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ORIGINAL ARTICLE

Clinical pharmacology and prescribing education: An updated medical school curriculum from the British Pharmacological Society

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Aims: Prescribing is a complex, essential skill that doctors must acquire to practice medicine safely and effectively. The British Pharmacological Society has historically provided a core curriculum to guide clinical pharmacology and prescribing education in UK medical schools. This study aimed to update the 2012 curriculum to reflect contemporary practice, regulatory requirements and the evolving needs of medical education.

Methods: A modified Delphi was undertaken. A steering committee of six clinical and educational experts reviewed the previous curriculum and oversaw the process. Forty experts, comprising clinical and academic pharmacologists, medical educators and pharmacists from across the UK, participated in three Delphi rounds. Round 1 involved item-level review of existing learning outcomes; Round 2 incorporated feedback and new proposals; Round 3 convened expert panels to resolve outstanding disagreements. Consensus was defined as ≥75% agreement.

Results: The updated curriculum comprises four sections: (I) Principles of Clinical Pharmacology, (II) Drugs, (III) Therapeutics and (IV) Prescribing and related skills. Key changes include consistent application of clearly defined command verbs, updates to reflect current practice and a reduction in learning outcomes (226 to 205), particularly in Section I. The core drug list remained stable, with minor revisions and reorganization.

Conclusion: This updated British Pharmacological Society curriculum provides a robust, evidence-based framework for clinical pharmacology and prescribing education. Its structured approach supports curriculum design, mapping and quality assurance, while alignment with national assessments and regulatory expectations ensures relevance for undergraduate education and early clinical practice. It aims to enhance safe, effective and responsible prescribing by future doctors.

KEYWORDS
clinical pharmacology, education, medication safety, prescribing, therapeutics

Dagan O. Lonsdale and Clare Guilding are joint first authors.

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1 | BACKGROUND

Prescribing a medicine is the most common patient facing health-care intervention undertaken by doctors, and the process of prescribing a medicine is complex. It requires knowledge of disease and the ability to make a diagnosis, an understanding of therapeutic goals and available treatment options, awareness of potential drug interactions, proficiency in writing prescriptions, and the skills to monitor and adjust therapy as needed. In addition, prescribers must be able to gather and understand the views and beliefs of the person for whom they are prescribing treatment and communicate information about the drug in a way that is clear, accessible and supports shared decision-making. Doctors must be able to understand their prescribing decisions within the broader context of the population, the health-care economy, the environment and the evolving landscape of pharmaceutical science. It is perhaps unsurprising that, with many thousands of licensed medicines available to prescribe, errors in prescribing are common. Eight to nine percent of inpatient prescriptions contain at least one error, and doctors earlier in their career are more likely to make errors than those later in their career [1–3].

Clinical pharmacology education during a medical degree is frequently integrated within systems-based blocks. Placing the learning of the discipline in a clinical context is advantageous in providing medical students with experience that will mirror their future practice. It does, however, provide educators with the challenge of ensuring that the cross-discipline elements of clinical pharmacology and therapeutics are covered during the degree [4–7]. The British Pharmacological Society aims to provide support for medical schools by outlining a core curriculum in the discipline, the first of which was published in 1997 [8]. In line with the publication of the 2002 edition of the GMC's *Tomorrow's Doctors* [9, 10], the core curriculum was updated, with a further update in 2011 following recommendations to improve safe prescribing in medical graduates and further changes to *Tomorrow's Doctors* [11, 12]. These British Pharmacological Society curricula have been used to inform the design, development, and evaluation of clinical pharmacology and therapeutics curricula in medical degree programmes nationally and internationally. For example, at Newcastle University, the last iteration of this curriculum was used to design a clinical pharmacology and therapeutics strand [13–16]. Other consensus statements on learning outcomes for medical undergraduates have been produced by similar organizations. In 2018, the European Association for Clinical Pharmacology and Therapeutics produced a consensus document utilizing a modified Delphi process to outline key learning outcomes in the discipline [14]. Unlike the British Pharmacological Society curriculum, this process did not produce agreement on a core drugs list contemporaneously, although this was produced in a subsequent Delphi process [15]. Other organizations across the globe have produced guidance on undergraduate clinical pharmacology education [17–19], with a variety of aims and objectives. In our view, none cover knowledge, skills in prescribing and a core list of drugs as comprehensively as the British Pharmacological Society's curriculum, and we can find no updated curricula from the last 5 years.

What is known about this subject

- Prescribing is an essential skill for graduating doctors, and prescribing education is highlighted as an important part of medical education, including the recent independent review into the prescribing safety assessment.
- The teaching of prescribing within an integrated medical curriculum presents a challenge for educators to ensure that the cross-discipline elements of clinical pharmacology and therapeutics are covered during the degree.
- The British Pharmacological Society has aimed to provide support for medical schools by outlining a core curriculum in the discipline. This curriculum has been used to design and develop curricula in the UK and internationally but has not been updated for a decade.

What this study adds

- This study provides an updated set of clinical pharmacology and prescribing learning outcomes for medical graduates.
- Updates reflect evolution of clinical practice, commonly prescribed drugs and pharmaceutical science, and reduce the total number of learning outcomes from the prior iteration.
- This study utilizes a modified Delphi consensus process that takes into account a broad range of expert opinion to create a detailed, evidence-based curriculum framework.

The British Pharmacological Society's core curriculum was designed to provide a guide that could allow medical schools to map clinical pharmacology learning across their degrees and identify where additional learning may be required. The curriculum is divided into four distinct Sections (I–IV) [11]. Principles of Clinical Pharmacology (Section I) covers learning that broadly might be expected to be learned early in the medical degree to provide a foundation for future clinical application. Drugs (Section II) is a suggestion for a 'student formulary'—a core list of drugs that a graduating doctor should be familiar with in relative depth. Therapeutics (Section III) provides a list of clinical conditions and their pharmacological treatment essential for a graduating medical student, and Prescribing and Related Skills, reflecting the competencies required of a newly qualified doctor in this domain, are outlined in Section IV.

The British Pharmacological Society continues to believe there is value in this resource, which can help to ensure that graduating medical students are ready to prescribe safely, effectively and responsibly. It is also important that doctors are equipped with the skills they will

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need to continue to learn clinical pharmacology as pharmaceutical science develops throughout their career. In the context of the United Kingdom Medical Licensing Assessment [20] and the recognition of the importance of clinical pharmacology learning and assessment from the Dacre review [21], we have undertaken a further update of the content of the clinical pharmacology curriculum using a modified Delphi consensus process. This methodology is recognized for its ability to establish consensus among experts, particularly in educational contexts [22]. Benefits of electronic Delphi platforms include the ability to disseminate rapidly and widely and afford anonymity to contributors that reduce some of the effects of group dynamic, including bias from power imbalance. Delphi processes have had widespread use in the development of curricula in medical education from a diverse range of specialties, including clinical pharmacology [14, 15, 23–26].

2 | METHODS

The curriculum update has been informed by a modified Delphi consensus process. A steering committee to oversee this process was established by the British Pharmacological Society. Experts in clinical pharmacology education based in the UK were invited to join this committee by application. The final steering committee comprised four clinical pharmacologists and two pharmacologists from medical and science backgrounds, respectively. All members of the steering committee (the authors of this paper) hold substantive leadership and course design roles in education, including leadership of clinical pharmacology and therapeutics within medical degree programmes. They have 13–35 years of experience in the design and delivery of clinical pharmacology education. Nationally, they hold or have held leadership and development roles within the Prescribing Safety Assessment and the British Pharmacological Society. Prior to commencing the Delphi process, the steering committee reviewed the most recent iteration of the curriculum [11] and made corrections which were felt to be matters of grammar or clear and obvious changes in practice over time.

The Delphi process consisted of three rounds. All rounds were conducted electronically. In Round 1, individual surveys were completed in which participants ranked each outcome on a three-point scale (accept/reject/amend). Items with ≥75% acceptance were left as written, and those with ≥75% rejection were removed. This threshold is in line with other Delphi processes, including in medical education [27, 28] All comments on individual learning items were reviewed regardless of acceptance level. Grammatical queries and commentary on matters of style were reviewed and actioned by the steering committee. Additional learning outcomes from reviewers were invited for inclusion in Round 2. Where suggested, these were presented by the steering committee with modification only to reflect consistency of style with the curriculum. In Round 2, participants were provided with feedback on changes from Round 1 alongside new learning outcomes for consideration. This round was completed via an online survey. The participants were asked to accept/reject/amend each section of the curriculum with the same acceptance/rejection criteria. In Round 3, a series of expert panels were convened to discuss any outstanding areas of disagreement, including debate on the use and definition of action verbs. These meetings were facilitated as online discussions by the steering committee.

The participants in the Delphi process were identified through invitation of the members of the British Pharmacological Society and by invitations to experts within each medical school in the United Kingdom. Experts were also invited to nominate colleagues with relevant expertise and involvement in pharmacology education. There were no explicit restrictions on qualification to participate in the panel, only a request for training in and active involvement with clinical pharmacology or prescribing education. All educators who opted in to the process were accepted. Participation was voluntary, and appropriate consent was sought for the process and storage and sharing of data. Experts were invited to provide information on their role, experience in education and training route into pharmacology education alongside some demographic details. Provision of personal data was optional. Ethical approval for this work was provided by City St George's, University of London ethics committee (REC reference 2024.0192). Data were stored according to UK data protection regulations. Only fully anonymized results were viewed by members of the steering committee for review of each round of the Delphi process, except for the meetings in Round 3 where opinions were discussed in person (online).

3 | RESULTS

The final curriculum is presented in Table 1. It is also available as a downloadable document from the British Pharmacological Society website. A total of 40 professionals from medical, pharmacy and pharmacology backgrounds participated in the Delphi process (Table 2). The median number of years in pharmacology education was 10, with a range of 2 months to 35 years of experience across stakeholders. Sixty-five percent of the participants had qualified as medical doctors and 30% were pharmacological science specialists. Forty percent of the participants were women. A list of contributors to the process is provided in Data S1. Inclusion in this list was by additional opt in consent and so is not the full list of contributors. Ethnicity data were self-identified with free text and are presented in Data S2.

In Round 1 of the Delphi, median agreement for learning outcomes was 81% (interquartile range 76–85%). Thirty-two learning outcomes (15%) were removed and 59 learning outcomes substantially re-written or added (28%). In Round 2, 68% of the participants recommended no additional changes. Most changes, where recommendations were made, were of a typographical or grammatical nature. The most significant recommendation in this round was to clarify the meaning of command verbs used in the curriculum and to provide some consistency in use (Table 3). This was applied prior to Round 3. There was one area of disagreement among the experts—whether to include ivabradine and nicorandil to the core drugs list (Section II). The expert panels were split evenly on whether to include these drugs or not. The steering committee made the decision to not

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TABLE 1 Updated clinical pharmacology, therapeutics and prescribing curriculum for medical degrees.

Section I. Principles of clinical pharmacology

Overview of clinical pharmacology and therapeutics in health care

- Define the terms pharmacology, clinical pharmacology and therapeutics
- Define the terms drug and medicine
- Explain the extent of medicines use within society
- Discuss the societal benefits, costs and harms associated with the use of prescription medicines and illicit drugs
- Describe the impact of drug development, medicines policy and prescribing choices on the environment

Principles of pharmacodynamics

- Define the term pharmacodynamics
- Describe the mechanisms of drug action at the molecular, cellular, tissue and organ levels
- Describe the common targets for drugs, for example, ion channels, receptors, transporters, enzymes, nucleic acid and antibodies
- Explain the relationship between drug dose and response
- Explain how a drug can interact with its target (e.g. agonist, antagonist)
- Explain the effect of antagonists on the dose–response curve of an agonist
- Explain the concept of receptor selectivity
- Define the terms affinity, efficacy and potency
- Define the term 'therapeutic index'
- Describe the phenomena of desensitization and tolerance

Pharmacokinetics

Introduction to pharmacokinetics

- Define the term pharmacokinetics
- Explain the four phases of pharmacokinetics
- Explain why an understanding of pharmacokinetics is relevant to prescribers
- Explain the mechanisms of drug movement across physiological barriers

Drug absorption

- Explain fundamental differences between various routes of drug administration
- Describe first pass metabolism and its importance
- Explain how one drug can influence the absorption of another

Drug distribution

- Explain the distribution of drugs across body compartments
- Define apparent volume of distribution
- Explain how the distribution of a drug may influence how it works and how it may be dosed

Drug metabolism and excretion

- Describe how drugs are metabolized, for example, Phases I and II metabolism
- Explain the important routes of drug excretion from the body
- Explain the role of the liver and cytochrome P450 enzymes in drug metabolism
- Explain why drug metabolism is a potential point of interaction between drugs

Concentration–time relationships

- Describe the typical concentration–time curve for a drug with first-order kinetics
- Explain the importance of zero-order (saturation) kinetics
- Define clearance and half-life
- Define bioavailability

Applied pharmacokinetics

- Discuss the pharmacokinetic factors that determine choice of formulation, dose, route and frequency of drug administration
- Explain the pharmacokinetics of repeated dosing including time to 'steady state'
- Explain how half-life has practical implications for dosing
- Explain the rationale for loading doses

Individual variability in the response to drugs including pharmacogenomics

- Identify factors (pharmacokinetic and pharmacodynamic/intrinsic and extrinsic) influencing variability in response to drugs and provide common examples
- Explain how inter-individual variability in pharmacokinetics can lead to variation in response to a dose of a drug
- Explain how pharmacodynamic factors can affect drug response (e.g. receptor sensitivity, tolerance, organ-disease)
- Identify important groups of people where pharmacokinetics is altered and explain the mechanisms involved and adjustments that may have to be made by prescribers
- Identify common ways in which genetic and epigenetic variation influences the handling and response to drugs and influences prescribing
- Explain how knowledge of pharmacogenetic variation can enable safer and more effective prescribing

Partnership with patients, adherence and compliance

Partnership with patients

- Explain the importance of, and barriers to, shared decision-making

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TABLE 1 (Continued)

- Describe how the values, preferences and beliefs of patients and prescribers may influence prescribing decisions
- Define the term concordance
- Explain ways in which concordance can be improved (e.g. presenting accessible information)
- Demonstrate the ability to communicate the benefits and risks of drug therapy with patients
- Demonstrate the ability to explore patients' views and wishes in relation to drug treatment

Adherence to medication

- Define the terms adherence and compliance
- Describe the influence of patients' beliefs on adherence
- Explain non-adherence and its consequences on an individual and population level
- Make an accurate assessment of adherence to medication
- Describe measures to improve adherence (whether intentional or unintentional)

Monitoring drug therapy

Overview

- Explain how monitoring drug therapy can aid decisions around altering or stopping therapy
- Describe the ways in which therapy can be monitored including clinical outcomes, pharmacodynamic responses and plasma drug concentrations, and identify the prerequisites, advantages and disadvantages of each approach
- List common examples where monitoring drug concentration is important

Using drug effect

- Explain why the impact of drugs on clinical outcomes can be difficult to measure
- Explain the difference between a surrogate and clinically relevant outcome
- Describe what makes a good surrogate outcome

Using drug concentration

- Describe the concept of inter-individual variability in the relationship between dose and plasma drug concentration, and the relationship between drug concentration and effect
- Describe the characteristics that make a drug suitable for monitoring by measurement of concentration
- List common medicines whose use is facilitated by measurement of drug concentration
- Describe the process of measuring plasma drug concentrations, including the timing of sampling in relation to dose
- Explain how to interpret drug concentration measurements, including that some assays measure total- and some free-drug concentrations
- Explain how drug concentration measurements may be used to adjust dosage

Adverse drug reactions

Basic principles

- Define the term adverse drug reaction and other adverse outcomes of drug therapy (e.g. drug toxicity, hypersensitivity)
- Outline the frequency of adverse drug reactions and their impact on public health
- Discuss why all drugs have both beneficial and adverse effects and list patient groups most at risk of adverse drug reactions
- Describe classification systems for adverse drug reactions such as ABCDE or DOTS

Drug allergy

- List factors that may be associated with increased risk of hypersensitivity reaction (e.g. allergy or anaphylaxis)
- List drugs that are frequently associated with hypersensitivity
- Explain how to identify and characterize hypersensitivity reactions to drugs
- Describe the importance of accurate diagnosis and recording of hypersensitivity reactions to drugs
- Describe the precautions that should be taken to reduce risk of hypersensitivity reactions

Diagnosis, interpretation and management

- Explain how to respond if an adverse drug reaction is suspected
- Explain how to manage a suspected adverse drug reaction

Avoiding adverse drug reactions

- Describe risk factors that predict susceptibility to adverse drug reactions
- Describe how identification of those risk factors can influence prescribing decisions
- List important sources of information about adverse drug reactions including the British National Formulary
- (BNF) and the electronic medicines compendium
- Explain how warnings in prescribing resources can prevent adverse reactions
- Explain how monitoring can prevent adverse reactions (e.g. monitoring renal function, drug concentration)

Pharmacovigilance

- Explain the ways in which adverse drug reactions can be identified (e.g. drug development, voluntary reporting, record linkage) and outline the limitations of these approaches
- Explain why the adverse drug reaction profile of a drug may be incomplete at the time of marketing authorization, and how it improves through effective pharmacovigilance
- Discuss the importance of pharmacovigilance, including the role and responsibilities of the prescriber
- Outline how to report a suspected adverse drug reaction using the MHRA Yellow Card scheme

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TABLE 1 (Continued)

Drug interactions

- Explain how drug interactions may cause beneficial or harmful effects
- Outline the main types of drug interaction (e.g. pharmaceutical, pharmacokinetic, pharmacodynamic)
- Explain why the potential for drug interactions is increasing, including the impact of polypharmacy and multimorbidity
- Identify sources of information about drug interactions to inform prescribing including the British National Formulary (BNF) and the electronic medicines compendium
- Explain how to anticipate and avoid drug interactions
- Explain how a drug interaction that cannot be avoided could be managed (e.g. dose adjustment, additional monitoring)
- Describe points of clinically important drug interactions, for example, liver metabolism, cytochrome P450 enzymes and drug transporters
- Explain how enzyme metabolism can be inhibited or induced and the impact this has on drug handling

Medication errors

Frequency and causes

- Define medication errors, including subtypes (e.g. mistakes, violations, slips and lapses)
- Outline human error theory in simple terms
- Identify individual and systems factors leading to error
- Outline the steps that should be taken when a medication error is discovered, including the use of error reporting systems

Prevention

- Explain how prescribers and health-care systems can reduce error, including the use of electronic prescribing
- Describe how collaboration with pharmacists and other health-care professionals can prevent errors

Drug development and regulation

Drug development

- Outline how drugs are discovered
- Describe the stages of drug development (Preclinical, Phase I to Phase IV clinical trials)
- Describe the risks and costs involved in developing drugs

Clinical trials

- Explain the different forms of clinical trial and their advantages and disadvantages
- Describe the requirements of a good clinical trial including consent, ethics, bias, statistics and dissemination of its findings

Drug regulation

- Explain why drugs need to be regulated and identify the major regulatory authorities in the UK and internationally (e.g. MHRA, EMA and FDA)
- Outline the approval process for new drugs
- Describe the implications of market exclusivity and patents, for example, on the range of products available and their cost

Drug marketing

- Outline how drugs are marketed by the pharmaceutical industry and the legal constraints on the marketing process
- Describe the role of codes of conduct in relation to marketing of drugs (e.g. the Association of the British Pharmaceutical Industry code of conduct and the Medicines and Healthcare products Regulatory Agency blue guide)
- Describe the potential for marketing processes to change attitudes to a drug and how this can be abused

Evidence-based prescribing

Overview

- Outline the features of a randomized controlled trial, cohort study, case control study, systematic review and meta-analysis
- Explain the difference between interventional and observational studies
- Identify different kinds of evidence and outline their hierarchy in terms of validity and reliability
- Discuss the limitations of applying clinical trial data to individual patients

Critical appraisal of clinical studies

- Describe the process of critical appraisal of clinical studies and demonstrate the ability to appraise research
- Describe an approach to identifying methodological flaws, including sources of bias
- Explain the different types of endpoints or outcomes in clinical trials, for example, patient centred, surrogate, biomarkers and clinically relevant
- Explain the concept of external validity and problems with extrapolating clinical trial results

Finding reliable information about drugs

- Identify important information resources that might inform prescribing decisions
- Describe how prescribers can keep up to date with change
- Evaluate sources of information for their reliability, for example, websites and online tools

Medicines management

National processes

- Describe how new medicines are assessed on the basis of safety, clinical efficacy and cost-effectiveness
- Outline the principles of pharmacoeconomic assessments
- Describe the roles of guideline groups, for example, the National Institute for Health and Care Excellence (NICE)

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TABLE 1 (Continued)

Local processes

- Outline the role of local and regional committees in medicines management
- Describe the role of local formularies and guidelines in the choice and use of medicines
- Describe the factors that influence prescribing choices and why these have to be limited (e.g. cost and antibiotic resistance)
- Explain the responsibility of prescribers to avoid wasteful prescribing and support sustainability

Guidelines

- Define 'clinical guideline' and outline its purpose
- Describe the limitations and harms of clinical guidelines
- Outline the legal standing of guidelines

Formularies

- Outline the relationship between the British National Formulary and local formularies
- Describe the reasons for creating limited lists of medicines
- Outline the important issues relating to coordination of prescribing in primary and secondary care

British National Formulary

- Identify resources contained within the British National Formulary and describe how they may be used
- Describe the limitations of the information contained in the British National Formulary

Ethical and legal aspects of prescribing

Legal aspects of prescribing

- Outline the legal categorization of drugs into General Sales List, Pharmacy medicines, Prescription-only medicines and Controlled drugs
- Describe who is entitled to prescribe medicines and the legal requirements involved
- Describe who is entitled to supply medicines and the legal requirements involved
- Describe the legal requirements associated with prescribing controlled drugs
- Identify common ways that prescription drugs can be supplied illegally (e.g. internet pharmacy)

Prescribing outside marketing authorization

- Describe the circumstances in which drugs are prescribed 'off-label'
- Explain the additional responsibilities associated with prescribing 'unlicensed' or 'off-label' medicines
- Describe what information should be given to patients to allow them to make informed decisions about 'off-label' treatment

Ethical aspects of prescribing

- Describe the responsibilities of prescribing in a resource-limited health-care system
- Describe the sometimes-conflicting responsibilities to individual patients and the wider health-care community
- Discuss the benefits and costs of adhering to therapeutic guidelines and drug formularies
- Explain why it is important to recognize limits of competence and to ask for help when needed
- Explain the responsibility and importance of keeping one's prescribing practice up to date with advances in medical knowledge

Prescribing for patients with special requirements

Prescribing for patients with impaired liver function

- Describe how impaired liver function may alter physiology, pharmacokinetics and pharmacodynamics
- List common medicines that are likely to cause harm to patients with impaired liver function
- Outline the principles involved in selecting medicines and designing dosage regimens for patients with impaired liver function
- Explain where to find relevant information about choosing and adjusting drug dosage in patients with impaired liver function

Prescribing for patients with impaired renal function

- Describe how impaired renal function may alter physiology, pharmacokinetics and pharmacodynamics
- List common medicines that are likely to cause harm to patients with impaired renal function
- Outline the principles involved in selecting medicines and designing dosage regimens for patients with impaired renal function
- Explain where to find relevant information about choosing and adjusting drug dosage in patients with impaired renal function

Prescribing for elderly patients

- Describe how advanced age may alter physiology, pharmacokinetics and pharmacodynamics
- List common medicines to which elderly patients are especially likely to respond differently
- Explain where to find relevant information about choosing and adjusting drug dosage in elderly patients
- Outline the principles that underlie prescribing in the elderly

Prescribing for pregnant women and women of child-bearing potential

- Explain the reasons for caution when prescribing for pregnant women and women of child-bearing potential
- Describe how pregnancy alters physiology, pharmacokinetics and pharmacodynamics
- List common medicines to which pregnant women are especially likely to respond differently
- Describe the possible effects of drugs on the developing foetus, in relation to the stage of gestation
- Outline the principles involved in selecting medicines and designing dosage regimens for pregnant women and women of child-bearing potential
- Explain where to find relevant information about choosing and adjusting drug dosage in pregnant women and women of child-bearing potential

Prescribing during breastfeeding

- Explain the reasons for caution when prescribing for women who are breastfeeding

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TABLE 1 (Continued)

- List common medicines that are likely to cause harm to the newborn as a result of transmission via breast milk
- Outline the principles involved in selecting medicines and designing dosage regimens for women who are breastfeeding
- Explain where to find relevant information about choosing and adjusting drug dosage in women who are breastfeeding

Prescribing for children (including neonates)

- Describe the changes in physiology, pharmacokinetics and pharmacodynamics in early life
- List common medicines to which children are likely to respond differently
- Explain where to find relevant information about choosing and adjusting drug dosage for children
- Explain the principles that underlie prescribing for children and adolescents, for example, administration, formulation and capacity

Rational approach to prescribing and dose selection

Rational approach to prescribing

- Make an accurate assessment of patient specific factors when prescribing
- Select an appropriate medicine based on its comparative efficacy, safety, convenience and cost
- Explain the importance of identifying diagnosis (if possible) and therapeutic objectives
- Evaluate the factors that influence the choice of formulation, dose, route, frequency and duration of treatment
- Demonstrate the ability to review a medication list and optimize therapy

Dose selection

- Explain the importance of accurate calculation of drug dosage, especially for intravenous infusions
- Demonstrate the ability to interpret and convert between different expressions of drug concentration or dose
- Calculate appropriate doses for individual patients, based on age, body weight and surface area
- Select drug dosage using commonly available nomograms
- Identify factors that may necessitate amendments of standard doses

Clinical toxicology

Principles of assessing poisoned patients

- Describe the epidemiology of poisoning
- Outline the principles of assessment of a poisoned patient
- Discuss the role of urine and blood sampling in poisoned patients
- Describe the clinical features of overdosage with commonly used medicines (e.g. paracetamol, salicylates, tricyclic antidepressants, opioids and benzodiazepines)

Principles of treating poisoned patients

- Outline the principles involved in treating a poisoned patient
- Explain how to access and obtain information from the National Poisons Information Service (e.g. TOXBASE)
- List drugs and toxins to which effective antidotes are available and explain the mechanisms of action
- Explain the means by which the elimination of drugs or toxins can be hastened

Misuse of drugs

- List drugs that are commonly misused (e.g. cannabinoids, MDMA, hallucinogens, volatile solvents, cocaine, opioids and alcohol) and outline some of their important pharmacodynamic effects
- Recognize that making, taking, carrying or selling some drugs is illegal and controlled by the UK Misuse of Drugs Act 1971
- Explain the extent of illicit drug use and its public health consequences
- Define tolerance, physical dependence and psychological dependence

Complementary and alternative medicine

- Describe the prevalence of use of complementary and alternative therapeutic approaches and recognize variation in use between populations
- Outline the motivations that lead people to seek complementary and alternative therapies
- Describe common therapies used by practitioners of complementary and alternative medicine and the evidence for their efficacy and safety
- Explain the potential of complementary and alternative medicines to cause adverse effects, including interactions with conventional therapy
- Describe the regulation of complementary and alternative medicines

Section II. Drugs (a 'Student Formulary')

This section provides a list of drug classes (with exemplar drugs) with which a graduate should be familiar after completing 5 years of undergraduate study. They are based on prior iterations of this curriculum and published formularies listing drugs commonly prescribed by doctors, particularly those in the early phases of their careers. For each, students should be able to describe the mechanism of action, indications for use, relevant contraindications and adverse effects to a depth that will enable them to anticipate their clinical effects, communicate effectively with colleagues and counsel patients. It is acknowledged that the depth of knowledge required for practice at graduation will vary a little between classes.

The intention of this list is to provide a core list or student formulary on which students will build their own formularies. It is anticipated that students will come across additional drugs in specialist rotations at undergraduate level. Biologics in particular represent a rapidly evolving and pharmacologically diverse area of therapeutics. This represents a challenge for educators that cannot easily be resolved within a therapeutics curriculum. When designing course content, we would encourage reflection on the fact that graduating doctors will require a greater knowledge of drugs that they are more likely to initiate and prescribe regularly, compared to those which they require knowledge of the impact of but are unlikely to be initial prescribers of. For example, targeted cancer treatments are likely to only be prescribed in a specialist setting, and the type of knowledge that a student may require of these will be necessarily different to that they require for simple analgesics.

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TABLE 1 (Continued)

Drugs are listed under organ systems to provide some structure to this section. Many of these drugs could be listed under several systems. Duplication in this way has generally been avoided for the sake of brevity.

Gastrointestinal system

Peptic ulcer disease

- Alginates and antacids
- H_2-antagonists (e.g. famotidine)
- Proton pump inhibitors (e.g. omeprazole)

Antidiarrhoeal drugs

- Antimotility drugs (e.g. codeine and loperamide)

Laxatives

- Laxatives (e.g. bran, ispaghula husk, senna, lactulose, phosphate and glycerol)

Antispasmodic drugs

- Antispasmodics (e.g. mebeverine and atropine)

Inflammatory bowel disease

- Aminosalicylates (e.g. mesalazine)
- Biologics (e.g. infliximab)

Antiemetics

- Dopamine D2-receptor antagonists
- Histamine H1-receptor antagonists
- Serotonin 5-HT3-receptor antagonists

Antimuscarinics

- Hyoscine

Vitamins

- Vitamins (e.g. vitamin K, B12 and thiamine)

Cardiovascular system

Diuretics

- Thiazide and thiazide-like diuretics (e.g. bendroflumethiazide and indapamide)
- Loop diuretics (e.g. furosemide)
- Potassium-sparing diuretics (e.g. amiloride and spironolactone)

Beta-adrenoceptor blocking drugs

- Beta-adrenoceptor blocking drugs (e.g. atenolol and bisoprolol)

Calcium channel blockers

- Calcium channel blockers (e.g. amlodipine and verapamil)

Nitrates

- Nitrates (e.g. glyceryl trinitrate)

Drugs affecting the renin-angiotensin system

- ACE inhibitors (e.g. ramipril)
- Angiotensin II receptor antagonists (e.g. losartan)

Alpha-adrenoceptor blocking drugs

- Alpha-adrenoceptor blocking drugs (e.g. doxazosin)

Anti-arrhythmic drugs

- Digoxin
- Amiodarone
- Adenosine

Anti-platelet drugs

- Anti-platelet drugs (e.g. aspirin, clopidogrel and ticagrelor)

Thrombolytics

- Thrombolytic drugs (e.g. alteplase)

Anticoagulants

- Heparins (unfractionated and low molecular weight) and fondaparinux
- Oral anticoagulants (e.g. warfarin and direct oral anticoagulants)

Lipid-lowering drugs

- Statins (e.g. atorvastatin)

Antimuscarinics

- Atropine

(Continues)

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TABLE 1 (Continued)

Respiratory system

Oxygen
- Oxygen therapy

Bronchodilators
- $Beta_2$ adrenoceptor agonists (e.g. salbutamol and formoterol)
- Antimuscarinics (e.g. tiotropium and ipratropium)
- Phosphodiesterase inhibitors (e.g. theophylline)

Corticosteroids
- Inhaled corticosteroids (e.g. beclometasone)

Other drugs for respiratory disease
- Leukotriene receptor antagonists (e.g. montelukast)
- Mucolytics (e.g. carbocisteine)

Nervous system

Drugs for Parkinson's disease
- Levodopa and dopa-decarboxylase inhibitors (e.g. co-careldopa)
- Other antiparkinsonian drugs (e.g. ropinirole)

Drugs used to treat epilepsy
- Anticonvulsant drugs (e.g. phenytoin, carbamazepine, valproate, lamotrigine and levetiracetam)

Drugs used to treat migraine
- $5\text{-}HT_1$-receptor agonists (e.g. sumatriptan)

Drugs for dementia
- Acetylcholinesterase inhibitors (e.g. donepezil and rivastigmine)
- Glutamate receptor antagonist (e.g. memantine)

Drugs for stroke
- Anti-platelet agents (e.g. aspirin and clopidogrel)
- Thrombolytic drugs (e.g. alteplase)

Drugs for muscle spasm
- Baclofen

Psychiatric disease

Anxiolytic and hypnotic drugs
- Benzodiazepines (e.g. diazepam and lorazepam)
- Z-drugs (e.g. zopiclone)

Antidepressant drugs
- Tricyclic antidepressants (e.g. amitriptyline)
- Selective serotonin reuptake inhibitors (e.g. fluoxetine and citalopram)
- Other antidepressant drugs (e.g. serotonin-noradrenaline reuptake inhibitors)

Antipsychotic drugs
- First- and second- generation (e.g. haloperidol, olanzapine and aripiprazole)

Mood stabilizers
- Mood stabilizers (e.g. lithium)

Drugs for ADHD (e.g. methylphenidate)

Drugs that are misused

As with other therapeutics, there are changes with time in drugs that are misused. Some examples include:
- Ethanol
- Ethanol
- Opioids
- Cannabinoids
- Amphetamines
- Cocaine
- Ketamine

Infectious disease

Antibacterial drugs
- Penicillins (e.g. benzylpenicillin, amoxicillin and flucloxacillin)
- Cephalosporins (e.g. cefuroxime)
- Aminoglycosides (e.g. gentamicin) and glycopeptides (e.g. vancomycin)
- Antituberculous drugs (e.g. isoniazid, rifampicin and ethambutol)

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TABLE 1 (Continued)

- Other antibiotics (e.g. chloramphenicol, meropenem, macrolides, nitrofurantoin quinolones, tetracyclines, trimethoprim and metronidazole)

Antifungal drugs

- Antifungal drugs (e.g. clotrimazole, amphotericin and nystatin)

Antiviral drugs

- Antiviral drugs (e.g. acyclovir)
- HIV infection treatment

Antiprotozoal drugs

- Antimalarial drugs (e.g. artesunate chloroquine)
- Immunization

Endocrine and metabolism

Drugs for diabetes mellitus

- Insulins
- Metformin
- Oral hypoglycaemic agents (e.g. sulfonylureas, thiazolidinediones, dipeptidyl peptidase-4 inhibitors and SGLT-2 inhibitors)
- GLP-1 agonists

Drugs for thyroid disease

- Drugs for thyroid disease (e.g. levothyroxine, propranolol and carbimazole)

Osteoporosis

- Bisphosphonates (e.g. alendronic acid)
- Other drugs used in osteoporosis treatment and prophylaxis (e.g. denosumab, calcium, vitamin D, oestrogens and related drugs)

Corticosteroids

- Corticosteroids (e.g. hydrocortisone, dexamethasone and prednisolone)

Drugs for obesity

- GLP-1 agonists

Renal and urological disease

Immunosuppressant drugs

- Immunosuppressants (e.g. ciclosporin, azathioprine, cyclophosphamide and tacrolimus)

Drugs for benign prostatic hyperplasia/enlargement

- Alpha blockers (e.g. tamsulosin)
- 5α reductase inhibitors (e.g. finasteride)
- Gonadorelin analogues (e.g. goserelin)

Drugs for urinary frequency, urgency and incontinence

- Antimuscarinics (solifenacin and oxybutynin)

Drugs for erectile dysfunction

- Phosphodiesterase (type 5) inhibitors (sildenafil)

Diuretics

- Diuretics (e.g. loop, thiazide and thiazide-like)

Drugs affecting the renin-angiotensin system

- ACE inhibitors (e.g. ramipril)
- Angiotensin II receptor antagonists (e.g. losartan)

Obstetrics and gynaecology

Female sex hormones

- Female sex hormones (e.g. oestrogens and progestogens)

Oxytocic drugs

- Oxytocic drugs (e.g. prostaglandins, ergometrine and oxytocin)

Other drugs in this specialty area

- Tranexamic acid

Skin, eyes, ears, nose and throat

Drugs for allergic rhinitis

- Antihistamines (e.g. cetirizine and chlorphenamine)

Drugs for the eyes

- Ocular lubricants (e.g. hypromellose and carbomer)
- Prostaglandin analogues (e.g. latanoprost eye drops)

(Continues)

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TABLE 1 (Continued)

Drugs for the skin
- Emollients
- Topical corticosteroids (e.g. hydrocortisone cream)
- Acne (e.g. benzoyl peroxide, topical and systemic retinoids)
- Permethrin and malathion

Oncology/cancer therapeutics

- Cytotoxic chemotherapies (e.g. doxorubicin, cisplatin and 5-flurouracil)

Targeted chemotherapeutics (a diverse field with some examples provided)
- Biologics
- Hormonal cancer therapies (e.g. tamoxifen and goserelin)

Rheumatology and other immunological disease

- Non-steroidal anti-inflammatory drugs (e.g. ibuprofen and naproxen)

Disease-modifying therapies
- Disease-modifying anti-rheumatic drugs (e.g. sulfasalazine and methotrexate)
- Biologics
- Drugs for gout (e.g. allopurinol and colchicine)

Surgery, anaesthesia and intensive care

Anaesthetic drugs
- General anaesthetics (e.g. propofol, isoflurane and other volatile agents)
- Local anaesthetic drugs (e.g. lidocaine)
- Muscle relaxants (e.g. suxamethonium and rocuronium)

Analgesic drugs
- Non-steroidal anti-inflammatory drugs (e.g. ibuprofen)
- Paracetamol and combination analgesics (e.g. co-codamol and co-dydramol)
- Opioids (e.g. codeine, tramadol and morphine sulphate)
- Gabapentinoids

Fluid and electrolyte replacement
- Intravenous fluids (e.g. 0.9% sodium chloride, balanced crystalloids, glucose solutions, magnesium, potassium and calcium)
- Blood transfusion (and other blood products)

Emergency drugs

- Adrenaline
- Adenosine
- Activated charcoal
- Atropine/antimuscarinics
- Calcium chloride/gluconate
- Naloxone
- Thrombolytics/fibrinolytics

Section III. Therapeutics

This section provides a potential list of therapeutic problems with which a graduate should be familiar after completing a medical degree. For each, they should be able to formulate a basic management plan and identify drugs (and non-pharmacological approaches) that might be indicated. For programmes in the United Kingdom, the General Medical Council's medical licensing assessment content map and the outcomes for graduates will already cover this content.

Gastrointestinal system

Gastric acid disorders and ulceration
- Peptic ulcers (including eradication of *Helicobacter pylori*)
- Gastro-oesophageal reflux disease

Diarrhoea and constipation
- Diarrhoea
- Constipation

Nausea and vomiting
- Functional bowel disorders
- Irritable bowel syndrome

Inflammatory bowel disease
- Ulcerative colitis
- Crohn's disease

Liver disease
- Hepatic encephalopathy and portal hypertension

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TABLE 1 (Continued)

- Ascites
- Alcohol withdrawal
- Upper gastrointestinal bleeding

Cardiovascular system

Hypertension
- Adult hypertension
- Hypertension in pregnancy

Myocardial ischaemia
- Stable angina
- Unstable angina/non-ST elevation myocardial infarction
- Acute ST elevation myocardial infarction

Heart failure
- Acute heart failure
- Chronic heart failure

Arrhythmias
- Atrial fibrillation
- Bradyarrhythmias
- Supraventricular tachycardia
- Ventricular arrhythmias
- Cardiac arrest

Vascular disease
- Acute and chronic limb ischaemia

Thromboembolic disease
- Deep vein thrombosis
- Pulmonary embolus

Hyperlipidaemia
- Hypercholesterolaemia
- Pericarditis

Respiratory system

Asthma
- Acute asthma
- Chronic asthma

Chronic obstructive pulmonary disease (COPD)
- Acute exacerbations of COPD
- Stable COPD

Cough
- Cough and congestion
- Respiratory failure
- Hypoxaemia

Nervous system

Stroke and transient ischaemic attack
- Acute stroke and transient ischaemic attack
- Primary and secondary prevention of stroke

Pain
- Principles of managing pain (including the analgesic ladder)
- Neuropathic pain

Movement disorders
- Parkinson's disease

Epilepsy
- Status epilepticus
- Chronic epilepsy

Headache
- Acute migraine
- Prophylaxis of migraine
- Cluster headache

(Continues)

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TABLE 1 (Continued)

- Tension headache
- Vertigo
- Dementia
- Muscle spasm
- Sleep disorders
- Insomnia

Psychiatric disease

Anxiety disorders
- Chronic anxiety
- Panic disorders

Depression
- Chronic depressive illness
- Bipolar disorder

Schizophrenia
- Chronic schizophrenia

Acute behavioural disturbance
- Acute behavioural disturbance

Drug dependence
- Alcohol dependence
- Nicotine dependence and withdrawal
- Opioid dependence and withdrawal

Infectious disease

Gastrointestinal infections
- Acute gastroenteritis
- Acute abdominal infections (e.g. appendicitis, cholecystitis and peritonitis)

Cardiovascular infection
- Acute bacterial endocarditis

Respiratory infections
- Upper respiratory tract infections
- Lower respiratory tract infections (e.g. pneumonia and bronchiolitis)
- Tuberculosis
- Viral infections (e.g. COVID-19, influenza)

Neurological infections
- Meningitis
- Encephalitis

Genito-urinary infection
- Urinary tract infection (e.g. cystitis and pyelonephritis)
- Epididymitis and orchitis
- Sexually transmitted infections (e.g. chlamydia and gonorrhoea)

HIV infection
- HIV infection

Skin infections
- Cellulitis

Post-operative infections
- Surgical site infection
- Post-operative peritonitis

Sepsis and bacteraemia
- Sepsis
- Bacteraemia of unknown origin

Hospital-acquired infections
- *Clostridium difficile* infection
- Methicillin-resistant *Staphylococcus aureus* (MRSA) infection
- Infection in an immunocompromised host
- Sepsis in an immunocompromised patient

Tropical infections
- Malaria

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TABLE 1 (Continued)

Endocrine and metabolism

Type 1 diabetes

- Management of type 1 diabetes
- Diabetic ketoacidosis
- Hypoglycaemia

Type 2 diabetes

- Management of type 2 diabetes

Thyroid disease

- Hyperthyroidism
- Hypothyroidism

Bone disease

- Osteoporosis
- Osteomalacia

Adrenal disease

- Addison's disease (incl. Addisonian crisis)
- Hyperaldosteronism
- Obesity
- Electrolyte imbalance

Renal and urological disease

Kidney disease

- Chronic kidney disease
- Acute kidney injury
- Glomerulonephritis
- Nephrotic syndrome

Urinary tract infection

- Cystitis
- Pyelonephritis

Bladder disease

- Incontinence
- Over-active bladder

Prostate disease

- Benign prostatic hyperplasia/enlargement
- Prostate cancer

Sexual dysfunction

- Erectile dysfunction

Obstetrics and gynaecology

Contraception

- Hormonal contraception
- Non-hormonal contraception (e.g. spermicide, barrier and intrauterine devices)
- Menopause
- Polycystic ovary syndrome
- Endometriosis
- Pre-eclampsia
- Gestational diabetes mellitus

Haematological disease

Anaemia

- Iron deficiency anaemia
- Macrocytic anaemias
- Blood transfusion (and other blood products)
- Anticoagulant reversal

Oncology

Cancer therapeutics

- Adverse effects related to cancer therapeutics (e.g. chemotherapy–neutropenia, nausea and vomiting)

Palliative care

- Cancer-related pain

(Continues)

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TABLE 1 (Continued)

- Management of other symptoms in terminal malignant disease
- Breast cancer

Locomotor system

Osteoarthritis

- Gout
- Acute gout
- Prophylaxis of gout
- Inflammatory arthropathies
- Rheumatoid arthritis
- Temporal arteritis and polymyalgia rheumatica

Diseases of the skin, eyes, ear, nose and throat

Diseases of the skin

- Atopic dermatitis and eczema
- Psoriasis
- Acne vulgaris
- Cellulitis and impetigo
- Urticaria
- Scabies and head lice

Diseases of the eye

- Acute glaucoma
- Chronic 'open-angle' glaucoma
- Conjunctivitis
- Uveitis

Diseases of the ear, nose and throat

- Allergic rhinitis
- Vertigo
- Otitis media/externa
- Throat infections and tonsillitis

Surgery, anaesthetics and intensive care

Preparation of a patient for surgery

- Antibiotic prophylaxis
- Thromboprophylaxis
- Managing and amending regular medication (e.g. warfarin and insulin)

Post-operative treatment

- Post-operative pain (including patient-controlled analgesia)
- Post-operative fluid replacement
- Post-operative infections

Accident and emergency medicine

Overdoses

- Paracetamol poisoning
- Tricyclic antidepressant poisoning
- Acute opiate intoxication

Allergic emergencies

- Acute anaphylaxis
- Other skin and systemic adverse drug reactions

Section IV. Prescribing and related skills

This section provides a list of learning outcomes expressing what a graduate should be able to do after completing a medical degree.

Medication history taking

Take a medication history

- Demonstrate the ability to elicit and document an accurate medication history, including current and recent medicines, to support effective medicines reconciliation
- Identify, where possible, for each drug the original indication, formulation, dose, route, duration and effects
- Assess exposure to non-prescribed agents and therapies (e.g. over-the-counter, complementary therapies, alcohol, tobacco, recreational drugs and internet-sourced drugs)
- Identify alternative sources of information about current treatment and outline the limitations of these information sources (e.g. electronic medical records, general practice records and carers)

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TABLE 1 (Continued)

- Interpret the medication history so that allergies and adverse drug reactions (ADRs) can be identified (distinguish between a history of drug allergy and intolerance)
- Identify common potentially important drug interactions

Prescribe a new medicine

Prescribe drugs safely, effectively, economically and sustainably

- Identify health concern(s) to be treated
- Identify the therapeutic objective(s) for new therapy
- Evaluate the risks and benefits of specific drug therapies
- Identify drugs with a narrow therapeutic index or high potential for serious adverse effects/interactions, and take appropriate precautions when prescribing them
- Demonstrate the ability to follow clinical guidelines, protocols and formularies where appropriate
- Outline economic and sustainability factors within prescribing decisions (e.g. choice of inhaler)

Write prescriptions that consider the needs of individual patients

- Identify possible contraindications, drug–drug interactions, previous ADRs, any special circumstances (including religious beliefs or lifestyle choices [e.g. porcine-derived medications or excipients]), age, weight, gender and diseases
- Select the appropriate formulation, dose, route, frequency and duration of a drug
- Interpret data that are relevant to prescribing decisions (e.g. renal function and drug concentrations)

Other prescribing-related skills

- Record the rationale for new prescribing decisions in the medical record
- Identify and reduce the risk of medication errors
- Identify situations where one's own prescribing skills are not sufficient and seek advice before proceeding
- Identify situations where non-pharmacological approaches may be more appropriate
- Prescribe in written and electronic form

Calculate drug doses

Drug calculations

- Calculate appropriate doses using individual patient data such as body weight, surface area, organ function and based nomograms where appropriate
- Convert doses between common units and convert between concentrations expressed as percentage and mass by volume
- Calculate equivalent doses when changing drug or pharmaceutical formulation (e.g. corticosteroid and opioid)

Prescription writing

Prescribe on hospital in-patient prescription forms (paper or electronic)

- Write an unambiguous, legible, complete and legal prescription (approved name, appropriate form and route, correct dose, any other necessary instructions, and signature), avoiding abbreviations and ambiguities (e.g. writing micrograms in full)
- Prescribe 'once-only', regular and 'as required' medicines

Prescribing on other documentation

- Prescribe on hospital supplementary prescription charts (e.g. insulin and anticoagulants)
- Prescribe 'to take out' drugs on discharge from hospital
- Prescribe on general practice prescription forms (e.g. FP10)
- Keep accurate records of prescriptions and drug responses
- Discontinue prescriptions appropriately

Communication

Discussing prescribing options with patients

- Engage in shared decision-making
- Communicate a treatment plan
- Offer guidance about safe and effective ways to take specific medicines (e.g. bisphosphonates and inhalers)
- Discuss important and common adverse effects and when to discontinue medicines or seek help if these occur

Discussing prescribing decisions with colleagues

- Communicate treatment plans and monitoring arrangements clearly with other members of staff, in both verbal and written form
- Keep accurate written records of management plans
- Write accurate discharge prescriptions and letters to other health-care practitioners

Reviewing prescriptions

Reviewing current lists of prescribed medicines

- Identify and correct prescription writing errors
- Identify and manage inappropriate prescribing and/or polypharmacy
- Identify opportunities for deprescribing and medicines optimization with patients

(Continues)

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TABLE 1 (Continued)

Adverse drug reactions

Managing, reporting and avoiding adverse drug reactions (ADRs)

- Assess and manage common ADRs and interactions in the context of the current clinical situation
- Report a suspected ADR using the MHRA Yellow Card scheme
- Find and interpret information about adverse drug reactions (e.g. British National Formulary [BNF])

Obtaining information to support rational prescribing

Find reliable sources of drug information and use them appropriately

- Demonstrate the ability to find and use a Summary of Product Characteristics
- Demonstrate the ability to use the British National Formulary
- Demonstrate the ability to find and use Poisons Information Services (e.g. TOXBASE)
- Interpret national or international guidance (e.g. National Institute for Health and Care Excellence [NICE]) in the context of the care of individual patients

Prescribing high-risk medicines

Oxygen

- Prescribe oxygen safely using appropriate documentation
- Interpret oxygen saturations and symptoms to guide oxygen therapy

Anticoagulants

- Prescribe anticoagulants safely using appropriate documentation
- Interpret therapeutic drug monitoring where appropriate to guide anticoagulation

Insulin

- Prescribe insulin safely using appropriate documentation
- Interpret blood glucose and other measures where appropriate (e.g. HbA1C, ketones and electrolytes) to guide insulin therapy

Intravenous fluids and electrolytes

- Prescribe intravenous fluids and electrolytes safely using appropriate documentation
- Monitor the clinical and biochemical effects of intravenous fluids and electrolytes

Opioid analgesics

- Prescribe opioid analgesics safely and effectively
- Convert between one opioid and another, recognizing differences in potency, duration of action and elimination routes

Drug administration

Administering parenteral medicines

- Administer drugs by subcutaneous injection
- Administer drugs by intramuscular injection
- Administer drugs by intravenous injection
- Administer drugs by intravenous infusion pumps

Administering medicines by other routes

- Administer drugs using an inhaler
- Administer drugs using a nebulizer
- Administer drugs to the eye
- Administer drugs to the ear
- Administer drugs to the skin

include these drugs as during the Delphi, agreement had not met the 75% threshold, and the drugs are not highly prescribed from national prescribing data [29]. In Round 3, there was an agreement on the application of action verbs and some further minor typographical change. There was a debate on the inclusion of Section III, regarding potential duplication of the GMC's content map [20], with a risk of future misalignment where this was updated. However, most experts favoured its retention, citing its utility in centring early years clinical pharmacology education in disease models and reflecting that the curriculum is likely to have some international utility.

The final curriculum is presented in Table 1. A full list of all changes to the drug list, alongside a table of changes across other sections of the curriculum, is available in Data S3. Briefly, the changes to Section I (Principles of Clinical Pharmacology) were largely with respect to reducing the number of command verbs and clarifying their meanings to better reflect the expectations of a newly graduated doctor (Table 2). The number of learning outcomes compared to the last iteration of the curriculum was reduced from 226 to 205. Most changes in Section II (Drugs a 'Student Formulary') related to layout or categorization with sub-headings, including an addition of a topic for 'emergency drugs'. There were six direct replacements of example drugs (e.g. atorvastatin replacing simvastatin). See Data S3 for the full list. In Section III (Therapeutics) of the curriculum, many changes involved updating language to reflect contemporary practice (e.g. sepsis from septicaemia). There was also some broadening of topics that relate to primary care (e.g. otitis media). In Section IV, command verbs were again revised in line with other sections. There were eight additional learning outcomes added to this section.

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TABLE 2 Demographics of Delphi participants.

Number of participants (*n*)	40
Profession	
Medical doctor (*n*)	26 (65%)
Pharmacological scientist (*n*)	11 (28%)
Pharmacist (*n*)	3 (8%)
Experience as an educator (median [IQR], years)	10 [10.5]
Current commitment to clinical pharmacology education (median [IQR], % full time equivalent)	40 [65]
Gender (male/female, %)	60/40

IQR, interquartile range.

4 | DISCUSSION AND CONSIDERATIONS FOR EDUCATORS

There is ongoing enthusiasm for guidance on what knowledge doctors of the future need in clinical pharmacology and therapeutics. This is reflective of the consensus among clinicians, medical educators and students themselves that adequate training and assessment in the discipline is likely to improve the quality of care provided by doctors and reduce the risk of prescribing errors [21, 30]. The updates to the British Pharmacological Society therapeutics and prescribing curriculum for medical degrees recommended by the participants in the Delphi process represent ongoing evolution of clinical pharmacology and therapeutics as a discipline. We are grateful to all of the contributors to the Delphi process for their time and expertise in this process.

Prescribing is a core skill for doctors that must be underpinned by knowledge of therapeutics. The structured learning outcomes enable medical schools to map student learning (and progression) and provide clearly structured and measurable outcomes that align with the needs of clinical practice. We believe this is particularly of use in modern integrated degree programmes. The focus, particularly in Section IV on skills that a graduating doctor requires, aligns with competence and capability-based frameworks for medical education [31, 32].

The curriculum provides support for the increasing interest in personalized medicine. Sections focussing on inter-individual variability, physiological factors, age and pregnancy provide the foundational principles necessary for personalized prescribing, including integrating pharmacogenomics (PGx) into prescribing education. The utility of electronic tools aimed at assisting prescribers and reducing harm to patients will become an increasingly important part of prescribing education. It is likely that in time this will include explicit educational requirements for understanding how artificial intelligence (AI) may be used as a tool for prescribers. While the challenge of operationalizing this for medical schools is outside of the scope of this work, we do acknowledge it to be significant. Multiple electronic tools are in operation within the UK health-care sector, and this is likely to expand significantly in the coming decade. How degree programmes adapt to provide appropriate exposure and evaluate competence will need to include building skills to learn and safely adopt new systems throughout a career [33].

We have been able to gain views from across the spectrum of UK educators, from pre-clinical medicine to practising doctors and pharmacists. Expertise was provided from a wide range of career stages, including those in their first teaching roles and those who had up to 35 years of experience. The number of contributors is in line with group size recognized to be effective in Delphi processes [28]. There was institutional representation from Wales, Scotland, Ireland and England. Fourteen of the experts contributing to the Delphi process were clinical pharmacology consultants, representing around 10% of the UK consultant workforce in the specialty [34]. We believe this is a considerable strength of our work and adds validity to the curriculum in representing an ideal foundation for doctors in the discipline of clinical pharmacology. In our view, this work provides a robust evidence-informed basis on which medical schools may build their educational material or undertake quality assurance of the delivery of this element of the medical degree in the United Kingdom.

The core drugs list has remained broadly similar to the previous iteration. This stability should allow course designers an opportunity to develop long lasting resources that provide students with a 'good place to start' in the learning journey about drugs that do not require frequent and extensive revisions. Given the constraints on time for university educators, we believe this is a welcome confirmation of previous work that has established that the most frequently prescribed drugs change little over time [35, 36].

This curriculum is consistent with the British Pharmacological Society's principles for inclusive implementation of the undergraduate pharmacology core curriculum, in the sense that the effects of interindividual differences in response to drugs are explored and the curriculum includes how drug effects can be impacted by diet, environmental variation and physiological variables such as age, sex and pregnancy [37]. While this curriculum does not address how the learning outcomes should be implemented, we encourage consultation with the inclusive principles.

The work to update this curriculum has a number of limitations that we would like to highlight. While we are satisfied with the breadth of clinical pharmacology expertise sampled in this process, we acknowledge that the process represents a small sample of the more general medical education community. Alongside this, we did not specifically seek out the views of course leaders or course directors responsible for the delivery and governance of medical courses. Our view is that the Delphi contributors provide a consensus of knowledge from the breadth of a medical degree that comes primarily from their expertise in pharmacology education, the main focus of this work. The recruitment strategy used, which included nomination by those we invited directly, was felt a pragmatic approach to ensure adequate participation and improve inclusivity. The consequence of this strategy is that we are unable to estimate a response rate as one might ordinarily expect from a Delphi report. We acknowledge this limitation, although we are content that the strategy has resulted in a panel with strengths reflected above.

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TABLE 3 Command verbs used in the curriculum.

Command verb	Definition applied in this curriculum
List	Recall a series of names or things.
Define	Give the meaning of a word, phrase or concept.
Outline	Indicate the principal features or main points
Select	Select or choose from a number of possibilities.
Describe	Give characteristics and main features
Identify	Recognize, pinpoint, or distinguish a specific piece of information, concept, or element from a larger set, and explain, evaluate or assess its relevance in the wider concept or issue.
Explain	Identify why or how something happens, set out purposes or reasons/make the relationships between things clear.
Discuss	Give a critical account of the points involved in a topic, including the arguments for and against an issue (supported by relevant evidence), and consider the wider implications of the issue.
Calculate	Generate a numerical answer.
Interpret	Review a scenario or set of data and draw conclusions/make deductions
Assess/make an accurate assessment of	Make an informed judgement, give an account with the relative importance of ideas and an evaluative statement
Demonstrate	Demonstrate the ability to perform a task
Evaluate	Judge or assess the quality, importance of something using evidence.

We are mindful of the importance of the student voice in curriculum design and implementation and acknowledge that we did not include students in this process. Our focus here was in understanding the core knowledge and skills required of a prescriber, and our view was that this necessitated focus on expertise from educators and prescribers through the Delphi process. We were also mindful of the multiplicity of approaches from degree courses across the UK and the complexity of running a student process within this context. We did include early career resident doctors as contributors.

We did not undertake an exhaustive demographic survey of contributors. We note that there were more men (60%) than women (40%) contributing to the process and White/White British ethnicity was most frequently self-identified. These figures are reflective of the wider UK higher education workforce [38], and we acknowledge the potential limitations that may derive from this in the process perhaps failing to adequately reflect the populations that are treated by doctors. The expert group was convened through a purposive, invitation-based recruitment process, relying on invitations being received, disseminated and acted upon.

As an endeavour of the British Pharmacological Society, this curriculum is centred in clinical practice in the National Health Service (NHS) and expertise of pharmacologists from the UK, which may limit its transferability to other countries' health-care systems. There is natural conflict between considering the global perspective and setting out the framework to ensure competence in UK practice—a straightforward example of the kind of question debated in this regard was around the inclusion of anti-malarial drugs given its importance as a global disease *vs*. the unlikely event of a newly qualified doctor being tasked with prescribing or monitoring the therapy in the UK. The focus of the experts here was UK practice, and we acknowledge the curriculum reflecting this is a strength for the UK but may limit generalizability.

The work retains structure and a reasonable amount of content from the last iteration and so also retains much of the content alignment with the European consensus project and the outcomes are compatible with preparing learners to prescribe in line with approaches described by international guidance, including that from the World Health Organization [11, 14, 39]. Similarly, we are cognisant that there are other professional groups who develop competencies in prescribing and clinical pharmacology. While elements of this work could be used for those professions, direct transfer is unlikely to be possible (or desirable) as the scale and scope of learning will be different when centred in another degree programme. Future work could address some of these shortcomings, including taking the curriculum to patient and student groups for these important perspectives. International collaboration to consider global generalizability of knowledge and skills could also be explored.

The curriculum does not provide guidance on delivery of its content as we are of the opinion that individual medical schools are best placed to decide how it could be used in delivering clinical pharmacology and therapeutics learning within their degree. There is no 'right' way to teach the discipline and how learning is delivered is beyond the scope of this work, although we refer readers to several recent articles on this topic [5, 6]. With many regions lacking expertise from clinical pharmacologists [34], it is likely that in some medical schools education in this discipline is not necessarily led by a specialist in the field. We therefore view the utility of this curriculum in the UK as providing a supportive framework that could be used to map learning and provide assurance that a medical degree course delivers the required learning. It may also support course design where gaps are identified [5, 6]. Similarly, the layout of the curriculum has not been altered from the last iteration. We recognize that there could be a range of ways to lay out the learning outcomes, including mirroring an organ-based approach that many medical courses divide their learning into. We do not believe there is significant merit of one approach over another and so have restricted debate in this Delphi to the content of learning.

5 | CONCLUSION

This updated curriculum from the British Pharmacological Society provides a comprehensive and contemporary framework for clinical pharmacology and prescribing education in the UK medical schools.

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Developed through a rigorous modified Delphi process involving a diverse panel of educators and clinicians, the curriculum reflects the evolving demands of medical practice and the critical importance of safe, effective and evidence-based prescribing.

The curriculum's structured approach, including learning outcomes in pharmacological principles, therapeutics, core drugs and prescribing skills, offers a framework for medical schools to design, map, and quality assure their clinical pharmacology teaching. Its alignment with national assessments and regulatory expectations ensures relevance for both undergraduate education and early clinical practice.

AUTHOR CONTRIBUTIONS

All authors contributed to the design, conduct and analysis of this work. All authors wrote the manuscript.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest. RS is an NIHR Research Professor (NIHR303160) and is funded by the NIHR. The views expressed in this publication are those of the author(s) and not necessarily those of the NIHR, NHS or the UK Department of Health and Social Care.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

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REFERENCES

1. Dornan T. *An in-depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education: EQUIP study*. General Medical Council; 2009.
2. Ashcroft DM, Lewis PJ, Tully MP, et al. Prevalence, nature, severity and risk factors for prescribing errors in hospital inpatients: prospective study in 20 UK hospitals. *Drug Saf*. 2015;38(9):833-843. doi:10.1007/s40264-015-0320-x
3. Ryan C, Ross S, Davey P, et al. Prevalence and causes of prescribing errors: the PRescribing outcomes for trainee doctors engaged in clinical training (PROTECT) study. *PLoS ONE*. 2014;9(1):e79802. doi:10.1371/journal.pone.0079802
4. Quesnelle KM, Zaveri NT, Schneid SD, et al. Design of a foundational sciences curriculum: applying the ICAP framework to pharmacology education in integrated medical curricula. *Pharmacol Res Perspect*. 2021;9(3):e00762. doi:10.1002/prp2.762
5. Crowley FC, Restini C, Burke K, Rieder MJ. Exploring the landscape of pharmacology education in health professions programs: from historical perspectives to current approaches to teaching. *Eur J Pharmacol*. 2025;994:177386. doi:10.1016/j.ejphar.2025.177386
6. Fasinu PS, Wilborn TW. Pharmacology education in the medical curriculum: challenges and opportunities for improvement. *Pharmacol Res Perspect*. 2024;12(1):e1178. doi:10.1002/prp2.1178
7. Maxwell SRJ. An agenda for UK clinical pharmacology: how should teaching of undergraduates in clinical pharmacology and therapeutics be delivered and assessed? *Br J Clin Pharmacol*. 2012;73(6):893-899. doi:10.1111/j.1365-2125.2012.04232.x
8. Walley T, Webb DJ. Core content of a course in clinical pharmacology. *Br J Clin Pharmacol*. 1997;44(2):171-174. doi:10.1046/j.1365-2125.1997.00668.x
9. Rubin P, Franchi-Christopher D. New edition of tomorrow's doctors. *Med Teach*. 2002;24(4):368-369. doi:10.1080/0142159021000000816
10. Maxwell S, Walley T. Teaching safe and effective prescribing in UK medical schools: a core curriculum for tomorrow's doctors. *Br J Clin Pharmacol*. 2003;55(6):496-503. doi:10.1046/j.1365-2125.2003.01878.x
11. Ross S, Maxwell S. Prescribing and the core curriculum for tomorrow's doctors: BPS curriculum in clinical pharmacology and prescribing for medical students. *Br J Clin Pharmacol*. 2012;74(4):644-661. doi:10.1111/j.1365-2125.2012.04186.x
12. Maxwell SR, Cameron IT, Webb DJ. Prescribing safety: ensuring that new graduates are prepared. *Lancet*. 2015;385(9968):579-581. doi:10.1016/S0140-6736(14)62339-4
13. Guilding C, Ball S, Kennedy D, Thanacoody R. Development and implementation of a clinical pharmacology, therapeutics and prescribing strand for Newcastle University's MBBS degree programme using the British Pharmacological Society's core curriculum for medical students. *pA2 Online: E Journal of the British Pharmacological Society*. 2015;13(3):188.
14. Brinkman DJ, Tichelaar J, Mokkink LB, et al. Key learning outcomes for clinical pharmacology and therapeutics education in Europe: a modified Delphi study. *Clin Pharmacol Ther*. 2018;104(2):317-325. doi:10.1002/cpt.962
15. Donker EM, Spitaleri Timpone P, Brinkman DJ, et al. The European list of key medicines for medical education: a modified Delphi study. *Clin Pharmacol Ther*. 2024;115(3):515-524. doi:10.1002/cpt.3132
16. Smith ER, Paley M, Lalli RK, Malekigorji M, Broad J. Interrogating the perceptions of undergraduate pharmacology teaching on an MBBS Programme at a UK medical school. *Pharmacol Res Perspect*. 2025;13(4):e70136. doi:10.1002/prp2.70136
17. Donnenberg VS, Burris JF, Wiernik PH, Cohen LJ, Korth-Bradley JM. How to fix the dangerous lack of clinical pharmacology education in the medical profession: the generation of core entrustable professional activities in clinical pharmacology for entering residency. *J Clin Pharmacol*. 2016;56(10):1177-1179. doi:10.1002/jcph.748
18. Lum E, Mitchell C, Coombes I. The competent prescriber: 12 core competencies for safe prescribing. *Aust Prescr*. 2013;36(1):13-16. doi:10.18773/austprescr.2013.007
19. Gitanjali B, Shashindran C. Curriculum in clinical pharmacology for medical undergraduates of India. *Indian J Pharmacol*. 2006;38(Suppl 2):S108-S114.
20. General Medical Council. 2021. Medical Licensing Assessment content map. Available from: https://www.gmc-uk.org/-/media/documents/mla-content-map-_pdf-85707770.pdf
21. British Pharmacological Society and Medical Schools Council, Independent Review into the Prescribing Safety Assessment, Prof. Dame Jane Dacre, Editor. 2023.
22. Oxley E, Nash HM, Weighall AR. Consensus building using the Delphi method in educational research: a case study with educational professionals. *Int J Res Method in Educ*. 2025;48(1):29-43. doi:10.1080/1743727X.2024.2317851
23. Jones SL, Ashton CM, Kiehne L, et al. Reductions in sepsis mortality and costs after design and implementation of a nurse-based early recognition and response program. *Jt Comm J Qual Patient Saf*. 2015;41(11):483-491. doi:10.1016/S1553-7250(15)41063-3
24. Clayton R, Perera R, Burge S. Defining the dermatological content of the undergraduate medical curriculum: a modified Delphi study. *Br J*

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Dermatol. 2006;155(1):137-144. doi:10.1111/j.1365-2133.2006.07190.x
25. Fishman SM, Young HM, Lucas Arwood E, et al. Core competencies for pain management: results of an interprofessional consensus summit. *Pain Med*. 2013;14(7):971-981. doi:10.1111/pme.12107
26. Woodcock T, Adeleke Y, Goeschel C, Pronovost P, Dixon-Woods M. A modified Delphi study to identify the features of high quality measurement plans for healthcare improvement projects. *BMC Med Res Methodol*. 2020;20(1):8. doi:10.1186/s12874-019-0886-6
27. Diamond IR, Grant RC, Feldman BM, et al. Defining consensus: a systematic review recommends methodologic criteria for reporting of Delphi studies. *J Clin Epidemiol*. 2014;67(4):401-409. doi:10.1016/j.jclinepi.2013.12.002
28. Humphrey-Murto S, Varpio L, Gonsalves C, Wood TJ. Using consensus group methods such as Delphi and nominal group in medical education research(). *Med Teach*. 2017;39(1):14-19. doi:10.1080/0142159X.2017.1245856
29. OpenPrescribing.net Bennett Institute for Applied Data Science, University of Oxford 2025
30. Magavern EF, Hitchings A, Bollington L, et al. UK prescribing safety assessment (PSA): the development, implementation and outcomes of a national online prescribing assessment. *Br J Clin Pharmacol*. 2024;90(2):493-503. doi:10.1111/bcp.15919
31. Frank JR, Snell LS, Cate OT, et al. Competency-based medical education: theory to practice. *Med Teach*. 2010;32(8):638-645. doi:10.3109/0142159X.2010.501190
32. General Medical Council. Outcomes for graduates. 2020. Available from. https://www.gmc-uk.org/education/standards-guidance-and-curricula/standards-and-outcomes/outcomes-for-graduates
33. Medical Schools Council. 2023; Data Science in the Medical Curriculum: Equipping Medical Students for the Digital Age. Available from. https://www.medschools.ac.uk/wp-content/uploads/2025/04/Data-Science-in-the-Medical-Curriculum-.pdf
34. A ten-year workforce strategy for UK clinical pharmacology. 2020. Available from. https://www.bps.ac.uk/getmedia/4a5665d0-0bb3-462f-b7e2-bd2cc89efa2c/Ten-year-workforce-strategy-for-clinpharm.aspx
35. Hitchings A, Lonsdale D, Burrage D, Baker E. *The top 100 drugs: clinical pharmacology and practical prescribing*. Elsevier; 2022.
36. Audi S, Burrage DR, Lonsdale DO, et al. The 'top 100'drugs and classes in England: an updated 'starter formulary' for trainee prescribers. *Br J Clin Pharmacol*. 2018;84(11):2562-2571. doi:10.1111/bcp.13709
37. British Pharmacological Society. Principles for inclusive implementation of the undergraduate pharmacology core curriculum. 2025 [cited 2025 05/08]. Available from: https://www.bps.ac.uk/education-engagement/teaching-pharmacology/undergraduate-curriculum/inclusive-principles
38. Higher Education Statistics Agency (HESA). Higher Education Staff Statistics: UK, 2023/24 - Statistical Bulletin SB270 2025 2025/01/28 cited 2025/06/19. Available from: https://www.hesa.ac.uk/news/28-01-2025/sb270-higher-education-staff-statistics
39. Keijsers CJ, Segers WS, de Wildt DJ, Brouwers JR, Keijsers L, Jansen PA. Implementation of the WHO-6-step method in the medical curriculum to improve pharmacology knowledge and pharmacotherapy skills. *Br J Clin Pharmacol*. 2015;79(6):896-906. doi:10.1111/bcp.12575

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