Diagnostic Errors in (Anatomic) Pathology
Conflict of Interest Disclosure

I have nothing to disclose that compromises or appears to compromise the integrity of this presentation.

I am on an advisory board for Philips focused on digital pathology.
Background
Key Finding

“It is likely that most of us will experience at least one diagnostic error in our lifetime, sometimes with devastating consequences.”
Medical error—the third leading cause of death in the US

BMJ 2016; 353 doi: http://dx.doi.org/10.1136/bmj.i2139
(Published 03 May 2016) Cite this as: BMJ 2016;353:i2139
IOM Definition of Diagnostic Error

The failure to:

(a) establish an **accurate** and **timely** explanation of the patient’s health problem(s)

or

(b) **communicate** that explanation to the patient
IOM Report
Pathology Focus

-Part of the Committee’s definition is reporting of the result to the patient...pathologists play a crucial role in timely reporting of results...to the patient

-Implementation of process improvement efforts across the entire patient experience (not just within the lab)
Key Report Themes

- Diagnostic errors are a **significant** and **underappreciated** health care quality challenge

- **Patients** are **central** to the solution—It’s about the patient

- Diagnosis is a **collaborative** effort—a “team sport”
Diagnostic Team Members

Health care professionals who support the diagnostic process

Diagnostics

Patient & Family Members
The Work System

External Environment

- Organization
- Diagnostic Team Members
- Technologies and Tools
- Physical Environment
- Tasks
Where Failures in the Diagnostic Process Occur

- Failure of Engagement
- Failure in Information Gathering
  - Failure in Information Integration
  - Failure in Information Interpretation
- Failure to Establish an Explanation for the Health Problem
- Failure to Communicate the Explanation

THE WORK SYSTEM
- Diagnostic Team Members
- Tasks
- Technologies and Tools
- Organization
- Physical Environment
- External Environment

THE DIAGNOSTIC PROCESS

Patient Experiences a Health Problem
Patient Engages with Health Care System

Information Gathering
Information Integration & Interpretation
Working Diagnosis

Communication of the Diagnosis

Treatment

Outcomes

The explanation of the health problem that is communicated to the patient
The planned path of care based on the diagnosis

Patient and System Outcomes
Learning from diagnostic errors, near misses, and accurate, timely diagnoses
IOM Report
Pathology Focus--

• No significant adverse information related to the practice of pathology/laboratory medicine.
• Pathologists are key member of the health care team!
• This is an opportunity…

“It’s Our Turn. Implications for Pathology form the Institute of Medicine’s Report on Diagnostic Error (Laposata & Cohen); Arch Pathol Lab Med 2016; 140: 505-7.
Cognitive Aspects of Diagnostic Errors
Arrogance

Guru (Expert) Pathology
“There are no borderline lesions, only borderline pathologists”

Pathology Favorites
Food: waffle
Plant: hedge
Car: Dodge
# Dreyfus Model of Skill Acquisition

<table>
<thead>
<tr>
<th></th>
<th>Knowledge</th>
<th>Autonomy</th>
<th>Coping with Complexity</th>
<th>Perception of context</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Novice</strong></td>
<td>textbook</td>
<td>Needs close supervision</td>
<td>Little or no</td>
<td>Tends to see actions in isolation</td>
</tr>
<tr>
<td><strong>Advanced</strong></td>
<td>Working, of key aspects</td>
<td>Straightforward tasks likely to be completed to an acceptable standard</td>
<td>Appreciates complex situations with only partial resolution</td>
<td>Sees actions as a series of steps</td>
</tr>
<tr>
<td><strong>Beginner</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Competent</strong></td>
<td>Good working &amp; background</td>
<td>Fit for purpose</td>
<td>Copes with complex through deliberate analysis</td>
<td>Sees actions partly in terms of long-term goals</td>
</tr>
<tr>
<td><strong>Proficient</strong></td>
<td>Depth of understanding of discipline</td>
<td>Fully acceptable standard achieved routinely</td>
<td>Deals with complex holistically</td>
<td>Sees ‘big’ picture &amp; how individual actions fit in</td>
</tr>
<tr>
<td><strong>Expert</strong></td>
<td>Authoritative and deep tacit understanding</td>
<td>Take responsibility for going beyond existing standards and creating own interpretations</td>
<td>Holistic grasp of complex situations with analytical &amp; intuitive ease</td>
<td>Sees ‘big’ picture and alternative</td>
</tr>
</tbody>
</table>
MY 2 MOST DANGEROUS TASKS
ONE I'VE NEVER DONE
ONE I'VE DONE 1,000 TIMES
Decision Making

System 1: Fast, automatic, frequent, emotional, stereotypic, subconscious

System 2: Slow, effortful, infrequent, logical, calculating, conscious
Dual Process Theory and Diagnosis

System 1 Processing

Symptoms and Signs RECOGNIZED

Patient Presentation

Pattern Recognition

Repetition

Executive override

Irrational override

Calibration

System 2 Processing

Symptoms and Signs NOT RECOGNIZED

T

Diagnosis
Some Cognitive Biases

Anchoring Bias: Over-reliant on the first piece(s) of information

Blind-spot bias: Failing to recognize your own cognitive biases is a bias in itself

Confirmation bias: tendency to search for or interpret information in a way that confirms one's preconceptions

Framing: Using a too-narrow approach and description

Overconfidence: Too confident about our abilities

Salience: Tendency to focus on the most easily recognizable features

Zero-risk Bias: Love certainty…even if it’s counterproductive
Cognitive Bias Cheat Sheet

- **Too much information** (e.g. attention bias, anchoring, confirmation bias, naïve realism)
- **Not enough meaning** (e.g. neglect of probability, attribution error, halo effect, Murphy’s Law, spotlight effect, hindsight bias)
- **Need to act fast** (e.g. overconfidence effect, sunk cost fallacy, status quo bias, ambiguity bias)
- **What should we remember** (e.g. suggestibility, stereotypical bias, duration neglect, next-on-line effect)

Buster Benson; *Cognitive Bias Cheat Sheet*: [https://betterhumans.coach.me/cognitive-bias-cheat-sheet-55a472476b18#.pi87tu71m](https://betterhumans.coach.me/cognitive-bias-cheat-sheet-55a472476b18#.pi87tu71m)
Rhabdomyosarcoma presenting as a parotid gland mass in pediatric patients: fine-needle aspiration biopsy findings.

Occam’s Razor: “entities must not be multiplied beyond necessity”

Hickam’s Dictum: “patients can have as many diseases as they damn well please”

Crabtree’s Bludgeon: “no set of mutually inconsistent observations can exist for which some human intellect cannot conceive a coherent explanation, however complicated” (BMJ 343:1301, 2011)
Dalhousie model of cognitive processes and clinical decision making

Understanding Dual Process

Patient presentation

Development of clinical decision

Understanding and detection of cognitive and affective bias

Communication issues

Metacognition Mindfulness Reflection

CBM mindware available for debiasing

Knowledge
- Comprehensiveness
- Accessibility
- Reliability

Standards of CT
- Clarity
- Precision
- Accuracy
- Significance
- Relevance
- Completeness
- Logic
- Fairness
- Breadth
- Depth

Rationality

Patient preferences
Back to AP
Approach to Error in AP

• Historically, focus has been on individual performance rather than system design

• Admonishment doesn’t have proven long term impact on quality/safety

“You call that mowin’ the lawn? ... Bad dog! ... No biscuit! ... Bad dog!”
Culture of Error Prevention

• Old way
  – Expert (audacity) will save us from ourselves
    – Striking oil

• New way
  – Good standard operating procedures
    – Value investing
Measure: Use LeTCI (from Baldrige Framework)

Levels: your current level of performance
Trends: your rate of performance improvement or sustainability of good performance
Comparisons: your performance relative to appropriate benchmarks
Integration: extent to which results match action plan performance requirements
Differential Diagnoses

- Congenital
- Genetic
- Environmental
- Mechanical
- Metabolic
- Infectious
- Immunologic
- Neoplastic
- Iatrogenic
- Psychological
- Idiopathic
General Algorithmic Approach to the 
Morphologic Evaluation of Body Fluids

- Normal
- Abnormal
  - Noncellular
    - Foreign
      - Starch
      - Fiber
    - Endogenous
      - Casts
      - Crystals
  - Cellular
    - Inflammatory
      - Acute
      - Chronic
      - Granulomatous
    - Neoplastic
      - Epithelial
      - Mesenchymal
      - Hematopoietic
    - Infectious
      - Viral
      - Bacterial
      - Mycobacterial
      - Fungal
      - Parasitic
    - Benign
    - Malignant
Elements of the Culture of Safety

• Recognize the inherent risk in every medical intervention (diagnostic opportunity)

• Every patient, every time, every … eliminate nonchalance in routine work

• “Bullet in the breast pocket”
“You can observe a lot just by watching.”

Yogi Berra
Become a Process Scholar

• 4000 ppm (0.4%) defect rate for laboratory QI monitors
  – Same as airline baggage handlers
What can we learn from the airline industry?
Pathologist Opportunity to Impact Patient Safety: Communicate Effectively

Doctor - doctor communication
Pay attention to report format
When to pick up the phone and call ordering physician?
Anatomic Path “critical values” -- ADASP recommendations

Doctor - patient communication
Pay attention to report format
Pathologists communicating directly with patients regarding their results
Remember we are physicians first
About Systems

“A bad system will beat a good person every time”
Edward Demming

“Every system is perfectly designed to achieve exactly the result is gets”
Don Berwick

“A common mistake that people make when trying to design something completely foolproof is to underestimate the ingenuity of complete fools”
Douglas Adams
Last Observation

In the final analysis, these comments are a plea to think about how you think (meta-cognition) and arrive at diagnoses (meta-diagnosis), paying particular attention to how we develop mastery and the cognitive biases we must recognize.
Pathology Redux?

“As is our pathology so is our practice...what the pathologist thinks today, the physician does tomorrow.”

Sir William Osler, M.D. (1849-1919)