MEDICAL EXPERTS: 
THE GOOD, THE BAD, AND THE UGLY

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Who are you?
How many of you are experts?
How many of you want to be experts?
→ Everyone! Who doesn’t…?
We are in the business of being experts, in an expert domain, and we also cultivate experts
… but, be careful what you wish for….

2004 paper by Baker & Norton, “The Canadian Adverse Events Study”

THE WALRUS

The Errors of Their Ways

Some 24,000 Canadians will die this year from medical mistakes. Even the most temperate doctors call this an...
So, be careful what you wish for!

Need to know what you are getting into...

Because you can do a better job (being an expert yourself, as well as training others to become experts), if you understand ‘expertise’

→ And this is what this talk is all about

→ From a cognitive perspective
Who am I?

- Cognitive Neuroscientist (research & training, consultancy)
- Interested in human performance, skills, judgment, and decision making
- Especially in expert domains (e.g., US Air Force, policing, forensic, and medical)
- Looking at improving performance
  - Most effective way to acquire skills
  - Make best possible decisions
  - Avoid/minimize error
Expertise

From ‘The Paradox of Human Expertise: Why Experts Can Get It Wrong’ (Dror, 2011), The Paradoxical Brain. Cambridge University Press: “Expertise is correctly, but one-sidedly, associated with special abilities and enhanced performance. The other side of expertise, however, is hidden. Along with expertise, performance may also be degraded, culminating in a lack of flexibility and error. Expertise is demystified by explaining the brain functions and cognitive architecture involved in being an expert. These information processing mechanisms, the very making of expertise, entail computational trade-offs that sometimes result in paradoxical functional degradation. For example, being an expert entails using schemas, selective attention, chunking information, automaticity, and more reliance on top-down information, all of which allows experts to perform quickly and efficiently; however, these very mechanisms restrict flexibility and control, may cause to miss and ignore important information, introduce tunnel vision and bias, and can cause other effects that degrade performance. Such phenomena are apparent in a wide range of expert domains, from medical surgeons and forensic examiners, to military fighter pilots and financial traders.”
Human cognition

- “The mind is not a camera” (from ‘Perception is Far From Perfection’, Dror, 2005, Journal of Brain & Behavioral Sciences)
- Understand how humans process information
- The cognitive underpinning of expertise

Just some illustrative examples

FINISHED FILES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS...

Alphabetically saying the months of the year...
The human element

• Stands at the heart of healthcare
  – Perception of information
  – Interpretation
  – Judgement
  – Decision making
  – Carry out procedures, etc.

→ Must deal with improving healthcare through understanding of human cognition

• Understand it within the medical environment

• Why are we not doing so well (as much as we can & should be…):
  An issue of public policy
Medicare pulling plug on hospital errors

Agency says it’ll no longer reimburse for many preventable patient-care slips

WASHINGTON — Medicare will stop paying the costs of treating infections, falls, objects left in surgical patients and other things that happen in hospitals that could have been prevented.

The rule change announced this month is among several initiatives that the administration says are intended to improve the accuracy of Medicare’s payment for hospital patients who receive acute care, and to encourage hospitals to improve the quality of their services.

“The hospital cannot bill the beneficiary for any charges associated with the hospital-acquired complication,” the final rules say.

Congress in 2006 gave the Centers for Medicare and Medicaid Services the power to prevent Medicare from giving hospitals higher payment for the extra costs of treating a patient when infections and other preventable conditions occur during a hospital stay.

Hospitals are to begin reporting secondary diagnoses present on the admission of patients starting with discharges on Oct. 1.

Then, starting exactly one year later, cases with these conditions would not be paid at the higher rate unless they were present on admission.

Costs expected to rise

Last year, Mark McClellan, then director of the Medicare and Medicaid programs, said the government could save hundreds of millions of dollars a year if the Medicare program stopped paying for medical errors such as operations on the wrong body part or mismatched blood transfusions.

Medicare provides coverage for about 43 million elderly and disabled people. The Medicare program’s expenses totaled about $408 billion in 2006; costs are expected to rise rapidly in coming years.

Private insurers are considering similar changes.

Lisa McGiffert, a health policy analyst at Consumers Union, hailed the rules. “Medicare is using its clout to improve care and keep patients safe. It’s forcing hospitals to face this problem in a way they never have before.”

The New York Times contributed to this report.

And when this does not work….?
PROVIDENCE, R.I. - Rhode Island Hospital was fined $50,000 and reprimanded by the state Department of Health Monday after its third instance this year of a doctor performing brain surgery in the wrong side of a patient's head.

"We are extremely concerned about this continuing pattern," Director of Health David R. Gifford said in a written statement. "While the hospital has made improvements in the operating room, they have not extended these changes to the rest of the hospital."
The human element

• Stands at the heart of medical care
  – Perception of information
  – Interpretation
  – Judgement
  – Decision making
  – Carry out procedures, etc.

→ Must deal with improving healthcare through understanding of human cognition

• Understand it within the medical environment
Medical environment

• Time pressure
  – Quantity and quality of information
  – Risk taking
  – Flexibility and adaptability
  – Cognitive systems involved

• Piecemeal
  – Distributed cognition
  – Lack of continuity

• Technology
  – Lots of it…
  – Not ‘brain friendly’

+ Human Cognition
+ Expertise

Have a challange!
What is this all about?

Improve patient care and safety

Reduce and minimize error

Risk management

Decision making

Judgement and interpretation

Perception
Information selectivity!

- **Can’t** be avoided → limited resources, inherent mismatch between demands & resources.

- **Don’t** want to avoid it → Overall good and effective mechanisms

- Much of it occurs automatically and without awareness

→ the more we become ‘experts’, the more these become automatic and unconscious
The cognitive system is **active and dynamic**. It is important to **engage** the cognitive system on its own terms, work with it, definitely not against it! Must really know and understand what is going on!
• **Step 1: Set Behavior Expectations**

Define Safety Behaviors & Error Prevention Tools proven to help reduce human error

• **Step 2: Educate**

Educate our staff and medical staff about the Safety Behaviors and Error Prevention Tools

• **Step 3: Reinforce & Build Accountability**

Practice the Safety Behaviors and make them our personal work habits
Training to reduce error

• Training should target specific causes of errors
  For example, making sure that you check that:
    – Right patient?
    – Right drug?
    – Right dose?
    – Right time?
• Imprint ‘red rules’ (e.g., no exception, etc.)
• Behavioural norms, such as STAR (Stop, Think, Act, & Review).

But.....

New England Journal of Medicine, 2010,"Temporal trends in rates of patient harm resulting from medical care"
Training to Minimize Error

- In addition to training to reduce error:
- **Train for error recovery!**
- Specifically:
  - Quick Error detection
  - Quick recovery
Error recovery $\rightarrow$ Error REDUCTION!

- Need to interact with real scenarios
- Learn to detect when an error occurs gradually:
  - first ‘exaggerated’, then more and more subtle, and then with distractions
  - first in others, then yourself…
  (use of ‘sabotage’)
- Once detected, train to respond to it gradually:
  - What do to: give answer, then give multiple choices for them to consider, and then let them generate options themselves)
  - Take action quickly

- Learn for the future!
A novel approach to minimize error in the medical domain: Cognitive neuroscientific insights into training*

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Abstract

Medical errors are an inevitable outcome of the human cognitive system working within the environment and demands of practicing medicine. Training can play a pivotal role in minimizing error, but the prevailing training is not as effective because it directly focuses on error reduction. Based on an understanding of cognitive architecture and how the brain processes information, a new approach is suggested: focusing training on error recovery. This entails specific training in error detection and error mitigation. Such training will not only enable better responses when errors occur, but it is also a more effective way to achieve error reduction. The suggested design for error recovery training is to begin with detecting errors in others. Starting off with highly visible and even exaggerated errors, and advancing to more challenging detections and finally requiring to detect errors within oneself rather than in others. The error mitigation training starts with providing the learners with the correct remedial actions (after they have detected the error). With training, the learners are required to select the appropriate actions within multiple choice alternatives, and eventually are required to generate the appropriate remedial responses themselves. These can be used for instruction as well as for assessment purposes. Time pressure, distractions, competitions and other elements are included so as to make the training more challenging and interactive.
Meta Cognition

- Different kinds of ‘knowledge about knowledge’
- People are very weak in meta-cognition (over estimate)
- Socrates the smartest person because of his meta-cognitive skills!
- When it comes to experts…. well...
  - Over self confidence
  - Do not listen
  - Discourage, frown, and ‘punish’ disagreement
  - Take undo risk
  - Escalation of commitment
  - Wishful thinking
  - Confirmation bias
  - …. and more!
We have seen examples of ‘problems’:

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+ Meta Cognition
THANK YOU!


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