Script

An eLearning programme to improve prescribing competency

A Guide for Clinical Tutors and Postgraduate Centre Managers

NHS

Health Education England

CONTENTS

1.0 BACKGROUND

It is estimated that one in ten patients is harmed while receiving hospital care. Medication errors can be defined as *"a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient"* [1]. Medication prescribing errors are those that have specifically occurred during the prescribing process, where there is a failure to order the right drug at the right dose at the right frequency for the right patient. In the UK, medication errors account for 10–20% of all adverse events in the National Health Service (NHS), and preventable harm from medicines is estimated to cost more than £750 million each year. A quarter of litigation claims in the NHS also stem from such errors.

In the UK, the majority of prescribing in hospitals is undertaken by Foundation trainee doctors in the first and second year of foundation training. Given the rate of errors, in 2009 the General Medical Council (GMC) commissioned a study to determine the causes of prescribing errors made by Foundation trainee doctors with the aim that this could inform evidence-based recommendations to improve patient safety and define a future research agenda. The EQUIP study[2] found that the rate of error varied depending on the grade of the doctor, but that year one and year two trainee doctors prescribed with an error rate of approximately 8% and 10% respectively. The findings of this study highlighted serious weaknesses in existing educational approaches, indicating that many newly qualified doctors are poorly prepared for prescribing. The authors found that poor prescribing was widespread and results in the underuse of effective medicines, avoidable adverse drug reactions, and medication errors. The study made three key recommendations:

- *Education in practical prescribing should be part of foundation year one education.*
- *Foundation trainee doctors should be given explicit feedback regarding their prescribing practice during foundation education.*
- *Help-seeking and feedback-seeking behaviours should be encouraged in workplace education and appraisal.*

As a result of the EQUIP study, in 2010 Health Education West Midlands (then the Strategic Health Authority) commissioned the Universities of Birmingham, Warwick and Aston to develop an online eLearning programme to improve prescribing competency of trainee doctors. The overall aims of the project were to:

- Encourage safe, effective, and rational prescribing by developing learning modules that reflect current prescribing practice in the NHS.
- Improve the prescribing knowledge and skills of newly qualified doctors during the formative years of their professional development, in order to reduce medication errors and improve patient safety.

SCRIPT (*Standardised Computerised Revalidation Instrument for Prescribing and Therapeutics*) was created in 2011 by a team of clinical pharmacists and clinical pharmacologists working in both education and healthcare.

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[1]Ferner RE, Aronson JK. Clarification of Terminology in Medication Errors: Definitions and Classification. Drug Safety. 2006;29(11):1011-22.
[2]Dornan T, Ashcroft D, Heathfield H, Lewis P, Taylor D, Tully MP, et al. An in depth investigation into causes of prescribing errors by foundation trainees in relation to their medical education. EQUIP study. 2009; Available from: http://www.gmc-uk.org/about/research/research_commissioned_4.asp.

2.0 THE RESOURCE

The programme comprises 47 web-based eLearning modules relating to prescribing and therapeutics across a wide range of subject areas (Appendix 1). All modules have been authored by specialist healthcare professionals and externally peer reviewed to ensure accuracy and relevance to practice.

The 47 modules are divided into seven categories:

- Principles of Prescribing
- Prescribing in Medical Emergencies
- Managing the Risks of Prescribing
- Prescribing in Special Circumstances
- Therapeutic Groups
- Clinical Governance
- Advanced Prescribing

The learning outcomes for the modules are based on the outcomes (i.e. 'foundation professional capabilities') and descriptors outlined in the Foundation Programme Curriculum[3], particularly those stated in Syllabus Section 3 *Prescribes safely*.

2.1 Structure of the modules

Each module has the same core components, commencing with a pre-test of 10 questions designed to allow the trainee to determine their baseline knowledge on the subject area. The trainee will be given a score out of 10 at the end of the test, but will not be provided with feedback at this stage. The learning starts with a brief session overview and recommendations for any reading that may facilitate progress through the module ('Pre-requisites') and learning outcomes.

The learning commences with a Case Vignette, which introduces some key concepts covered in the module content. In-module activities are included throughout the modules to discuss complex patient scenarios and embed learning.

At the end of the module, the trainee will sit a post-test of the same 10 questions presented in the pre-test. These will be asked in a random order and as the resource develops, the post-test questions may be different for some modules. In order for the post-test to be activated the trainee must have viewed all content in each module. Guidance on this is given in the 'Post-test' page in the Summary section of each module.

2.2 Certification

Upon completion of the module, a certificate will be made available as a PDF stating:

- The trainee's name.
- The module title.
- The learning outcomes of the module.
- The date and time the certificate was generated.

The certificate will have the Health Education England logo in the top right hand corner.

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[3]The Foundation Programme. Curriculum and assessment. Available online at http://www.foundationprogramme.nhs.uk/pages/home/training-and-assessment

2.3 The pre/post-test score

The pre/post-test is intended to help the trainee determine their baseline knowledge on the module subject, and be a measure of knowledge acquisition. It also adds an element of interactivity. The questions have not been reviewed by an examination board.

Your local Deanery has decided if a pass mark has been assigned to the modules (Appendix 2) and whether the trainees post-test score is generated onto their module certificate. However, whether or not a pass mark has been set, clinical tutors can monitor a trainees progress through the modules, and consistent low scores throughout may call for modules to be re-set and for the test to be re-taken (see section 3.3, Integration into Foundation Training).

3.0 INTEGRATION INTO FOUNDATION TRAINING

3.1 Mandatory modules

Some regions of Health Education England mandate that trainees complete specific modules in their F1 and F2 years. Appendix 2 outlines any local requirements, including the title of the module, the pass mark and the time period over which these should be completed. We recommend that modules are completed gradually over the year. Tutors can monitor that this is being adhered to and that trainees are not completing modules in bulk prior to review meetings. We have provided trainees with a check list to facilitate the documentation of completed modules over the two years (see Appendix 2, Trainee Guide).

As you will be aware, trainees are provided with three hours of protected study time during their working week. Some of this time may be allocated by postgraduate centres in order to complete SCRIPT modules. Please note that this practice may not be consistent across the country. We are working hard to encourage centres to allow some time to be allocated for this, reducing the time trainees need to spend on these outside of work. Unfortunately the SCRIPT team cannot control local implementation, merely advise.

3.1.1 Remediation for the PSA

As you will be aware, from 1 August 2016 all new F1 doctors are required to pass the Prescribing Safety Assessment (PSA). Doctors who do not pass the PSA at medical school will be required by Foundation Schools to take the assessment during their induction week". Any F1 entrant who is unable to pass the PSA at this stage is expected to undergo a programme of remediation prior to retaking the PSA during F1"[4]. Appendix 3 lists 18 modules that you may like to direct trainees to during this process of remediation.

[4]British Medical Association. The Prescribing Safety Assessment 22nd April 2016. Available online at https://www.bma.org.uk/advice/career/studying-medicine/prescribing-safety-assessment

3.2 How to monitor trainee progress

SCRIPT eLearning has a dedicated management site that can be accessed by both clinical tutors and postgraduate centre mangers in order to monitor the progress of trainees. When your instance of SCRIPT is setup you will receive full training on the use of the management site through either face-to-face meetings or online WebCT (or equivalent) sessions. Full support is provided by Jenni Ferguson at OCB Media who can be contacted on 0116 2855993 or jenni@ocbmedia.com

The management site serves two purposes:

1. You can ensure that trainees are taking steps to develop their prescribing knowledge in postgraduate education.
2. It can encourage discussion about prescribing in workplace education and during appraisals or reviews.

In the 'managers' site, you can see the following information about your trainees' progress:

- When they completed the modules (day of week and time of day).
- How long they have spent on the learning.
- The pre- and post-test scores for each module.

The management site will facilitate the Annual Review of Competence Progression (ARCP) in signing off trainees if completing modules is mandatory in your region.

3.2.1 SCRIPT and the ePortfolio

We have recommended to trainees that they save their certificates and upload these to their ePortfolio as evidence of module completion. You may use these as evidence in addition to the information gathered from the management site.

3.3 Re-taking the pre/post-test

Clinical tutors monitoring a trainees progress through the learning can re-set the module and request that they re-take the test. This is a local decision and one that should be taken in discussion with the trainee. In addition, the trainee can also re-set the module themselves.

3.4 Modules completed at undergraduate education

SCRIPT eLearning is being used in some UK academic institutions (e.g. the University of Birmingham). Therefore trainees may have completed some modules during your degree, for example, in preparation for the Prescribing Safety Assessment.

If a trainee has completed any of the mandated modules within 12 months of starting the F1 year, these can be used to fulfil the Foundation requirements. However, you will need to see the certificate(s) as evidence of the module(s) being completed.

3.5 Probity

Since SCRIPT was introduced into training in 2010, we have monitored its use by trainees. This has been conducted for quality assurance and to ensure that trainees are using the resource as intended. Importantly, our research has informed how we integrate the learning into postgraduate education[5,6]. At the beginning of each module, trainees are reminded that the GMC Good Clinical Practice states: **"You must always be honest about your experience,qualifications and current role"** [Act with honesty and integrity; paragraph 66][7]. This is because we have found evidence of dishonest behaviours to work around mandated modules in order to progress through the ARCP. These include for example fraudulently creating certificates for modules that have not been completed, completing multiple modules simultaneously by opening a number of tabs on the computer, and rushing through modules in under 10 minutes (the average time to complete a moduleis 30 minutes). These behaviours can now be identified from the management site and can be seen by clinical tutors.

If you suspect a trainee has avoided completing modules mandated in your Deanery, you might like to discuss this with the SCRIPT team. Email us as at info@safeprescriber.org

No trainee data is accessible by or shared with any other SCRIPT clients. Your trainee data is kept on a separate database on a secure external server.

4.0 REGISTRATION

Trainees are provided with registration guidance in their User Guide, as follows:

1. Go to www.safeprescriber.org
2. Register with the **'Foundation'** programme
3. During registration, you will be asked to provide the following information:
   i. Name
   ii. Email address
   iii. Telephone Number
   iv. Profession
   v. Professional Number (i.e. GMC number)
   vi. Start Year (i.e the year you started Foundation training)
   vii. NHS Trust
   viii. Foundation School
   ix. Password
4. When you have entered your details, you will need to agree to the terms and conditions.
5. You will receive an email confirming your registration. When this is complete, you can login and access all the modules.
6. When you have completed a module, a certificate will be made available which you can upload to your ePortfolio.

[5]Brooks, H. L., Pontefract, S. K., Hodson, J., et al. (2016) An evaluation of UK foundation trainee doctors' learning behaviours in a technology-enhanced learning environment. BMC Medical Education, 16: 133.

[6]Brooks, H. L., Pontefract, S. K., Vallance, H. K., et al. (2016) Perceptions and Impact of Mandatory eLearning for Foundation Trainee Doctors: A Qualitative Evaluation. PLoS ONE, 11 (12): e0168558.

[7]General Medical Council (2013). Good Medical Practice. Available online at http://www.gmc-uk.org/guidance/index.asp

5.0 FREQUENTLY ASKED QUESTIONS

5.1 Technical problems: The management site

I cannot access the management site?

On the login page, click to indicate you have forgotten your password. Enter your email address and click submit. You will receive an email that contains a link to change your password.

What does it mean when a trainee's name is highlighted in red?

This means that the trainee has completed the module in under 10 minutes. Each module takes an average of 30 minutes to complete. The only exception to this is 'Rational Drug Choice', which takes around 20 minutes to complete.

5.2 Technical problems: The eLearning programme

Can I have a username and password to see the modules my trainees are completing?

Email us at info@safeprescriber.org or click 'Feedback' on the home-page. The technical team will respond accordingly.

What do I do if I have forgotten my password?

On the login page, click to indicate you have forgotten your password. Enter your email address and click submit. You will receive an email that contains a link to change your password.

What do I do if I have forgotten the email address I registered with?

Email us at info@safeprescriber.org or click 'Feedback' on the home-page. The technical team will respond accordingly.

5.3 Content queries and feedback

Who do I contact if I spot an error on the site?

Email us at info@safeprescriber.org or click 'Feedback' on the home-page. The editorial team will review your query and respond accordingly.

5.4 SCRIPT and the Foundation Programme

What are the requirements for trainee module completion in my region?

Each region decides locally which (if any) modules trainees are required to complete. The requirements for your region are listed in Appendix 2.

Is there a pass mark for the post-test?

Your region decides locally whether a pass mark has been assigned to the modules (Appendix 2).

How long do the modules take to complete?

Each module takes an average of 30 minutes to complete.

What should I do if a trainee has completed some or all of the F1 mandated at undergraduate?

If any of the mandated modules have been completed within 12 months of starting the F1 year, these can be used to fulfil the Foundation requirements. You will need to see the module certificates as evidence.

How does the trainee get the module certificate?

A certificate is generated upon completion of all elements of the module. This includes the pre- and post-test. This certficate will always be available on your profile to download.

What should trainees do with their certificates?

Trainees should save their certificates and upload these to their ePortfolio.

6.0 APPENDICES

APPENDIX 1: Module titles and learning outcomes
APPENDIX 2: Summary of recommendations in your region
APPENDIX 3: Modules for the PSA

APPENDIX 1: Module titles and learning outcomes

Category	The Principles of Prescribing
Module Title	**Learning Outcomes**
Prescription Documentation	At the end of this module, and with reference to 'The Ten Principles of Good Prescribing' (accessible via the British Pharmacological Society website: www.bps.ac.uk), you should be able to: • Describe the legal aspects of prescribing, including the prescribing of drugs subject to control under the Misuse of Drugs Act 1971. • List the different types of prescription documentation available in both primary and secondary care. • Explain unlicensed and off-label prescribing and the role of any applicable good practice guidelines. • Describe the standards expected of both hand-written and computer-generated prescriptions. • Discuss the importance of prescribing within the limits, knowledge, skills and experience of the prescriber.
Prescribing and Therapeutics in Foundation Training	By the end of the session, you should have an understanding of: • Discuss the Foundation Programme Curriculum outcomes (i.e. 'foundation professional capabilities') and descriptors relating to safe prescribing. • Describe the key aspects of the General Medical Council's (GMC) guidance on 'Good practice in prescribing and managing medicines and devices'. • List the restrictions relating to the prescribing of medicines at Foundation level.
Fundamentals of Pharmacology	At the end of this module, you should be able to: • Define the following terms: agonist, antagonist, partial agonist, and allosteric modulator. • Define, and explain the differences between affinity, efficacy and potency. • Be able to understand and use graphical methods to relate dose and response. • Define up-regulation and down-regulation of receptors and using examples, explain how this can affect the response to drugs or alter physiological behaviour. • Define, using key examples, how drugs can act on different types of chemically sensitive sites, including: G-protein coupled receptors, ion channels, nuclear receptors, carrier molecules, and enzymes.
Taking a Safe and Effective Drug History	At the end of this module, you should be able to: • Describe the information needed to complete a safe and effective drug history. • Describe the different information sources available when obtaining or confirming a drug history, and their limitations. • Be able to overcome difficulties in eliciting a drug history. • Identify non-adherence and the impact this can have on the drug treatments prescribed. • Understand what is meant by Medicines Reconciliation, and their role and responsibility in this process. • Understand the importance of effective communication at the transfer of patient care.
Adherence and Concordance	At the end of this module, you should be able to: • Understand medicines adherence and discuss the importance of informed choice and shared decision-making in optimising the safe and effective use of medicines. • Define adherence and how this differs to compliance in relation to drug treatment. • Discuss the influences that affect patient adherence to medicines. • Describe interventions to actively support adherence to medicines and treatment regimens. • Discuss the implications of non-adherence to both the patient and the National Health Service (NHS).

Category	The Principles of Prescribing
Module Title	**Learning Outcomes**
Clinical Kinetics	At the end of this module, you should be able to: ▪ Know the different routes of drug administration. ▪ Know how a change in route can influence pharmacokinetic parameters. ▪ Define 'bioavailability', 'volume of distribution', 'half-life', and 'clearance', and the factors that can affect these. ▪ Using graphical representation, discuss simple models of pharmacokinetics. ▪ Discuss the main processes of drug metabolism in the body and the factors affecting it. ▪ Relate the pharmacokinetics of a drug to the adjustments in dose, frequency and choice of formulation.
Dosing and Calculation	At the end of this module, you should be able to: ▪ Describe the different dose units and their equivalencies (e.g. milligrams and grams). ▪ Demonstrate the different ways a dose may need to be calculated, including those based on Actual Body Weight (ABW), Ideal Body Weight (IBW) and Body Surface Area (BSA). ▪ Understand the dose adjustments that may be required in hepatic or renal dysfunction. ▪ Calculate complex dose regimens and intravenous infusions. ▪ Understand the importance of a second-check when undertaking dose calculations. ▪ Apply simple mathematics to day to day prescribing scenarios.
Formulation and Administration	At the end of this module, you should be able to: ▪ Describe how different formulations of a drug can differ in their pharmacokinetic properties and how this can affect dosing. ▪ Understand which route or formulation should be prescribed to achieve an optimum therapeutic response and avoid harm. ▪ Describe how formulation change can help patients take their medicines and appreciate the value of sharing decisions with the patient when choosing suitable formulations. ▪ Understand how the timing of administration can be crucial for therapeutic response and safety. ▪ Describe the factors that should be considered when prescribing and administering unlicensed medicines. ▪ Describe the relevance of consent in relation to drug administration.
Prescribing in Infection	At the end of this module, you should be able to: ▪ Describe the different classes of antibacterials available and their site of action on a microorganism. ▪ Describe how bacteria can be resistant to antibacterials. ▪ Explain why certain antimicrobials might be restricted in a Trust, and how access to them could be obtained. ▪ Know where to look for guidelines on treating infections and why adherence is important.
Utilising the BNF(C)	At the end of this module, you should be able to: ▪ Describe the basic layout and structure of the BNF and BNFC. ▪ Navigate the smartphone mobile app, online and printed book versions. ▪ Describe the information contained within the *General Guidance* section. ▪ Find and accurately interpret the dose, route, frequency and indication for a given medicine. ▪ Find information on the licensed status of a medicine. ▪ Find information about the different formulations available for a medicine, and identify excipients contained within these. ▪ Find instructions on the administration of medicines given via intravenous infusions. ▪ Describe the information available in the appendices and indices of the BNF and BNFC.

Category	Prescribing in Medical Emergencies
Module Title	**Learning Outcomes**
Drug Allergy and Anaphylaxis	At the end of this module, you should be able to: • Take an accurate history of any previous reactions to drugs, medicinal and related products and non-drug allergies. • Examine a drug chart, and decide which drugs might pose a risk to the patient in light of known allergies. • Recognise the signs and symptoms of allergic reactions to drugs. • Distinguish allergic reactions from other adverse drug reactions. • Manage acute allergic reactions to drugs. • Arrange appropriate follow up in cases of suspected drug reactions.
Poisoning	At the end of this module, you should be able to: • Describe the risks associated with taking specific drugs in overdose. • Manage a patient presenting with poisoning. • Describe the role of the National Poisons Information Service (NPIS). • Describe the information available on TOXBASE and how to access this.
Cardiac Arrest	At the end of this module, you should be able to: • Explain the steps involved in the management of an adult in cardiac arrest. • Recall the reversible causes of cardiac arrest. • Describe the modifications to practice when resuscitating a pregnant woman. • Manage the care of patients post-resuscitation.
Fluids	At the end of this module, you should be able to: • Describe the signs and symptoms of hypovolaemia and hypervolaemia. • Calculate fluid loss, gains and requirements. • Calculate electrolyte requirements. • Explain the difference between crystalloid and colloid fluid replacement therapy and when each might be appropriate for use. • Monitor fluid replacement therapy effectively to avoid adverse effects and achieve optimal response.
Diabetic Emergencies	At the end of this module, you should be able to: • Manage hypoglycaemia in a conscious, semi- or unconscious patient. • Take appropriate samples for unexplained episodes of hypoglycaemia. • Describe the characteristic features of Diabetic Ketoacidosis (DKA). • Initiate appropriate fluid replacement and a fixed rate intravenous insulin infusion for a patient with DKA. • Effectively monitor a patient with DKA and know when to request senior review. • Identify and treat any precipitating factors for an episode of DKA. • Distinguish between DKA and Hyperosmolar Hyperglycaemic State (HHS). • Describe the characteristic features of HHS. • Describe the principles of treatment of HHS and initiate immediate management.
Sepsis	At the end of this module, you should be able to: • By the end of the module, the trainee should have an understanding of Discuss the spectrum of infection and continuum of sepsis. • Know where to find and how to use tools to help you to recognise the acutely ill patient with sepsis. • List situations where patients may not manifest the traditional signs and symptoms of sepsis. • Discuss the factors to consider when prescribing for the septic patient. • List the six elements of the Sepsis Six® Care bundle and the time frame in which these should be administered. • Discuss good antimicrobial stewardship relating to the management of sepsis. • Discuss the ongoing management of the patient with sepsis, including the importance of source control.

Category	Managing the Risks of Prescribing
Module Title	**Learning Outcomes**
Adverse Drug Reactions	At the end of this module, you should be able to: • Define an ADR and the classification of ADRs. • Identify susceptibility factors that place patients at increased risk of ADRs. • Discuss the concepts of pharmacovigilance and its importance for public health. • Explain the role and function of the Yellow Card scheme. • Identify sources of information on ADRs.
Medication Errors	At the end of this module, you should be able to: • Define medication errors, including subtypes. • Identify individual and systems factors leading to error. • Describe how medication errors are reported. • Describe the role and impact of electronic prescribing.
Monitoring Drug Therapy	At the end of this module, you should be able to: • Understand why it is important to monitor drug therapy. • Identify the commonly prescribed drug therapies that require monitoring before, during and after treatment. • Understand the strategies for monitoring drug therapy, and the criteria that will determine whether such a strategies will be clinically accepted. • Identify common drugs that require Therapeutic Drug Monitoring (TDM) during treatment to avoid sub-therapeutic plasma concentrations and toxicity.
Drug Interactions	At the end of this module, you should be able to: • Demonstrate knowledge of potential drug-drug interactions (DDIs) mechanisms (pharmacodynamic and pharmacokinetic). • List patient factors that may intensify drug-drug interactions, related to age, gender, metabolising enzyme profile (sometimes related to ethnicity), disease, diet, smoking and illicit drug use. • Describe some of the common drug interactions seen in clinical practice and strategies for minimising their occurrence. • Know where to find information on potential drug interactions. • Highlight the importance of identifying and reporting 'suspected' drug interactions and Adverse Drug Reactions (ADRs) to the Medicines and Healthcare Products Regulatory Agency (MHRA).
Toxic Tablets	At the end of this module, you should be able to: • Describe the risks of drugs and how harm from the most dangerous drugs can be minimised. • Discuss the general methods used to limit harm from drugs. • Describe how the prescribing of dangerous drugs requires a concordant approach to therapy to avoid serious harm and adverse drug reactions. • Describe the role of policy and protocol in preventing serious untoward medication errors. • Understand the importance of monitoring drug therapy.
Parenteral Poisons	At the end of this module, you should be able to: • Describe the risks of drugs and how harm from the most dangerous drugs can be minimised. • Discuss the general methods used to limit harm from drugs. • Describe how the prescribing of dangerous drugs requires a concordant approach to therapy to avoid serious harm and adverse drug reactions. • Describe the role of policy and protocol in preventing serious untoward medication errors. • Discuss the importance of monitoring drug therapy.

Category	Prescribing in Special Circumstances
Module Title	**Learning Outcomes**
Perioperative Prescribing	At the end of this module, you should be able to: • Describe the elements of the drug history that are important for preoperative patients. • Examine a preoperative drug history, and decide which drugs to continue and/or omit. • Define the drug classes where alternative treatments are required perioperatively. • Explain the potential for adverse drug reactions (ADRs) and adverse drug-drug interactions in the perioperative period. • Describe the actions to be taken when a surgical patient is discharged with regards to prior chronic therapy and new take home medicines.
Prescribing in Hepatic Dysfunction	At the end of this module, you should be able to: • Describe the principles of safe prescribing in patients with hepatic dysfunction. • Explain the effect of disease in hepatic dysfunction when prescribing. • Discuss the important adverse effects of commonly prescribed drugs on the liver. • Describe the metabolism of drugs by the liver. • Describe the effect of some drugs on liver metabolism. • Rationalise drug treatments in hepatic dysfunction, and make dose adjustments where necessary. • Know where to access up-to-date and reliable information on the prescribing of drugs in hepatic dysfunction.
Prescribing in Renal Dysfunction	At the end of this module, you should be able to: • Show how impaired renal function alters the pharmacokinetics of drugs. • Know how to assess renal function and the limitations of the available methods. • Know which drugs and agents can be nephrotoxic and how these can cause AKI. • Identify common drugs that need dose adjustment in kidney disease. • Demonstrate effective management of (a) intravenous fluid therapy (b) hyperkalaemia (c) antihypertensive therapy and (d) diuretics in kidney disease. • Know where to find information to guide prescribing in kidney disease.
Prescribing in Older Adults	At the end of this module, you should be able to: • Explain the processes of absorption, distribution, metabolism and excretion of drugs in the older patient. • Describe how age-related physiological and pathological processes affect how the body reacts to drugs. • Describe how physical, cognitive and social aspects may affect an older patient's ability to adhere to treatment. • List the factors that make older adults more at risk of developing adverse drug reactions (ADRs). • Develop strategies to reduce problems with medication in the older population.

Category	Prescribing in Special Circumstances
Module Title	**Learning Outcomes**
Prescribing in Pregnancy	At the end of this module, you should be able to: • Explain how the physiological changes during pregnancy can alter the pharmacokinetics of a drug, and therefore require dose adjustment. • Discuss the risks/benefits of prescribing in pregnancy and how this risk changes depending on the trimester. • Describe how to minimise the risk of harm to the fetus when prescribing in pregnancy. • Describe the key drugs (or drug groups) to avoid during pregnancy and why. • Describe how to minimise risks in women of child bearing potential. • Provide examples of drugs where concurrent contraceptive use is essential and why. • Identify the main sources of information to guide prescribing in pregnant women or women of child bearing potential.
Prescribing in Breastfeeding	At the end of this module, you should be able to: • Discuss the risks and benefits of prescribing in patients who are breastfeeding. Considering the gestational age of the infant and both infant and mother's comorbidities. • Describe the ways in which exposure to drug therapy via breast milk may be minimised. • List some drugs known to suppress lactation and describe how they may be used therapeutically. • Identify the sources of advice available to guide decision-making when prescribing for this group of patients.
Paediatric Prescribing	At the end of this module, you should be able to: • Explain how children and neonates handle drugs differently from adults and how this influences prescribing. • Calculate maintenance and rehydration fluid requirements for children of all weights and ages. • Prescribe safely for children, avoiding medication errors, communicating effectively and encouraging good adherence. • List some common medicines for children that are prescribed off-label or are unlicensed, and understand the legal position of this practice. • Be familiar with common prescribing scenarios in paediatrics, including pain relief.
Dementia Friendly Prescribing	At the end of this module, you should be able to: • Describe the common presentations and causes of dementia. • Describe how to assess a patient for suspected dementia, and know which investigations are relevant. • Identify which patients require referral to specialist services, and what these services will offer. • Describe rational treatment choices to slow the progression of dementia, including NICE guidance on when these treatments should be prescribed. • Choose suitable treatments for the behavioural and psychological symptoms of dementia (BPSD), including assessing the risk of the harm and benefit of antipsychotic use.

Category	Therapeutic Groups
Module Title	**Learning Outcomes**
Respiratory Medicine	At the end of this module, you should be able to: • Prescribe oxygen safely in both the acute and long-term settings. • Counsel patients about the options available for smoking cessation and prescribe appropriate nicotine replacement therapy. • Know the different devices available for delivering inhaled therapy, and be able to choose the most suitable device for the patient. • Manage both acute and chronic COPD and asthma. • Choose appropriate management strategies for patients with common respiratory infections.
Diabetes	At the end of this module, you should be able to: • Describe the onset and duration of action of different insulins available in the UK. • Discuss when a Variable Rate Intravenous Insulin Infusion (VRIII) is indicated. • Know how to set up a VRIII insulin regimen. • Know how to make the safe transition from intravenous insulin, to regular diabetes treatment. • Know the importance of self-management, and the points to consider when educating a patient on their treatment. • Know when to refer a patient to the specialist diabetes team.
Psychiatric Symptom Management in General Hospital Settings	At the end of this module, you should be able to: • Assess and treat depression in a person suffering from a chronic physical illness. • Understand the place in therapy, major adverse effects and interactions of key antidepressants. • Know what the available options are for the treatment of anxiety. • Know what the most effective interventions are for insomnia. • Describe the aims of Rapid Tranquilisation (RT) together with the various treatment options available. • Explain the risks of abrupt antidepressant withdrawal and benzodiazepine dependence. • Emphasise the importance of good adherence in preventing relapse, together with the need for physical health monitoring where appropriate in severe mental illness.
Anticoagulation	At the end of this module, you should be able to: • Discuss the indications, cautions, duration and monitoring requirements for anticoagulation therapy. • Provide practical guidance on achieving and maintaining a target INR and managing patients with INRs above the recommended therapeutic range. • Appreciate the need to balance benefit with the risk of harm when prescribing anticoagulant therapy. • Understand the need to consider lifestyle changes, drug-drug interactions and drug-food interactions when making dosing decisions. • Understand the role of the anticoagulant clinic and the importance of communication at the transfer of care.

Category	Therapeutic Groups
Module Title	**Learning Outcomes**
Infection in Secondary Care	At the end of this module, you should be able to: • Select the most appropriate drug, dose, route and duration of treatment for commonly encountered infections in secondary care. • Describe which antibacterials are contraindicated in patients who are pregnant or breastfeeding, or who have hepatic or renal dysfunction. • Recall the common drug-drug interactions encountered when prescribing in infection. • Explain how and why to monitor and review treatment. • Describe where to look for information regarding the safe and effective management of infection, both locally and nationally.
Management of Pain	At the end of this module, you should be able to: • Describe how the WHO Pain ladder assists in rational prescribing of analgesic therapy for both acute and chronic pain. • Understand the risks associated with paracetamol and NSAIDs, and how these may be minimised. • Identify weak opioid analgesics and when they are appropriate for use. • Identify strong opioid analgesics, and how to minimise the risks when switching between different opioid analgesics and titrating doses to meet individual patient requirements. • Describe the indications and cautions of Patient Controlled Analgesia (PCA). • Recall the stepwise management of neuropathic pain, and understand when a referral to the specialist Pain team is necessary. • Describe the use of local anaesthetics in secondary care setting, and how to recognise and manage toxicity. • Identify patients with complex analgesic requirements where input may be required from specialist teams.
Heart Failure	At the end of this module, you should be able to: • With reference to national and international guidelines, discuss the pharmacological management of heart failure. • Discuss how drug treatment regimens are monitored to avoid harm and optimise therapeutic effect. • Describe the cautions and contraindications of treatment regimens in patients with comorbidities. • Discuss the risks of fluid replacement therapy in this patient group.
Cardiac Dysrhythmias	At the end of this module, you should be able to: • Describe the common arrhythmias that are likely to present to secondary care. • Recall cardiovascular physiology relevant to arrhythmia management. • Recall the evidence-base for the management of common arrhythmias, and where best to find this evidence. • Describe the pharmacological agents used in the management of different arrhythmias and know their cautions and contraindications for use. • Describe how to reduce the risk of thromboembolic events in patients with AF and the importance of balancing this with the risk of bleeding.

Category	Therapeutic Groups
Module Title	**Learning Outcomes**
Epilepsy	At the end of this module, you should be able to: • Discuss the aims and objectives of drug treatment in the long-term management of epilepsy. • Discuss the factors governing the choice of AED treatment including the adverse effects associated with them. • Discuss the management options of epilepsy in women of child-bearing potential and during pregnancy. • Describe some of the common drug-drug interactions associated with AEDs. • Discuss the role of therapeutic drug monitoring (TDM) for AEDs. • Describe the pharmacological management of status epilepticus in secondary care, and the monitoring requirements following the administration of drug treatment.
Drugs of Misuse	By the end of the session, you should be able to: • List both the psychological and physical signs and symptoms of dependence and withdrawal. • Describe the pharmacological mechanisms of dependence and withdrawal. • List common legal and illegal substances of abuse. • Discuss the impact of drug abuse on mental and physical health. • Discuss pharmacological interventions for the management of substance misuse. • Discuss non-pharmacological interventions for the management of substance misuse. • Refer the patient for appropriate support and follow-up.
Rheumatology	By the end of the session, you should be able to: • Understand how disease activity is measured and used to guide therapy. • List the commonly prescribed non-biologic and biologic disease modifying drugs and explain how these are monitored for both their beneficial and adverse effects. • Discuss the cautions and contraindications to treatments, including use during pregnancy and breastfeeding. • List the adverse effects of disease modifying drugs and be able to evaluate symptoms in a patient on unfamiliar drug treatments to determine potential problems. • Describe the principles of safe vaccination practice in patients on disease modifying drugs. • Describe important errors that can arise from methotrexate prescribing. • List the important extra-articular manifestations of rheumatoid arthritis and common clinical and radiological signs that suggest an extra-articular manifestation. • Discuss the purpose of effective shared care agreements and the requirements of practitioner should responsibility be shared.
Parkinsons Disease	By the end of the session, the should be able to: • Discuss the aims and objectives of drug treatment in the long-term management of idiopathic Parkinson's disease (Parkinsonism's will not be covered in this module). • Discuss the factors governing the choice of treatment, including the adverse effects associated with them. • Describe some of the common drug interactions. • Describe the pharmacological management of PD in the perioperative period in secondary care, or for a patient with a compromised swallow.

Category	Clinical Governance
Module Title	**Learning Outcomes**
Rational Drug Choice	At the end of this module, you should be able to: • Describe the need for evidence-based practice (EBP). • Explain how EBP can improve patient safety and outcomes. • Describe the principles of evidence-based medicine and levels of evidence. • Explain the difference between Relative Risk Reduction (RRR) and Absolute Risk Reduction (ARR). • Define and be able to calculate the Number Needed to Treat (NNT). • Determine if a trial is statistically significant, using P-values and confidence intervals. • Describe the principles of critical appraisal, and the tools required to review industry advertising critically. • Seek appropriate evidence and interpret it effectively to aid prescribing decisions. • Describe how evidence-based medicine is crucial in the development of healthcare policies, protocols and Trust formularies. • Describe the role of clinical audit and the stages involved.
Root Cause Analysis	At the end of this module, you should be able to: • Discuss the importance of 'being open' when a patient safety incident occurs. • Discuss the tools used in the Root Cause Analysis (RCA) of incidents. • Explain how the tools for RCA help identify ways of improving patient safety.
Ethics and Consent	At the end of this module, you should be able to: • Discuss the principles and processes of gaining consent for adult patients. • Describe the process of assessing capacity and how it is affected by the Mental Capacity Act 2005. • Explain how the principles of consent may differ depending on the circumstances. • Discuss the GMC guidance on ethical issues and consent.

Category	Advanced Prescribing
Module Title	**Learning Outcomes**
Prescribing at the Interface and Team Prescribing	At the end of this module, you should be able to: • Explain the aims and objectives of Effective Shared Care Agreements and when and why they may be necessary. • Describe the role of the Independent Prescriber (IP) and how their role relates to that of a medical practitioner. • Describe the role of the Supplementary Prescriber (SP) and how their role relates to that of a medical practitioner. • Describe the function of Patient Group Directions (PGDs).
Managing Complications of Anticancer Therapies	At the end of this module, you should be able to: • Describe the differences between the main groups of Systemic Anticancer Therapies (SACT). • Explain the aims of SACT - maintaining the balance between maximised effect and minimised risk. • Identify and formulate initial treatment plans for common oncological emergencies. • Identify adverse effects of SACT and formulate simple treatment plans to deal with these complications. • Know that only those practitioners who are identified on the local intrathecal register may be involved in any process surrounding the prescribing, supply and administration of intrathecal chemotherapy.
Palliative and End-of-Life Care	At the end of this module, you should be able to: • Describe the principles of palliative care. • Discuss the importance of shared decision-making in providing palliative care to patients, taking into account the priorities of the individual and their close family. • Describe the principles of pain management in palliative care, including breakthrough pain. • Commence morphine for a patient in chronic pain and how to alter the dose safely. • Appreciate how a change in the route of administration can affect dose, and identify when dose conversion is necessary. • Understand when to give a drug by continuous subcutaneous infusion using a syringe driver. • Explain which drugs can be given by subcutaneous infusion using a syringe driver, and where to find information about compatibilities. • Describe the pharmacological options available to provide comfort and well-being for the symptomatic relief of nausea and vomiting, terminal restlessness and agitation, respiratory secretions, and breathlessness.

APPENDIX 2: Pre/post-test scores and mandatory modules in London

Appendix 2.1: Pre/post-test score

The London Deanery have not set a pass mark for the modules and the post-test score is not generated onto the module certificate.

Appendix 2.2: Mandatory modules

The London Deanery have not mandated any SCRIPT modules.

APPENDIX 3: Modules for the PSA

PSA Prescribing Area / Topics included	SCRIPT Module
Prescribing	
Drug history	Taking a Safe and Effective Drug History
Fluid management	Fluids
Prescription Documentation	Prescription Documentation
Rational Drug Choice	Rational Drug Choice
Utilising information to inform prescribing	Utilising the BNF / BNFc
Prescription Review	
Adherence	Adherence and Concordance
Adverse Drug Reactions	Adverse Drug Reactions
Dosing	Dosing and Calculation
Drug history	Taking a Safe and Effective Drug History
Hepatic Impairment	Prescribing in Hepatic Dysfunction
Interactions	Drug Interactions
Medication Errors	Medication Errors
Polypharmacy	Prescribing in Older Adults
Rational Drug Choice	Rational Drug Choice
Renal impairment	Prescribing in Renal Dysfunction
Utilising information to inform prescribing	Utilising the BNF / BNFc
Planning Management	
Adherence	Adherence and Concordance
Drug history	Taking a Safe and Effective Drug History
Rational Drug Choice	Rational Drug Choice
Providing Information	
Adherence	Adherence and Concordance
Adverse Drug Reactions	Adverse Drug Reactions
Dosing	Dosing and Calculation
Formulation and Administration	Formulation and Administration
Interactions	Drug Interactions
Calculation Skills	
Administration	Formulation and Administration
Calculations	Dosing and Calculation
Adverse Drug Reactions	
Adverse Drug Reactions	Adverse Drug Reactions
Anaphylaxis	Drug Allergy and Anaphylaxis
Interaction	Drug Interactions
Management of ADRs	Parenteral Poisons
Management of ADRs	Toxic Tablets
Utilising information to inform prescribing	Utilising the BNF / BNFc
Drug Monitoring	
Adverse Drug Reactions	Adverse Drug Reactions
Rational Drug Choice	Rational Drug Choice
Therapeutic Drug Monitoring	Monitoring Drug Therapy
Utilising information to inform prescribing	Utilising the BNF / BNFc
Data Interpretation	
Hepatic Impairment	Adverse Drug Reactions
Rational Drug Choice	Rational Drug Choice
Renal Impairment	Prescribing in Renal Dysfunction
Therapeutic Drug Monitoring	Monitoring Drug Therapy
Utilising information to inform prescribing	Utilising the BNF / BNFc