

Initial Education and Training of Pharmacists: Clinical Reasoning Indicative Curriculum

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Introduction

This curriculum for Clinical Reasoning has been developed by NHS England – Workforce, Education and Training (WT&E) Directorate and the Pharmacy Schools Council.

The revised General Pharmaceutical Council (GPhC) standards for the Initial Education and Training of Pharmacists (IETP) integrate learning outcomes that include clinical reasoning and decision-making. In the literature around clinical decision-making a number of different terminologies are used such as clinical reasoning, diagnostic reasoning, clinical judgment, complex decision-making, and therapeutic decision-making.

Cooper and Frain provide a broad definition of clinical reasoning: “...*the thinking and decision-making processes associated with clinical practice*”¹. This is a helpful definition as it then allows us to describe how clinical reasoning is used in pharmacy.

The decisions that pharmacists make are primarily therapeutic decisions. That is, the part of clinical reasoning that focuses on making decisions about drug therapy. In medicine, clinical reasoning is most often associated with diagnostic reasoning. As pharmacists take on more prescribing roles, particularly in community pharmacy, they will need to understand the process of diagnosing.

Clinical Reasoning encompasses a number of elements, and the pharmacist needs an underpinning knowledge of all of these elements, and of basic and clinical science in order to make sound decisions. These elements are utilised and put together when clinicians make decisions. [Figure 1](#) describes these elements and [Figure 2](#) shows how they are put together with other prescribing skills to develop pharmacist independent prescribers.

A glossary of terms is provided after this introduction, describing the definitions used in this curriculum document.

¹ Cooper, N., Frain, J. (2017). Clinical Reasoning: An Overview. In: Cooper, N., Frain, J. ABC of Clinical Reasoning. Wiley Blackwell.

Figure 1. The elements of clinical reasoning (adapted from Cooper and Frain (2017))

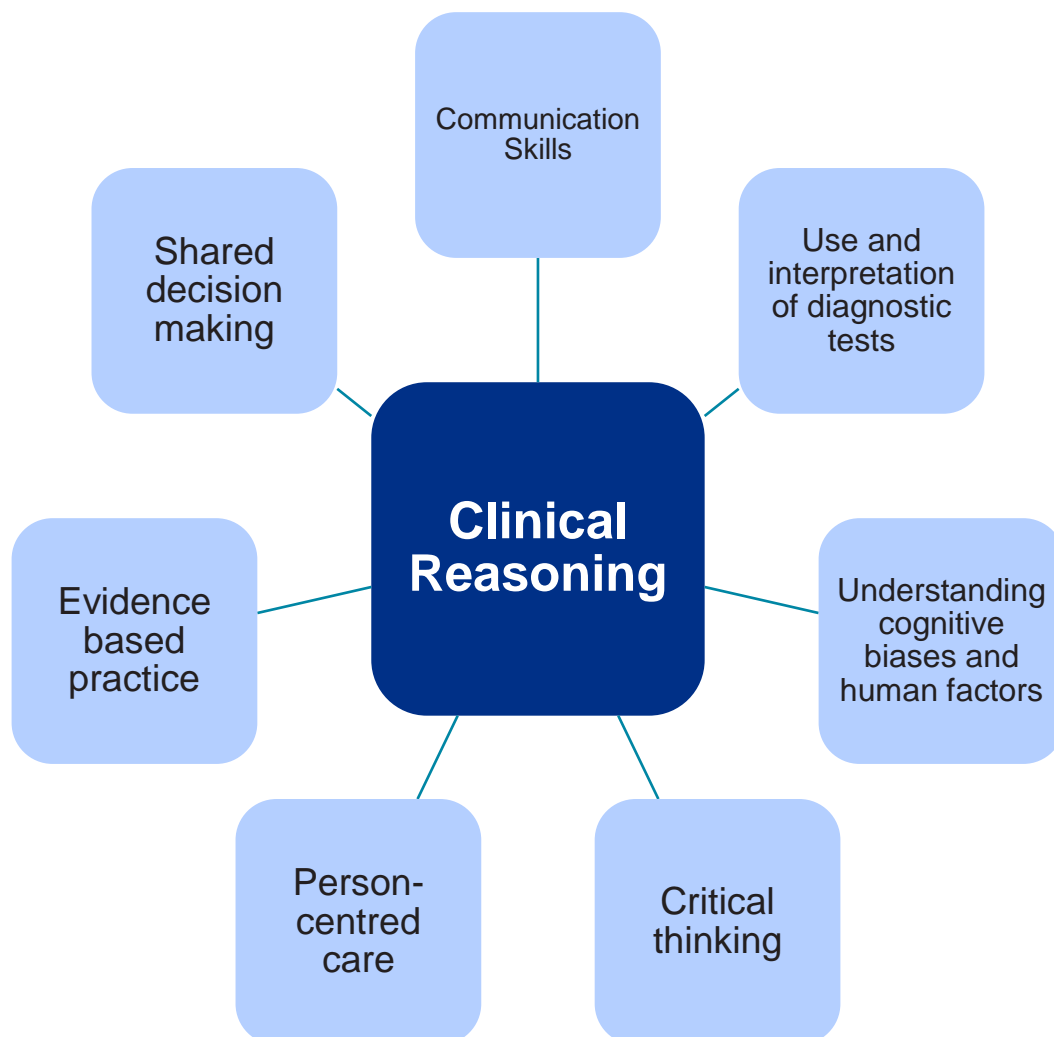
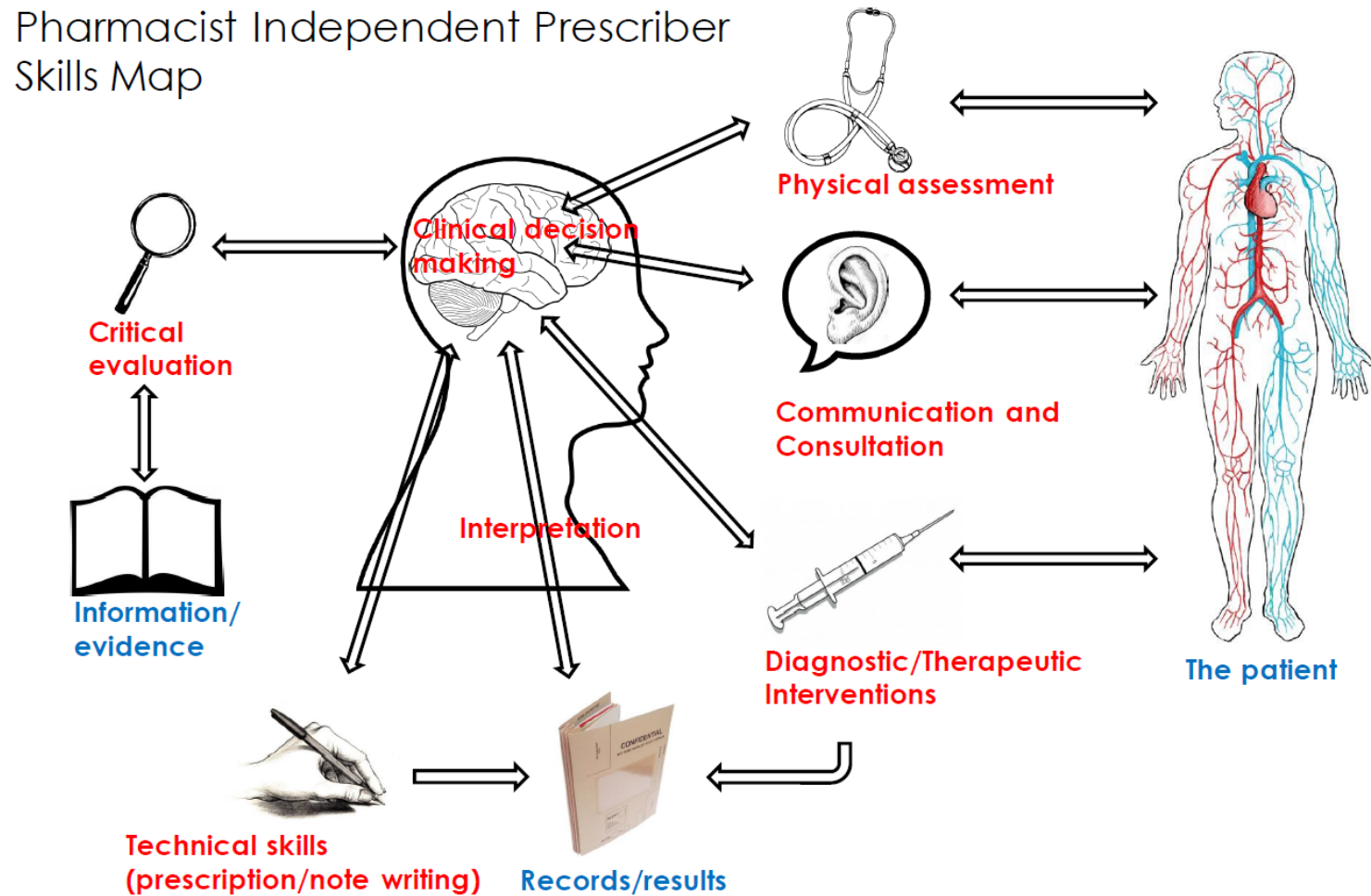


Figure 2. Pharmacist Independent Prescriber Skills Map



Glossary

Clinical Decision-Making

A term often used interchangeably for clinical reasoning.

Clinical Judgement

The process of weighing up the options available and prioritising them on the basis of their impact². The impact may include financial considerations, social implications, impact on the patient's family, impact on how the patient interacts with health services, for example, as well as the immediate impact on their health. Judgement involves a risk benefit analysis and is often based on ambiguity and uncertainty.

Clinical Reasoning

The thinking and decision-making processes associated with clinical practice. It includes the ability to gather, analyse and use relevant information to benefit patients¹. Clinical reasoning is a complex cognitive process, requiring various mental processes to operate simultaneously during the clinical encounter. Clinical reasoning encompasses the ability to make a diagnosis with the available clinical information, to choose an appropriate treatment and to make a shared decision with the patient, and to make these decisions in the face of clinical uncertainty.

Critical Thinking

The process of actively conceptualising, applying, analysing, synthesising and evaluating information gathered in order to form a judgement.

Diagnostic Reasoning

A dynamic thinking process that leads to identification of a hypothesis that best explains the clinical evidence. This might be when forming a diagnosis by identifying a disease or condition based on its signs and symptoms or detecting adverse drug events³.

Human Factors

Enhancing clinical performance through an understanding of the effects of teamwork, tasks, equipment, workspace, culture and organisation on human behaviour and abilities and application of that knowledge in clinical settings⁴.

² Wright, D., Anakin, M., Duffull, S. Clinical decision-making: An essential skill for 21st century pharmacy practice. *Research in Social and Administrative Pharmacy*, 2019: 15; 600-606

³ Mertens, J., Koster, E., Deneer, V., Bouvy, M., van Gelder, T. Clinical reasoning by pharmacist: A scoping review. *Currents in Pharmacy Teaching and Learning*, 2022: 14 (10); 1326 - 1336

⁴ NHS. Human Factors in Healthcare. A concordat from the National Quality Board. 2013. Available from <https://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf> (last accessed 15.2.23)

Therapeutic Decision Making

The part of clinical reasoning that focuses on making decisions about drug therapy. This is a core part of the pharmacist's role².

Indicative Curriculum

Below is an indicative curriculum for clinical reasoning. It can be used to guide the design and delivery of teaching and training within the MPharm and Foundation Training Year. This curriculum is underpinned by the [RPS Competency Framework for All Prescribers](#). The RPS competency framework is a generic framework for any prescriber, regardless of their professional background or setting. It reflects the key competencies needed by all prescribers and is intended to be the basis on which a curriculum can be built.

In this curriculum, clinical reasoning is broken down into 'elements' (see [figure 1](#)) which are utilised and put together when clinicians make decisions. The key skills that a student/trainee needs to develop are described. Indicative learning resources/references are provided (these should not be viewed as an exhaustive list) and each element is mapped to the relevant IETP learning outcome and also the competencies within section 1 of the [RPS Competency Framework for All Prescribers](#).

Some of the elements of clinical reasoning are included in the [NHS England Initial Education and Training of Pharmacists: Prescribing Training Joint Curriculum](#). These are listed in [table 1](#) below and, to avoid duplication, are not included in the indicative curriculum for clinical reasoning.

Table 1. Elements of Clinical Reasoning Described in the NHS England Initial Education and Training of Pharmacists: Prescribing Training Joint Curriculum

Element of Clinical Reasoning	Elements from the NHS England Initial Education and Training of Pharmacists: Prescribing Training Joint Curriculum
Overview of Clinical Reasoning	Clinical reasoning/decision making
Communication Skills	Managing a structured consultation Begins the consultation Takes a structured history
Shared Decision Making	Shared decision making
Person-centred care	Identifies and makes adjustments/adaptations to meet the needs of the patient

[Table 2](#) and [table 3](#) below list the learning outcomes from the GPhC standards for the Initial Education and Training of Pharmacists and the competencies from the [RPS competency framework for all prescribers](#) that are covered by this Indicative Curriculum for Clinical Reasoning.

Table 2 GPhC Learning Outcomes

GPhC Learning Outcomes:	MPharm degree	Foundation training year
1. Demonstrate empathy and keep the person at the centre of their approach to care at all times	Does	Does
2. Work in partnership with people to support and empower them in shared decision-making about their health and wellbeing	Shows How	Does
8. Assess and respond to the person's particular health risks, taking account of individuals' protected characteristics and background	Shows How	Does
9. Take responsibility for ensuring that personal values and beliefs do not compromise person-centred care	Does	Does
10. Demonstrate effective consultation skills, and in partnership with the person, decide the most appropriate course of action	Does	Does
11. Take into consideration factors that affect people's behaviours in relation to their health and wellbeing	Shows How	Does
12. Take an all-inclusive approach to ensure the most appropriate course of action based on clinical, legal and professional considerations	Shows How	Does
13. Recognise the psychological, physiological and physical impact of prescribing decisions on people	Shows How	Does
26. Consider the quality, safety and risks associated with medicines and products and take appropriate action when producing, supplying and prescribing them	Knows How	Shows How
28. Demonstrate effective diagnostic skills, including physical examination, to decide the most appropriate course of action for the person	Shows How	Does
29. Apply the principles of clinical therapeutics, pharmacology and genomics to make effective use of medicines for people, including in their prescribing practice	Shows How	Does
30. Appraise the evidence base and apply clinical reasoning and professional judgement to make safe and logical decisions which minimise risk and optimise outcomes for the person	Shows How	Does
31. Critically evaluate and use national guidelines and clinical evidence to support safe, rational and cost-effective procurement for the use, and prescribing of, medicines, devices and services	Shows How	Does
34. Apply the principles of effective monitoring and management to improve health outcomes	Shows How	Does
35. Anticipate and recognise adverse drug reactions, and recognise the need to apply the principles of pharmacovigilance	Does	Does
36. Apply relevant legislation and ethical decision-making related to prescribing, including remote prescribing	Shows How	Does
43. Identify misuse of medicines and implement effective strategies to deal with this	Shows How	Does
48. Actively take part in the management of risks and consider the impacts on people	Shows How	Does

Table 3 RPS Prescribing Competencies

RPS Prescribing Competencies:
1.6 Takes and documents an appropriate medical, psychosocial and medication history including allergies and intolerances.
1.7 Undertakes and documents an appropriate clinical assessment.
1.8 Identifies and addresses potential vulnerabilities that may be causing the patient/carer to seek treatment
1.9 Accesses and interprets all available and relevant patient records to ensure knowledge of the patient's management to date.
1.10 Requests and interprets relevant investigations necessary to inform treatment options.
1.11 Makes, confirms or understands, and documents the working or final diagnosis by systematically considering the various possibilities (differential diagnosis)
1.12 Understands the condition(s) being treated, their natural progression, and how to assess their severity, deterioration and anticipated response to treatment.
1.13 Reviews adherence (and non-adherence) to, and effectiveness of, current medicines
1.14 Refers to or seeks guidance from another member of the team, a specialist or appropriate information source when necessary.
2.1 Considers both non-pharmacological and pharmacological treatment approaches
2.2 Considers all pharmacological treatment options including optimising doses as well as stopping treatment (appropriate polypharmacy and deprescribing).
2.3 Assesses the risks and benefits to the patient of taking or not taking a medicine or treatment.
2.4 Applies understanding of the pharmacokinetics and pharmacodynamics of medicines, and how these may be altered by individual patient factors.
2.5 Assesses how co-morbidities, existing medicines, allergies, intolerances, contraindications and quality of life impact on management options.
2.6 Considers any relevant patient factors and their potential impact on the choice and formulation of medicines, and the route of administration.
2.7 Accesses, critically evaluates, and uses reliable and validated sources of information.
2.8 Stays up to date in own area of practice and applies the principles of evidence-based practice.
2.9 Considers the wider perspective including the public health issues related to medicines and their use and promoting health.
2.10 Understands antimicrobial resistance and the roles of infection prevention, control and antimicrobial stewardship measures.
3.1 Actively involves and works with the patient/carer to make informed choices and agree a plan that respects the patient's/carer's preferences.
3.2 Considers and respects patient diversity, background, personal values and beliefs about their health, treatment and medicines, supporting the values of equality and inclusivity, and developing cultural competence.
3.3 Explains the material risks and benefits, and rationale behind management options in a way the patient/carer understands, so that they can make an informed choice
3.4 Assesses adherence in a non-judgmental way; understands the reasons for non-adherence and how best to support the patient/carer
4.1 Prescribes a medicine or device with up-to-date awareness of its actions, indications, dose, contraindications, interactions, cautions and adverse effects.
4.2 Understands the potential for adverse effects and takes steps to recognise, and manage them, whilst minimising risk.

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|---|
| 4.3 Understands and uses relevant national, regional and local frameworks for the use of medicines. |
| 4.7 Recognises potential misuse of medicines; minimises risk and manages using appropriate processes. |
| 4.11 Prescribes unlicensed and off- label medicines where legally permitted, and unlicensed medicines only if satisfied that an alternative licensed medicine would not meet the patient's clinical needs |
| 6.1 Establishes and maintains a plan for reviewing the patient's treatment |
| 6.3. Adapts the management plan in response to on-going monitoring and review of the patient's condition and preferences |
| 8.2 Accepts personal responsibility and accountability for prescribing and clinical decisions, and understands the legal and ethical implications |
| 8.3 Knows and works within legal and regulatory frameworks affecting prescribing practice. |
| 8.4 Makes prescribing decisions based on the needs of patients and not the prescriber's personal views. |
| 8.5 Recognises and responds to factors that might influence prescribing. |
| 9.7. Considers the impact of prescribing on sustainability, as well as methods of reducing the carbon footprint and environmental impact of any medicine |

Element of clinical reasoning	Suggested resources
<p>Overview of Clinical Reasoning</p> <p><i>Describe the process of clinical reasoning, and the elements that are needed to make a clinical decision</i></p> <p><i>Use a process for diagnostic reasoning</i></p>	<p>See also the resources detailed in the Prescribing Training Joint Curriculum.</p> <p>Models of clinical reasoning</p> <ul style="list-style-type: none"> Cooper, N. and Frain, J. ABC of Clinical Reasoning. Wiley Blackwell, 2017. Rutter PM, Harrison T. Differential diagnosis in pharmacy practice: Time to adopt clinical reasoning and decision making. Research in Social and Administrative Pharmacy. 2020;16:1483–6. doi:10.1016/j.sapharm.2020.02.020 Rutter PM, Harrison T, Mills L. How to use clinical reasoning in pharmacy. <i>The Pharmaceutical Journal</i>, PJ, February 2022, Vol 308, No 7958;308(7958)::DOI:10.1211/PJ.2022.1.124225 <p>Learning resources</p> <p>The Complex Clinical Reasoning e-learning programme has been designed for clinicians working along the continuum of enhanced to advanced practice, who want to learn about the complexities of clinical reasoning. There are 9 modules to complete.</p> <ul style="list-style-type: none"> https://learninghub.nhs.uk/Catalogue/Complex-Clinical-Reasoning/browse <p>These resources require an account which can be set up with either an NHS e-mail address or via OpenAthens. Covers complex reasoning which may be too advanced for MPharm students but would be a useful resource for those supporting students and to support students in their Foundation year.</p>

	<p>Useful websites</p> <p>Although primarily medicine-based, the UK Clinical Reasoning in Medical Education Group website contains useful resources for all healthcare professionals. It contains videos introducing concepts related to clinical reasoning.</p> <ul style="list-style-type: none"> • www.creme.org.uk <p>Improve diagnostic is a website dedicated to improving diagnostic reasoning in clinical practice. It contains a number of resources for developing skills in diagnostic reasoning.</p> <ul style="list-style-type: none"> • https://www.improvediagnosis.org/toolkits/ <p>Short videos</p> <p>A short, eight-minute introduction to how people make decisions, and why this is relevant for pharmacy professionals making clinical decisions.</p> <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=2v8BIm7SIJs <p>A two-minute animated video introducing analytical reasoning (application of rules) and pattern recognition as two types of clinical reasoning. The video introduces some factors and biases that influence decisions and foster cognitive errors, including emotions, underlying knowledge, time pressures, previously seen patients, the influence of colleagues, over-confidence and biases.</p> <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=gud5xeHmvXw
<p>Use and Interpretation of Diagnostic Tests</p>	<p>Using and Interpreting Diagnostic Tests</p> <ul style="list-style-type: none"> • Chapter 3. Using and Interpreting Diagnostic Tests. In Cooper, N. and Frain, J. ABC of Clinical Reasoning. Wiley Blackwell, 2017



These resources support with:

- *Deciding if further tests are required*
- *Identifying appropriate tests considering patient and cost factors*
- *Interpreting test results in conjunction with the patient's history*
- *Describing how individual patient factors might influence test results*

Reference ranges

The Geeky Medics webpage gives a selection of reference ranges for various haematological and biochemical investigations.

- <https://geekymedics.com/reference-ranges/>

Common investigation panels

Lab Tests Online-UK supports healthcare professionals to understand the many clinical laboratory tests that are used in diagnosis, monitoring and treatment of disease.

- <https://labtestsonline.org.uk/tests-index>

CPPE biochemistry e-learning

CPPE have a suite of e-learning packages available which range from an introduction to biochemistry to case studies and quizzes (*login required for some resources*).

- <https://www.cppe.ac.uk/gateway/biochem>

How to interpret arterial blood gas results

This Pharmaceutical Journal article discusses acid-base balance and how to interpret arterial blood gas results.

- <https://pharmaceutical-journal.com/article/ld/how-to-interpret-arterial-blood-gas-results-2>

Liver function tests: indications and interpretation

This Pharmaceutical Journal article discusses liver function tests and how to interpret the results.

- <https://pharmaceutical-journal.com/article/ld/liver-function-tests-indication-and-interpretation>

	<p>Interpretation of electrocardiograms</p> <p>This Pharmaceutical Journal article discusses the basic principles of the electrocardiogram and how to recognise common abnormalities.</p> <ul style="list-style-type: none"> • https://pharmaceutical-journal.com/article/ld/interpretation-of-electrocardiograms
<p>Understanding of cognitive biases and human factors</p> <p><i>Decision making is flawed by virtue of the fact that we are human. We all fall into cognitive traps and biases. Having an awareness of these cognitive biases and patterns in thinking can reduce the possibility of errors.</i></p> <p><i>Human factors approaches decision making from a systems point of view, looking at the systems in which we work and how these can make errors more or less likely to happen.</i></p>	<p>Cognitive biases</p> <ul style="list-style-type: none"> • Chapter 5. Cognitive Biases. In Cooper, N. and Frain, J. ABC of Clinical Reasoning. Wiley Blackwell, 2017. <p>Human Factors</p> <ul style="list-style-type: none"> • Chapter 6. Human Factors. In Cooper, N. and Frain, J. ABC of Clinical Reasoning. Wiley Blackwell, 2017 <p>The Chartered Institute for Ergonomics and Human Factors (CIEHF) published a Coping with Complexity resource alongside HEE in 2020. This resource was designed to support pre-registration and early career pharmacist in clinical decision-making.</p> <ul style="list-style-type: none"> • https://ergonomics.org.uk/resource/coping-with-complexity.html <p>This Pharmaceutical Journal article gives an outline of the skills pharmacists need in order to make complex clinical decision and how to improve these over time.</p> <ul style="list-style-type: none"> • https://pharmaceutical-journal.com/article/ld/complex-decision-making-for-foundation-and-newly-qualified-pharmacists <p>Useful Websites</p> <p>A series of resources about human factors and ergonomics in healthcare, with many examples that are relevant to pharmacy.</p> <ul style="list-style-type: none"> • https://ergonomics.org.uk/learn/publications.html

	<p>Short videos</p> <p>A three-minute animated video introducing cognitive errors and biases in clinical reasoning, with examples of premature closure, availability bias, gambler's fallacy, confirmation bias and base rate neglect.</p> <ul style="list-style-type: none"> • https://www.youtube.com/watch?v=LzkmaB_M_Rxw&t=4s
<p>Critical Thinking (Metacognition)</p> <p><i>Metacognition is 'thinking about thinking' and can be used to reduce the impact of biases and improve clinical decision making</i></p>	<p>Chapter 7: Metacognition and Cognitive Debiasing. In Cooper, N. and Frain, J. ABC of Clinical Reasoning. Wiley Blackwell, 2017.</p> <p>Epstein, R., 1999. Mindful Practice. JAMA: 282(9):833-9 https://pubmed.ncbi.nlm.nih.gov/10478689/</p> <p>Deliberate Practice</p> <p>The Deliberative Practice Network online community has a range of learning, research and communication tools for healthcare professionals to use.</p> <ul style="list-style-type: none"> • https://deliberativepractice.com/
<p>Evidence-based practice</p>	<p>Critical appraisal</p> <p>The Critical Appraisal Skills Programme (CASP) has a series of easy to use checklists to support user of research evidence to systematically assess the trustworthiness, relevance and results of published papers.</p> <ul style="list-style-type: none"> • https://casp-uk.net/casp-tools-checklists/ <p>Evaluating guidelines</p> <p>The Appraisal of Guidelines for Research and Evaluation (AGREE) tools support the development, reporting and evaluations of practice guidelines and health system guidance.</p> <ul style="list-style-type: none"> • https://www.agreetrust.org/resource-centre/agree-ii/agree-ii-training-tools/

Appendix 1: Version history and editorial review process

This Clinical Reasoning Indicative Curriculum was first published in December 2023.

We encourage education colleagues to share in the development of this guidance and welcome your comments and suggestions via [this link](#).

A joint editorial team consisting of NHS England – Workforce, Education and Training Directorate and Pharmacy Schools Council representatives will review these submissions on a 6-monthly basis and an updated version will be posted on [our website](#).

Version	Change
1.0	
1.1	Checked for broken links.
1.2	Minor clarification to table 1

Next review date: August 2025

Next publication date: September 2025

In the meantime, please contact england.pharmacyteam@nhs.net to report any broken links or errors.

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