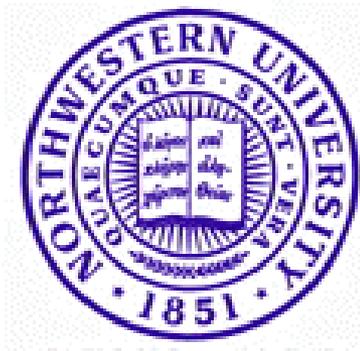# Improving Medical Decision Making in Real Time: Teaching Heuristics and Bias

Aashish Didwania, MD
Vinky Chadha, MD
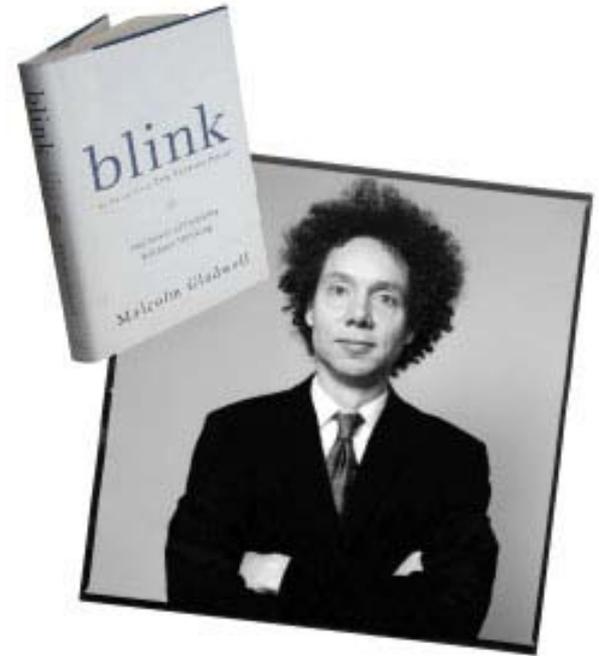Aarati Didwania, MD
Diane Wayne, MD

Objectives

- Define heuristics and biases
- Identify heuristics and biases in medical decision making
- Learn how to teach trainees process of self-improvement in decision making

Heuristics

- Fast and Frugal approach to thinking

- Powerful and outperform analytic approach in many situations

- In medicine
  - Wegwarth O. Smart strategies for doctors and doctors-in-training: heuristics in medicine. Medical Education 2009


The Power of Thinking Without Thinking

Issue	Umpires	Doctors
What is the complexity level of the decision?	Binary—it's a strike or a ball.	There are thousands of diseases and syndromes, but typically the number of reasonable choices is less than 10.
How well do we do? What is the ACTUAL error rate?	The stated accuracy rate for Major League Baseball umpires is 92%–94%.	10% or more of autopsies disclose important discrepancies that would have changed the clinical care or prognosis. Studies looking at specific clinical conditions find an error rate of approximately 10%.
How well do we THINK we do? What is the perceived accuracy rate?	Anecdotally, better than the truth would support.	Much better than reality. Most clinicians can't recall a diagnostic error they themselves have made. While they are keenly aware that diagnostic error exists, they believe errors are made by other physicians, less careful or skilled than themselves.
What are the consequences of error?	Typically, no impact. Rarely, errors lead to lost games, a losing series, or career changes.	Typically, no impact—the error is inconsequential or is not discovered. Rarely, the error may cause injury or death.
What types of cognitive processes are used to make the decision?	The umpire integrates his perception of the ball's path in the context of his knowledge of the strike zone, all interpreted automatically (subconsciously).	Most patient problems are very familiar to clinicians. Physicians integrate their perception of the facts in the context of their medical knowledge base. This occurs automatically (subconsciously) and involves recognizing patterns (schema) they have seen before.
What factors detract from perfection?	Stress, fatigue, distractions, affective factors, and the inherent shortcomings of automatic processing (bias).	
Can the error rate be reduced?	Possibly—the QuesTec system is providing feedback to umpires to improve performance and calibration.	Possibly—avenues for improvement exist but are unproven (decision support, feedback, "cognitive de-biasing").

Heuristics and Error

Schulman K, N Engl J Med '99
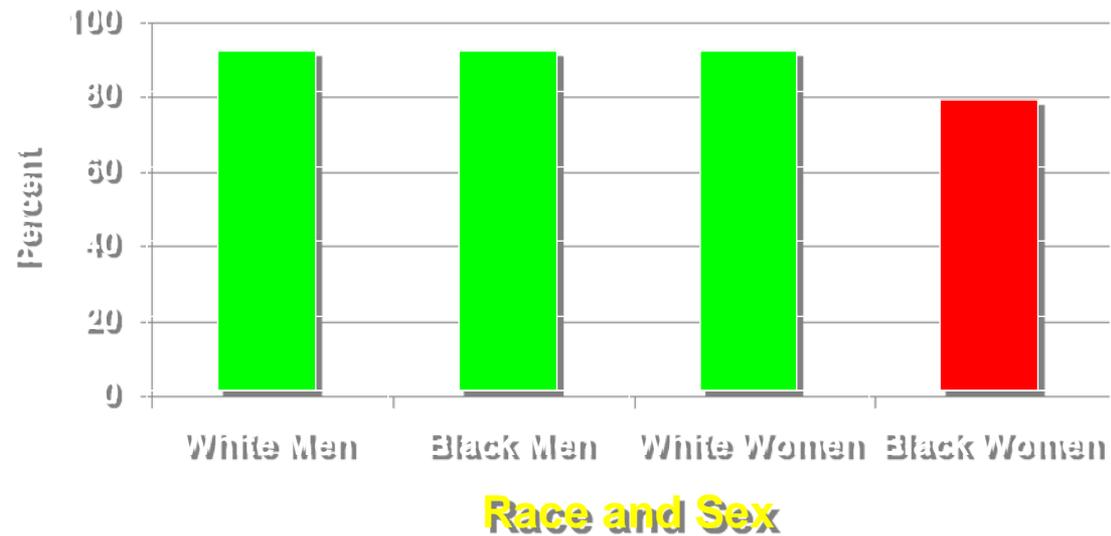
JUDGMENT ISSUES (Adequate knowledge, incorrect judgment)

Strong but wrong rule: rule usually works but wasn't appropriate in this situation.

Bad Rule: generally held belief that has no basis in fact.

Confirmation Bias: the tendency to overemphasize data that supports an existing hypothesis rather than data that refutes that hypothesis.

Overconfidence Bias: over-reliance on the opinions of the expert that came before (the attending or consultant or primary team).

Availability Heuristic: this patient has whatever your last patient who looked like this has or whatever is commonly discussed.

Premature Closure/Anchoring: the tendency to decide that the patient's current problem is related to the first thing we diagnose rather than more than one issue.

Commission Bias: the tendency to need to do something rather than stand there.

Hassle Bias: the tendency to take a course of action that is easiest or exposes the physician to the least amount of grief.

Regret Bias: the tendency to take a course of action due to guilt from a missed diagnosis.

Other: Ego Bias, Representativeness Bias (Gambler's Fallacy), Framing Effect (Order effect)…

Videos

- 1st case: 51yo with diabetes admitted for DVT. 2nd day of admission on routine chemstiks, morning sugar is 240.

- 2nd case: 60yo HTN who comes in with chest pain. The pain occurred 3 different times on the day of admission. The pain lasted for a few seconds and was not associated with associated symptoms. MI was ruled out in the ER.

- 3rd case: 33yo paraplegic with chronic UTIs(indwelling foley catheter) who comes in with cough, congestion. No fever. Urinalysis shows 10-50 wbcs. CXR was normal. WBC 6.2.

The patient is a 67-year-old farmer with chronic right hip pain. The diagnosis is osteoarthritis. You have tried several nonsteroidal anti-inflammatory agents (eg, aspirin, naproxen,and ketoprofen) and have stopped them because of either adverse effects or lack of efficacy. You decide to refer him to an orthopedic consultant for consideration for hip replacement surgery. The patient agrees to this plan. Before sending him away, however, you check the drug formulary and find that there is one nonsteroidal medication that this patient has not tried (ibuprofen).

What do you do?   53% chose the default option of proceeding to surgery.

The patient is a 67-year-old farmer with chronic right hip pain. The diagnosis is osteoarthritis. You have tried several nonsteroidal anti-inflammatory agents (eg, aspirin, naproxen, and ketoprofen) and have stopped them because of either adverse effects or lack of efficacy. You decide to refer him to an orthopedic consultant for consideration for hip replacement surgery. The patient agrees to this plan. Before sending him away, however, you check the drug formulary and find that there are two nonsteroidal medications that this patient has not tried (ibuprofen and piroxicam).

What do you do?   72% chose the default option of proceeding to surgery.

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Improving MDM at the Point of Care

Techniques
- "What was my first impression?" (metacognition)
- "What information is most relevant to the assessment?"
- Elaborate decisions made
  - Avoid distortion of facts
- "How confident am I?"
- "Consider alternative diagnosis"
- "Advantages and disadvantages of treatment"

Learning Pearls
- The odds of being wrong
- Pocket card with common biases and heuristics
- Caution under Stress, Fatigue and Time Pressure as these worsen Bias.
- Clues to judgment errors: Disparities, Return Visits and Patients not improving.
- Bayesian Reasoning – risk is not binary.

Improving MDM

- Uncertainty and Tacit Knowledge
- EBM
  - Use of Algorithms
    - Mt. Sinai: http://www.mssm.edu/medicine/general-medicine/ebm/index.html#cpr
- M&M and Autopsy Conference
- QI and Patient Safety
- Simulation and Experience – Awareness, Heuristics, Self-Reflection, Follow up, Feedback
  - May help catch subconscious error
  - Experience builds intuition

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