



NATIONAL STEM LEARNING CENTRE

Clinical Reasoning in Context

4th one-day conference
for educators

Conference e-book

12TH NOVEMBER 2025

www.creme.org.uk



Welcome!

Welcome to CReME's 4th one-day conference for educators: **Clinical Reasoning in Context**.

Our mission is to promote excellence in teaching clinical reasoning in undergraduate and postgraduate medical education and to provide high quality resources for teachers and learners.

We're delighted to welcome Dr Charilaos (Harris) Koufidis of the Karolinska Institute in Stockholm. Harris is a practicing physician and researcher whose research focuses on how students learn to practice medicine in real-life contexts, with a particular interest in clinical reasoning. The insights gained from his research are particularly relevant to clinical teachers and we look forward to hearing more from Harris at the conference.

We've revamped our website and you can now become a member of CReME for only £30 per year! Join to access our members' forum, connect through special interest groups, collaborate and network with like-minded colleagues, vote in AGMs, and stay in the loop with the latest news and events via our mailing list. Why re-invent the clinical reasoning wheel? Let's learn from each other and collaborate to make high quality clinical reasoning education a reality.

A big thank you to everyone who has helped to put this conference together, from the National STEM Learning Centre team, CReME committee members, to our HYMS student volunteers, and all our speakers, workshop facilitators, presenters, and poster authors – thank you for giving your time and expertise to make this conference happen!

Prof Nicola Cooper

Chair, UK Clinical Reasoning in Medical Education Group

What is “clinical reasoning”?

‘Clinical reasoning is a complex set of abilities healthcare students have to learn during their studies and continue to further develop in the workplace. Clinical reasoning encompasses the application of knowledge to collect and integrate information from various sources to arrive at a diagnosis and management plan for patients in a shared decision-making process. Due to its multifactorial nature and unconscious components it is both difficult to learn and teach. A lack of clinical reasoning abilities is a primary cause of cognitive errors in patient care and threats to patient safety including unnecessary pain, treatments, or procedures for patients and increasing the costs of healthcare. In the European Union the number of errors and adverse events in healthcare is estimated at 8–12% of hospitalizations (WHO). Despite the importance of clinical reasoning for the workplace of healthcare professionals and patient safety there is still a lack of structured and explicit teaching, learning, and assessment of clinical reasoning in healthcare education. Such training can help to improve patient safety and reduce costs – two priorities of the EU Health policy.’

From <https://did-act.eu/>

Developing, implementing, and disseminating an adaptive clinical reasoning curriculum for healthcare students and educators.

Programme

0930-1000	Registration and coffee / sign-up for workshops
1000-1010	Welcome Prof Anna Hammond & Prof Lucy Ambrose, HYMS
1010-1100	Keynote <u>Dr Charilaos (Harris) Koufidis</u> Department of Learning, Informatics, Management & Ethics Karolinska Institutet, Stockholm, Sweden Clinical Reasoning in Context
1100-1130	Coffee & poster viewing
1130-1300	Parallel sessions 1. Workshop 1 Teaching clinical skills and clinical reasoning. 2. Workshop 2 Using case-based learning to teach clinical reasoning in an undergraduate curriculum. 3. Workshop 3 Using gamification to cultivate clinical reasoning. 4. Workshop 4 A framework for thinking about a clinical reasoning curriculum.
1300-1400	Lunch & poster viewing
1400-1420	Plenary <u>UK Clinical Reasoning in Medical Education Group (CReME)</u>
1420-1450	Oral presentations Chair: Prof Simon Gay
1500-1630	Parallel sessions Workshops 1–4 repeated.
1630	Close.

Workshops

Workshop 1

When you listen to the patient, do they really tell you the diagnosis? Teaching clinical skills and clinical reasoning.

John Frain

William Osler exhorted his students to listen to the patient with the expectation of hearing the diagnosis. Was this literally true or an aphorism? What did Osler mean and how did he arrive at this conclusion? Is it relevant in 2025? Patients experience their illness through their symptoms. On presentation, they will already have reasoned to an understanding of what is happening to them and perhaps discussed it with friends and family or search for explanations online. Symptoms are not always well defined and sometimes no clear diagnostic label can be given to them. The patient's own perspective here, including anatomical and physiological, is essential in arriving at a viable management plan in which they will have confidence. Although communication models encourage exploration of 'ideas, concerns and expectations' often these are of subsidiary interest to the clinician. Without exploration of the patient's full dataset, the risk of misdiagnosis and error increases. Inductive foraging for lines of enquiry at the beginning of a consultation generates a majority of diagnostic cues. Active involvement of the patient thereafter may improve formulation of diagnostic hypotheses and may also direct subsequent physical examination, investigation and management.

This will be an interactive workshop. We will examine the rationale for Osler's advice, discuss how it might have looked in the 19th Century and how it has evolved in the light of research in foundational science, clinical communication, and reasoning. With diagnostic error and complaint frequently arising partly or even wholly through errors in communication and data collection, active involvement of the patient in clinical reasoning from the outset is a potential win for all parties. The workshop will also involve case-based discussion using both positive and negative examples.

Workshop 2

Using case-based learning to teach clinical reasoning in an undergraduate curriculum.

Michael Trimble

Paul Hamilton

Andrew Spence

Phil Toner

Case-based learning (CBL) is simply the use of clinical cases to aid teaching. The model for clinical reasoning used is based on Pellegrino and Thomasma's description of the clinical encounter. This concept is introduced early in year 1 of the course by lectures and tutorials and then applied to CBL in years 1 to 4. CBL functions as a 'curricular skeleton' to contextualise all other taught content. We have developed a method for writing CBL cases that, by asking questions at appropriate times, allows students to develop sound clinical reasoning skills. In constructing these early cases, it is important to strike a balance between authenticity and complexity without overwhelming the students. We utilise a suite of 23 scripted cases in the first two years of our course to fit in with a systems-based delivery model. In year 3 students are on clinical attachment and CBL is delivered by clinical tutors. The year 3 cases are more complex and are designed to be authentic representations of common clinical presentations. Again, the focus is on clinical reasoning and integration of knowledge rather than delivery of content. In year 4, students select their own cases from patients they have encountered and generate their own learning outcomes based on their individual submitted cases, phrased as questions for the group. Sessions are facilitated by a GP and specialist and take place online.

This workshop will provide instruction in the theory behind CBL and guidance on its implementation in practice, including how the methodology can be adapted to suit local requirements. Topics will include case writing and facilitation, as well as programme planning, organisation, and faculty training.

Workshop 3

Using gamification to cultivate clinical reasoning.

Ryan Peers

Shireen Tahir

This interactive workshop will explore the role of games and gamification in medical education, beginning with a brief introduction to the history of games in learning and an open discussion about common barriers. These include perceptions that games are "child-like" or repetitive, concerns about loss of teacher control, and doubts about their pedagogical rigour or real-world transferability.

We will then shift the focus to the opportunities gamification offers, including its ability to appeal to multiple learning styles, increase motivation, provide safe environments for experimentation, and make learning engaging and memorable. Drawing on examples from both medical education and popular culture, we will consider how games can foster deep and lasting learning – even enabling learners to master vast, complex information, as seen in non-educational contexts such as Pokémon. We will then use demonstrate examples of how we have used this knowledge to create our own well reviewed games designed to cultivate clinical reasoning skills.

Participants will be introduced to a range of educational games of varying styles and purposes (e.g., "Define and Shine," ethical scenarios, and reverse acronyms) before working in small groups to design their own medical education games. The session will culminate in a playtesting phase, offering participants a chance to refine their ideas and experience their games in action.

Key considerations such as collaboration versus competition, opportunities for metacognition, freedom to fail versus elimination, and fairness will be discussed throughout, equipping attendees with practical frameworks for developing meaningful and effective games in their own teaching.

Workshop 4

A framework for thinking about a clinical reasoning curriculum.

Nicola Cooper

Mini Singh

Mark Lillicrap

The purpose of this workshop is to present a framework for thinking about a clinical reasoning curriculum in our own institutions, based on CReME's consensus statement and the work of various UK colleagues. Useful things to think about in our framework include: a shared definition, a model, teaching and learning strategies, assessment, and staff development. It's important to emphasise that a clinical reasoning curriculum does not require additional time, rather it is an approach to teaching, re-framing what already exists to emphasise developing clinical reasoning ability among learners – from foundational science through to solving real patient problems.

Once a "framework" of a curriculum is in place, the most challenging aspect of implementation is often staff training. So what would a staff development programme look like? And which staff should we target first?

In this workshop we'll present some initial ideas, but we also want to hear from you, your ideas, and what you are doing in your institutions.

Oral presentations

Mentors' feedback on clinical reasoning skills to fourth year students. What can AI tell us?

Caroline Sprake

Richard Thomson

Sarah Cope

Sarah Graham

Michael Gallon

Introduction

We explored the use Artificial Intelligence (AI) to analyse clinical examiners' written feedback relating to clinical reasoning.

Methods

AI was used as a tool to interrogate the data from 430 students all performing four circuits of our MOSLER exam (1720 stations). University licensed Copilot was used on anonymised data so that no student or mentor could be identified. Questions asked:

- To what extent are the examiners using appropriate technical language to describe clinical reasoning skills?
- Is there evidence of examiners commenting on purposeful questioning (i.e. focused history, picking up cues)?

Results

Copilot pulled out specific examples of Understanding the Patient's Story, Rationale for Investigations, Establishing a Problem List and Differential Diagnosis, Management Plans and Future Planning and Follow-Up. The use of technical language is evident, with terms like "differential diagnosis," "clinical assessment," "investigations," "management plan," and "follow-up" being commonly used. This indicates that examiners are using appropriate technical language to describe clinical reasoning skills. Copilot gave examples of commenting on purposeful questioning, including focused history-taking and picking up cues. These indicate examiners are attentive to how students structure their questioning, notice patient cues, and use purposeful interviewing techniques to gather relevant information.

Discussion

In our experience use of AI is a time efficient tool for data analysis (total time taken for data collection 5 mins). The results demonstrate that staff development is working but also guides areas for future work.

Clinical reasoning in high-stakes exams

James Gray

Introduction

This research project sought to answer the question as to how clinical students undertake the process of clinical reasoning in Single Best Answer (SBA) questions and Objective Structured Clinical Examinations (OSCE).

Methods

A narrative literature review was undertaken to formulate a concept framework for the clinical reasoning process. The concept framework was used as the basis for a nominal group approach formulating ten key exploratory questions to explore different aspects of clinical reasoning through a convergent mixed methods study.

Three universities took part in the study, two with both medical and physician associate students and one with physician associate students. The quantitative element contained 595 data points (an individual participant completing all 10 questions). The qualitative arm included seven focus groups of 2 to 18 participants. These were transcribed and analysed using thematic analysis.

Results

Key findings included that students felt being in an exam affected their reasoning, but this appeared linked to the difference between eustress and distress. SBA is heavily pattern recognition, OSCE less so than the quantitative data alone would suggest. Early hypothesis generation was typical in both assessments, but SBA was answer driven, OSCE was plan driven. Student thinking processes tended toward inductive reasoning, but this was stronger for SBA. Evidence for metacognition was seen with results suggesting abductive reasoning is the most appropriate description. Satisficing occurs commonly but is multifactorial in nature, particularly around knowledge and time pressure. Students are aware of biases, although there is confusion with heuristics. The evidence that they actively seek to manage them is less clear.

Discussion

The results facilitated a revision of the concept framework and consideration of a number of implications for assessment, education, policy and research. The design, and revision, of the concept framework can act as a guide for educators when designing programmes and support education and curricula plans.

GP Tutors' reflections on delivering clinical reasoning workshops in Primary Care: Impact on their own practice, classroom based teaching and maximising learning from patient encounters.

Anna Hammond

Howard Skinner

Introduction

Experts and novices approach clinical reasoning in different ways, experts mostly using fast processing, using an extensive bank of illness scripts, which can be opaque to novices.

Methods

Aligning to the consensus statement on clinical reasoning (Cooper et al., 2022) we have adopted a sequence of pedagogical interventions:

1. An explicit Year 2 clinical reasoning curriculum of eight small group classroom-based sessions facilitated by University-based clinician clinical skills tutors
2. A series of three Year 3 and two Year 4 Clinical Reasoning Workshops delivered by Faculty to the whole cohort
3. A multi-faceted programme of staff development delivered to our University-based clinician clinical skills tutors and to primary and secondary care clinical placement tutors (e.g. face to face and online tutor development sessions, Q&A and iterative support in-year). These interventions introduced clinical reasoning theory (e.g. Dual Processing model), focusing on the importance of making their own clinical reasoning explicit to students in teaching surgeries and encouraging a shared student and tutor vocabulary around clinical reasoning.

Over the last two years, we have trained over 60 Y3 and Y4 GP tutors to each deliver two half day clinical reasoning workshops during GP tutorial time. The training included online workshops, Q&A, and providing extensive training materials. We have focussed on embedding clinical reasoning, emphasising the importance of the need for effective student communication skills and to maximise student learning from patient encounters, underpinned by a cognitive apprenticeship model.

Results

GP tutors have reported that delivering the workshops has increased insights into their own clinical reasoning/biases and enhanced their skills in providing feedback to students on their clinical reasoning. We will present a detailed evaluation of GP tutors' reflections on delivering the workshops and the impact on their own practice, classroom-based teaching, and facilitation of student learning from patient encounters.

Posters

Graduate Entry Medical (GEM) students' perceptions and the progression of CR skills during alternating PBL and clinical placement sessions.

Rita Wassef, Enjy Abouzeid, Julia Blitz, Patricia Harris.

Enhancing clinical reasoning through interprofessional collaboration.

Rebecca Hancock, Ms Inga Andrew, Professor Chris Eggett.

International online clinical reasoning group teaching.

Sumant Luhana, Peter Garus, Sandisile Ndlovu, Samantha Montandon, Judith Cave, Clare Polack, Elizabeth Estabrook

Mentors' feedback on clinical reasoning skills to fourth year students. What can AI tell us?

Caroline Sprake, Richard Thomson, Sarah Cope, Sarah Graham, Michael Gallon.

Structured bedside teaching to enhance clinical reasoning in junior doctors.

Meera Ben.

How do clinical phase medical students experience informal ward-based learning opportunities? A phenomenological study.

Emma Brown, Stephen Agius.

The feasibility of introducing a large cohort of early (second year) medical students in a GP simulation clinic.

Rini Paul.

Our experience of embedding a clinical reasoning strand into an MBBS curriculum.

Sarah Graham, Sarah Cope, Lucy Richardson, Tiegian Bowers, Phone Paing.

Stop and think: strengthening implicit bias awareness through contextualised clinical reasoning teaching.

Sian Powell, Michael Cole.

Component lead reflections on large scale use of a clinical reasoning tool in classroom-based medical student teaching.

Ryan Peers, Jessica Grundy, Matt Smith, Kurt Wilson, Shireen Tahir.

Implementing and assessing a simulated ward round session for early years medical students.

Tom Broughton, Dan Wright, Sarah Ruaux, Ingrid Wallace.

How clinical students undertake the process of clinical reasoning in Single Best Answer (SBA) questions and Objective Structured Clinical Examinations (OSCE).

James Gray.

Teaching clinical reasoning throughout an MBBS programme.

Charlotte O'Callaghan, Rebecca Farrington.

Teaching students the role of tests and investigations, including test selection and test accuracy.

Helen Moran, Lisa Finnikin, Tanya Feghali, Louise Hammersley.

Evaluation of Clinical Debrief Teaching for undergraduate medical students.

Susan Harris, Aaron Drovandi, Shireen Tahir, Sarah Merrifield.

Simulation sessions to improve students' understanding of clerking and clinical decision-making.

Jasspreet Kaur Sohal, Deelan Vadher, Mahi Manoharan.

From reporters to interpreters: Using illness script templates to develop clinical reasoning in fourth-year medical students.

Egbe Efeharoro, Magdy Abdalla.

"What happens to the ones who don't just pick it up?" – A student-led reflection on gaps in clinical reasoning education.

Nina Tabibzadeh.

Making reasoning visible by learning to document in patient notes.

Rebecca Lin, Stephanie Dean, Samson Woodley.

Utilising Kolb's experiential learning cycle to understand how to maximise bedside teaching for the development of clinical reasoning.

Samson Woodley.

"When you would rather not know..." Decontextualised risk information. Familiar to working clinicians, but a novel conceptualisation, and a challenge to clinical reasoning.

Alex Burns.

Speaker biographies

Keynote speaker

Dr Charilaos (Harris) Koufidis is a practicing pulmonologist at Gävle Hospital, Sweden, and a qualitative researcher affiliated with the Karolinska Institute. Holding a Master's in Medical Education (2015) and a PhD (2023) from Karolinska, Dr Koufidis's research examines how clinical reasoning has been understood, conceptualised, and studied in medical education, as well as how it is learned in workplace settings. One key outcome of this work is the development of the clinical sensemaking model—an empirically informed framework describing how medical students learn to reason in clinical environments, particularly in the early stages of the curriculum.

Article: Koufidis C, Manninen K, Nieminen J, Wohlin M, Silen C. Clinical sensemaking: Advancing a conceptual learning model of clinical reasoning. MEDICAL EDUCATION. 2024; 58(12): 1515–1527.

Article: Koufidis C, Manninen K, Nieminen J, Wohlin M, Silen C. Representation, interaction and interpretation. Making sense of the context in clinical reasoning. MEDICAL EDUCATION. 2022; 56(1): 98–109.

Article: Koufidis C, Manninen K, Nieminen J, Wohlin M, Silen C. Grounding judgement in context: A conceptual learning model of clinical reasoning. MEDICAL EDUCATION. 2020; 54(11): 1019–1028.

Workshops and oral presentations

Prof Anna Hammond is Chair of Medical Education, Director of the MBBS programme, and Academic Lead for Clinical Skills & Reasoning at the Hull York Medical School. She is the co-chair of the HYMS EDI Committee. Anna works two days as a GP in York. She has many years of interest in both clinical reasoning and doctor-patient communication, and is a co-founder of UK CReME.

Prof John Frain is a senior partner at Derwent Valley Medical Practice, Derby, and Professor of Clinical Skills and Medical Education at the University of Nottingham. He leads an integrated Graduate Entry Medicine course across clinical communication, professionalism, inclusion in healthcare, physical examination and clinical reasoning themes. John is interested in the application of technology and evidence to clinical skills education. In 2025, he published 'Exploring Symptoms - an evidence-based approach to the patient history' (Wiley). John is now developing a similar project, 'Finding Signs' on the evidence-base for physical examination.

Dr Michael Trimble is a Clinical Reader in the Centre for Medical Education at Queen's University and a Consultant Physician at the Royal Victoria Hospital, Belfast. He studied medicine at the University of Dundee before returning to Belfast where he trained in General Internal Medicine and Clinical Pharmacology & Therapeutics. During training, he developed an interest in the delivery of acute medical care and was appointed as Consultant in Acute Medicine in the Belfast City Hospital – the first such post in Northern Ireland.

Dr Paul Hamilton trained as a general physician and clinical pharmacologist and worked as a consultant in Acute Medicine before electing to undertake a period of further training. He is now a clinical academic consultant chemical pathologist, working between Queen's University Belfast and the Belfast Health and Social Care Trust. He has an interest in medical diagnostics and clinical decision making.

Dr Andrew Spence is a clinical lecturer in medical education at Queen's University Belfast and consultant gastroenterologist in the Royal Victoria Hospital, Belfast. He graduated from Queen's University Belfast in 2009 and completed his medical training in Northern Ireland in 2023. He has completed a Master's in Clinical Education, Master's in Healthcare Ethics and Law, and a PhD. His main academic interests are in curriculum development, innovation, and simulation-based medical education, with a particular focus on clinical reasoning.

Dr Phil Toner is a medical academic specialising in Clinical Therapeutics and Pharmacology with General Internal Medicine, based in Royal Victoria Hospital, Belfast. He is a clinical lecturer at Queen's University, Belfast, in the Centre of Medical Education. Within the medical school his roles include academic lead for year 3 medicine and deputy lead for case-based learning. Current research interests include the transition experiences of medical students from pre-clinical to clinical years, and drug safety systems within the NHS.

Dr Ryan Peers is a General Practitioner, Clinical Lecturer, and mindfulness meditation coach. He is the academic lead for Clinical Debrief at the University of Manchester, where students work in small groups to cultivate their clinical reasoning skills. Within his academic work, he has a special interest in non-traditional approaches to teaching, such as the gamification of learning, and widening participation in medicine. His current projects explore innovative ways to develop reasoning in undergraduate education.

Dr Shireen Tahir is a clinical lecturer, general practitioner and Deputy Academic Lead for Clinical Debrief on the MBChB Medicine programme at the University of Manchester. Clinical Debrief' is small group case-based teaching, scaffolded across the programme and designed to develop student clinical reasoning. Shireen holds an MSc in Medical Education and has interests in belonging and professional identity. In addition to her current role, she has been part of an Advance HE Collaborative Award for Teaching Excellence team.

Prof Nicola Cooper is director of Postgraduate Taught Courses in Medical Education at the University of Nottingham, a consultant physician based in Derby, and Chair of UK CReME. With colleague John Frain, she edited and wrote the ABC of Clinical Reasoning 2e (Wiley), and is regularly asked to speak on clinical reasoning topics. Nicola is passionate about CReME's mission: to promote excellence in teaching clinical reasoning in undergraduate and postgraduate medical education and to provide high quality resources for teachers and learners. Her research interests include learning in clinical environments.

Prof Mini Singh is a Professor of Medical Education and Honorary Consultant Dermatologist. She was awarded the prestigious Principal Fellowship of the Higher Education Academy for her strategic leadership in healthcare education. She is Director of the Medical School at Edge Hill University and Education Vice President of the British Association of Dermatologists. She has designed innovative curricula across the breadth of healthcare education, including MBChB programmes, Master's degrees and CPD courses. She has supported many national and international medical programmes around curriculum and faculty development and sits on multiple educational committees, either as chair or member. Her research interests focus on clinical reasoning, faculty and curriculum development.

Prof Mark Lillicrap is Professor of Medical Education Practice at the University of Cambridge, Clinical Sub-Dean (Curriculum), Director of the Undergraduate Clinical Supervisor Programme and is heavily involved in faculty development delivery. He is also an honorary Consultant Rheumatologist at Addenbrooke's Hospital, Cambridge, since 2004. Mark facilitates undergraduate teaching sessions on clinical reasoning and regularly delivers faculty development sessions on how to deliver effective clinical reasoning skills teaching and embeds this in bedside and clinical teaching activities. He is the Treasurer of UK CReME.

Prof Simon Gay is Professor of Medical Education and Dean of Medicine at Leicester Medical School. Simon's medical education involvement has included being a GMC Education Associate, former Treasurer of the International Clinical Skills Foundation, Editor-in-Chief of the journal Education for Primary Care, former Chair of the ASME Educator Development Committee, and a co-founder and former Treasurer of CReME. He has contributed to more than 80 clinical reasoning related academic outputs including peer-reviewed publications, book chapters, key-note presentations and workshops. More than 15 years ago, with a fellow co-founder of CReME, he designed and implemented the world's first clinical reasoning dedicated development programme for medical students. Simon was a co-recipient of the inaugural ASME Education Innovation Award in 2011, and a member of a five-person team that won an ASME/GMC Excellent Medical Education Award in 2015. A holder of PFHEA, he was also awarded a National Teaching Fellowship for his contributions to clinical reasoning education in 2025.

Dr Caroline Sprake is the Course Director for year 4 CELTS (Clinical Experience in Long Term Conditions and Elective Surgery) in the School of Medicine, Newcastle University. She is also a local GP partner in Newcastle, GP trainer and undergraduate teacher. Caroline strives to deliver and facilitate the teaching of person-centered medicine to our doctors of the future and will be presenting alongside one of her colleagues, Dr Emer Kennedy.

Dr Emer Kennedy is a Clinical Teaching Fellow in the School of Medicine at Newcastle University, and teaches years 1 and 2 of the MBBS curriculum. Emer recently completed Foundation Programme training in Newcastle and developed a strong interest in medical education, particularly in supporting the development of clinical and communication skills in early stage medical students.

Dr James Gray is a Senior University Teacher, Director of Student Recruitment, and Deputy Programme Director (MBChB) at the University of Sheffield. He successfully led the MMedSci in PA Studies from its inception, through GMC accreditation and achieved top national results, embedding clinical reasoning as a core component in response to stakeholders. During COVID-19, he led crisis management, designing the first face-to-face, socially distanced OSCE examination nationally. He publishes on clinical reasoning and AI in medical education, with his PhD research referenced in the Leng Review on the PA professions.

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Certificates of attendance will be available at the end of the conference.