The Weekly Probe

10th February 2017 **Volume 14 Issue 5**

WELCOME & FAREWELLS- last week we said farewell to all the RMOs yet I didn't realise there was a simultaneous change of registrars. A big thank you to all the regs who have moved onto other hospitals or rotations (+ the ones sticking around) – thanks for all your hard work over the busy December – January period. Despite the significant and challenging workload you've managed to keep the department "afloat" while maintaining the camaraderie amongst the whole ED team. Thank you!!

Welcome also to all the new staff- new interns and JMOs / regs rotating through the department. The ED can be a daunting place at times but there is always someone to ask for help or advice if you need direction / assistance. There is never a stupid question.

THIS WEEK

CRITICAL THINKING – CDRS AND ADRS

This is a topic we discussed last year yet this is key issue and worth repeating a couple of times a year to cover new and "old" staff.

This is one of the most important issues we look at. Read the info and think of how

the information is relevant to the successes or (near) misses of you or your colleagues. Apply

the information next time you process the patients you see or you review on behalf of the

juniors, and you'll see how important it is.

However to expand on these points and look at other literature, we've tried to summarise this

important topic.

Editor: Peter Wyllie

Over the years we've looked at many clinical conditions and the management of these conditions.

However getting to the diagnosis and deciding on the clinical plan requires effective decision making

and clinical reasoning.

Diagnostic errors may occur when there are inadequacies of knowledge (errors of ignorance), a focus

of the bulk of our teaching.

However there may be problems with the application of this knowledge, which results in errors of

implementation, the main focus of this discussion.

Editor: Peter Wyllie

In the ED we work in a unique and challenging environment. With the variety of clinical cases (age, severity, pathology and complexity), the “chaos” going on around us, and multiple distractions in the context of bed pressures, multiple KPIs and medicolegal concerns, we need to get our decision making right. Some have described Emergency medicine as the “Specialty of Uncertainty” and this uncertainty adds to our risk.

Editor: Peter Wyllie

Previously there was no real educational emphasis on critical thinking and where we can go wrong

yet this is changing. Look up work from people including icons like Pat Croskerry (including a 2014

CJEM article which explains why these happen particularly in the ED and what we / you can do

about it), in addition to some of the other references and links shown below. We've tried to summarise

some of the key issues raised these articles, issues in "Patient Safety in Emergency Medicine" by

Croskerry et el, and a couple of other articles – see references / links below.

Dual process of Reasoning Metacognition is the term coined to describe the analytical practice of examining one's thought processes and affective state (your mood) and considering their effects on clinical reasoning. This is the focus of this discussion. One model developed to describe our clinical reasoning is the Dual process of Reasoning.

System 2 - is the rational, analytical, careful, logical thought processes which arrives at a well-calibrated decision (hypothetico-deductive). However this takes more time and resources something that we cannot "afford" with every case considering the pressures in the ED.

Editor: Peter Wyllie

System 1 – on the other hand is rapid , reflexive, intuitive, more simplistic, based on pattern

recognition eg man walks in with flank pain ++ = renal colic. It is the key to rapid , efficient and safe

“Flesh and Blood Decision making”. One key aspect is heuristics, which are rules of thumb, maxims

or other mental shortcuts. This mode of reasoning is often dependent on the context in which the

information is received and is influenced by the individual characteristics of the decision maker (eg

affect, personality, biases). As a result it is more vulnerable to errors.

Editor: Peter Wyllie

Note that they are not exclusive. Making a diagnosis often involves a some interactive combination of

both types of reasoning as System 1 processing can be monitored by system 2 , and blended thinking

may be used. However the brain generally tries to default to system 1 and overrides system 2

thinking producing irrational thinking eg ordering a CXR when you feel there is no indications.

It has been estimated that we spend about 95% of our time in the intuitive system 1 mode acting on

the information we obtain from the history, exam , investigations and other inputs. Most of the time

this works yet particularly with System 1 reasoning (not exclusively though), our thinking is influenced by a number of affective and cognitive “biases”.

Like a bias in a lawn bowls ball, these biases (+ heuristics, sanctions, fallacies and errors) tend to skew our decision one way or the other (towards or away from the correct diagnosis) and as a result they tend to have a negative connotation. Psychologist have subsequently coined the terms Affective Dispositions to Respond (ADRs) and Cognitive Dispositions to Respond (CDRs). (Note that affect is inseparable from thinking). These ADRs and CDRs are reactions to contextural clues and are largely

unconscious yet they influence our judgment, decisions and rationality, with the result that we include

factors we should ignore and ignore those factors we should pay attention to. **Note that we are ALL**

prone to make these CDRs, so this is relevant to all clinicians.

This is not a plea to abandon all the rapid decision making skills, heuristsics and experience you have

picked up that allow the ED to function. These are often the ways we think and problem solve which

often results in **correct** diagnosis.

Editor: Peter Wyllie

We also do not want a ED full off junior medical registrars seeing 3 patients a shift whilst waiting from

the CRP and d-dimer before the patient arrests. However the most important point is that

DETECTION AND RECOGNITION OF THESE COGNITIVE and AFFECTIVE PHENOMENA IS THE

FIRST STEP TO IMPROVING CLINICAL DECISION MAKING as they can pull you in the wrong

direction. Once you've detected the bias then the next step is to change your thinking and maintain

this change.

There are over 50 of these and some overlap, but we can broadly classify these CDR into a number of groups.

Error of over-attachment to a particular diagnosis

- Anchoring- locking onto a feature in the presentation too early in the diagnostic process and failing to adjust this initial impression in light of later information.

- Confirmation bias- tendency to look for confirming evidence to support a diagnosis rather than looking for disconfirming evidence to refute it despite the latter being more persuasive or definitive.

- Premature closure- accepting a diagnosis before a definitive diagnosis has been verified- “when the diagnosis is made, the thinking stops”

- Sunk costs- the more a clinician invests in a diagnosis, the less likely they might be to release it and consider alternatives.

Editor: Peter Wyllie

- Attentional bias - the tendency to pay attention to emotionally dominant stimuli in one's

environment and to neglect relevant data when making judgments of a correlation or

association- this results in a tendency to believe that there is a relationship between 2 variables

when instances are found of both being present. Subsequently more attention is paid to this

condition than when either variables are absent eg loose bowel motion + abdo pain = gastro

and ectopic is not considered.

2. Error due to Failure to consider alternative diagnosis

- Multiple alternative Bias- conflict or uncertainty arise when there are multiple options or differentials , the clinician simplifying the decision by reverting to a smaller subset, ignoring other differentials eg it it is probably A, may be B but I don't know much about C

- Representativeness Restraint- drives the clinicians towards looking for prototypical manifestations of a disease. The problem is that restraining decision making along these lines leads to atypical variants being missed eg "if the pain is not tearing or into the back it's not dissection"

Editor: Peter Wyllie

- Search satisficing- tendency to call off a search once something is found - leads to missed 2nd

  #, FBs, co-ingestants, comorbidities

- Sutton's slip- the diagnostic strategy of going for the obvious diagnosis may lead to the

  possibility that other diagnoses are not considered

- Unpacking principle - by failing to elicit all relevant information (limiting the patient's history

  giving or selective Hx taking on the part of the clinician) may lead to other diagnoses not being

  considered

- Vertical Line failure- associated with routine repetitive tasks as it is efficient and economical yet is inflexible. Lateral thinking on the other hand creates opportunities for looking for the "unexpected" with the clinician thinking "What else might this be?" Eg chest pain patient admitted under cardiology- Ix as ACS yet non-cardiac condition

- Congruence bias - similar to confirmation bias but refers more to an over-reliance on direct testing of a given hypothesis and a neglect of indirect testing otherwise known as, trying to prove myself right. Based on the idea that clinicians are so sure that their hypothesis is correct that they do not test other hypotheses to truly understand what is going on.

Editor: Peter Wyllie

- Contrast effect- occurs when the value of information is enhanced or diminished through juxtaposition to other information of greater or lesser value eg a recent patient with recurrent atypical chest pain who presented with syncope- a focus was made on the chest pain and arrhythmia missed.

3. Error due to inheriting someone else's thinking

- Diagnostic Momentum -once diagnostic labels are applied they become stickier and stickier.

  Eg patient is diagnostically labeled by ambos then triage then medical staff - to the exclusion

  of other diagnoses.

- Framing effect- how patients and clinicians might be influenced by the way a question is

  framed as people react differently to a particular choice depending whether it is presented as

  a loss or as a gain eg thrombolysis decisions relating to risks of dying / risks survival

- Ascertainment effect- occurs when a physicians thinking is influenced by a prior expectation

  or by what the clinician expects to find eg dismissing patient labelled as “drug seeker” or

"frequent flyer". Steroeotyping or gender bias are also examples (PS the man flu is a real entity!).

- Bandwagon effect- tendency for people to believe and do certain things if many others are doing so.

4. Errors in prevalence perception or estimation

- Availability bias- things tend to be judged to be more frequent if they readily come to mind-

  recency effect underlies this bias. However is contrasted by the non-availability where

  insufficient attention is paid to conditions not recently seen.

- Ambiguity bias- tendency to select options where the probability of a particular disease or

  outcome is known as compared with one that is unknown.

- Base-rate neglect- ignoring the true prevalence of a disease either inflating or reducing the

  base-rate eg “rule out worst case scenario”

- Gambler's fallacy- the pre-test probability that a person will have a certain diagnosis is

  influenced by preceding but independent events eg see 9 patients in a row with ACS so

  assume next chest pain patient must be non-ACS.

- Aggregate bias - belief that aggregated data (such as developed in clinical decision rules)

  does not apply to their patient as they are somehow different

- Hindsight bias- knowing the outcome influences the perception of past events and prevents a

  realistic appraisal of what happened which compromises learning- this may give a

underestimation (illusion of failure) or overestimation (illusion of control) of the decision

makers abilities.

- Playing the odds- a tendency to opt for benign diagnosis in equivocal cases on the basis that

it is significantly more likely than a serious one.

- Posterior Probability error - when the estimate for the likelihood of disease is unduly

influenced by what has gone before for a particular patient. It is opposite of the Gambler's

fallacy in that the physician is gambling on the sequence continuing, e.g. presents with

overdose twice before, the decrease in LOC is likely to be also labeled as OD.

- Order effects- there is a tendency to remember the beginning part (primacy effect) or the end (recency effect) when information is transferred such as during a handover – this is referred to as serial position effects. Try to give due consideration to all information, regardless of the order in which it is presented.

5. Errors involving patient characteristics or presentation context

- Information bias - The tendency to believe that more evidence one can accumulate to support

a decision the better- sound like some physicians?. Will the result change your management?

Try to anticipate the value of information and whether it will be useful to not in making a

decision, rather than collect information because we can for its own sake, or for curiosity eg

CRP.

- Fundamental attribution error- The tendency to be judgmental and blame patients for their

illnesses (dispositional causes) rather than examine the circumstances (situational factors)

that might have been responsible.,

- Gender bias-believing that gender is a determining factor in the probability of diagnosis of a particular disease when no such pathophysiological basis exists. Generally, it results in an overdiagnosis of the favoured gender and an underdiagnosis of the neglected gender eg IHD

- Psych-out error- Psychiatric patients appear to be particularly vulnerable a number of CDRs especially fundamental attribution error. This may exacerbate their condition with co-morbid medical conditions being overlooked or minimized.,

Editor: Peter Wyllie

- Triage cueing- “geography is destiny” Triage, both in a nursing and medical sense, results in patients being sent in particular directions, which cue their subsequent management. This triaging can be geographical, such as to a subacute or fast-track direction, with de-emphasising of the potential severity of the illness, or it may be to a specific discipline. Within that speciality , there may be a bias to look at the patient only from their own perspective which is referred to as deformation professionnelle (associated with vertical line failure eg non-cardiac chest pain admitted under cardiology).

- Yin-yang out - When patients have been subjected to exhaustive and unavailing diagnostic investigations, they are said to have worked up the ying-yang. The ying-yang out is the tendency to believe that nothing further can be done to throw light on the dark place where and if, any definitive diagnosis resides for the patient. Subsequently the clinician is let out of further diagnostic effort. This may be compounded by Fundamental attribution error, Playing the Odds, Anchoring and Representativeness (pt seen as frequent flyer), Diagnostic momentum etc. However a patient's conditions may have changed, certain conditions may have been overlooked or there may have been concurrent disease that could be missed.

6. **Errors associated with physician affect, personality, or decision style**

- Commission bias-- a reasoning that harm can only be prevented by active intervention-

  tendency toward action rather than inaction

- Omission bias-more common than the above bias- the tendency toward inaction rooted in the

  principle of doing no harm

- Outcome bias- tendency to opt for diagnostic decisions that will lead to good outcomes,

rather than those associated with bad outcomes, thereby avoiding chagrin associated with

the latter. Clinicians thus have a bias in their decision making for what they hope will happen

rather than what they really believe might happen.

- Visceral bias- the influence of affective sources of error on decision-making is significant.

Visceral arousal leads to poor decisions. Counter-transference, involving both negative and

positive feelings towards patients, might result in diagnoses being missed. This may lead to

"under management" (eg psych or IVDU patients) or "over management" (eg VIPs)

- Overconfidence/ underconfidence- universal tendency to believe that we know more than we do. Overconfidence reflects a tendency to act on incomplete information, intuitions or hunches. Too much faith is placed in opinion instead of carefully gathered evidence.

- Belief bias- the tendency to accept or reject data depending on one's personal belief system, especially when the focus is on the conclusion and not the premise or data.,

- Ego bias - systematically overestimating the prognosis of one's own patients compared with that of a population of similar patients. More senior physicians tend to be less optimistic and more realistic about patient's prognosis, possibly reflecting reverse ego bias.

- Blind spot diagnosis - the general belief people have that they are less susceptible to bias than others, due mostly to the faith they place in their own introspections.

- Zebra retreat – when a rare diagnosis (zebra) figures prominently on the differential diagnosis but the physician retreats from it for various reasons alone or in combination: there may be

resource or logistical barriers or costs of obtaining the tests , lack of conviction and

confidence on the part of the clinician, unfamiliarity with the diagnosis might make the

physician less likely to go down an unfamiliar road; and fatigue or other distractions might tip

the physician toward retreat.

- Intervention bias - the bias to intervene, whether it is with drugs, diagnostic tests or procedures, when not intervening would be a reasonable alternative eg antibiotics for bronchitis

Logical Fallacies- Another important skill is developing the ability to identify, analyse and challenge

assumptions in statements and arguments, and being able to detect fallcies in the reasoning logic.

Affective Dispositions to Respond (ADRs) – alterations in our mood impact on our cognition and our decision making. Therefore all our ADRs are CDRs. Sources of ADRs include:

- Countertransference (redirection of a clinician's feelings toward a patient or emotional entanglement)
- Fundamental Attribution Error

- Ambient, chronobiological and other influences- changing conditions, interpersonal conflict, temperament, motivation
- Specific affective biases in decision making
- Endogenous Affective Disorders within the physician (depression, anxiety, mania)
- Emotional dysregulation in the physician
    - Unconscious defenses, avoidance, anxiety
    - Excessive emotional involvement or detachment

Note that certain conditions such as fatigue, sleep deprivations and cognitive overload predispose us to using System 1 processes and increasing the vulnerability to biases. Some common situations are:

High Risk Situations	Potential biases
Was the patient handed over to me from a previous shift?	Diagnosis momentum, framing
Was the diagnosis suggested to me by the patient, nurse, or another doctor?	Premature diagnosis, framing bias
Did I just accept the first diagnosis that came to mind?	Anchoring, availability, search satisficing, premature closure
Did I consider other organ systems beside the obvious one?	Anchoring, search satisficing, premature closure
Is this a patient I don't like, or like too much , for some reason?	Affective biases
Have I been interrupted or distracted while evaluating this patient? (ie all patients!)	All biases
Am I feeling fatigued, / sleep poorly, cognitively overloaded or over extended?	All biases
Am I stereotyping this patient?	Representative bias, affective bias, anchoring, fundamental attribution error, psych out error
Have I effectively ruled out must-not-miss diagnoses?	Overconfidence, anchoring, confirmation bias

If you want more info on strategies for cognitive debiasing look at the Table 1 in the Croskerry article

“Cognitive debiasing 2 “ in the qualitysafety link below. Forcing strategies (table 2) which require the

clinician to consciously apply a metacognitive steps and force a necessary consideration of other

alternative diagnoses may also be tried. These include rule out worst case scenarios, standing rules,

or “considering the opposite”.

In summary there a number of steps to developing and improving specific abilities underlying

critical thinking

- Know and understand System 1 and System 2 thinking

- Recognise distracting stimuli, propaganda, bias, irrelevance-

- Familiarise yourself with the various types of CDRs that exist and ways to avoid

them.

Editor: Peter Wyllie

- Conquer logical fallacies - Identify, analyse and challenge assumptions in arguments and statements- Be skeptical and analytical about information we receive.
- Be aware of cognitive fallacies and poor reasoning
- Recognise deception, deliberate or otherwise
- Have a capacity for assessing credibility of information
- Recognise and compensate for imperfect systems that hinder optimal decision making
- Understand the need for monitoring and control of own thought processes
- Understand the importance of monitoring and control of own affective state

Editor: Peter Wyllie

- Be aware of the critical impact of fatigue and sleep deprivation on decision making

- Imagine and explore alternatives- get a good history, recheck & keep your mind open

- Avoid the increasing reliance on objective data from diagnostic testing to compensate for reduced history and examination skills.

- Have a capacity for effectively working through problems

- Understand the importance of the context under which the decisions are made

- Effective decision making

- Develop a capacity for anticipating the consequences of decisions

Editor: Peter Wyllie

- Optimise your feedback to improve your skill development-the problem with working in the ED is that in many cases we do not know what happened to the patient you have seen- follow results or patients once discharged home or to the ward in order to refine your thinking

- Consider checklists – however these are best used for discrete observable tasks such as central venous lines or discharge procedures.

Refs – Croskerry P, Achieving Quality in Clinical Decision Making: Cognitive Strategies and Detection of Bias , *Acad Emerg Med* 2002; 9(11) / Croskerry P, Context is everything or How could I have been that stupid. *Healthcare quarterly* 2009 / Croskerry P, ED cognition:any decision by anyone at any time *CJEM* 2014;16(1):13-19 / http://en.wikipedia.org/wiki/List_of_cognitive_biases / Croskerry et al Patient Safety in Emergency Medicine 2009 Lippincott Williams & Wilkins / http://qualitysafety.bmj.com/content/22/Suppl_2.toc Croskerry P Bias: a normal operating characteristic of the diagnosing brain *Diagnosis* 2014; 1(1): 23–27 link

NEXT WEEK'S CASE

A 59yo lady presents with cough , lethargy and fevers. Hx of SLE on prednisone 5mg . On exam T 37.8C – conjunctival pallor – rest of exam NAD (incl PR)

Bloods showed :

FBC - Hb 54 ↓↓ (MCV 100 ↑– MCH 35 ↑)- WCC 7.7 Pl 115

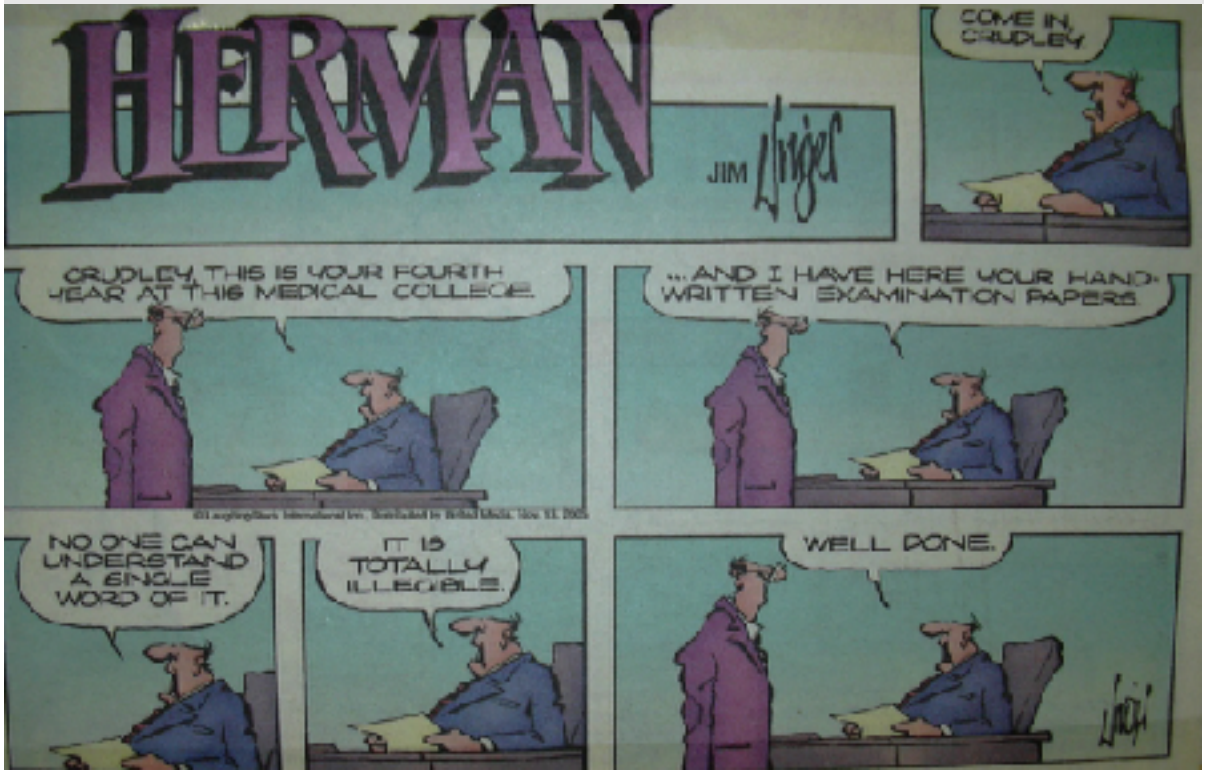
B12, folate N – iron studies showed increased ferritin only

VBG – pH 7.36 CO2 23 BE -13 Bicarb 13 - lactate 1.4 (N) – ketone 0.5 (mild elevation)

UEC – 126 / 5.2 / 96 / 12 / 7.3 / 76 - Alb 31↓ Protein 91↑ Bili 29 ↑

There are problems cross matching the sample due to antibodies. What are the potential causes for the anaemia and the metabolic acidosis, the 2 "meatiest" parts of the results? What other test could we consider to clarify these issues and the diagnosis ?

JOKE / QUOTE OF THE WEEK



Please forward any funny and litigious quotes you may hear on the floor (happy to publish names if you want)

THE WEEK AHEAD
Tuesdays - 14:30 – 15:30 Intern & JMO teaching -Thomas & Rachel Moore
Wednesday- 0800-0900 Critical Care Journal Club. ICU Conf Room / 14:30 – 15:30 Intern & JMO teaching -Thomas & Rachel Moore

Editor: Peter Wyllie

Thursday 0730-0800 Trauma Audit. Education Centre / 0800-0830 MET Review Education centre / 1300-1400 Medical Grand Rounds. Auditorium.

Editor: Peter Wyllie