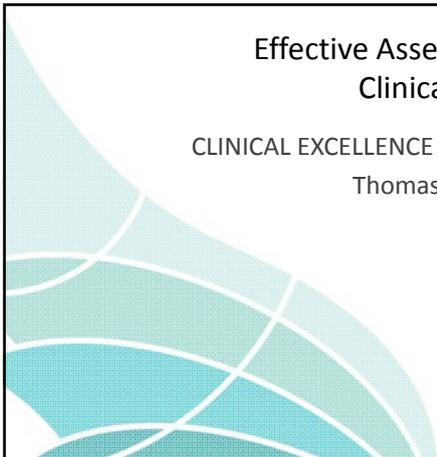


Effective Assessment and
Clinical Judgment

CLINICAL EXCELLENCE COMMISSION
Thomas Loveday, PhD

August 2015



Presentation Overview

This presentation will:

- Define clinical judgement
- Discuss the limits of perception, attention, memory and decision-making
- **Illustrate these limits using healthcare examples**
- Identify pre-existing interventions designed to enhance clinical judgment



2

Case Study 1

Day 1

- 61 y.o. female patient transferred to ED from satellite renal dialysis unit with hypotension, increased respiratory rate, tachycardia, shortness of breath
- Differential diagnosis of hypotension secondary to decreased oral intake and dialysis AND/OR Sepsis
- Transferred to A1 Hospital ward



3

Case Study 1

Day 2

- Reviewed by renal team, bone marrow biopsy suggested
- Reviewed by Haematology team, scheduled bone marrow biopsy
- Obs within normal limits

Day 3

- Obs remained within normal limits
- Nausea and vomiting noted



Case Study 1

Day 4

- Obs taken regularly. **Systolic BP ranged between 76-92mmHg**, HR between 102-110bpm, rr 18brpm, oxygen saturations 98-100% on room air
- Documented by EN, requested review by JMO
- Reviewed by weekend JMO, plan to encourage oral intake



Case Study 1

Day 5 at 0935 hours

- Reviewed by Renal Consultant
- Repeat observations were BP 90/60, HR122 bpm, oxygen saturations **85% on 10L oxygen**
- RR (finally) called by consultant
- Patient transferred to ICU

Days 6 & 7

- Continued deterioration, death



Case Study 1

RCA Investigation

- Staff managed red zone patient **like** yellow zone.
- **Assumption** by staff that the patient was a chronic renal patient who was **normally hypotensive**.
- Staff had **high threshold** for treatment urgency.



Clinical Judgement

- Critical thinking activities based on actual observation of a patient.
- Encompasses a range of tasks
 - Diagnosis
 - Escalation
 - Recognition of deterioration or improvement
 - Triage
 - Catching errors
 - Setting alarm criteria



Clinical Judgment

Situation Assessment

- Acquire information (i.e. symptoms) about the patient/s

Information Processing

- Derive meaning from the information to guide subsequent action/s



Case Study 2

- Exploratory laparotomy with possible bypass to relieve a small bowel obstruction.
- Anaesthetist administered 2mls of Midazolam (5mg/5mls).
- On arrival into OT, patient found to be unresponsive, no pulse
- Cardiopulmonary resuscitation, patient intubated, surgery cancelled
- Anaesthetist had accidentally administered Atacurium (50mg/5mls)



Case Study 2

- Number of nearly identical incidents
- Atacurium 50mg/5ml and Midazolam 5mg/5ml ampoules of similar size and shape



Other look alike errors



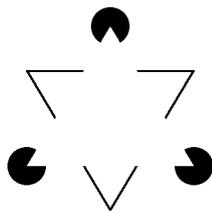
Perception

- Perception is a combination of:
 - Input from physical senses
 - Cognitive processes in interpreting those senses
- We don't necessarily **experience** the world as it is.



13

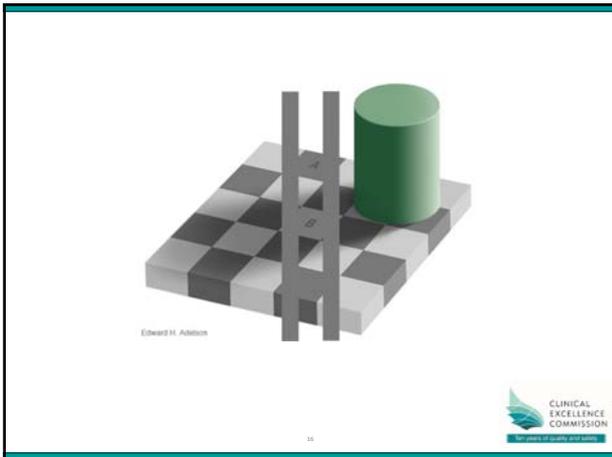
How many triangles?



14



15







Case Study 3

- Post-surgery readmission, vomiting, diarrhoea
- Impression: Possible pulmonary oedema, Possible pulmonary embolus
- 1930: SaO2 92% on 3L O2
- 2030: SaO2 89% on room air
- 2130: SaO2 88% on room air, improved to 93% with 2L O2
- 1700 (following day): SaO2 88% on room air
- 1730: SaO2 86% on 4L O2
- 1830: SaO2 92% 3L O2
- 0005: SaO2 86% on 15L O2



Situation Awareness

Endsley (1995):

- "Situation awareness is the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future."
- **The ability to anticipate future events based on current information.**



Loss of Situation Awareness

Commonly caused by **Overload**

- The practitioner is faced with more stimuli and/or or cognitive processing within a volume of time than he or she is able to process.
- Processing limitation determined by **working memory**.



Memory

- Long-term memory
 - “Memory processes associated with the preservation of information for retrieval at any later time.” APA
 - **Nearly limitless store of information**
- Working memory (WM)
 - Where the subject of attention is processed, and reasoning tasks (like diagnosis) are accomplished.
 - **Extremely limited ($\approx 4 - 7$ items simultaneously)**



22

Working Memory (WM)

| | |
|-------|-----------|
| 37+ | 34785239+ |
| 41 | 41236478 |
| <hr/> | <hr/> |
| 78 | 76021717 |
| <hr/> | <hr/> |



23

Wait a minute...

- Hospitals are full of stimuli, but we don't seem to be constantly overloaded!
- We complete a broad range of tasks, but we manage to make good decisions all the time!
- We must constantly monitor a number of patient variables/devices.



24

Bypassing WM Limits

Our brain has to cheat to avoid overload!

- 'Chunking' related information
- Attention (fixation)
- Heuristics (rules of thumb)
- Automated processing/retrieval

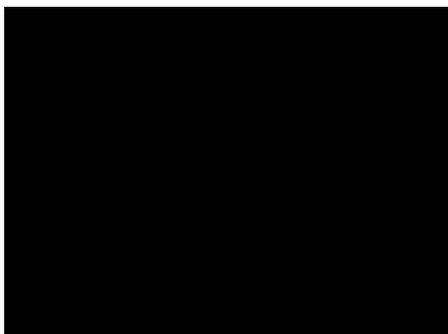


Attention

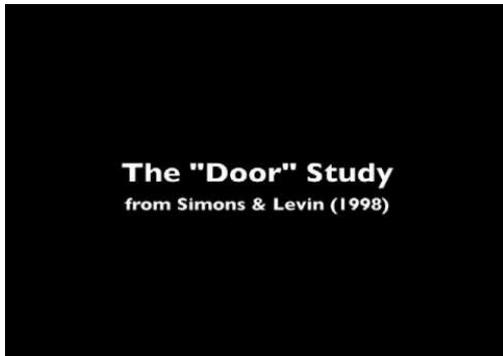
- "A state of focused awareness on a subset of the available information." APA
- Necessary because we don't have sufficient **working memory** to process all information in the environment.



Counting basketballs



The Door Study



Selective attention

- Focus on **task relevant** information.
- Explains why we missed the gorilla.
- Can cause problems when we miss **seemingly** unimportant details
 - Recall the decreasing SaO2
- This is why we **MUST** be comprehensive in our observations/physical examinations of the patient.



Automated Processing

- Dual-process paradigm (Kahneman):
 - **System 1 (intuitive):**
 - Automated and non-conscious use
 - Rapid
 - Based on **heuristics** – rules of thumb that produce a *good enough* outcome
 - Used by experts
 - **System 2 (true-reasoning):**
 - Conscious and effortful
 - Slow
 - Thorough
 - Used in unfamiliar situations (and by non-experts)



Heuristics

- Driving Heuristic
 - What distance should you maintain behind a vehicle that is directly in front of your vehicle?
- Deterioration Heuristic
 - What do you do if the patient is no longer “between the flags”?



11

Case Study 4

- 30 year old female presents to Community Hospital ED after hours – seen by RN
- MO offsite – advice provided by telephone
- RN informed MO that patient had severe abdominal pain and vomiting after consuming (likely rancid) ham sandwich
- Patient treated for food poisoning.
 - intravenous (IV) 4mg – 8mg Ondansetron prn
 - IV Maxolon 10mg tds prn
 - Normal Saline 250mls stat and then 125mls per hour



12

Case Study 4

- Following treatment:
 - Minimal/no improvement in pain score;
 - Abdomen was still tender (attributed by RN to vomiting);
 - Patient given **additional** Ondansetron wafer to reduce vomiting.
- Discharged home by RN.
- *Ruptured Gangrenous Acute Appendicitis.*



13

Bias = failed heuristics

Sometimes our heuristics are wrong or inappropriate – we call this ‘bias’.

- **Anchoring** – failing to adjust initial interpretation in light of new information.
- **Confirmation bias** – only seek symptoms that support initial interpretation.
- **Premature closure** - accepting a diagnosis (or interpretation) before it has been fully verified
- **Framing** – we are strongly influenced by the way in which information is expressed
- Croskerry (2003) identified 32 types of bias that *commonly* occur in healthcare.



More biases:

- Croskerry, P. (2003). "The Importance of Cognitive Errors in Diagnosis and Strategies to Minimize Them." *Academic Medicine* 78(8): 775-780.
- Graber, M. L., et al. (2005). "Diagnostic error in internal medicine." *Arch Intern Med* 165(13): 1493-1499.



Bias Risk factors

- Time pressure and workload
 - Never stop to question initial System 1 *impression*
- Fatigue, stress and boredom
 - Known to deplete available working memory
- Transition to expertise
 - Heuristics not yet nuanced, but will increasingly rely on satisficing.



Lessons learned

- Targeted information better than information overload
- Salient information more likely to be processed
- Don't expect people to complete simultaneous tasks reliably
- Bias is a form of automation error – it is not simply a matter of taking a time-out



17

Between the Flags

- Triggers for recognising deterioration can be subtle re. gradual change over time.
 - Monitoring task may deplete working memory.
 - Features can be difficult to perceive and/or attend to
- **What if we changed the nature of the decision?**
 - Prof Ken Hillman established vital sign thresholds (calling criteria) for escalation and a clinical response team with advanced life support skills (MET)
 - BTF became simple, salient binary decision.



18

VTE Risk Assessment

- Many VTE cases could be prevented by timely administration of prophylaxis
- Doctors **over estimate** risk of bleeding
- VTE Risk Assessment
 - Asks user to find reasons **not** to prescribe prophylaxis.
 - Subtly **re-frames** VTE treatment as the default!



19

Summary

- Clinical Judgment is mentally taxing
- We have a limited capacity to process information
- The brain overcomes these limits using *predictable* shortcuts
- These shortcuts are susceptible to bias



"A general "law of least effort" applies to cognitive as well as physical exertion. The law asserts that if there are several ways of achieving the same goal, people will eventually gravitate to the least demanding course of action. In the economy of action, effort is a cost, and the acquisition of skill is driven by the balance of benefits and costs. Laziness is built deep into our nature."

Daniel Kahneman, *Thinking, Fast and Slow*



For further information:

Thomas.loveidav@health.nsw.gov.au
www.cec.health.nsw.gov.au