was a new mother-in-training and as a new post-doc-in-training, was Professor Graeme Henderson, who I met at University of Bristol. We both worked in the same department at University of Bristol and lived in the same North Somerset village (Wrington), so he was kind enough to invite me to car share with him into the University each morning. I relocated from Glasgow to Bristol after I completed my PhD when my son Dylan was 6 months old. Graeme was integral to helping me settle into life at University of Bristol as a fellow G protein-coupled receptor (GPCR) pharmacologist, and to life in Bristol in general as he introduced me and my partner to many people in the village. It was Graeme's continual encouragement during my post-doc years that led me to get involved in the British Pharmacological Society. He flagged up an opportunity to join the British Pharmacological Society Pharmacology Matters Magazine as an editorial board member, and then highlighted review editor positions for the newly established PR&P journal. After joining both, I then went on to become the magazine Editor-in-Chief for 5 years (2017-2023), and currently sit on the BPS awards and the BPS engagement committees. I have also been actively involved in the BPS Educator workshops as a participant and co-organiser of a joint BPS-IUPHAR-Education Section Satellite meeting in Glasgow for WCP-2023.

Were there any significant milestones during your academic journey?

I would say the significant milestones during my career have been the ones where I have been fortunate to share with my family. To mark the end of my PhD, I gave birth to my son Dylan in 2009 and moved to Bristol with my new family in 2010. I then went on to have two further children, Amélie-Rose in 2017 and Merida in 2018, during my Chancellor's Fellowship (2014-2019). These were remarkably challenging periods in my career as I was trying to complete my PhD when I had Dylan and in the middle of establishing my own laboratory when I had my daughters. I would like to say it was plain sailing but that would be a lie, particularly as my daughter Merida was born with sepsis and other complications which led to significant intervention in the early days, months and years of life. Needless to say, it was lifechanging from a personal, family and career standpoint.



Dylan was born during the final year of my PhD in 2009. I went on to have two daughters during my Chancellor's Fellowship, Amélie-Rose (2017) and Merida (2018). All now play for Loch Lomond Rugby Club mini and juniors, where I am the Child Protection Officer in my spare time.

I am often asked by those considering a career in academia, “when is the right time to have a family?” My response through the years has changed with every new child experience I have faced. Now my response is simple – there is never a right time, and you can never plan for every eventuality. There will be speed bumps along the way and some compromises that may have to be made which will be unique to the support network you have access to. I have been fortunate to have a very supportive mentors at critical stages of my career, which have been in addition to the network of friends, family and colleagues I have developed along the way.

What achievements are you most proud of?

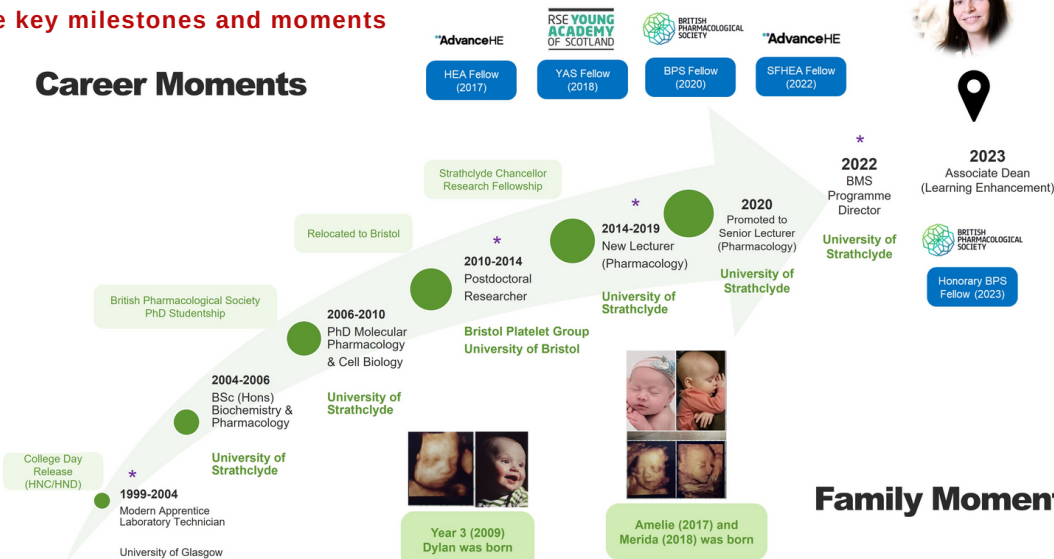
One of the achievements I was most proud of was when I received an email from Paul Tizard from the BPS to say I had been nominated for BPS Fellowship in 2020. This was followed up by a second email from Paul in 2023 inviting me to join Honorary Fellowship and notifying me that I was awarded the BPS Rang Prize for Outstanding Achievement in Teaching. This was a special moment that I got to celebrate with Robin and Graeme (pictured) who were so influential throughout my career in pharmacology.



Left to right: Prof. Robin Plevin, Dr Maggie Cunningham, Prof. Graeme Henderson at the 2023 British Pharmacological Society awards event in London in December 2023. Here I picked up Honorary Fellowship and the Rang Prize for Outstanding Achievement in Teaching. Collecting my Honorary Fellowship from Prof. Clive Page (BPS President).

Timeline key milestones and moments

Career Moments



Family Moments



Year 3 (2009) Dylan was born



Amelie (2017) and Merida (2018) was born

Critical mentorship phases *

IUPHAR EDUCATION SECTION

MORE AWARDS AND ACHIEVEMENTS

Prizes for Excellence in Teaching awarded to Pharmacology Lecturers at University College Cork, Ireland

Each year the president of University College Cork gives awards for excellence in teaching and learning. Although these awards are University-wide, this year lecturers in the Dept. Pharmacology and Therapeutics won two of these awards. **Drs. Meade-Murphy and van Pelt received a team award for the development of a package of online interactive teaching material for the BSc. Programmes in Paramedic Studies.** This provides accessible and inclusive learning, interactivity, engagement, and support for the paramedic students undertaking the pharmacology module, as they simultaneously face challenges of managing their clinical duties.



Dr McCarthy received an **Early Career Award** for designing new Pharmacology modules for BSc in Medical and Health Sciences and including multiple forms of assessment which ties in with the Universal Design for Learning (UDL) framework as it provides techniques that make modules more applicable to students with different backgrounds, learning styles, abilities and disabilities.

Hollie Swanson, Ph.D., professor in the Department of Pharmacology and Nutritional Sciences in the UK College of Medicine, earned the **Undergraduate Educator Award** from the Society of Toxicology.

>>> [READ MORE: UK's Swanson earns Undergraduate Educator Award](#)



Rang Prize for Outstanding Achievement in Teaching **>>> [APPLY NOW](#)**

This annual prize recognises outstanding achievement in the teaching of both clinical and non-clinical pharmacology. There are up to two awards available. Winners will receive £1,000.

Deadline for applications: 31 March 2024.

LINKS TO RECENTLY PUBLISHED PAPERS

Sonstein Stephen A. , Silva Honorio , Jones Carolynn T. , Bierer Barbara E. (2024) [Education and training of clinical research professionals and the evolution of the Joint Task Force for Clinical Trial Competency](#); Frontiers in Pharmacology, 15. doi: 10.3389/fphar.2024.1291675

Guiding C, Kelly-Laubscher R and White P (2024). [The future of pharmacology education: a global outlook](#); Expert Review of Clinical Pharmacology, 17:2, 115-118.

Perdigão M, Afonso A, de Oliveira-Martins S. et al (2024). [Pharmacovigilance teaching and learning: a mixed cross-sectional analysis of the Portuguese public higher education system](#). BMC Med Educ 24, 13.

Hingham JP and Colquhon D (2024). [The affinity-efficacy problem: an essential part of pharmacology education](#). arXiv:2402.14617

Boneberg A (2023). [Assessing the Effectiveness of Gaming as a Teaching Strategy in an Undergraduate Nursing Pharmacology Course](#), Teachers College, Columbia University.

Carriere JJ, Davies NA, Cunningham MR, Wallace MJ, Seeley A (2023). [Co-created in vivo pharmacology practical classes using the novel organism Lumbriculus variegatus](#); Pharmacol Res Perspect; 11:1(6):e01158. doi: 10.1002/prp2.1158.

GLOBAL JOB ALERTS

➤➤➤ [See the full list of pharmacology jobs currently listed on ScienceCareers](#)

[Professor of Molecular Pharmacology](#)., Coventry University - Research Institute for Health and Wellbeing (IHW), IHW Centre for Health and Life Sciences (CHLS): Closing date: 18th March 2024

[Lecturer in Pharmacology and Therapeutics \(2 Posts\)](#)., University College Cork, Ireland: Closing date: Tuesday, 19th March 2024.

[Associate Professor/or Senior Lecturer in Pharmaceutical Sciences](#)., University of Tasmania, Australia. Closing date: 24th March 2024

[Lecturer/Senior Lecturer, Teaching & Research \(Emerging areas of Pharmacology\)](#)., University of New South Wales, Australia. Closing date: 26th March 2024

UPCOMING WORKSHOPS/ACTIVITIES



Are you interested in integrating the WHO 6-step model in your CPT curriculum, or do you want to hear how others do this? Then register yourself for the upcoming CP4T Teach the Teacher course.



[CLICK TO REGISTER AND READ MORE](#)

Identification of Educational Milestones and Entrustable Professional Activities for Day One Prescribing Competence

Workshop 14 May 2024

Dr Martin Hawes

Senior Lecturer in Veterinary Pharmacology and Therapeutics
School of Veterinary Medicine, University of Surrey, UK

High-level Entrustable Professional Activities (EPAs) and Educational Milestones (EMs) have been published for multiple health professions. Discipline-specific EPAs and EMs are less established. The purpose of this workshop will be to identify EPAs and EMs for new graduate Day One prescribing competence. The focus will be on veterinary education, however the workshop will be relevant to other healthcare disciplines with prescribing knowledge and skills development within the curriculum.

The workshop will consist of parallel in-person (at University of Surrey, UK) and online streams. Attendance is limited to 36 for each stream. The workshop is aimed at educators, pharmacologists and practitioners, but is open to anybody with experience in the education of new prescribers. Guest speakers include:

- **Professor Clare Guilding** (Newcastle University, UK), Chair of the International Union of Basic and Clinical Pharmacology (IUPHAR) Education Section
- **Professor Arend Werners** (St George's University, Grenada), President of the European College of Veterinary Pharmacology and Toxicology
- Member of the Council on Outcomes-based Veterinary Education (COVE) – to be confirmed
- **Dr Helen Hull** (University of Portsmouth), Programme Lead (Pharmacy Education)




Please click [here](#) for further details and to register for the event.

Pharmacology / Biomed Education Conferences, Workshops or events

- **Canadian Soc of Pharma and Therapeutics** – Ontario – 16-19th June 2024
- **Pharmacy Education Event** – Manchester - Monday 24 June 2024
- **Monash Pharmacy Education Symposium** – Prato July 7-10th 2024
- **IMU International Pharmacy and Pharmaceutical Science Conf.** 2024, KL, Malaysia, July 29th - 2nd August 2024
- **Heads of University Centres of Biomedical Sciences (HUCBMS)** – Leeds Beckett Uni, September dates TBC
- **Heads of University Biosciences (HUBS)** – various events
- **Developing My Scholarship of Teaching and Learning Project (Hybrid)** – May 9th 2024

OPPORTUNITIES



IUPHAR
INTERNATIONAL UNION OF BASIC
AND CLINICAL PHARMACOLOGY

**BRITISH
PHARMACOLOGICAL
SOCIETY**

World Smart Medication Day 2024
International Students' Poster Competition

Theme: Drug Evaluation at the Extremes of Ages

Submit by: 29 March 2024

>>> FIND OUT MORE



**Join the BPS
Content Board**

Applications open until 26 April 2024

**BRITISH
PHARMACOLOGICAL
SOCIETY**

The British Pharmacological Society (BPS) is seeking volunteer editors to join their Content Board.

>>> FIND OUT MORE

Dear Colleague.

Many of us introduced alternatives to traditional UG and PGT research projects during the pandemic. You may have retained these and/or expanded your portfolios since.

The purpose of this short survey is to determine what project/capstone opportunities colleagues currently offer and/or plan to introduce going forward, the challenges you have faced in offering non-traditional projects and your solutions to these. There is also an opportunity to ask for support from myself or others

This information will be used to create support resources for educators and learners and to drive forward change across the Sector.

The survey has ethical approval from the University of Leeds Faculty of Biological Sciences Research Ethics Committee. You do not have to answer any question you choose not to. No individual, programme or Institution will be identifiable in any output.

Please share with appropriate colleagues.

Thank you for your help with this. Any queries, please contact myself (d.i.lewis@leeds.ac.uk)

Dave Lewis

Opportunity to complete survey on Undergraduate and Masters research/capstone/dissertation modules or courses

>>> COMPLETE THE SURVEY

The survey is being led by Dr David Lewis who is a Senior Lecturer in Pharmacology and Bioethics and a Higher Education Academy National Teaching Fellow at the University of Leeds.

COUNCILLOR PERSPECTIVE: FARHAN AHMAD (INDIA)

MULTIFACETED APPROACH TO COMBAT ANTIMICROBIAL RESISTANCE

Antimicrobial resistance poses the greatest threat to the healthcare community is a well-known fact. Thus, in order to defeat this menace, we must work together. As a clinical pharmacologist and a member of the hospital infection committee, I believe that irrational prescription of antibiotics by health professionals is not the only cause of antimicrobial resistance, pharmacists and patients also play an equal and important role. Therefore, I have attempted to communicate my message to overcome the greater issue of antibiotic resistance through this article.

Introduction:

Which is a bigger threat- Rise of antimicrobial resistance or decline in development of new antibiotics?

As we know some of the species of animals are endangered as there is increase in their declining rate and decrease in the survival rate. The same is true for antibiotics also, as there is rise of antimicrobial resistance and decline in development of new antibiotics. Antimicrobial resistance (AMR) has become a major obstacle to the treatment of infectious diseases worldwide.

The discovery, widespread use, and commercialization of antimicrobial drugs to treat infections transformed the therapeutic paradigm and transformed modern medicine. Antibiotics are, in fact, becoming one of the most crucial medical interventions required for the development of sophisticated medical techniques, including advanced surgical techniques, solid organ transplantation, and cancer patient management, among others.

Antibiotics are, in fact, one of the most crucial medical interventions and currently under jeopardy due to the notable rise in antibiotic resistance among prevalent bacterial infections, endangering the effective outcomes of patients in critical condition and one of the reasons for the global burden (Figure 1). In fact, one of the three biggest concerns to public health in the twenty-first century, according to the World Health Organisation, is antibiotic resistance (1).

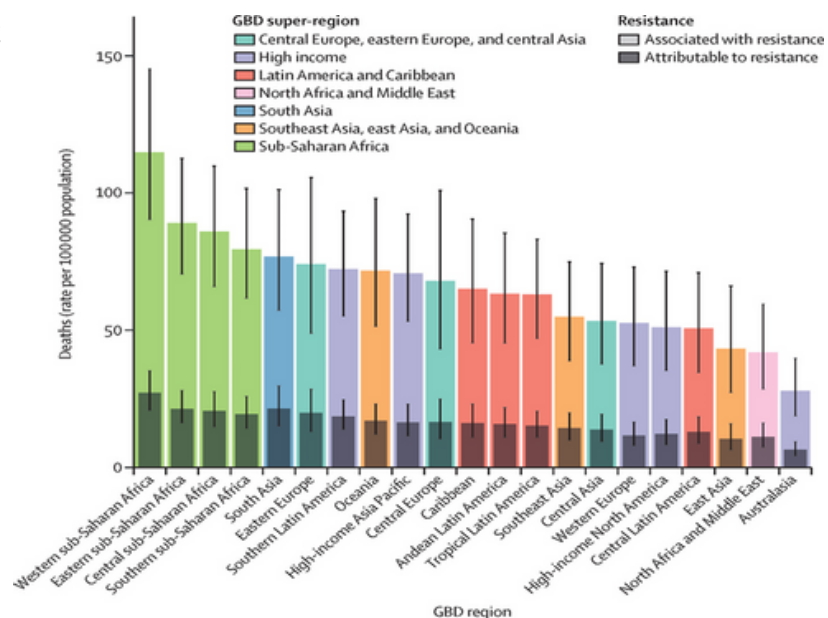


Figure 1: P.C: Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis.

[DOI: [https://doi.org/10.1016/S01406736\(21\)02724-0](https://doi.org/10.1016/S01406736(21)02724-0)]

COUNCILLOR PERSPECTIVE: FARHAN AHMAD (INDIA)

MULTIFACETED APPROACH TO COMBAT ANTIMICROBIAL RESISTANCE

CONT...

Reasons of AMR

1. Despite being a naturally occurring evolutionary phenomena, antibiotic abuse and misuse in humans and animals continue to constitute a severe threat to the formation and spread of antimicrobial resistance (AMR) (2). AMR has an impact on socioeconomic development, environmental welfare, food security and sustainability, global health, and financial sustainability (3).
2. Not only the human population but also food and food animals are equally contributing to antibiotic resistance.

Multidrug resistance (MDR), one of the biggest issues in clinical practice, made the AMR situation worse. Multi-drug-resistant tuberculosis (MDR-TB) is identified in roughly 500,000 new cases worldwide each year. Globally, an estimated 410000 people developed multidrug-resistant or rifampicin resistant TB (MDR/RR-TB) in 2022 (4). The majority of ESKAPE pathogens, which include *Enterobacter faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species, are multidrug-resistant isolates that present the greatest challenges in clinical practice and are the primary cause of life-threatening nosocomial infections in critically ill and immunocompromised patients (5).

AMR has a particularly negative effect on vulnerable populations including infants and young children as well as environments with limited resources. Bloodstream infections and bacterial pneumonia rank among the leading causes of death in children under five. Thirty percent or so of newborns with sepsis pass away from bacterial infections that are resistant to several first-line treatments (6).

Resistance strains have emerged as a result of the widespread over prescription and careless usage of antibiotics. Since most antibiotics may be obtained without a prescription and are, regrettably, sold over-the-counter in developing nations, patient education and public awareness campaigns are essential (7).

WHO global priority pathogens list of antibiotic-resistant bacteria (8,9)

Priority 1: CRITICAL	Priority 2: HIGH	Priority 3: MEDIUM
<ul style="list-style-type: none"> • <i>Acinetobacter baumannii</i> (carbapenem-resistant) • <i>Pseudomonas aeruginosa</i> (carbapenem-resistant) • <i>Enterobacteriaceae</i> (carbapenem-resistant, ESBL-producing) 	<ul style="list-style-type: none"> • <i>Enterococcus faecium</i>, (vancomycin-resistant) • <i>Staphylococcus aureus</i>, (methicillin-resistant, vancomycin-intermediate and resistant) • <i>Helicobacter pylori</i>, (clarithromycin-resistant) • <i>Campylobacter spp.</i>, (fluoroquinolone-resistant) • <i>Salmonellae</i> (fluoroquinolone-resistant) • <i>Neisseria gonorrhoeae</i>, (cephalosporin-resistant, fluoroquinolone-resistant) 	<ul style="list-style-type: none"> • <i>Streptococcus pneumoniae</i>, (penicillin-non-susceptible) • <i>Haemophilus influenzae</i>, (ampicillin-resistant) • <i>Shigella spp.</i>, (fluoroquinolone-resistant)

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MULTIFACETED APPROACH TO COMBAT ANTIMICROBIAL RESISTANCE

CONT..

Antibiotics in Pipeline:

The development and discovery of new antibiotics has slowed significantly since the late 1990s; in the last three decades, the FDA has approved only three new antibiotics. A limited pipeline for antibiotic drugs was noted in two recent WHO publications on clinical and preclinical drug development. This could jeopardise international efforts to control drug-resistant diseases. In the preclinical stage of drug development, 217 products are in the very early stages of testing and may become available in approximately ten years. Of the 77 antibiotics in clinical studies, the majority have limited benefits; of these, 27 are against the WHO high-priority pathogens (10).

The WHO recently released a new warning regarding the worldwide threat of antibiotic resistance (AMR) as a result of the lack of new antibiotic discoveries and the departure of several large pharmaceutical companies from the antimicrobials industry. Moreover, compared to the more robust and active preclinical biotechnology pipeline, the amount of research and development (R&D) expenditure in clinical development is insufficient to fulfil the needs of global health (11). As a result, the pharmaceutical industry's research and development pipeline is deficient in novel medications. Hence, Antibiotic stewardship is the need of the hour.

Solutions to combat AMR

Antimicrobial stewardship (AMS) is defined as “an organizational or healthcare-system-wide approach for fostering and monitoring judicious use of antimicrobials to preserve their effectiveness”. In 1996, John McGowan and Dale Gerding first applied the term “Antimicrobial Stewardship”, where they suggested a causal association between antimicrobial agent use and resistance. AMS is one of the three pillars of an integrated approach to strengthening the health care system. The other two include infection prevention and control (IPC) and patient and medicine safety.

Initially, it was described as structured interventions aimed at enhancing the use of antibiotics by choosing the right agents, dose, delivery method, and treatment duration without negatively affecting patient outcomes (11).

A collection of coordinated tactics known as Antimicrobial Management Strategies (AMS) aim to:

- (i) enhance patient care and outcomes through optimal therapy;
- (ii) lessen collateral harm by minimising the usage of antimicrobials (reduced resistance);
- (iii) lower the cost of antibiotics (12).

By raising public awareness and instructing medical professionals on the responsible use of antibiotics as part of an Antimicrobial Stewardship Programme (ASP), these tactics can be applied internationally to aid in the management of antimicrobial resistance (AMR). In general, AMR ought to be prioritised internationally, and all nations and organisations ought to work together to put new laws into place and conduct ASP-related research.

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AwaRe (13):

The WHO Expert Committee on Selection and Use of Essential Medicines created the AWaRe Classification of Antibiotics in 2017 as a tool to promote local, national, and international initiatives to steward antibiotics. This tool divides the antibiotics into three classes:

- **Access:** The antibiotics in this group exhibit a lesser potential for resistance while still demonstrating effectiveness against a broad spectrum of frequently encountered susceptible infections.
- **Watch:** This category encompasses antibiotic classes with a greater potential for resistance and comprises the majority of the agents with the highest priority. These medications ought to be given top priority as important goals for stewardship initiatives and oversight
- **Reserve:** Antibiotics and antibiotic classes included in this group should only be used to treat infections caused by multidrug-resistant organisms, whether they are proven or suspected. Antibiotics from the reserve group ought to be used as a "last resort."

To educate the health care workers (Medical students, Registered medical practitioners, paramedical staff, Nurses, Public, Media, Political leaders) about the optimal use of antibiotics and the antibiotic resistance.

Healthcare Professionals

- Develop and implement clinical guidelines for antibiotic use based on local resistance patterns and best practices.
- Organize and participate in educational workshops and training programs on AMS principles, antibiotic selection, and responsible prescribing habits.
- Establish an antibiotic stewardship team with representatives from different specialities to monitor antibiotic use, identify areas for improvement, and provide guidance to other HCPs.
- Implement electronic prescribing systems with decision support tools to guide antibiotic selection and prevent inappropriate use.
- Promote peer review and feedback mechanisms to encourage adherence to AMS guidelines.
- Prescribe antibiotics only when truly necessary and based on appropriate diagnostic testing.
- Choose the narrowest spectrum antibiotic effective for the suspected pathogen.
- Follow recommended durations and dosages of antibiotics.
- Document antibiotic use and rationale clearly in patient records.

Medical and Paramedical Students

- **Education and Training:** Provide regular training sessions on AMS principles, antibiotic resistance, and appropriate antibiotic use for all healthcare professionals.
- **Curriculum Integration:** Integrate AMS principles into the medical, paramedical and nursing curriculum.
- **Guidelines and Protocols:** Develop and implement evidence-based guidelines and protocols for antibiotic prescribing and usage. Encourage adherence to these guidelines.

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- **Monitoring and Feedback:** Establish monitoring systems to track antibiotic prescriptions. Provide regular feedback to healthcare professionals about their prescribing practices.
- **Collaboration:** Encourage interdisciplinary collaboration between healthcare professionals to discuss challenging cases and optimize antibiotic use.
- **Clinical & Inter-disciplinary Rotations:** Include AMS components in clinical rotations, providing students with practical experience in antibiotic decision-making and stewardship.
- **Awareness Campaigns:** Involve students in awareness campaigns within the hospital and community to spread the message about responsible antibiotic use.

Media

- Develop and disseminate accurate information about AMS and the dangers of antibiotic misuse.
- Highlight the positive impact of successful AMS programs.
- Challenge sensationalized or misleading information about antibiotics.
- Produce balanced and informative news stories about AMS.
- Partner with healthcare professionals and public health organizations to develop educational materials.
- Avoid promoting the misuse of antibiotics or perpetuating myths about their effectiveness.



Source: BSAC Handbook: ANTIMICROBIAL STEWARDSHIP
From Principles to Practice

Does the media enhance or impede public knowledge of AMR and AMS?

After the BMJ published Llewellyn et al.'s opinion post on when it is appropriate to stop taking antibiotics in July 2017, mainstream media coverage and discussions caused confusion among the public. Media/journalists must collaborate with certified health specialists and write scientifically sound, honest and easy to comprehend articles for the general public.

General Public

- Develop public education campaigns that raise awareness about the dangers of antibiotic misuse and promote responsible antibiotic use.
- Partner with community organizations to disseminate AMS information.
- Make AMS information readily available in hospitals, clinics, and pharmacies.
- Only take antibiotics when prescribed by a doctor and follow their instructions carefully.

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MULTIFACETED APPROACH TO COMBAT ANTIMICROBIAL RESISTANCE

CONT...

- Never share antibiotics with others.
- Do not pressure healthcare providers to prescribe antibiotics when they are not necessary.
- Seek information about AMS from reliable sources.
- Farmers/livestock and fishery owners should also adopt AMS in growing and rearing the produce.

Political Leaders/Local Leaders

- Advocate for increased funding for AMS programs and research.
- Support policies that promote responsible antibiotic use in the community, such as restrictions on over-the-counter antibiotic sales.
- Raise awareness about the dangers of antibiotic misuse through public education campaigns.
- Allocate resources for AMS programs and initiatives.
- Enact policies that support responsible antibiotic use in healthcare settings and the community.
- Champion public awareness campaigns about the importance of AMS.

This article was written by Professor Farhan Ahmad Khan, and residents Sreemedha Choudhury and Bharat Srivatsava Department of Pharmacology, Jawaharlal Nehru Medical College Hospital, Aligarh Muslim University, Aligarh, India

Corresponding Author: Prof. Farhan Ahmad Khan | Email: dr.farhan.k@gmail.com



Professor Farhan Ahmad Khan brings over 16 years of expertise in Clinical Pharmacology, marked by extensive research and administrative roles. With an MBBS and MD (Pharmacology) from a premier Indian institute, he has excelled in guiding numerous postgraduate students across diverse research domains, including Antibiotic Resistance, Rational Drug Use, Oncotherapy, Pharmacogenetics, and Pharmacovigilance. Prof. Khan's contributions extend to shaping hospital drug formularies and his editorial roles in esteemed international peer-reviewed journals as Editor-in-Chief and Editorial Board member. He is also a member of various academic bodies such as the American College of Clinical Pharmacology, British Pharmacological Society, and currently serves as an IUPHAR-Ed Councillor.

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UPCOMING PHARMACOLOGY MEETINGS

➤➤➤ **16th Congress of the European Association for Clinical Pharmacology and Therapeutics (EACPT) 8-11 June, Rotterdam 2024**



16th Congress of EACPT 2024 – Rotterdam, June 8th-11th

➤➤➤ **9th European Congress of Pharmacology (EPHAR) 23-26 June, Athens 2024**



➤➤➤ **ASCEPT, APFP & APSA Joint Congress 1-4 Dec, Melbourne 2024**

➤➤➤ **Pharmacology 2024, 10-12 Dec**



➤➤➤ **ASPET May 16-19, 2024**

➤➤➤ **20th World Congress of Basic and Clinical Pharmacology (WCP) 12-17, July Melbourne 2026**

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This issue of the IUPHAR-Ed newsletter was compiled by Elly Djouma, Alex Conibear, Nilushi Karunaratne and Betty Extinaris. Thank you to everyone that contributed content. The next issue will be distributed to members around mid- June 2024. If you would to be featured in a future newsletter or have any content to contribute please contact the communications team by sending an email to Elly: e.djouma@latrobe.edu.au. The deadline to contribute content for the June newsletter is 31st May, 2024.