Minutes of the Derby Medical Society, Tuesday 18th February 2025
Derby Medical School Lecture Theatre

Teaching Clinical Reasoning
Professor Nicola Cooper; Professor of Medical Education

Apologies: None Received

Dr Sally Archer, President, welcomed everyone to this, the eighth meeting of the 2024-2025 season.

Minutes of previous meeting given by Dr McIntyre

Dr Archer announced the three successful students for this years Medical Student Elective Bursary. They are:

- Isobel Rowland
- Simran Sahota
- Nana Danso-Appiah

Dr Archer introduced Prof Cooper. She is a Consultant Physician working in Acute Internal Medicine. As a Clinical Academic she has developed an interest in medical education and is the Course Director of postgraduate taught courses in Medical Education. Her particular interest is in clinical reasoning education. She is chair of the UK Clinical Reasoning in Medical Education group (www.creme.org.uk), a not-for-profit organisation with links in the majority of medical schools that promote excellence in teaching clinical reasoning in medical education and provide high quality resources for teachers and learners.

Prof Cooper outlined the scope of her lecture: what is clinical reasoning and why it matters; what to teach; how to teach. A working definition of clinical reasoning is *'a skill, process, or outcome wherein clinicians observe, collect, and interpret data to diagnose and treat patients….It entails both conscious and unconscious cognitive operations, interacting with contextual factors'*. It is hugely important as reaching the wrong diagnosis from the patients symptoms is a major cause of patient harm. Improving clinical reasoning can reduce diagnostic error and improve patient outcomes. She expanded on how system failures (eg IT, availability of diagnostics, available expertise, junior supervision, overcrowding) can contribute to diagnostic error. She also pointed out the importance of human factors such as workload, overcomplicated process, equipment, rota design, rest breaks. However, a crucial element is errors in thinking. Clinicians need sound knowledge but the way we think has an impact and it is possible to teach reasoning better. The majority of cognitive errors arise from faulty synthesis of the available information. Research shows common themes: common diseases get missed, often due to missed opportunities in history/physical exam and information in the medical records is overlooked.

Prof Cooper then turned to: what to teach? The domains of clinical reasoning education ('the what') have been identified as: evidence-based history and physical examination; choosing and interpreting tests; problem identification and management; shared decision making; clinical reasoning concepts. She used problem representation as an example. Defining and representing the problems allows aligning with 'illness scripts' in our long-term memory. Illness scripts do take time to develop. However, when we use precise and accurate language

that enable use of illness scripts it is associated with 80% accuracy in resolving complex problems.

So how can we teach clinical reasoning? Prof Cooper discussed things that do and do not work. Evidence supports that learners need: a deep foundation of factual knowledge; understand facts and concepts in a conceptual framework; organise knowledge in a way that facilitates retrieval. By contrast teaching clinical reasoning concepts alone does not work. She highlighted three proven ways of teaching clinical reasoning: self explanation; dual coding; script based teaching/learning. Self explanation is when learners explain out loud to themselves. Dual coding is where verbal and visual information is combined. Combining visual and auditory information activates the visual and auditory pathways and related information processed in both leads to better learning. In script based teaching, teachers making their own scripts transparent. They can also guide reflection eg ask learners to list what fits or doesn't with their differential diagnoses. Asking what the evidence for the conclusion is or what else it might be is another strategy. There is a need to practise with cases ('deliberate practice') with teachers who provide feedback and correction.

Prof Cooper concluded by highlighting some important resources that are available. Clinical Reasoning in Medical Education group (www.creme.org.uk) provide a variety of resources including podcasts. A useful book is ABC of Clinical Reasoning (second edition)

21 members and guests signed the register.