Presentation to IOM Committee on Diagnostic Error in Health Care

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Outline

• 10 Principles for engaging Dx error
• Enhancing Dx Safety in Medicine
  – Diagnosis Risk Situational Awareness
  – Diagnosis Risk Safety Nets
• Priorities for IOM to reduce frequency and severity of diagnostic error
10 Principles for Engaging Dx Error

1. ↓ reliance on human memory
2. Leverage HIT; esp clinical documentation, f/up
3. Co-production of Dx (patient; team)
4. Need for new science and culture of uncertainty
5. Culture/praxis of conservative dx
6. Foundation trusting, continuous relationships
7. Linkages Dx & Rx (diagnosing what matters)
8. Special role/responsibility iatrogenic dx
9. ↑ synergy with “disease specific” research
10. Diagnosis as a multi-dimensional construct
What is a diagnosis?
What is a “Diagnosis”? 

- Preliminary diagnosis
- Working diagnosis
- Differential diagnosis
- Syndromic diagnosis
- Etiologic diagnosis
- Possible diagnosis
- Tissue diagnosis
- Computer diagnosis (EKG read)
- Deferred diagnosis
- Multiple/dual diagnoses
- Preclinical diagnosis
- Diagnosis/disease risk factor
- Incidental finding
- Billing diagnosis
- Telephone diagnosis
- Postmortem diagnosis
- Prenatal diagnosis
- Rare diagnosis
- Difficult/challenging diagnosis
- Undiagnosed disease
- Contested diagnoses
- Novel diagnosis
- Futile diagnosis
- Erroneous diagnosis
Health Care Reform

Diagnostic Error in Medicine

Analysis of 583 Physician-Reported Errors

Gordon D. Schiff, MD; Omar Hasan, MD; Seijeoung Kim, RN, PhD; Richard Abrams, MD; Karen Cosby, MD; Bruce L. Lambert, PhD; Arthur S. Elstein, PhD; Scott Hasler, MD; Martin L. Kabongo, MD; Nela Krosnjar; Richard Odwazny, MBA; Mary F. Wisniewski, RN; Robert A. McNutt, MD

Background: Missed or delayed diagnoses are a common but understudied area in patient safety research. To better understand the types, causes, and prevention of such errors, we surveyed clinicians to solicit perceived cases of missed and delayed diagnoses.

Methods: A 6-item written survey was administered at 20 grand rounds presentations across the United States and by mail at 2 collaborating institutions. Respondents were asked to report 3 cases of diagnostic errors and to describe their perceived causes, seriousness, and frequency.

Results: A total of 669 cases were reported by 310 clinicians from 22 institutions. After cases without diagnostic errors or lacking sufficient details were excluded, 583 remained. Of these, 162 errors (28%) were rated as major, 241 (41%) as moderate, and 180 (31%) as minor or insignificant. The most common missed or delayed diagnoses were pulmonary embolism (26 cases [4.5% of total]), drug reactions or overdose (26 cases [4.5%]), lung cancer (23 cases [3.9%]), colorectal cancer (19 cases [3.3%]), acute coronary syndrome (18 cases [3.1%]), breast cancer (18 cases [3.1%]), and stroke (15 cases [2.6%]). Errors occurred most frequently in the testing phase (failure to order, report, and follow-up laboratory results) (44%), followed by clinician assessment errors (failure to consider and overweighing competing diagnosis) (32%), history taking (10%), physical examination (10%), and referral or consultation errors and delays (3%).

Conclusions: Physicians readily recalled multiple cases of diagnostic errors and were willing to share their experiences. Using a new taxonomy tool and aggregating cases by diagnosis and error type revealed patterns of diagnostic failures that suggested areas for improvement. Systematic solicitation and analysis of such errors can identify potential preventive strategies.

Arch Intern Med. 2009;169(20):1881-1887
What went wrong: DEER Taxonomy Localization

- Failure/delay considering dx: 10
- Failure/delay ordering needed test(s): 63
- Erroneous lab/radiol test reading: 61
- Too much weight competing dx: 44
- Failed/deay f/up of test result: 42
- Failure eliciting history data: 40
- Failure eliciting P.Exam data: 37
- Failure/delay reporting result: 30
- Error clinician test interpretation: 25
- Technical error processing specimen/test: 17
- Inaccurate interpretation history data: 15
- Inaccurate interpretation P Exam: 14
- Failure in preforming ordered test: 11
- To little weight give to dx: 11
- Failure to recognize urgency: 11
- Failure to recognize complication: 11
Failure to Consider: Cognitive or System Problem

**Why** did clinician fail to consider?

- Lack knowledge, memory recall
- Inadequate time
- Failure to elect key hx or physical
- Competing diagnoses, symptoms
- Rare, atypical
- Tests threw off

**What are the causes?**

- Distractions
- Biases; heuristic
Micro environment: IT, staff, teamwork, support systems

Time Pressures, Distractions, Interruptions

Pt. Presentation
Signal: Noise
Ambient Conditions
Difficult diagnoses

Training
Prior Experience
Self-awareness limitations

Dx Errors
Diagnostic Risk
Situational Awareness

• Specialized type of situational awareness
• High reliability organizations/theory
  – High worry anticipation of what can go wrong
  – Preoccupied w/ risks recognizing/preventing
• Appreciation diagnosis uncertainty, limitations
  – Limitations of tests, systems’ vulnerabilities
  – Knowing when “over head” need for help
• Making failures visible
• Don’t miss diagnoses, red flag symptoms
• Diagnostic pitfalls – potentially useful construct
## Cases Closed: Allegations by Close Year

<table>
<thead>
<tr>
<th>Diagnosis-related</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>72</td>
<td>82</td>
<td>79</td>
<td>83</td>
<td>81</td>
<td>397</td>
</tr>
<tr>
<td>Medication-related</td>
<td>11</td>
<td>13</td>
<td>14</td>
<td>14</td>
<td>16</td>
<td>68</td>
</tr>
<tr>
<td>Medical Treatment</td>
<td>14</td>
<td>4</td>
<td>10</td>
<td>8</td>
<td>5</td>
<td>41</td>
</tr>
<tr>
<td>Communication</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Violation of Rights</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Safety &amp; Security</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>OB-related Treatment</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Surgical Treatment</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Breach of Confidentiality</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Number of Cases</strong></td>
<td><strong>108</strong></td>
<td><strong>109</strong></td>
<td><strong>107</strong></td>
<td><strong>116</strong></td>
<td><strong>111</strong></td>
<td><strong>551</strong></td>
</tr>
</tbody>
</table>

N=551 CRICO and Coverys outpatient PL cases closed 2005–2009 naming General Medicine staff/fellow physicians (excl. Hospitalists) and excluding ED locations.
## Cases Closed: Top Final Diagnoses

<table>
<thead>
<tr>
<th>Final Diagnoses</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer</td>
<td>190</td>
</tr>
<tr>
<td>Diseases of the heart</td>
<td>43</td>
</tr>
<tr>
<td>Diseases of blood vessels</td>
<td>27</td>
</tr>
<tr>
<td>Infection</td>
<td>22</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>16</td>
</tr>
<tr>
<td>Lower gastrointestinal disorders</td>
<td>9</td>
</tr>
<tr>
<td>Orthopedic injuries</td>
<td>7</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top Cancers</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorectal</td>
<td>56</td>
</tr>
<tr>
<td>Lung</td>
<td>29</td>
</tr>
<tr>
<td>Prostate</td>
<td>26</td>
</tr>
<tr>
<td>Breast</td>
<td>18</td>
</tr>
<tr>
<td>Other GI</td>
<td>10</td>
</tr>
<tr>
<td>Benign neoplasm</td>
<td>8</td>
</tr>
<tr>
<td>Urinary organs</td>
<td>8</td>
</tr>
<tr>
<td>Lymphatic and hematopoietic tissue</td>
<td>8</td>
</tr>
<tr>
<td>Head and neck</td>
<td>6</td>
</tr>
<tr>
<td>Uterus and cervix</td>
<td>5</td>
</tr>
</tbody>
</table>

N=551 CRICO and Coverys outpatient PL cases closed 2005–2009 naming General Medicine staff/fellow physicians (excl. Hospitalists) and excluding ED locations.
# Four Major Cancers: Colorectal, Lung, Prostate and Breast Breakdowns in the Process of Care

<table>
<thead>
<tr>
<th>STEP</th>
<th>PERCENT OF COLORECTAL CANCER CASES* (N=56)</th>
<th>PERCENT OF LUNG CANCER CASES* (N=29)</th>
<th>PERCENT OF PROSTATE CANCER CASES* (N=26)</th>
<th>PERCENT OF BREAST CANCER CASES* (N=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patient notes problem and seeks care</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2. History/physical &amp; evaluation of symptoms</td>
<td><strong>55%</strong></td>
<td>24%</td>
<td>23%</td>
<td><strong>94%</strong></td>
</tr>
<tr>
<td>3. Order of diagnostic/lab tests</td>
<td>29%</td>
<td>24%</td>
<td>38%</td>
<td>11%</td>
</tr>
<tr>
<td>4. Performance of tests</td>
<td>9%</td>
<td>14%</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>5. Interpretation of tests</td>
<td>5%</td>
<td>21%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>6. Receipt/transmittal of test results</td>
<td>0%</td>
<td>10%</td>
<td>15%</td>
<td>0%</td>
</tr>
<tr>
<td>7. Physician follow up with patient</td>
<td>21%</td>
<td>0%</td>
<td>27%</td>
<td>11%</td>
</tr>
<tr>
<td>8. Referral management</td>
<td>5%</td>
<td>7%</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>9. Patient compliance with follow-up plan</td>
<td>7%</td>
<td>3%</td>
<td>8%</td>
<td>0%</td>
</tr>
</tbody>
</table>

*One case often will have multiple factors identified.

N=397 CRICO and Coverys outpatient PL cases closed 2005–2009 naming General Medicine staff/fellow physicians (excl. Hospitalists), excluding ED locations, with a diagnosis-related major allegation. 129 of the 397 cases have a final diagnosis of colorectal, lung, prostate or breast cancer.
Are Test Results Reliably Acknowledged and Acted on?

<table>
<thead>
<tr>
<th>Test</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>251</td>
<td>16%</td>
</tr>
<tr>
<td>Cr</td>
<td>572</td>
<td>37%</td>
</tr>
<tr>
<td>K</td>
<td>278</td>
<td>18%</td>
</tr>
<tr>
<td>INR</td>
<td>213</td>
<td>14%</td>
</tr>
<tr>
<td>PSA</td>
<td>148</td>
<td>10%</td>
</tr>
<tr>
<td>Guaiac+</td>
<td>10</td>
<td>1%</td>
</tr>
<tr>
<td>Abnl Colonspy</td>
<td>18</td>
<td>1%</td>
</tr>
<tr>
<td>Abnl Mamgrm</td>
<td>11</td>
<td>1%</td>
</tr>
<tr>
<td>Abnl Pap</td>
<td>4</td>
<td>0%</td>
</tr>
<tr>
<td>Pulm Nodule</td>
<td>22</td>
<td>1%</td>
</tr>
<tr>
<td>Abdom Mass</td>
<td>17</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>1544</td>
<td></td>
</tr>
</tbody>
</table>

Table: Test Results Acknowledged and Acted on

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result Found in Chart</td>
<td>97.1%</td>
</tr>
<tr>
<td>Abnormal Acknowledged</td>
<td>90.1%</td>
</tr>
<tr>
<td>Action Plan Documented</td>
<td>78.7%</td>
</tr>
<tr>
<td>Action Plan Completed</td>
<td>80.0%</td>
</tr>
<tr>
<td>Patient Notified</td>
<td>77.4%</td>
</tr>
</tbody>
</table>

Preliminary data PROMISES Project Unpublished 2012
Disposition of Closed Cases
GM Cases More Frequently Settled or Plaintiff Verdict

DIAGNOSIS CASES (N=397)
- 39% Settled
- 45% Defense Verdict
- 11% Plaintiff Verdict
- 2% Dropped/denied/dismissed

MEDICATION CASES (N=68)
- 29% Settled
- 57% Defense Verdict
- 12% Plaintiff Verdict
- 2% Dropped/denied/dismissed

ALL GM CASES (N=551)
- 35% Settled
- 49% Defense Verdict
- 14% Plaintiff Verdict
- 2% Dropped/denied/dismissed

ALL NON-GM CASES (N=6,673)
- 20% Settled
- 69% Defense Verdict
- 11% Plaintiff Verdict
- 1% Dropped/denied/dismissed

N=551 CRICO and Coverys outpatient PL cases closed 2005–2009 naming General Medicine staff/fellow physicians (excl. Hospitalists) and excluding ED locations.

Schiff et al JAMA Internal Med 9/29/13
| **GI Screening Colonoscopy Indications** |

| **Submit** |

| **PATIENT NAME:** | **TEST, TEST** | **BWH MRN:** | **29344728** |
| **ROOM:** | | **SERVICE:** | |
| **BIRTH DATE:** | 10/21/1933 | **AGE:** | 80 years |
| **GENDER:** | Female | **PHONE NUMBER:** | 6172257878 |
| **PREGNANCY STATUS:** | Unknown | **PAYOR:** | BWH - Self Pay |
| **ORDERING PROVIDER:** | SCHIFF, GORDON D MD | **PERCIPIO ORDER ID:** | 30521909 |
| **EXAM:** | GI Screening Colonoscopy | **ORDERING SITE:** | The Phyllis Jen Center for Primary Care |
| **CREATED BY:** | | | |
Diagnostic Risk Safety Nets

• Recognizing inherent uncertainties/risks, build in mitigation, protections, recovery structures and processes
• Proactive, systematic follow-up, feedback via closed loop systems
• Major role for HIT to hard-wire
  – To automate, ensure reliability, ease burden on staff/memory, ensure loops closed and outliers visible
What is the most important thing IOM committee could recommend to reduce frequency and severity of diagnostic error?

What action(s) to improve diagnosis would you prioritize first?
Priority Suggestion

• Reclaim, reengineer EMR/clinical documentation for clinicians’ & patients’ diagnosis safety/quality needs
Canvass for Your Assessment

Van Gogh: Self-Portrait in Front of the Easel
Canvass for Your Assessment

- Differential Diagnosis
- Weighing Likelihoods
- Etiology
- Urgency
- Degree of certainty
Reengineering EMR for diagnosis needs

• CYA: Canvas for your assessment.
• Crafted/shared w/ patient.
• Visually organized for cognitive support
• Problem list integration
• Integrating diagnostic checklists
1. Essential Data Elements - Elements of Hx, P.exam, tests data that should be reliably obtained for every pt presenting with given sx. In many situations can reliably be done w/ computer questionnaire.

2. Don’t miss diagnoses – critical dx can present w/ sx that are fatal or have serious consequences if not recognized and rx promptly. These dx should be considered in every patient with that symptom.

3. Red flag symptoms - sx or findings (e.g. back pain with new urinary incontinence in cancer patient) that may indicate serious condition & should lead to heightened suspicion/evaluation for don’t miss dx.
Diagnosis Essentials Checklist

4. Potential drug causes – meds that can cause the symptom. High % sx med side effects, yet infrequently considered.

5. Required referrals - When is specialist expertise or technology needed to adequately and safely evaluate the patient? Includes possible rare conditions that only specialists have sufficient experience or where required testing (biopsy or endoscopy)

6. Patient follow-up instructions and plan - Warnings that patients should receive regarding specific symptoms that should lead them to return or call. These should be in writing and include a time frame. (e.g. call if you develop rash or fever, or if you are not improved in 48 hours)
Reengineering EMR for diagnosis needs

- CYA: Canvas for your assessment.
- Crafted/shared w/ patient, others on team
- Visually organized for cognitive support
- Problem list integration
- Integrating diagnostic checklists
- Increased veracity/update (smart carry forward)
- Weaving continuity and follow-up.
- Test result incorporation, closing loops
Reengineering EMR for diagnosis/ needs

- Facilitating patients raising questions.
- Enhanced access to knowledge, specialists
- Redesigned for feedback, learning
- Making workflow interruptions more tolerant
- ↓ entry time; ↑ time to listen, talk, think
• Not claiming EMRs currently do these things well; only that they can do these things much much much better if we commit ourselves to their redesign and continuous improvement

• Not leave clinicians and patients to vagaries and fragmentation of market
Box 1 Condensed set of categories describing different steps in diagnosis targeted by diagnostic health information technology (HIT) tools

- Tools that assist in information gathering
- Cognition facilitation by enhanced organisation and display of information
- Aids to generation of a differential diagnosis
- Tools and calculators to assist in weighing diagnoses
- Support for intelligent selection of diagnostic tests/plan
- Enhanced access to diagnostic reference information and guidelines
- Tools to facilitate reliable follow-up, assessment of patient course and response
- Tools/alerts that support screening for early detection of disease in asymptomatic patients
- Tools that facilitate diagnostic collaboration, particularly with specialists
- Systems that facilitate feedback and insight into diagnostic performance
Priority Suggestions

• Reclaim, reengineer EMR/clinical documentation for clinicians’ & patients’ diagnosis safety/quality needs

• AHRQ CERT Model → Centers for Diagnostic Research (CERD)
Supplemental Slides

• Role, Challenges, Examples of Feedback
• Patients’ Role in Preventing/Minimizing Error
• Beyond triggers: overcoming burden of manual case review
• Diagnosis Challenges for Hospitalists
• Avoiding Potentially Problematic Interventions
  – Tampering, Sub-optimization, Workarounds, Redundancy
Feedback – Key Role in Safety

- Structural commitment patient role to play
- Embodies/conveys message: uncertainty, caring, reassurance, access if needed
- Allows deployment of test of time, more conservative diagnosis
- Enables differential diagnosis
- Emphasizes that disease is dynamic
- Reinforces culture of learning & improvement
- Illustrates how much disease is self limited
- Makes invisible missed diagnoses visible
Feedback - Challenges

- Effort, time, support required
- Discontinuities
- Can convey non-reassuring message
- Feedback fatigue
- Non-response not always good predictor of misdiagnosis as multiple confounders
- Tampering – form of availability bias
55/338 (16%) → not improved of whom only 21 (38%) had contacted any clinician
Examples of Feedback Learning

Feeding back to upstream hospital
- spinal epidural abscess

IVR follow-up post urgent care visit
- UAB Berner project

Dedicated Dx Error M&M

Autopsy Feedback
- 7/32 MDs aware disseminated CMV

ED residents post admission tracking

Feedback to previous service

Tracking persistent mysteries

Chart correction by patients

Radiology/pathology
- systematic second reviews

2nd opinion cases
- Best Doctors dx changed

Linking lab and pharmacy data
- to find signal of errors (missed ↑ TSH)

Urgent care
- call back f/up systems

Malpractice
- knock on the door
Diagnosis Error M&M’s
Upstream feedback cases

• Guillain-Barre Syndrome
  – Missed by ED attg admitted elsewhere
• Spinal epidural abscess
  – Seen repeatedly elsewhere w/ “negative” MRI
• Staph sepsis
  – Confusion hypotension overlooked over holiday
• GI bleed and H.Pylori
  – Chestpain misattributed in homeless pt
  – Lab stumbles out during conference
• Tongue hematoma
  – Misdiagnosed as ACE-I angioedema
• Disseminated CMV infection
  – Autopsy+; only 7/32 MD’s aware
Role for Patient
In Minimizing and Preventing Diagnosis Error and Delay

- Push for timely access
- Reliable follow-up, continuity
- Keen observer, reporter sx
- Proactive on test results
- Sharing hunches
- Curiously reading on own
- Meticulously adhering w/ empiric trial regimens
- Active as co-investigator

- Being patient: time & tests
- Recruiting family for support
- Respecting limits on staff time, society resources
- Agreeing to disagree
- Help in building, maintaining trust and communication
- Getting involved with patient organizations

**Key question is:**
What will it take at the provider and institutional end to support these roles and help them flourish?
ED note for visit leading to admission

Note for prior encounter

Area to record assessment

List of prior encounters

**HISTORY OF PRESENT ILLNESS:** Emely, a middle-aged woman presenting with 3 days of right lower quadrant abdominal pain. The pain is crampy in nature and is associated with tenderness to the epigastric area. No change with intake of food. No sick contacts, recent travel or prior episodes of the symptoms. No recent ingestion of unusual food.

**PHYSICAL EXAMINATION:** The patient actually looked well and had normal vital signs, although earlier, she had a high fever of 101.5. Her abdominal exam revealed minor tenderness, mainly in the right lower quadrant. No rebound or guarding.

**LABORATORY DATA:** Culture was taken and results are pending.

**2 Days Before Index Visit**

- **Source:** DC Summary
- **DocType:** DC Summary
- **Date:** 12/1/2009
- **Source:** DC Summary
- **DocType:** Hospital Note
- **Date:** 12/23/2008
- **Source:** DC Summary
- **DocType:** Outpatient Note
- **Date:** 12/19/2008

El-Kareh and Schiff - DEM Conference 2009
I interviewed and examined the patient and I confirm the documentation on the written chart. Please see the written chart for details.

HISTORY OF PRESENT ILLNESS: Briefly, the patient is a middle-aged woman presenting with 3 days of right lower quadrant abd pain. The pain is crampy in nature, 8/10 in severity with radiation to the epigastic area. No change with intake of food. No sick contacts, recent travel or prior episodes of the symptoms. No recent ingestion of unusual food.

PHYSICAL EXAMINATION: The patient actually looked well and had normal vital signs, although earlier, she had a high fever of 101.5. Her abdominal exam revealed minor tenderness, mainly in the right lower quadrant. No rebound or guarding.

LABORATORY DATA: CBC had a white blood count of 14. With...

INTERVAL HISTORY: This delightful 59-year-old woman has a history of diabetes and hyperlipidemia. She has been on insulin and a statin for quite some time. Today she complains of intermittent abdominal discomfort along with occasional chills. She gets cold very easily in her poorly heated apartment. The abdominal pain occurred after she ate a large burrito at a fast food restaurant 3 days ago. She is complaining of some constipation.

PHYSICAL EXAM:
Temperature 99.8 and remainder of vitals are normal.
Gen: Slightly uncomfortable
HEENT: Moist mucous membranes
Abd: Soft, mildly tender in right lower quadrant.
Ext: No edema
Hospitalist Misdiagnosis Vulnerabilities

1. Lack of prior knowledge of the patient
2. Missing past medical data and illness course
3. In addition to missing data, information can also be misleading
4. Prioritization and diagnostic focus
5. Divergent, conflicting, and sometimes excessive information
6. Transfers can fragment and complicate the diagnostic process
7. Trainees and diagnosis
8. Inexperience of hospitalists
9. Base rate distortions
10. Decline of the autopsy and other “feedback” mechanisms
11. Higher thresholds required to justify hospital admission
12. Lower threshold of patients remaining in the hospital

Schiff & Graber, Ch 8 in McKean Principles of Hospital Medicine (2012).
Tampering

• Reflex actions in response to errors
• Need to understanding/diagnose difference between special cause vs. common cause variation
• Responding to special cause as if it was common cause analogous to availability bias – where fail to weigh true incidence, instead overweigh more vividly recalled event.
Suboptimization
How to recognize and avoid

• Suboptimization refers to the process of optimizing one element of the system at the expense of the other parts of the system and the larger whole.
  – Every lab perfecting own ordering, reporting system
  – Every unit in hospital its own system
  – Ditto every practice and doctor

• Workarounds as both symptoms of and contributor to problems
Workarounds

• Most diagnostic processes developed in an ad hoc fashion over time; filled with workarounds and unnecessary steps and opportunities for error.

• Workaround=bypass problems
  – Often creative, innovative, successful
  – But temporary, suboptimal to fixing problem
  – Can mask embedded problems, inhibit solving
  – Worse yet, may introduce new problems
Redundancy

• Duplication of critical components of a system with the intention of increasing reliability of the system, usually in the case of a backup or fail-safe, or parallel systems.

• However to extent redundancy increases complexity, dilutes responsibility and even encourages risk taking, should be questioned as safety strategy.

• Redundant systems can be costly, using valuable resources that could be freed for more reliable, productive system.