

Script

Ambulance Service

An eLearning programme to improve
prescribing competency

A Guide for Paramedics, Paramedic
Technicians and Paramedics in Training



Health Education England

Version 2: October 2020

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1.0 BACKGROUND

There are an estimated 237 million medication errors occurring in England every year¹. 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"*². 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 the estimated cost of 'probably avoidable' ADRs is £1.6 billion per annum¹.

In 2010, Health Education West Midlands (then the Strategic Health Authority) commissioned the development of an online eLearning programme to improve the prescribing competency of Foundation 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 together with eLearning experts from OCB Media Ltd. The **'Medicine and Surgery'** version of the programme was fully integrated into the West Midlands Foundation doctor curriculum in 2012, and since August 2017 has been available to every Foundation trainee doctor in England, Wales and Northern Ireland. It has also been implemented as a remedial resource for junior doctors who have failed the national Prescribing Safety Assessment (PSA)³. In addition, several medical schools have acquired the programme to support their undergraduate teaching relating to prescribing and therapeutics, and to provide a resource that can aid preparation for the national PSA.

Following the success of SCRIPT for Foundation trainee doctors, versions have been commissioned for other healthcare professionals. Modules are now available to Dentists (8 modules), Paediatric Specialist Trainees (24 modules), Qualified Nurses (18 modules relating to medicines management and optimisation) and Primary Care staff (24 modules when portfolio complete). Since March 2020 (during COVID-19) all SCRIPT modules (excluding Dental modules) have been freely available to anyone with an NHS email address.

SCRIPT has been identified as a valuable educational resource for paramedics, particularly those training to be non-medical prescribers (NMPs). The resource can help to support your preparation to become a safe, effective and rational prescriber. The modules available within Ambulance Service SCRIPT are an amalgamation of the modules available in our **'Medicine and Surgery'**, **'General Practice'** and **'Nursing'** versions. Although the cases within modules may be based in settings different from your area of practice, the principles discussed are relevant to prescribers working in any healthcare setting (e.g. primary or secondary care).

¹Elliott RA, Camacho E, Campbell F, et al. Prevalence and Economic Burden of Medication Errors in the NHS in England. Policy Research Unit in Economic Evaluation of Health and Care Interventions. Sheffield, United Kingdom: University of Sheffield and University of York; 2018.

²Ferner RE, Aronson JK. Clarification of Terminology in Medication Errors: Definitions and Classification. Drug Safety. 2006;29(11):1011-22.

³Reygate, K., Prescribing Safety Assessment Guide for Foundation Doctors. 2016, Health Education England.

2.0 THE RESOURCE

The programme comprises 58 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 58 modules are divided into eleven categories:

- Principles of Prescribing
- Prescribing in Medical Emergencies (Secondary Care Focus)
- Managing the Risks of Prescribing (Secondary Care Focus)
- Prescribing in Special Circumstances (Secondary Care Focus)
- Therapeutic Groups (Secondary Care Focus)
- Clinical Governance
- Advanced Prescribing (Secondary Care Focus)
- Prescribing in Medical Emergencies (Primary Care Focus)
- Therapeutic Groups (Primary Care Focus)
- Prescribing in Special Circumstances (Primary Care Focus)
- Principles of Medicines Management

2.1 Structure of the modules

Each module has the same core components, commencing with a *pre-test* of 10 questions designed to allow you to determine your baseline knowledge on the subject area. You 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 *Module Overview*, recommendations for any reading that may facilitate progress through the module ('Pre-requisites') and *Learning Outcomes*.

In most modules, a 'Case Vignette' introduces some key concepts covered in the module content. In-module activities are included throughout the modules to discuss patient scenarios and embed learning. Note that some of the key learning points may be provided within the feedback to these cases.

At the end of the module, you will undertake 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 you 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:

- Your name
- The module title
- The learning outcomes of the module
- The date and time the certificate was generated

2.3 The pre/post-test score

The pre/post-tests are intended to help you determine your baseline knowledge on the module subject and be a measure of knowledge acquisition. They also add an element of interactivity.

The questions have not been reviewed by an examination board. As such, the SCRIPT team has not set a pass mark and the post-test score is not generated onto your module certificate. However, decisions may have been made locally about applying a pass mark for the modules. If applicable, this information will be communicated to you locally.

Some NHS Trusts, institutions, practices or regional ambulance NHS Trusts may choose to mandate specific SCRIPT modules. If this is the case, your progress through the modules may be monitored by named individuals in your organisation, and consistent low scores throughout may call for modules to be re-set and for the test to be re-taken.

3.0 RESOURCE IN PRACTICE

3.1 Mandatory modules

Some NHS Trusts, institutions, practices or regional ambulance NHS Trusts may choose to mandate specific SCRIPT modules. This information will be communicated to you from local leads. Should modules be mandated, the certificates provided at the end of the module can serve as evidence of module completion.

3.2 How is my progress monitored?

SCRIPT eLearning has a dedicated management site that may be accessed by named individuals in your organisation to monitor user progress. This serves two purposes:

1. Ensures that you are taking steps to develop your prescribing knowledge
2. Encourages discussion about prescribing in workplace education

The named individuals will be able to see the following information about your progress:

- When you have completed the modules (day of week and time of day)
- How long you spent on the learning
- Your pre- and post-test scores

Information from the management site may be used in addition to module certificates to confirm that the learning has been completed in full.

3.3 Re-taking the pre/post-test

Named individuals monitoring your progress through the learning can re-set the module and request that you re-take the test. This is a local decision and one that should be taken in discussion with you. In addition, you can also re-set the module yourself.

3.4 Probity

Probity is at the heart of any healthcare profession. Probity means being honest and trustworthy and acting with integrity.

Since the launch of SCRIPT, we have monitored its use by healthcare professionals. This has been conducted for quality assurance and to ensure that users are interacting with the resource as intended. Importantly, our research has informed how we integrate the learning into postgraduate education^{4,5}.

At the beginning of each module, you are reminded about probity. This is because we have found evidence of dishonest behaviours to 'work around' modules. This includes fraudulently creating certificates for modules that have not been completed and completing multiple modules simultaneously by opening a number of tabs on the browser. These behaviours can now be identified from the management site, as can modules that are completed in under 10 minutes (the average time to complete a module is 30-40 minutes).

⁴Brooks, 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.

⁵Brooks, 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.

4.0 REGISTRATION

To register with the '**Ambulance Service**' version of the programme:

1. Go to www.safeprescriber.org, and select '**Ambulance Service**'.
2. Click '**Sign up**'
3. During registration, you will be asked to provide the following information:
 - i. Name
 - ii. Email address
 - iii. Telephone Number
 - iv. Profession
 - v. Region
 - vi. 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.

Your registration information is not shared with a third party and is maintained on a secure server.

5.0 FREQUENTLY ASKED QUESTIONS

5.1 Technical problems

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' in the bottom right hand corner of the homepage. The technical team will respond accordingly.

5.2 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' in the bottom right hand corner of the homepage. The editorial team will review your query and respond accordingly.

5.3 SCRIPT Requirements

What are the requirements for module completion?

Each organisation or region decides locally which (if any) modules you are required to complete. This information will be communicated to you locally.

How do I know which modules are mandated?

Each organisation or region decides locally which (if any) modules you are required to complete. This information will be communicated to you locally.

How long do the modules take to complete?

Each module takes an average of 30-40 minutes to complete.

Is there a pass mark for the post-test?

The SCRIPT team does not set a pass mark. However, your organisation or region may have assigned a pass mark to the modules. This information will be communicated to you locally.

How do I get the module certificate?

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

6.0 APPENDICES

APPENDIX 1: Module titles and learning outcomes

Appendix 1 SCRIPT Ambulance Service: Module titles and learning outcomes

Category	The Principles of Prescribing
Module Title	Learning Outcomes
Prescription Documentation	<p>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:</p> <ul style="list-style-type: none"> • 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 in Infection	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> ▪ 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.
Fundamentals of Pharmacology	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> ▪ 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> ▪ 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> ▪ 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.
Utilising the BNF(C)	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> ▪ 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 <i>General Guidance</i> 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 (Secondary Care Focus)
Module Title	Learning Outcomes
Drug Allergy and Anaphylaxis	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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.

Category	Prescribing in Medical Emergencies (Secondary Care Focus)
Module Title	Learning Outcomes
Sepsis	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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.
COVID-19	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Define the Public Health England criteria for a possible inpatient case of COVID-19. • Discuss the symptoms of mild, moderate and severe disease. • Describe the patients who are at high-risk of moderate to severe infection. • Discuss the scores that can be used to inform ceiling of treatment decisions. • List the Personal Protective Equipment that must be worn for all patient contact in those with suspected or confirmed COVID-19, and describe in what order these should be donned and doffed. • List aerosol generating procedures, and discuss this in the context of administering cardiopulmonary resuscitation in a patient with suspected or confirmed COVID-19.

Category	Managing the Risks of Prescribing (Secondary Care Focus)
Module Title	Learning Outcomes
Adverse Drug Reactions	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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 (Secondary Care Focus)
Module Title	Learning Outcomes
Perioperative Prescribing	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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 (Secondary Care Focus)
Module Title	Learning Outcomes
Prescribing in Pregnancy	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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 (Secondary Care Focus)
Module Title	Learning Outcomes
Respiratory Medicine	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> •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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> •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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> •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 (1)	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Describe the basic pharmacology of Vitamin K Antagonists (VKAs). • Discuss the indications for treatment, the recommended dosing regimens and duration of treatment. • List the cautions and contraindications of treatment. • Discuss the importance of balancing the risk of harm with the benefits of treatment. • Discuss the potential complications of therapy. • Describe the monitoring requirements. • List the common drug-drug and drug-food interactions. • Counsel patients prescribed a VKA in order to support adherence and minimise the risk of harm. • Describe role of the anticoagulant clinic and the importance of communication at transitions of care.
Anticoagulation (2)	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Describe the basic pharmacology of Direct Oral Anticoagulants (DOACs), unfractionated heparin and Low Molecular Weight Heparins (LMWHs). • Discuss the indications for treatment, the recommended dosing regimens and duration of treatment for each. • List the cautions and contraindications of therapy. • Discuss the potential complications of therapy. • Describe the monitoring requirements. • List some common drug-drug interactions. • Counsel patients prescribed a DOAC or a LMWH in order to support adherence and minimise the risk of harm.

Category	Therapeutic Groups (Secondary Care Focus)
Module Title	Learning Outcomes
Infection in Secondary Care	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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 Arrhythmias	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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 (Secondary Care Focus)
Module Title	Learning Outcomes
Epilepsy	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>By the end of the session, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>By the end of the session, you should be able to:</p> <ul style="list-style-type: none"> • 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.

Category	Clinical Governance
Module Title	Learning Outcomes
Rational Drug Choice	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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.

Category	Advanced Prescribing (Secondary Care Focus)
Module Title	Learning Outcomes
Prescribing at the Interface and Team Prescribing	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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.

Category	Therapeutic Groups (Primary Care Focus)
Module Title	Learning Outcomes
Rheumatology	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • 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. • Distinguish between different clinical scenarios to choose an appropriate corticosteroid dose. • 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 the practitioners should responsibility be shared. • Counsel a patient on the key issues relating to the diagnosis, management and monitoring of treatment.
Paediatric Dermatology	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Initiate therapy for the management of atopic eczema and step treatment up and down according to response and as recommended by NICE guidance. • Select and prescribe appropriate topical treatments for psoriasis. • List the systemic treatments available for psoriasis and explain their use to patients and their families. • Select and prescribe topical therapy and antibacterials for acne vulgaris, and list the indications for isotretinoin use. • Differentiate between common skin infections and select appropriate treatment. • Recognise when disease severity may warrant referral for systemic therapy (e.g. with immunosuppressants). • Recognise which haemangiomas need referral for treatment, and the therapeutic options available. • Treat and manage common causes of hair loss. • Describe the management of skin erythemas in the newborn. • Recognise drug reactions and discuss the early management of the most severe, including Stevens-Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN) and DRESS syndrome (Drug Reaction with Eosinophilia and Systemic Symptoms).

Category	Prescribing in Special Circumstances (Primary Care Focus)
Module Title	LearningOutcomes
Dementia Friendly Prescribing	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Describe the common presentations and causes of dementia. • Describe how to assess a patient for suspected dementia, including 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 National Institute for Health and Care Excellence (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 harm and likelihood of benefit from antipsychotic agents.
Pregnancy and Breastfeeding	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Explain how the physiological changes during pregnancy can alter the pharmacokinetics of a drug, and the need for adjustment of dose regimens as a result. • Discuss the risks and benefits of prescribing in pregnancy and how this risk changes depending on the trimester. • Describe how to minimise the risk of harm to the foetus when prescribing in pregnancy. • Describe the key drugs (or drug groups) that should be avoided during pregnancy and why. • Describe how to minimise risk of complications 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. • Describe both 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 how foetal exposure to drug therapy via breast milk may be minimised. • List the drugs known to suppress lactation and describe how they may be used therapeutically. • Identify the sources of advice available to guide your decision-making when prescribing for this group of patients.

Category	Prescribing in Medical Emergencies (Primary Care Focus)
Module Title	Learning Outcomes
Acute Coronary Syndrome	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Identify the steps to manage a presentation of Acute Coronary Syndrome (ACS). • Know the protocol for management of an adult cardiac arrest. • Know the reversible causes of cardiac arrest, and which long term prescriptions increase their risk. • Know the appropriate post-resuscitation care needed. • Know the modifications needed when performing resuscitation on pregnant women and children.
Anaphylaxis	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • List the signs and symptoms of anaphylaxis. • Distinguish allergic reactions from other adverse drug reactions. • Describe the stepwise pharmacological management of anaphylaxis in the general practice setting. • Counsel patients and their relatives/carers on the administration of adrenaline auto-injectors. • Arrange appropriate follow up for patients who have experienced anaphylaxis.
Asthma and Croup	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Identify the presentation of an exacerbation of asthma. • Determine the grade of an asthma attack and the appropriate action required. • Describe the emergency treatment of an exacerbation of asthma in different patient groups. • Prescribe oxygen safely. • Describe the dosing and pharmacology of emergency medications used in the management of acute asthma, and possible adverse effects. • Describe the features of croup and grade the symptom severity. • Identify the patients who can be managed with active treatment in the community, as opposed to hospital admission. • Know the different dosages indicated for prednisolone and dexamethasone in croup. • Know the post-event care likely to be needed.

Category	Prescribing in Medical Emergencies (Primary Care Focus)
Module Title	Learning Outcomes
Meningococcal Disease	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Identify the possible symptoms of meningococcal disease. • Know the differences between meningitis and meningococemia. • Know the appropriate triage screening questions for suspected meningococcal disease. • Understand the emergency treatment and management protocol in suspected meningococcal disease. • Know the appropriate post-diagnosis actions.
Seizures	<p>At the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Describe the step-wise management of a patient developing a seizure and status epilepticus. • Describe the requirements of post-seizure management. • Identify potential drug-drug interactions in patients on antiepileptic medicines. • Discuss the role of therapeutic drug monitoring (TDM) for antiepileptic drug (AED) treatment.

Category	Principles of Medicines Management
Module Title	Learning Outcomes
Formulation and Administration	<p>By the end of this module, you should be able to:</p> <p>Formulation</p> <ul style="list-style-type: none"> • Describe the role of excipients in medicines formulation and give examples of when they are cautioned or contraindicated in specific patient groups. • List the drugs that are recommended to be prescribed as brands, owing to changes in bioavailability between formulations. • Define unlicensed and off-label medicines and provide guidance on the administration of these. <p>Administration</p> <ul style="list-style-type: none"> • Discuss the process measures that should be taken to reduce the risk of administration errors (e.g. second checks). • Discuss the risks of preparing injectables in advance, considering both the stability of the medicine and risk of inadvertent administration to the wrong patient. • Describe some complications of drug administration and how they can be managed. • Discuss the practical aspects of administering medicines via enteral feeding tubes and the cautions and contraindications with regards the manipulation of medicines for this route. • List reputable evidence-based resources available to assist the preparation of medicines for parenteral administration or via enteral feeding tubes. • With reference to national statistics on omissions of medicines ('missed doses'), discuss the importance of timely administration and working with pharmacy to ensure availability of treatments to avoid patient harm. • With reference to specific drugs and formulations, discuss the importance of timely administration in relation to response and monitoring (e.g. nitrate free period, timing prior to therapeutic drug monitoring).

Category	Principles of Medicines Management
Module Title	Learning Outcomes
UK Medicines Policy	<p>By the end of this module, you should be able to:</p> <ul style="list-style-type: none"> • Describe the Nursing and Midwifery Council's (NMC) '<i>Standards for Medicines Management</i>'. • Describe the scope of the Human Medicines Regulations 2012, in relation to the: <ul style="list-style-type: none"> ○ Authority to prescribe, supply and administer medicines. ○ The use of medicines that are controlled by the Misuse of Drugs Regulations 2001. ○ Storage, supply and destruction of medicines. • Define what a 'Patient Specific Direction' (PSD) is and why local guidance in the form of a Medicines Policy informs the use of medicines in hospitals.