



CLINICAL REASONING IN MEDICAL EDUCATION CONFERENCE

3rd one day conference for medical educators

National STEM Learning Centre, University of York, Seward's Way, North Campus,
Heslington, York, YO10 5DD

Tuesday 26th November 2019

CONFERENCE eBOOK

TWITTER HASHTAG: **#CRconf2019**

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Conference approved for 5 CPD points by the Royal College of Physicians of London (code 126846)

WELCOME!

Welcome to the UK Clinical Reasoning in Medical Education group's 3rd one day conference for medical educators. We are grateful once again to be able to use the National Science Learning Centre at the University of York in collaboration with Hull York Medical School.

The goal of medical education is to produce clinicians with knowledge, skills and behaviours that lead to good decisions. Good education is important for good patient care. Our conference aims to provide high-quality continuing professional development for educators in undergraduate and postgraduate medical education, with a specific focus on clinical reasoning education. We have some excellent speakers and workshop facilitators, all of whom are actively involved in clinical reasoning education in their institutions. We are especially delighted to welcome Prof Pat Croskerry from Dalhousie University, Canada, who is a well-known author and expert in this field. We will also be launching our consensus statement on the content of clinical reasoning curricula in undergraduate medical education at today's conference.

Don't forget to take time to network with new colleagues! If you would like to explore some of the conference topics in more detail, you can find further resources on our website - www.creme.org.uk . We also Tweet regularly about clinical reasoning topics, so do follow us @UK_CReME.

A big thank you goes to Dr Anna Hammond who has played a vital role in getting this conference organised. Another big thank you goes to Dr Jo Matthan for putting together this eBook and co-ordinating the oral presentations and flashtalks. We'd also like to say thank you to all our speakers, workshop facilitators, presenters, poster authors and everyone who has given their time and expertise to make this conference happen.

Welcome to our conference!

Dr Nicola Cooper

Consultant Physician & Clinical Associate Professor in Medical Education
Chair, UK Clinical Reasoning in Medical Education Group (CReME)

PROGRAMME

0930-1000	Registration and coffee
1000-1010	Welcome Dr Anna Hammond & Professor Gabrielle Finn, HYMS
1010-1110	Plenary Teaching the scarecrow: Critical thinking to improve clinical decision making Professor Pat Croskerry, Dalhousie University, Halifax, Canada
1110-1140	Coffee
1140-1310	Parallel sessions <ol style="list-style-type: none">1. Workshop: Clinical reasoning: the nuts and bolts Professor Maggie Bartlett2. Workshop: Teaching critical thinking Dr Michael Trimble3. Workshop: Clinical reasoning classroom learning: showcasing learning approaches used in Years 3 & 4 Dr Anna Hammond (with HYMS students)4. Workshop: Assessment of clinical reasoning Dr Mini Singh5. Workshop: Engaging the reflective mind in clinical decision making Dr Jim Boyle and Dr Nicola Cooper6. Oral presentations (10mins & 5mins for questions) Chair: Dr Joanna Matthan
1310-1410	Lunch & poster viewing
1410-1430	Plenary A consensus statement on the content of a clinical reasoning curriculum in undergraduate medical education UK Clinical Reasoning in Medical Education Group (CRoME)
1430-1600	Parallel sessions <ol style="list-style-type: none">1. Workshop: Fixing biases: principles of cognitive debiasing Professor Pat Croskerry2. Workshop: Methods for researching clinical reasoning Professor Susan Jamieson3. Workshop: Teaching clinical reasoning in the clinical setting Professor Simon Gay and Dr Caroline Sprake4. Workshop: Developing trainee/near-peer led clinical reasoning teaching Dr Mark Lillcrap5. Workshop: Threshold concepts in clinical reasoning Professor Hilary Neve and Dr Anna Hammond6. Flash talks (5mins & 5mins for questions) Chair: Dr Joanna Matthan
1600	Close. Please hand in your feedback forms!

SPEAKER BIOGRAPHIES

Professor Maggie Bartlett is Professor of Education in General Practice at Dundee School of Medicine and has an interest in clinical reasoning that dates back about 10 years. She has co-authored a five-day course for year 4 students at Keele School of Medicine and has co-authored papers on this course, including one on how teaching clinical reasoning improved the course tutors' own clinical practice.

Dr James Boyle is a Consultant Endocrinologist based at Glasgow Royal Infirmary. He is Head of Year 3 MBChB, Director of Clinical Reasoning and an Associate Professor at the University of Glasgow.

Dr Nicola Cooper is a Consultant Physician based at the University Hospitals of Derby & Burton NHS Foundation Trust. She is also a Clinical Associate Professor in Medical Education, teaching on the Masters in Medical Education at the University of Nottingham, and is part of a team researching aspects of clinical decision making and how best to teach it. Nicola is a training programme director, supervisor, teacher, author and co-edited the ABC of Clinical Reasoning (Wiley, 2018).

Professor Pat Croskerry has published over 80 journal articles and 30 book chapters on patient safety and clinical decision making. He has worked in patient safety for the last 15 years and has given over 500 talks locally, nationally and internationally. He established the first Canadian Symposium on Patient Safety. His research is concerned with clinical decision making, specifically the diagnostic process. He was a member of the organising committee of the first conference on Diagnostic Error (2008, Phoenix) and the second conference (2009, Los Angeles). He has contributed at each annual international conferences on Diagnostic Error in Medicine since.

Professor Simon Gay has been a practicing GP for more than 25 years. He is Professor of Medical Education (Primary Care) at the University of Leicester School of Medicine and is a former Director of Educational Governance

for Nottingham University's MBBS programme. He is a past Deputy Director of Education in General Practice and Director of the MBChB Curriculum at Keele and the current treasurer and a founding member of the UK Clinical Reasoning in Medical Education group (CReME). While at Keele, Simon co-designed one of the world's first undergraduate clinical reasoning courses for medical students and has previously facilitated many clinical reasoning related workshops in the UK and internationally. His academic interests include clinical reasoning, clinical skills development, reflection and professionalism.

Dr Anna Hammond is Director of Communication Skills Teaching and Academic Lead for Clinical Skills & Reasoning at HYMS and a General Practitioner who works at a practice in York three sessions a week. She has a particular interest in doctor-patient communication and clinical reasoning. She co-founded the Clinical Reasoning in Medical Education group (CReME) with Dr Janine Henderson (formerly of HYMS) and colleagues from Keele and Cambridge medical schools.

Professor Susan Jamieson is Professor of Health Professions Education (HPE) at the University of Glasgow, Director of the MSc HPE programme, and supervises doctoral students undertaking HPE research. Her original background is in cancer research, but her doctorate in education examined critical thinking in the social context of problem-based learning tutorials. Her interests include social/socio-cultural theories of learning, critical thinking and clinical reasoning.

Dr Mark Lillicrap is a Consultant Rheumatologist at Addenbrooke's Hospital in Cambridge and Hinchingsbrooke Hospital in Huntingdon. He is an Associate Lecturer and Curriculum Sub-Dean at the University of Cambridge, an Educational Supervisor for postgraduate trainees, a lecturer and tutor on the Cambridge PGCert in Medical Education and the Director of the undergraduate clinical supervisor programme in Cambridge. He delivers regular clinical reasoning teaching to both undergraduate and postgraduate trainees. He also trains teachers (junior and

senior doctors and allied health professionals) how to effectively teach clinical reasoning and has done this training locally, nationally and internationally.

Dr Joanna Matthan is Senior Lecturer and Director of Academic Studies at the School of Dental Sciences at Newcastle University, with a background in Medicine and a current career in Clinical Anatomy across the Faculty of Medical Sciences. Jo has recently transitioned from the School of Medical Education, where she was the Newcastle University representative on the UK Clinical Reasoning in Medical Education group (CReME) and she is a founding committee member of CReME and keen to expand clinical reasoning into dental education.

Professor Hilary Neve is Associate Head of School and Professor of Medical Education at the University of Plymouth Peninsula Medical School where she leads the professionalism, small group and social engagement programmes. Hilary has led the re-design of Peninsula's clinical reasoning formative assessment process. She also works as a General Practitioner, is a Principal of the Higher Education Academy and a National Teaching Fellow. Hilary has a longstanding interest in threshold concepts and troublesome knowledge in medical education and has pioneered the use of audio diaries as a method for researching these. She has published on threshold concepts in medical education, problem-based learning, professionalism, population health and 'professional touch'.

Dr Mini Singh is a Senior Lecturer and Honorary Consultant Dermatologist at the University of Manchester and Salford Royal NHS Foundation Trust. As Principal Fellow of the Higher Education Academy, she has a passion for medical education and completed her Masters at UCL to distinction level. Her current role is Associate Programme Director for Teaching and Learning for University of Manchester Medical School. As the largest medical school in the UK, it supports over 2000 students. Dr Singh is responsible for curriculum development, design and implementation across the five-year course. Her interest lies in

translational education: applying theory to real world programmes. As part of this, she has recently driven programmatic changes to embed clinical reasoning education in to the curriculum. Though predominantly engaged in undergraduate work she has a keen interest in postgraduate education, establishing a Dermatology International Fellowship Programme, career placement programmes for junior doctors, an MSc in Skin Ageing and Aesthetics and a CPD programme for healthcare professionals in community medicine. National work includes Chair of the undergraduate workstream for the British Association of Dermatology and committee membership of the UK Clinical Reasoning in Medical Education Group (CReME). She has been invited to deliver several workshops in clinical reasoning and broader areas of education across the UK and abroad.

Dr Caroline Sprake is a GP in North Tyneside and Associate Sub-Dean for Primary and Community Care and Senior Lecturer for the School of Medical Education at Newcastle. The undergraduate medical curriculum has recently undergone a review and Caroline has been part of a clinical reasoning working group establishing a spiral curriculum for clinical reasoning, ensuring it is explicitly taught across all years of the curriculum. This has been aided by the being part of CReME and our recent consensus statement to understand what is required within the curriculum to support clinical reasoning development.

Dr Michael Trimble is a Clinical Lecturer in the Centre for Medical Education at Queen's University Belfast (QUB) and a Consultant in Acute Medicine at the Royal Victoria Hospital, Belfast. During his training, Michael developed an interest in the delivery of acute medical care and was appointed as a Consultant in Acute Medicine in the Belfast City Hospital – the first such post in Northern Ireland. He has an interest in postgraduate medical training, having held the roles of training programme director for Acute Medicine and Head of the School of Medicine in the Northern Ireland Deanery. In 2016, he moved to his current post at QUB. Within the university, he is subject lead for Internal Medicine, clinical ethics and clinical reasoning.

PARALLEL SESSION ROOM ALLOCATIONS

TITLE	SPEAKERS	LOCATION
MORNING SESSIONS		
Workshop 1: Clinical reasoning: the nuts and bolts	Professor Maggie Bartlett	Seminar Rooms 1&2 (First Floor)
Workshop 2: Teaching critical thinking	Dr Michael Trimble	Teaching Room 2 (Second Floor)
Workshop 3: Clinical reasoning classroom learning: showcasing learning approaches in Years 3 & 4	Dr Anna Hammond and HYMS students	Teaching Room 5 (First Floor)
Workshop 4: Assessment of clinical reasoning	Dr Mini Singh	Seminar Rooms 3&4 (First Floor)
Workshop 5: Engaging the reflective mind in clinical decision making	Dr Nicola Cooper and Dr James Boyle	Lecture Theatre 1 (Ground Floor)
Session 6: Oral presentations	Chair Dr Joanna Matthan	Lecture Theatre 2 (First Floor)
AFTERNOON SESSIONS		
Workshop 1: Fixing biases: principles of cognitive debiasing	Professor Pat Croskerry	Lecture Theatre 1 (Ground Floor)
Workshop 2: Methods for researching clinical reasoning	Professor Susan Jamieson	Teaching Room 2 (Second Floor)
Workshop 3: Teaching clinical reasoning in the clinical setting	Professor Simon Gay and Dr Caroline Sprake	Seminar Rooms 3&4 (First Floor)
Workshop 4: Developing trainee/near-peer led clinical reasoning teaching	Dr Mark Lillicrap	Seminar Rooms 1&2 (First Floor)
Workshop 5: Threshold concepts in clinical reasoning	Professor Hilary Neve & Dr Anna Hammond	Teaching Room 5 (First Floor)
Session 6: Flash talks	Chair Dr Joanna Matthan	Lecture Theatre 2 (First floor)

PARALLEL SESSIONS

MORNING SESSIONS

WORKSHOP 1: Clinical Reasoning: the nuts and bolts (Professor Maggie Bartlett)

This workshop considers some of the theories and models that underpin clinical reasoning teaching and learning and how they inform educational practice. We will think about decision-making in general, and how it transfers into clinical practice. We will also look at some of the current thinking about how clinical reasoning should be taught in the workplace and what students can do to work on their own development in this area. The workshop will be a mixture of information giving and practical exercises.

WORKSHOP 2: Teaching critical thinking in medicine (Dr Michael Trimble)

Historically, university students would be expected to master the basics of logic – how to think; rhetoric – how to debate; and grammar – how to use language, before embarking on their higher studies. In contemporary education, such skills are often assumed. This workshop aims to encourage participants to think about thinking and to provide suggestions and examples of how we can help our students improve their thinking skills. The workshop will explore thinking, errors in general and thinking as applied to the practice of medicine.

WORKSHOP 3: Clinical reasoning classroom learning: showcasing learning approaches in Years 3 & 4 (Dr Anna Hammond and HYMS students)

Anna Hammond is delighted to have two Year 5 HYMS students running this workshop with her. This parallel session will showcase the approaches used in the HYMS Year 3 and 4 clinical reasoning workshops which were introduced to provide a formal underpinning curriculum to supplement the extensive workplace experiential learning in this area. The clinical reasoning workshops are delivered in small groups on clinical sites, using a ‘flipped classroom’ model with pre-session work on HYMS Blackboard (virtual learning environment). The approaches demonstrated in this parallel session are

easily transferable to a clinical setting and delegates from all backgrounds are welcome!

WORKSHOP 4: Assessment of clinical reasoning (Dr Mini Singh)

This workshop will cover the following learning objectives: (1) Review existing methods of assessing clinical reasoning, considering advantages and disadvantages, (2) Discuss and debate the integration of clinical reasoning into clinical and workplace assessments, (3) Consider the applications of ideas to your local environment. We will review current literature briefly before focussing on the ‘does how’ level of Miller’s Pyramid in clinical reasoning assessment with group exercises, debate and sharing of practical tools.

WORKSHOP 5: Engaging the reflective mind in clinical decision making (Dr Nicola Cooper and Dr James Boyle)

This is a two-part workshop: (1) An overview of the evidence of the importance of metacognition/engaging in reflection during clinical decision making, and (2) Identification of practical ways in which teachers can facilitate reflection, using a components of clinical reasoning model. We will try to leave plenty of room for discussion and sharing of experience and tips among participants.

PARALLEL SESSION 6: Oral Presentations (Chair Dr Joanna Matthan)

Come and listen to the clinical reasoning work done on the shop-floor across the UK. Five presentations of very different types of clinical reasoning work have been selected from across the country and will make for very interesting listening, with potential opportunities for collaboration and further work in the respective areas.

AFTERNOON SESSIONS

WORKSHOP 1: Fixing biases: principles of cognitive debiasing (Professor Pat Croskerry)

This workshop will cover the principles of cognitive de-biasing, including established strategies as well as newly evolving ones. The challenges of debiasing will also be discussed.

WORKSHOP 2: Methods for researching clinical reasoning (Professor Susan Jamieson)

In this workshop, we'll identify some of the ways in which clinical reasoning has been researched to date. We'll relate specific data collection and analysis methods to the aims or questions being addressed, to the clinical context, to specific models of clinical reasoning etc. The workshop will be activity-based, using resources such as excerpts from the literature and a glossary of methodological terminology. The aim is to increase awareness, selection and/or critique of different methods that may be used for research into clinical reasoning.

WORKSHOP 3: Teaching clinical reasoning in the clinical setting (Professor Simon Gay and Dr Caroline Sprake)

Teaching clinical reasoning in the clinical setting, we will be exploring the opportunities to teach clinical reasoning in our own environments and sharing different models for deconstructing and promoting the students' reasoning to encourage more explicit understanding of the process.

WORKSHOP 4: Developing trainee/near-peer led clinical reasoning teaching (Dr Mark Lillicrap)

This workshop will enable delegates to share their experiences of using junior doctors and more senior students to deliver clinical reasoning training. Frameworks that have been used successfully in training programmes will be discussed and ideas on best practice in this area will be discussed. By the end of the session delegates should feel confident to create and

improve near-peer led clinical reasoning teaching in their local institutions

WORKSHOP 5: Threshold concepts in clinical reasoning (Professor Hilary Neve and Dr Anna Hammond)

This interactive workshop offers you the opportunity to look at clinical reasoning with a new 'threshold concept' lens. Identified by Meyer and Land in 2003, 'thresholds' are thought to be key to achieving mastery of a subject. We will first introduce the ideas of threshold concepts, troublesome knowledge and the liminal space and encourage you to consider examples from your own experiences. You will work in groups to 1) consider which clinical reasoning concepts may be threshold or troublesome and 2) analyse student language to notice when and why students are struggling or have crossed thresholds. We will discuss how the learning from these activities could influence how you develop curricula or teach clinical reasoning in your own settings. We will also share ways you can further develop your understanding of threshold concepts.

PARALLEL SESSION 6: Flash talks (Chair Dr Joanna Matthan)

We have selected five topics for our flash talk session. These are interesting clinical reasoning projects from around the country delivered in a short and punchy style, with 5 minutes for the presenter to present the concept and 5 minutes for any discussion arising from the talk. This is an opportunity to network, get new ideas for implementing them at your own institute as well as for collaborating across institutes.

PRESENTATIONS AND POSTERS

ORAL PRESENTATIONS	FLASHTALKS	POSTERS
Cognitive bias and debiasing strategies in Core Medical Trainees: a qualitative study (Sarah Lawrence)	Student perceptions: the perceived advantages and disadvantages of the Clinical Reasoning Discussion (CRd) assessment (Nilani Uthayakumar and Jonathan Cartledge)	How effectively are we training our teachers to teach clinical reasoning? (SweYin Khin-Htun , J Hickman and I Glover)
Supporting clinical reasoning teaching using online patient simulations: a feasibility randomised controlled trial (Ruth Plackett , Angelos P Kassianos, Maria Kambouri, Stephen Duffy, Rosalind Raine and Jessica Sheringham)	Introducing 'cognitive dispositions to respond' to 2 nd year medical students at Dundee (Evie Fioratou)	Learning strategies to facilitate clinical reasoning ability among medical students (Nicola Cooper)
Making the invisible visible: guiding faculty to share their clinical reasoning with students (Kurt Wilson , J Grundy, P Watson, M Jones, C Warner, M Singh)	Is there a case for using virtual reality to develop students' clinical reasoning skills? (Holly Mould)	What are assessors' perceptions of the advantages and limitations of the CRd tool? (Nilani Uthayakumar and Jonathan Cartledge)
Integrating practical and clinical reasoning skills into a new curriculum within a large medical school (Hannah Hubbard and Emma McAllister)	Clinical reasoning and Radiology : the untapped potential for medical students (Cindy Chew and Jessica Liu)	
A pilot study into the effects of mindfulness training on the clinical decision-making of medical students during their Student Selected Component (SSCs) (Michael Atkinson , Caroline Sprake, Lucy Harrison)	Work-based assessments in clinical reasoning: supporting students, informing curriculum development. (Christian Warner , Matt Jones, Rebecca Farrington, Lisa Collins, Pippa Watson, Mini Singh)	

ORAL PRESENTATIONS

PRESENTATION 1: Cognitive bias and debiasing strategies in Core Medical Trainees: A qualitative study (Dr Sarah Lawrence, University of Manchester)

Introduction: 1 in 20 deaths occurring in hospital in the UK are preventable and 30% of associated errors occur during diagnosis (Hogan *et al.* 2012). Cognitive factors are present in the majority of cases (Graber, Franklin and Gordon, 2005). Core Medical Trainees (CMTs) are postgraduate doctors of at least 2 years' experience who perform the initial diagnosis and management of many patients referred to General Medicine. Drawing on dual process theory (Kahneman and Tversky, 1974), this qualitative study is the first to explore understanding of cognitive bias in CMTs and how they develop and use debiasing strategies to avoid error.

Methods: All CMTs (n=10) at a UK teaching hospital were invited to participate. Of these, 7 responded and were subjected to audio-recorded clinical case discussions and semi-structured interviews. Resulting transcripts were coded and themes defined and described using inductive thematic analysis (Braun and Clarke, 2006).

Results: The following themes were identified: the wider hospital context, interface with other specialties, pragmatic practice, previous experience of error, cues for rational override, the debiasing journey, common debiasing strategies, the relationship of debiasing to the CMT programme and the teaching and assessment of debiasing.

Discussion: CMTs demonstrate good implicit understanding of cognitive bias and their debiasing strategies are contextualised by the pressures of daily practice in a busy hospital. Clinical decision-making, use of heuristics and debiasing techniques are often aimed at maintaining a safe clinical trajectory in unwell patients rather than achieving definitive diagnosis. In accordance with constructionist theory, knowledge around cognitive bias is generated in a social space with case discussions used as currency of communication. Motivation to improve debiasing is closely linked to CMTs' future role as a Medical Registrar. Future research aimed improving debiasing should utilise established

avenues of shared reflection and unmet demand for experiential learning.

PRESENTATION 2: Supporting clinical reasoning teaching using online patient simulations: a feasibility randomised controlled trial (Plackett Ruth, Kassianos Angelos P., Kambouri Maria, Duffy Stephen, Raine Rosalind, Sheringham Jessica)

Introduction: Theories of learning and clinical reasoning indicate online patient simulations (OPS) can support the teaching of clinical reasoning skills to undergraduate medical students, which may help to reduce future diagnostic errors. eCREST — the electronic Clinical Reasoning Skills Educational Simulation Tool — is an OPS that uses interactive vignettes with reflective prompts, to address cognitive biases that can impair clinical reasoning. This study examines the feasibility and acceptability of eCREST.

Methods: A feasibility randomised controlled trial was conducted from March 2017 to February 2018 to assess the uptake, completion rates and acceptability of eCREST and to test clinical reasoning outcomes. Final year undergraduate students from three UK medical schools were invited to participate and randomised into two groups. The intervention group received 3 patient cases via eCREST for 1 week and the control group received teaching as usual. Clinical reasoning skills were measured using a self-report survey and student performance on a further patient case delivered via eCREST.

Results: In total, 18.2% (264/1454) of eligible students volunteered to participate. One week after baseline 72% (99/137) of the intervention and 68% (86/127) of the control group remained in the study. After one month 57% (78/137) of the intervention and 55% (70/127) of the control group remained in the study. The intervention was acceptable, 82% (84/98) of the intervention group who completed the survey, agreed that eCREST helped them to learn clinical reasoning skills applicable to their clinical work. Preliminary findings suggested that eCREST may improve students' ability to gather essential information from patients over controls (*OR* = 1.4; 95% CI 1.1-1.7, *n* = 148).

Discussion: Uptake and acceptability of eCREST were satisfactory, suggesting that it is feasible to conduct a summative trial to

estimate effectiveness. OPS provide an opportunity to teach reflective and flexible reasoning skills, which may contribute to reducing future diagnostic errors.

PRU acknowledgement: This abstract presents independent research commissioned and funded by the National Institute for Health Research (NIHR) Policy Research Programme, conducted through the Policy Research Unit in Cancer Awareness, Screening and early Diagnosis, PR-PRU-1217-21601. The views expressed are those of the author(s) and not necessarily those of the NIHR, the Department of Health and Social Care or its arm's length bodies, or other Government Departments.

PRESENTATION 3: Making the invisible visible: guiding faculty to share their clinical reasoning with students (K Wilson, J Grundy, P Watson, M Jones, C Warner, M Singh; Manchester Clinical Reasoning Group, Division of Medical Education, University of Manchester, Manchester, UK)

Educational Objective: Our medical school has made clinical reasoning (CR) a core element of learning across our programme, both in terms of learning content and assessment. There is clear evidence that faculty need to engage with CR learning in order to effectively deliver teaching (Bartlett & Gay, 2015).

Purpose: To educate undergraduate faculty to include CR in their teaching delivery.

Methods: We ran a series of interactive workshops for mixed groups of tutors from primary and secondary care. We used simulated case reports, based on real clinical encounters in general practice, in-patient and out-patient care that we had been part of. These cases provided context to our training about CR, promoting discussion and debate between the tutors in small and large group interactions. Tutor feedback was collected quantitatively and qualitatively at the end of the training, using electronic survey.

Results: Ninety-six tutors attended our training, with sixty-five tutors providing feedback. Our staff development was met favourably by tutors, with an overwhelming rating of our training as very useful (4.3/5 on a Likert scale). Tutors clearly saw the place of CR within the contexts of everyday teaching within their clinical settings. Delegates fed back that the workshops helped them see the

value of sharing CR as part of their teaching. Comments included: *'Really made me sit up and think whether I was practicing clinical reasoning in my teaching'* and, *'Turned out I was teaching a lot of clinical reasoning but I had no idea what it was called!'* They reported that over their previous 10 teaching sessions, they made deliberate expressions of their clinical thought processes in about half of these (5.4/10). The need for more deliberated and explicit explanation of clinical reasoning when teaching students was evident in quantitative feedback, and also qualitatively. Comments included *'Interactive, thought provoking. Will use a couple of techniques in future'* and, *'I can incorporate this explicitly into my teaching practice.'* Our faculty reported that at the end of the workshop, they felt more confident in the promotion of reflection on CR for the students. Comments included: *'Really useful ideas for how to do this.'*

Conclusions: Providing clinical context to tutors in their training about teaching CR helped tutors understand the importance of this topic. The cases showed its relevance to all clinical settings, and sparked discussion and reflection with regard to how best individuals would introduce this teaching into their clinical placement. Whilst tutors reported that they provided deliberate explanations of their clinical reasoning in around half of their teaching encounter, they this as an essential process for teaching students. The workshop raised awareness of how best to make tutor clinical reasoning visible to those they trained.

PRESENTATION 4: Integrating practical and clinical reasoning skills into a new curriculum within a large medical school (Hannah Hubbard, Emma McAllister; School of Medical Education, Newcastle University, Newcastle upon Tyne)

Clinical reasoning is often taught in isolation with limited integration of practical skills including history taking and examination. Given that educational theory and pedagogic research evidence suggests that learning in context improves transfer and application of knowledge, we aimed to pilot a novel integrated approach to clinical reasoning education. Here we describe the development and implementation of our approach into

years one and two (Essentials of Medical Practice, EOMP) of the undergraduate medical programme at Newcastle University.

We developed two patient cases for the year 2 (n= 287) EOMP cohort to follow from presentation to diagnosis. Rather than teach history taking, examination and clinical reasoning separately, we aimed to link these sessions through longitudinal integration of the patient case. During the history taking session, students took and documented the patient history. Following an examination session, they watched a video of the patient being examined. Finally, students brought their history notes and clinical findings from the examination to the clinical reasoning session. Students then proposed differentials and interpreted basic investigation findings, to arrive at a diagnosis. Course evaluations revealed our approach to be very well-received by students, particularly in terms of learning experience and clinical relevance.

Following the success of this pilot, we intend to roll out integrated clinical reasoning across the whole EOMP curriculum. Based on student feedback, we plan to introduce sessions from the beginning of year one, with the cases gradually increasing in complexity. A key priority for the 2019/20 iteration will be to merge history taking, examination and clinical reasoning into a single session so they occur in almost real time. We propose that this innovative approach will improve the ability of students in applying their knowledge, and their confidence in clinical reasoning.

PRESENTATION 5: A pilot study into the effects of mindfulness training on the clinical decision-making of medical students during their Student Selected Component (SSCs) (Michael Atkinson, Caroline Sprake, Lucy Harrison)

Introduction: Clinical decision-making (CDM) is an essential component of clinical reasoning. The cognitive processes involved are complex, layered and involve higher level thinking. One important aspect is attentive mindful observation i.e. to be able to attend to the patient whilst attending to one's own mental processes. Thus, it is logical to assume that Mindfulness Training (MT) could be of benefit.

Methods: This pilot study utilised data from two separate 4th year Student Selected

Components (SSCs) at the University of Newcastle between April and May 2019, delivered by two different teachers:

SSC 1. Six medical students volunteered to partake in a 4-week introductory MT to complement a clinical 6-week hospital-based SSC.

SSC 2. Four medical students engaged in an SSC which involved a formal 6-week mindfulness course (adapted Mindfulness Based Intervention)¹ integrated with general practice.

The intention was to explore qualitatively if MT influenced CDM. Following a focus group at the end of the SSC, thematic analysis was used to identify themes and draw conclusions. Additionally, quantitative data was collected using the Mindfulness Attention Awareness Scale (MAAS) before and after SSC.

Results: Qualitative data revealed enhancements in concentration, attentional control, kindness and empathy toward self and patients, and for some, increased confidence to make decisions. Quantitative data revealed that all students experienced an overall increase in mindfulness.

Discussion: The results indicate that MT could potentially improve CDM; particularly the ability to pause to process emotions and formulate judgments, as well as having more presence of mind, focus and concentration during consultations. Nevertheless, we did not find sufficient evidence to directly attribute MT to CDM due to the small sample size. Further longitudinal research and larger sample sizes would be required to establish this. This study adds to the growing field of research into MT and medical education.

¹ *Mindfulness-Based Cognitive Therapy*

FLASHTALKS

FLASHTALK 1: Student perceptions: the perceived advantages and disadvantages of the Clinical Reasoning Discussion (CRd) assessment (Nilani Uthayakumar and Jonathan Cartledge)

Introduction: The CRd tool is a new workplace-based assessment (WPBA) being used at University College London (UCL) Medical School. It allows students to receive specific feedback on their diagnostic reasoning and management plans. The Case-Based Discussion (CBD) is similar in nature but the CRd assessment allows students to write down their management plan and differentials, making it more specific. Students write the patient summary, top diagnoses, diagnoses that need excluding, immediate management plan and then this is critiqued. Student opinions are important to decide whether this tool is of benefit and could be made a standard UCL WPBA.

Methods: The first cohort of medical students (120) to use the CRd assessment was targeted. Anonymised online questionnaires with a blend of closed and open questions and Likert scales were used. Qualitative data was analysed using the constant comparison method whereby open coding, axial coding and selective coding were employed to categorise data before proceeding to content analysis.

Results: There was a 17% response rate. 65% found the CRd easy to complete. 55% felt they had received useful feedback from their tutor. 60% found that the CRd feedback helped them consolidate their knowledge and 40% reported that gaps in their knowledge were highlighted. Advantages highlighted were the ability to obtain instant feedback, more specific discussion and a more structured approach. Disadvantages raised were that it was time-consuming and difficult to complete due to formatting.

Discussion: Both qualitative and quantitative data from this study show that the CRd assessment has been well received with some advantages acknowledged over the CBD and some disadvantages highlighted that are correctable. From the qualitative data accrued, the main advantage of CRd found was improved learning experience.

FLASHTALK 2: Introducing cognitive dispositions to respond to 2nd year medical students at Dundee (Evie Fioratou, Lecturer in Behavioural & Social Science, Dundee Medical School)

Introduction: Second year medical students at Dundee are introduced to Croskerry's (2003) cognitive dispositions to respond (CDRs) in the Dermatology block, following a lecture on System 1 vs System 2 thinking processes at year 1. Learning about CDRs through experience allows students to appreciate their ubiquitous nature and how they can lead to misdiagnosis, even in experts. The current teaching session in Dermatology explores CDRs and their effects on diagnostic decisions, before exploring potential strategies to avoid them or at least recover faster from them in the future.

Method: A dermatological case reported (Lipper, 2017) was given to students in groups (4 groups per 3 sessions) at the start of a 2 hour workshop. Students were asked to consider their differential diagnosis and most likely diagnosis under 4 conditions: with a picture of a seborrheic keratosis accompanying the history or with a picture of a malignant melanoma, whilst being in a GP or a dermatology department. Lipper's (2017) patient history primes towards a malignant melanoma and a subsequent request at a second opinion of a GP or a dermatologist is either congruent or incongruent to the picture provided. Each group served in one of the 4 conditions, allocated randomly.

Results: Malignant melanoma topped the differential list in all 4 conditions and eventually was decided as the main diagnosis irrespective of the visual examination or the incongruent 2nd opinion even the seborrheic keratosis picture groups. All the seborrheic keratosis groups in all 3 sessions exhibited anchoring on the patient's history of previous cell carcinoma.

Discussion: Second year medical students learned about CDRs by exploring their own and their fellow students diagnostic decisions in the four conditions designed during their Dermatology session. Implications for the design of future teaching sessions on CDRs will be discussed.

FLASH TALK 3: Is there a case for using virtual reality to develop students' clinical reasoning skills? (Holly Mould)

Clinical reasoning skills are a core competency that should be taught to undergraduate medical students to support safe clinical decision making. Yet the literature demonstrates that foundation doctors are not prepared for managing acute deterioration in patients or complex cases. Workplace pressures limit opportunities for deliberate practice with constructive feedback. Simulation using

Simulated patients and virtual patients are an effective tool for developing medical students' clinical reasoning abilities. However, simulated patients do not have visible signs of disease and most current Virtual patient models do not provide an immersive clinical environment for the student to practise in a lifelike scenario.

Virtual reality technology has been used to develop competency in surgical procedural skills before practising on patients in real life environment. Theoretically, virtual reality could present a more immersive clinical environment through which medical students of the future could develop their clinical reasoning. I performed a literature review with an aim to evaluate the use of both 'traditional' virtual patients and virtual patients within virtual reality. In this talk I will present the findings of this review – what virtual patients and virtual reality are, the benefits and disadvantages of virtual patients, and where a virtual patient in virtual reality could sit within current the medical education curriculum at the University of Manchester.

FLASH TALK 4: Clinical reasoning and Radiology: the untapped potential for medical students (Cindy Chew, Ms Jessica Liu, University of Glasgow)

Main Message: Modern clinical medicine is increasingly reliant on Radiology. It is important we teach our students the role it plays in the diagnostic process. While almost every condition the medical student is expected to master has a medical image to accompany it, it should not be the default investigation for every patient encounter. The combination of clinical stories with Radiology is a potent way to teach clinical reasoning. We present our initial experience using Storyline® to interactively guide the student to work

through a patient's presentation, clinical findings, investigations, imaging (where appropriate!) and results to finally arrive at a diagnosis. The short online exercise concludes with a 1 slide summary of the condition to encourage further reading.

Relevance to conference: They say a picture paints a thousand words! Clinical reasoning is a complex thought and decision-making process – culminating in a diagnosis and treatment plan. Radiology is arguably the most powerful diagnostic tool in a clinician's armoury. Together clinical reasoning can be taught in a fun, interactive way without excessive cognitive load.

FLASH TALK 5: Work based assessments in clinical reasoning: supporting students, informing curriculum development (Christian Warner, Matt Jones, Rebecca Farrington, Lisa Collins, Pippa Watson, Mini Singh; Manchester Clinical Reasoning Group, Division of Medical Education, University of Manchester)

Main Message: Taking evidence from the literature on methods that promote clinical reasoning the University of Manchester medical school have incorporated electronic work based assessments (WBAs) for all of its clinical students (n= 1380). Applying the clinical reasoning cycle model, emphasising the centrality of context, offering multiple practice opportunities and discourse with meaningful feedback have identified areas of strength, and challenge for learners. Data from over 8000 patient encounters demonstrates an accessible model to assess clinical reasoning in the workplace: identify areas for curricula development, provide individualised feedback to students and demonstrates the impact of longitudinal learning in clinical reasoning.

Relevance: Teaching methods that support medical students' development in clinical reasoning are essential preparation for clinical practice. Underpinning these methods with pedagogic evidence increases effectiveness. This flashtalk will share with the audience our experience of delivering a model for WBA for clinical reasoning learning: the challenges and benefits for students and curriculum developers.

POSTERS

POSTER 1: How effectively are we training our teachers to teach clinical reasoning? (Khin-Htun S¹, Hickman J² and Glover I²; ¹School of Medicine, University of Nottingham, Nottingham, United Kingdom; ²Cambridge University Hospitals NHS Trust, United Kingdom)

Introduction: Clinical reasoning (CR) is an ability to think, reason and make decisions in a context dependent clinical scenario but its intuitive component can be a challenge to teach in formal education settings. The aim of this research is to assess the learning needs of the clinical educators and develop a training programme based on this.

Methods: In the initial phase, nine Teaching Fellows (TF) were interviewed to explore their understanding of CR and their current application of it within their teaching which allowed for the subsequent development of three half day workshops.

Fourteen teachers attended workshop one, which focussed on an introduction to the principles of CR. Workshop two explored literature recommendations and constraints on teaching, with 30 participants. Workshop three covered different learning theories and applications, 20 teachers attended this workshop. Then, in every workshop, information about how this would change their practice as clinicians and educators was collected.

Results: Results from the initial learning needs analysis revealed that although the general consensus was CR should be taught, teachers were unsure how or when. Another constraint was poor knowledge of teaching methods and tools that could be used. In the post course evaluation 100% ranked the workshops as four or five on the Likert scale. The workshops were described as a great learning experience, with fantastic resources and credible tutors.

Discussion: As with previous research we found a dual benefit from our interventions: Teaching Fellows felt having learned how to teach CR would change their practice as both clinicians and educators. In conclusion, the educational techniques proven to aid CR are well developed but the lack of faculty expertise in teaching CR remains a significant barrier. This faculty development programme will

enable us to train our clinical teachers to more effectively and explicitly teach CR.

POSTER 2: Learning strategies to facilitate clinical reasoning ability among medical students (Nicola Cooper)

Introduction: Knowledge (factual, conceptual and experiential) are key determinants of diagnostic accuracy (Norman et al 2006; Norman et al 2017). Organised, problem-specific knowledge is associated with better diagnostic performance among medical students with similar *generic* knowledge levels (Coderre et al, 2009) and also enhances spontaneous analogical transfer, that is, the application of learning to new cases in different contexts. While practice with corrective feedback with as many cases as possible in as many different contexts as possible is critical for learning, practice alone is insufficient – it needs to be structured to gain optimal effects. Retrieval practice and spaced practice are examples of ‘desirable difficulties’ that are superior in getting knowledge in to long term memory and enhancing diagnostic performance (Eva 2009; Eva, 2017). Strategies that build knowledge and understanding are also more effective (Schmidt & Mamede, 2015; Weinstein & Sumeracki, 2019). This poster outlines these strategies in more detail.

Conclusions: Some teaching and learning strategies have been shown to be more effective than others in facilitating learning, memory, skill acquisition, and clinical reasoning ability. While practice with corrective feedback with as many cases as possible in as many different contexts as possible is critical for learning, practice alone is insufficient – it needs to be structured to gain optimal effects. Retrieval practice and spaced practice are examples of ‘desirable difficulties’ that are superior in getting knowledge in to long term memory and enhancing diagnostic performance (Eva 2009; Eva, 2017). Strategies that build knowledge and understanding are also more effective (Schmidt & Mamede, 2015; Weinstein & Sumeracki, 2019).

POSTER 3: What are assessors' perceptions of the advantages and limitations of the CReD tool? (Nilani Uthayakumar and Jonathan Cartledge)

Introduction: The Clinical Reasoning Discussion (CReD) is a new workplace-based assessment (WPBA) tool used by medical undergraduates at a London university. It is thought to allow more specific feedback than other WPBAs. It is similar to the Case-Based Discussion (CBD) but focuses more on diagnostic reasoning and management. Students must commit to writing their reasoning into a template and then discuss this with a supervisor.

Methods: Semi-structured interviews were used to gather qualitative data. Purposive sampling was used to efficiently build a sample and provide relevant data. Data was evaluated using content analysis. Themes and categories that arose from the interview process were acknowledged and explored, removing the limitation of preconceived themes.

Results: There was a response rate of 3.5% but out of these 6 respondents, 1 was untraceable, 3 were ineligible, leaving just 2 suitable candidates (1.2 %). Assessors received the CReD favourably overall as they find it is easy to use, promotes deeper learning, its structure guides both learner and assessor and there has been evidence that some may prefer it to the CBD and other WPBAs. Another theme was that this WPBA specifically prepares medical students for becoming junior doctors. A disadvantage highlighted was that this was yet another WPBA for students to complete (i.e. in addition to other requirements) when assessors are under great time pressures.

Discussion: The sample size was smaller than intended and this may reflect current NHS pressures. Despite this limitation, these findings are still useful. The university can take reassurance from the positive feedback received that this is a tool worth employing and work on the disadvantages raised i.e. train assessors on how to use this tool and increase use of this WPBA by students.