

Diagnostic Error Still Leading the Pack

A Lookback at 10 Years of Medical Malpractice

Shari Moore, RN, BSN

▶ Objectives

At the conclusion of the program, participants will:

- ▶ Discuss the leading causes of medical professional liability claims over the last 10 years
- ▶ Describe the current trends in both the frequency and severity of malpractice claims
- ▶ Identify actionable insights from examining the clinical components of malpractice claims
- ▶ Identify the two most commonly identified systems of thinking that may contribute to diagnostic error
- ▶ Analyze how diagnostic and treatment errors are made and take steps to avoid these errors in their practice

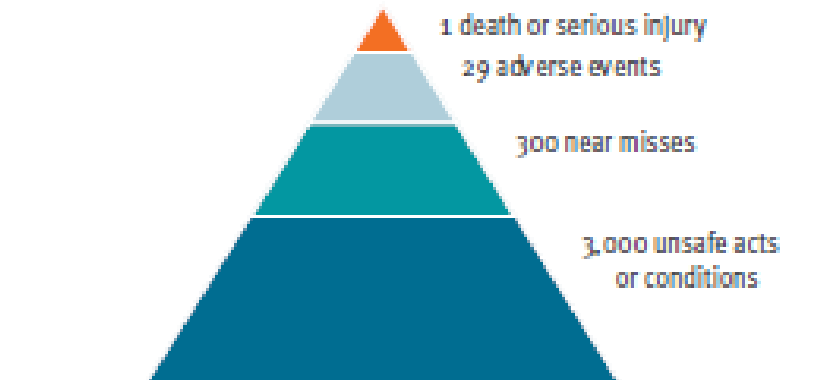
CRICO 2018 CBS BENCHMARKING REPORT

Medical Malpractice in America

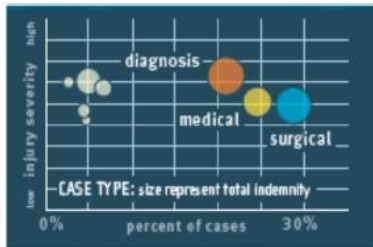
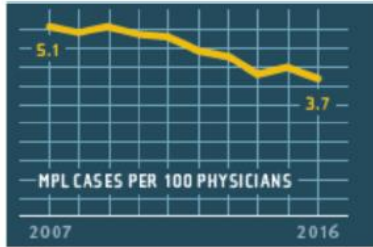
A 10-YEAR ASSESSMENT WITH INSIGHTS

Heinrich's Theory

Incident Ratio Model



▶ Analysis indicates:

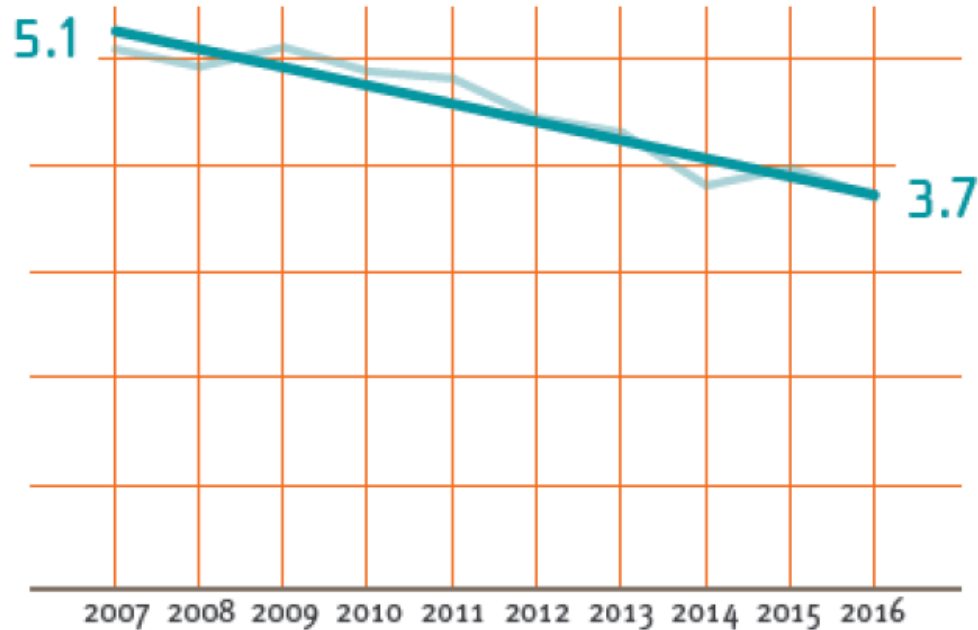


- ▶ Case frequency went down
- ▶ Expenses and indemnity payments rose...about as expected
- ▶ Deeply coded cases provide actionable insights

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▶ The MPL case rate decreased 27% over 10 years

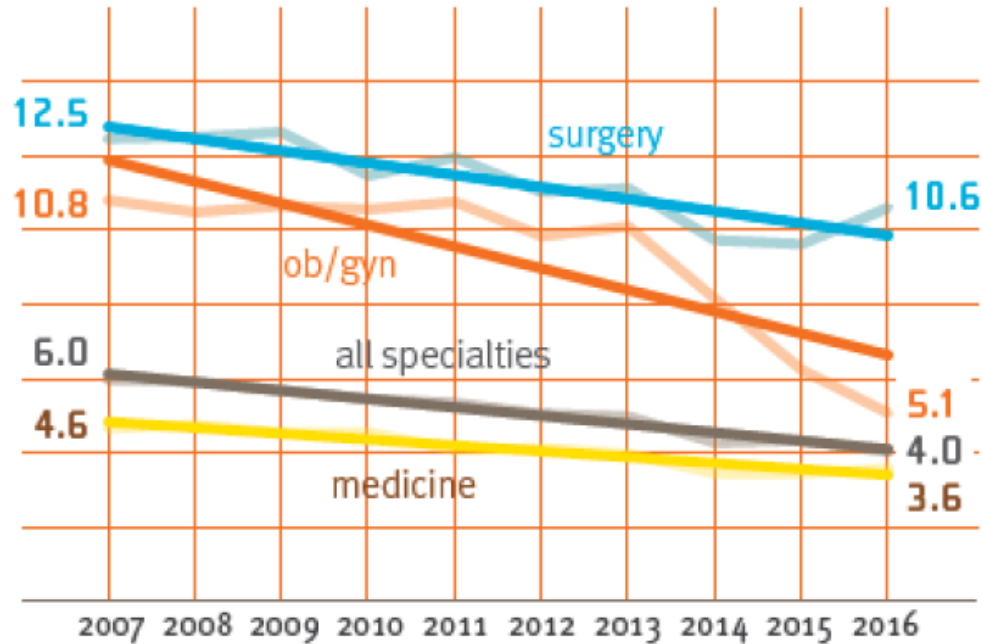
MPL CASES PER 100 PHYSICIANS



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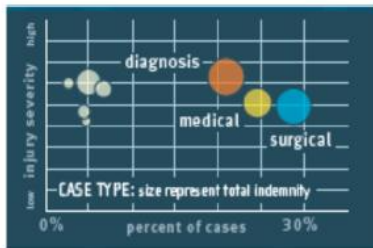
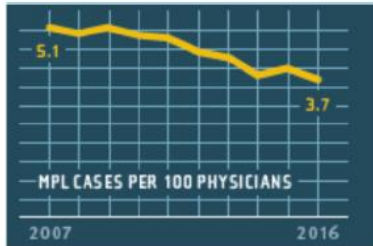
▶ Defendant rates declined most steeply in OB/GYN

DEFENDANTS PER 100 PHYSICIANS



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▶ Analysis indicates:

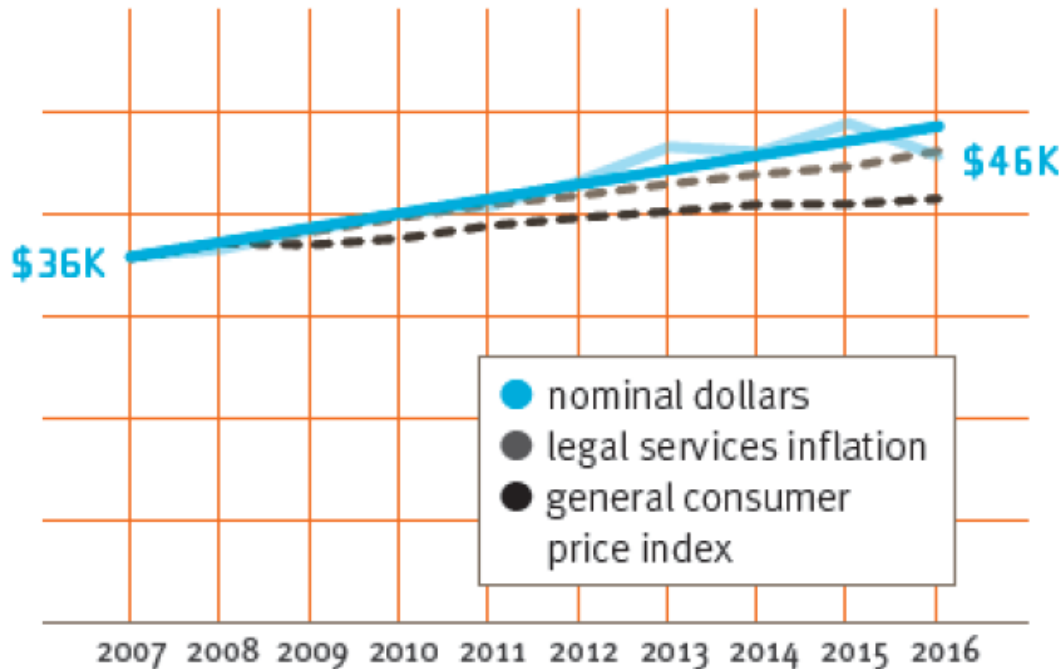


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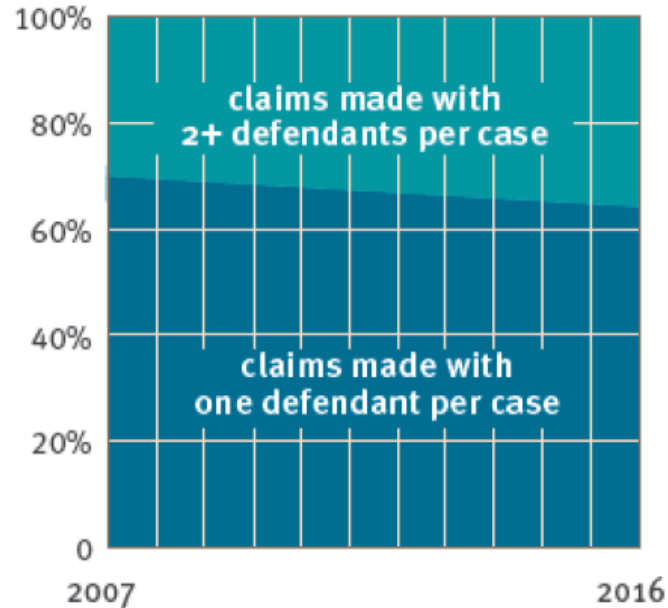
▶ Case management expenses outpaced consumer and legal inflation indices

AVERAGE EXPENSE PER CASE



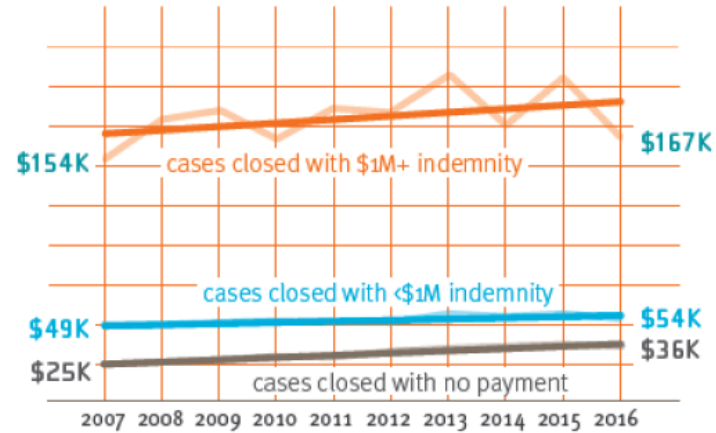
▶ The proportion of cases naming multiple defendants is growing

CASES BY NUMBER OF DEFENDANTS



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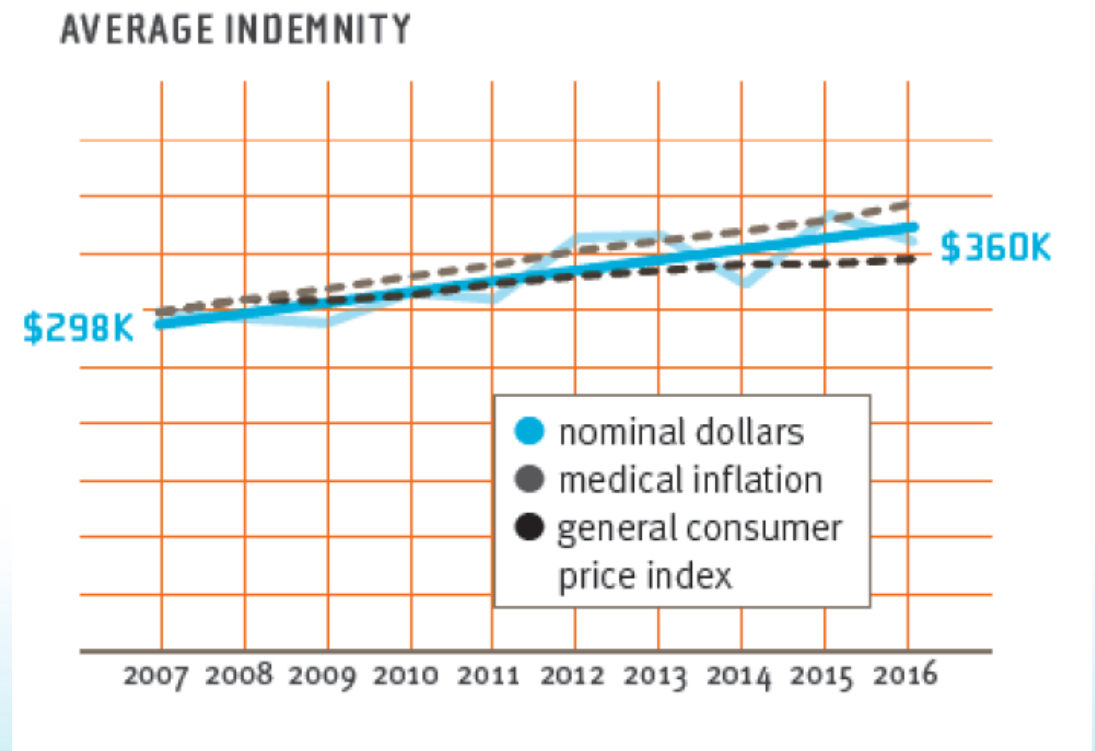
▶ Average expenses rose faster for cases without payment



Cases closed...	TEN-YEAR AVERAGE	AVERAGE CHANGE PER YEAR	AVERAGE PERCENT CHANGE PER YEAR
...with no payment	\$31K	+\$1.5K	+4.7%
...under \$1M	\$52K	+\$0.7K	+1.4%
...\$1M+	\$180K	+\$2.3K	+1.3%

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▶ Average indemnity payments increased 3% annually

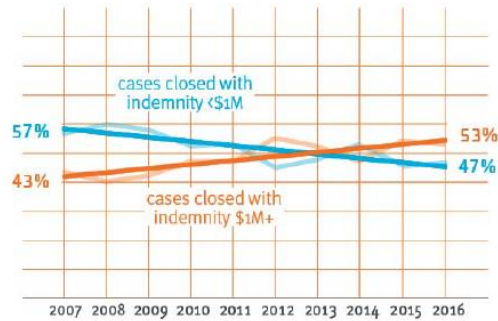


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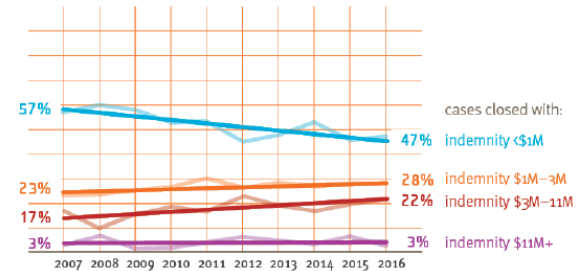
▶ Cases with payment \$1M+ driving indemnity growth with fastest growth in the \$3M-11M layer

PERCENT OF TOTAL INDEMNITY



Cases closed...	TOTAL INDEMNITY		TEN-YEAR AVERAGE	AVERAGE CHANGE PER YEAR	AVERAGE PERCENT CHANGE PER YEAR
	2007	2016			
...under \$1M	\$602M	\$515M	\$525M	-\$1.4M	-0.3%
...\$1M+	\$459M	\$580M	\$496M	+\$27M	+5.5%

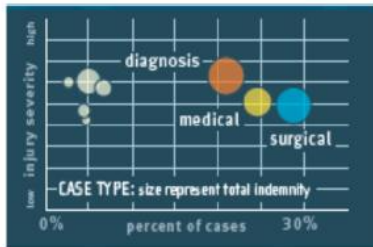
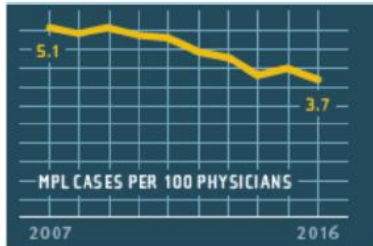
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...under \$1M	\$602M	\$515M	\$525M	-\$1.4M	-0.3%
...\$1M-\$3M	\$248M	\$309M	\$273M	+\$12M	+4.4%
...\$3M-\$11M	\$175M	\$243M	\$184M	+\$15M	+7.9%
...\$11M+	\$36M	\$29M	\$40M	-	-

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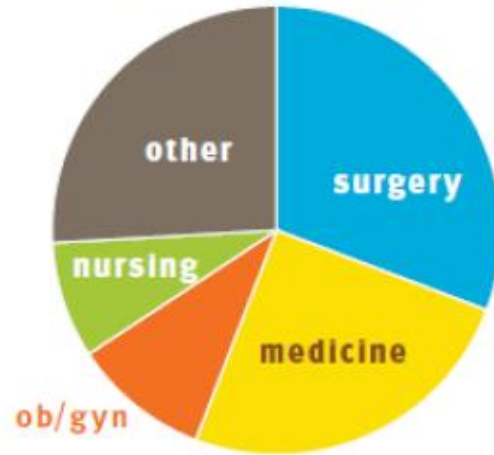
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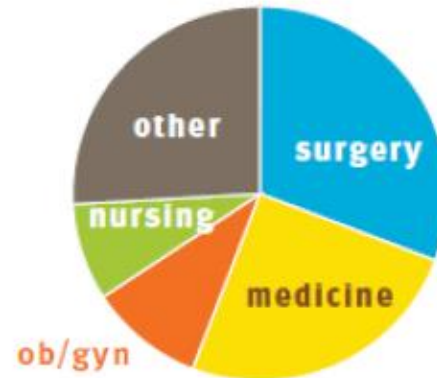
▶ Service area

RESPONSIBLE SERVICES AS A PERCENT OF CASES
THE RELATIVE SIZE OF THE PIE CHARTS REFLECTS THE DECLINE IN THE CASE RATE

2007
5.1
CASES PER
100 PHYSICIANS

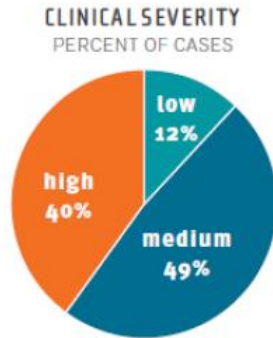


2016
3.7
CASES PER
100 PHYSICIANS



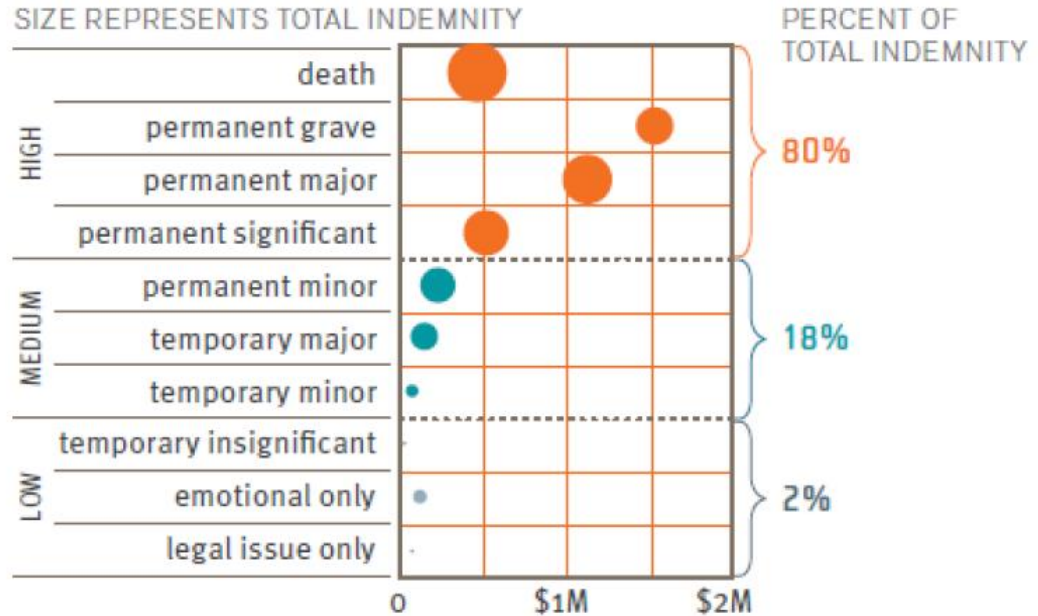
▶ Clinical severity

- ▶ High-severity injuries are 41% more likely to lead to an indemnity payment



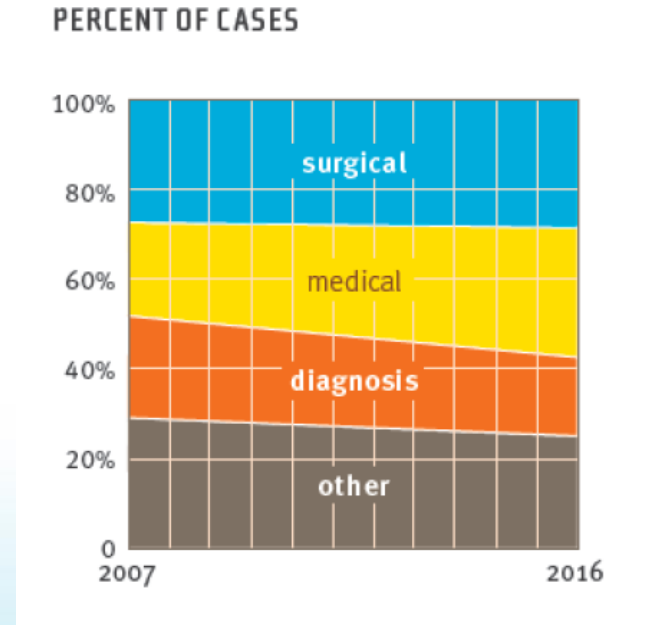
CLINICAL SEVERITY AND AVERAGE INDEMNITY

SIZE REPRESENTS TOTAL INDEMNITY



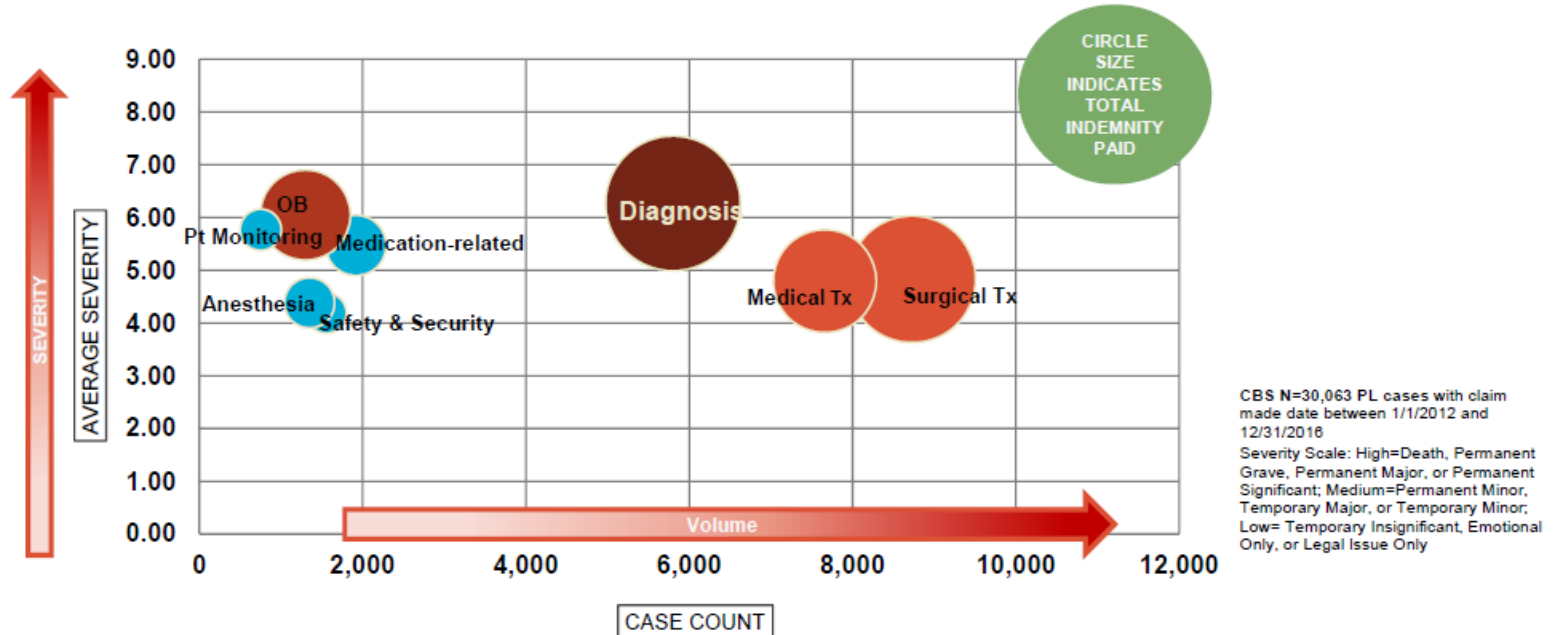
▶ Case type

- ▶ Vast majority of cases stem from 3 categories
 - ▶ Surgical treatment-most prevalent
 - ▶ Diagnosis-most costly
 - ▶ Medical treatment-becoming more common



▶ Case type

Top Major Allegations in Claim Made Year 2012–2016

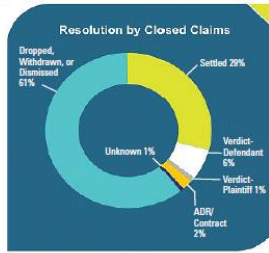
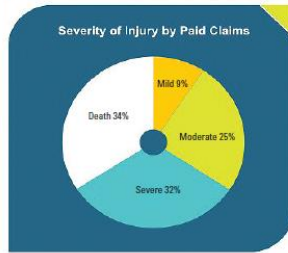


CLAIMS INVOLVING DIAGNOSTIC ERROR (2008-2017)

Of the 83,887 closed claims and lawsuits reported to the Data Sharing Project (DSP) between 2008 and 2017, 22% cited diagnostic error as the primary allegation.



Average Indemnity Paid for Specialties with the Highest Number of Closed Claims



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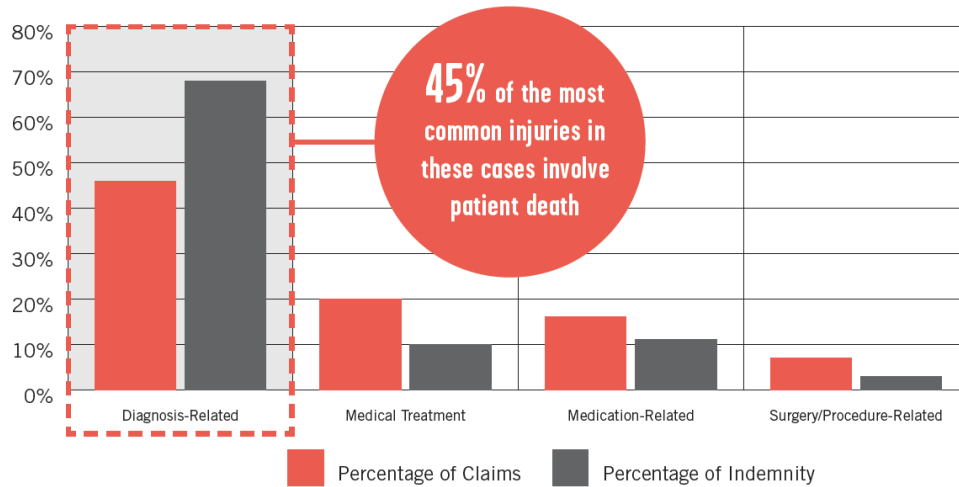


2019 Top 10
Patient Safety Concerns
Executive Brief

2019 Top 10 Patient Safety Concerns

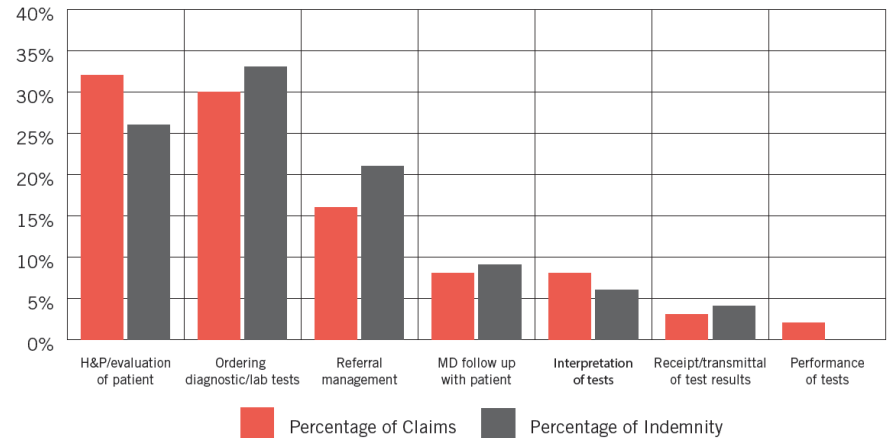
1. Diagnostic Stewardship and Test Result Management Using EHRs
2. Antimicrobial Stewardship in Physician Practices and Aging Services
3. Burnout and Its Impact on Patient Safety
4. Patient Safety Concerns Involving Mobile Health
5. Reducing Discomfort with Behavioral Health
6. Detecting Changes in a Patient's Condition
7. Developing and Maintaining Skills
8. Early Recognition of Sepsis across the Continuum
9. Infections from Peripherally Inserted IV Lines
10. Standardizing Safety Efforts across Large Health Systems

Figure 1. Top Allegation Categories

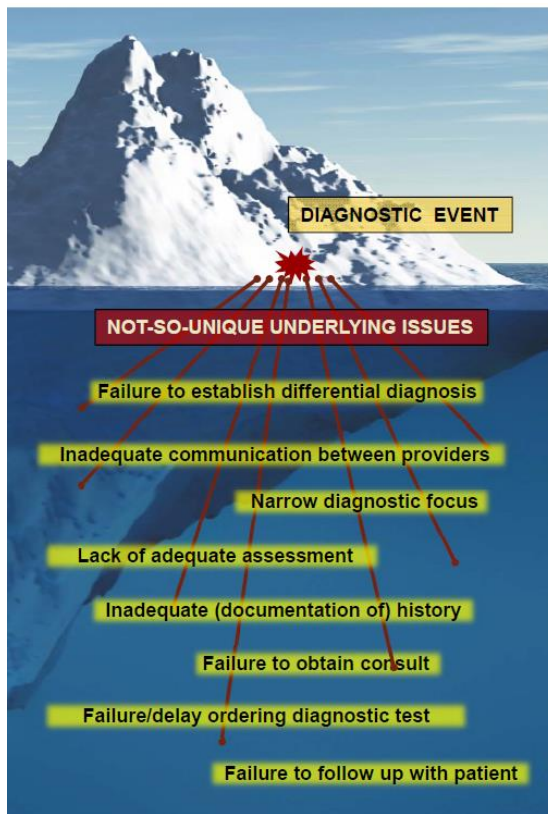


Selection: N=1,800 closed PL claims from 2013-2017 with a Primary Care Physician

Figure 2. Top Allegation Details - Diagnosis-Related



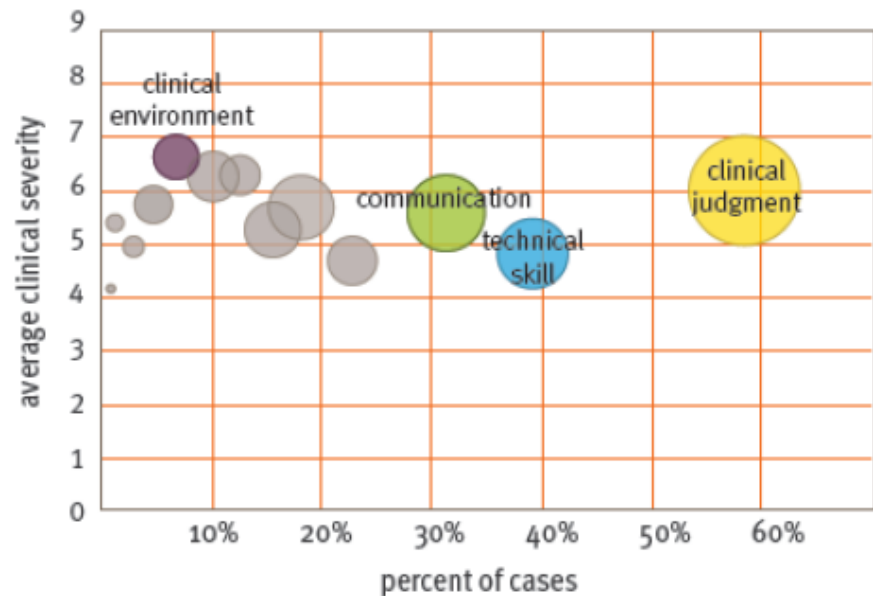
Selection: N=834 closed PL claims from 2013-2017 with a Primary Care Physician and a Diagnosis-Related allegation



▶ Contributing factors

CONTRIBUTING FACTOR CATEGORIES

SIZE REPRESENTS (RELATIVE) TOTAL INCURRED LOSSES



ODDS RATIOS FOR CLINICAL JUDGMENT CASES

compared to cases without these issues

3.76 to involve a high-severity injury

2.80 to close with payment

5.63 to close with payment \$1M+

▶ Contributing factors

Examining Patient Assessment

At the detail level, contributing factors pinpoint specific opportunities for care improvement and MPL risk reduction.

PATIENT ASSESSMENT CASES



38%

of all MPL cases involved patient assessment issues

44% closed with payment

\$523K average indemnity

\$222K median indemnity

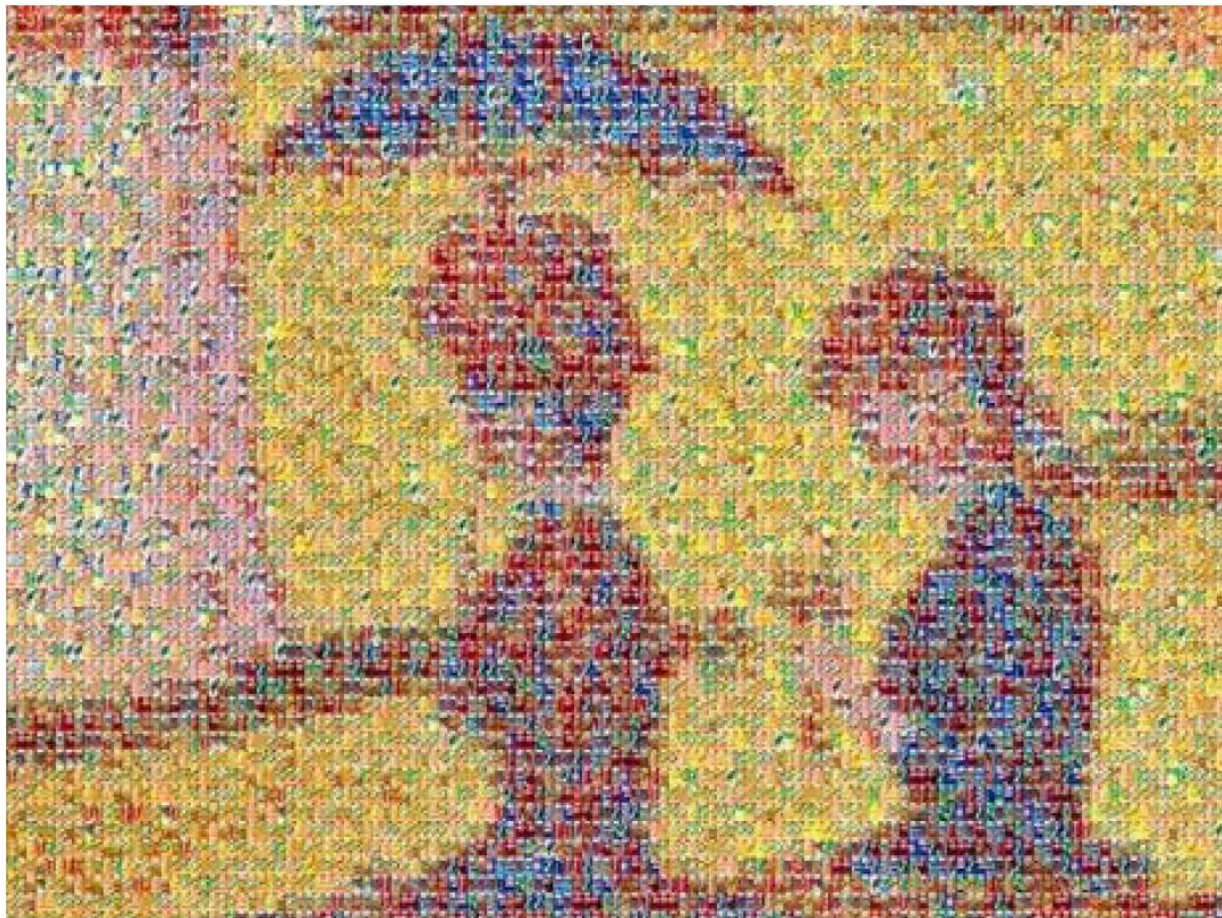
AMONG CASES INVOLVING A PATIENT ASSESSMENT FAILURE

	PERCENT OF CASES*
failure/delay in ordering diagnostic test	33%
failure to appreciate and reconcile relevant signs or symptoms	33%
failure to establish differential diagnosis	20%
misinterpretation of diagnostic studies (X-rays, slides, film)	17%
inadequate history and physical	14%

*Cases may have multiple issues.



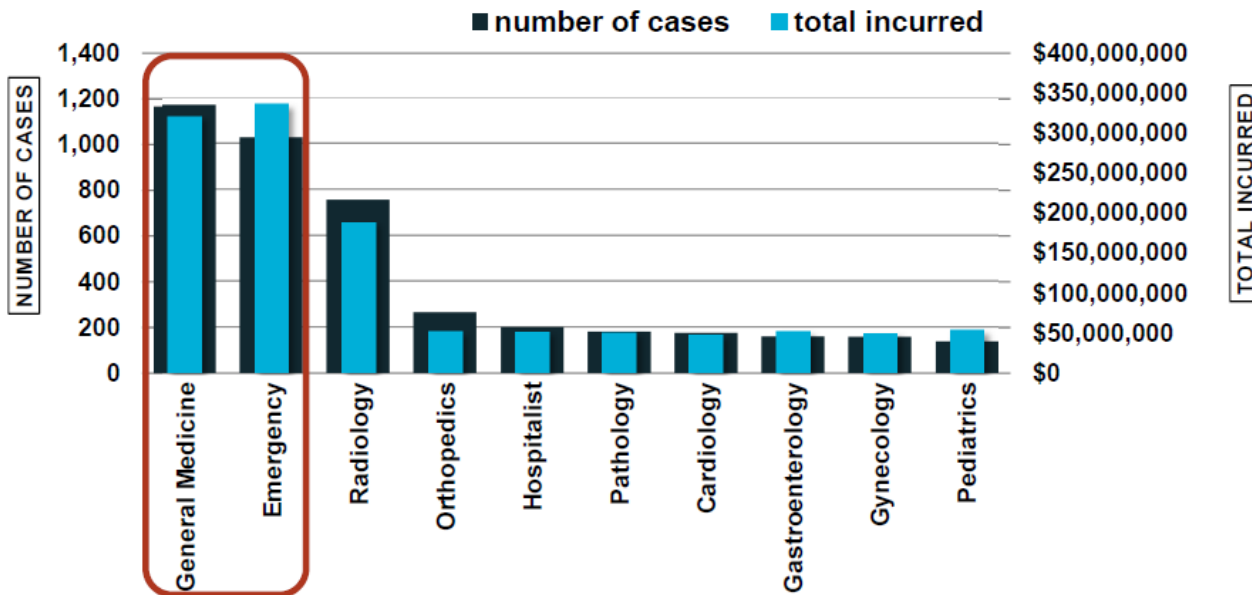
Monet?
Seurat?
Cezanne?





▶ Primary responsible service

Together, general and emergency medicine account for 38% of the cases and 41% of the dollars associated with diagnosis-related claims.

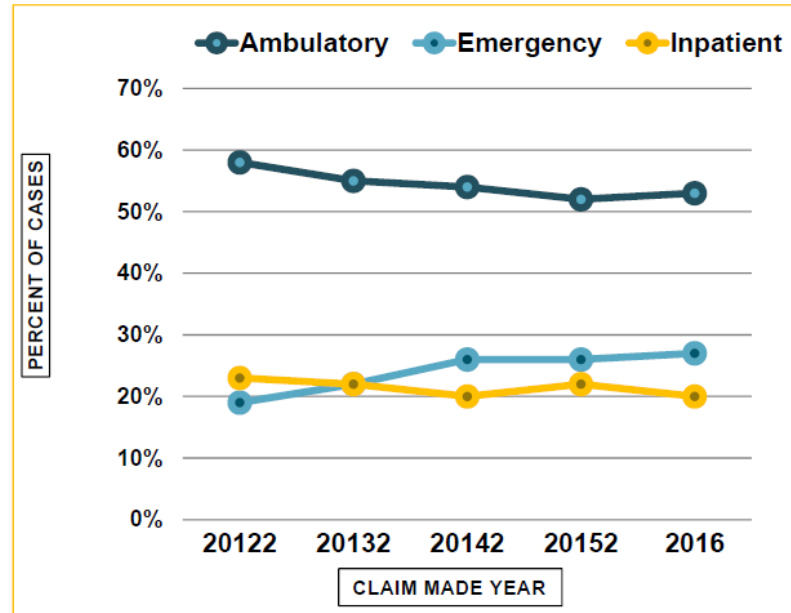
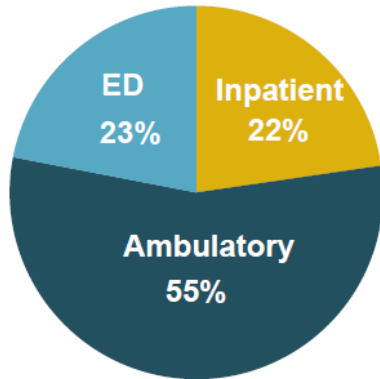


N=5,800 MPL cases claim made date 1/1/12–12/31/16 with a diagnosis-related major allegation.

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▶ Clinical setting

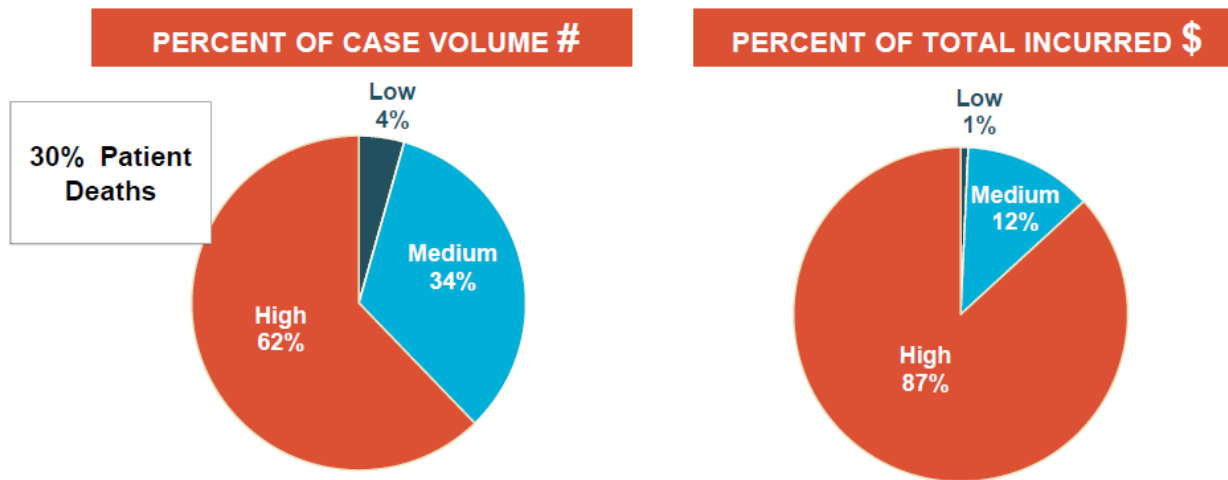
Diagnosis-related cases arising from the ambulatory and ED setting account for >75% of all claims.



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▶ Clinical severity

High severity injuries are prevalent in diagnosis-related cases and drive significant financial losses.



30% Patient Deaths

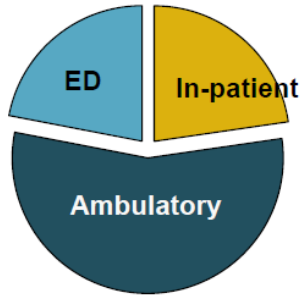
N=5,800 MPL cases claim made date 1/1/12–12/31/16 with a diagnosis-related major allegation.

Total Incurred includes reserves on open and payments on closed cases.

*NAIC Severity Scale: High = death, permanent grave, permanent major, or permanent significant

Medium = permanent minor, temporary major, or temporary minor

Low = temporary insignificant, emotional only, or legal issue only

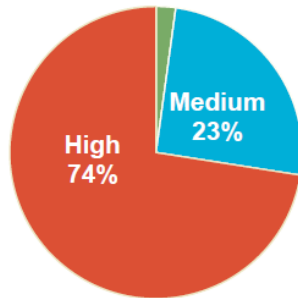


While ambulatory cases are more prevalent, in-patient cases have a greater % of high severity and death

Clinical Severity by Location

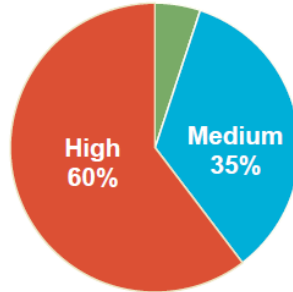
In-patient

46% of In-patient dx cases result in deaths



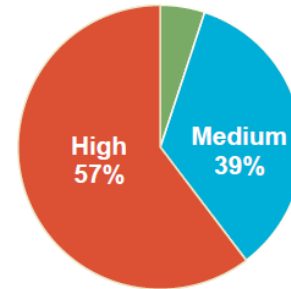
Ambulatory

24% of Ambulatory dx cases result in deaths



ED

31% of ED dx cases result in deaths



N=5,800 MPL cases claim made date 1/1/12-12/31/16 with a diagnosis-related major allegation.

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▶ Inpatient cases

RESPONSIBLE SERVICE	% CASES
Medicine	53%
Hospitalist	15%
Internal Medicine	12%
Cardiology	7%
Neurology	4%
Family Medicine	3%
Surgery	19%
General Surgery	6%
Orthopedic	5%
Neurosurg	3%
Radiology	9%
Peds/Neonatology	5%
Nursing	4%

▶ Top diagnoses

▶ Complications of care

- Hemorrhage
- Post-op infection

▶ MIs and CV events

- PEs
- MIs

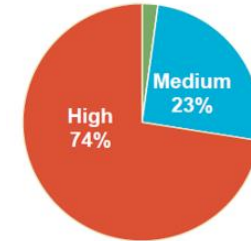
▶ Infections/Sepsis

▶ Key contributing factors

- ▶ 31% Communication among providers
- ▶ 31% Failure to appreciate/reconcile relevant s/s/test results
- ▶ 30% Failure/delay in ordering diagnostic test
- ▶ 27% Failure to establish differential dx

In-patient

46% of In-patient dx cases result in deaths



▶ Ambulatory cases

RESPONSIBLE SERVICE	% CASES
Medicine	48%
Family Medicine	16%
Internal Medicine	13%
Gastroenterology	4%
Dermatology	3%
Surgery	19%
Orthopedic	6%
Urology Surgery	3%
Otolaryngology	3%
Ophthalmology	3%
Radiology	15%
OB/GYN	4%

▶ Top Diagnoses

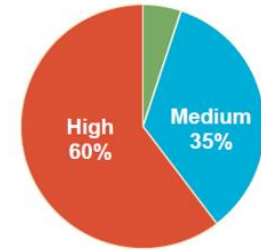
- ▶ Cancer
- ▶ Cardiac care (including MI)
- ▶ Injury (ortho/head & spine)

▶ Diagnostic process of Care (12 steps)

- ▶ 35% (3) Patient assessment/evaluation of symptoms
- ▶ 37% (4) Diagnostic processing
- ▶ 34% (5) Order of diagnostic/lab test
- ▶ 25% (7) Interpretation of tests
- ▶ 21% (9) Physician follow up with results to patient
- ▶ 23% (10) Referral management

Ambulatory

24% of Ambulatory dx cases result in deaths



▶ Process of ambulatory care

Missed opportunities early in the diagnostic process can significantly affect the trajectory of ambulatory-based patient care.

PROCESS OF AMBULATORY CARE	# CASES*	% CASES	TOTAL INCURRED
1. Patient notes problem and seeks care	37	1%	\$4,115,034
2. History and physical	300	9%	\$103,089,632
3. Patient assessment/evaluation of symptoms	1,119	35%	\$347,385,724
4. Diagnostic processing	1,196	37%	\$362,056,790
5. Order of diagnostic/lab test	1,071	34%	\$377,272,397
6. Performance of tests	103	3%	\$41,383,687
7. Interpretation of tests	804	25%	\$232,642,162
8. Receipt/transmittal of test results to provider	130	4%	\$38,666,831
9. Physician follow up with results to the patient	674	21%	\$203,772,181
10. Referral management	726	23%	\$234,927,517
11. Provider-to-provider communication	534	17%	\$167,103,642
12. Patient compliance with follow-up plan	551	17%	\$124,739,633

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▶ Process of ambulatory care

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Evaluation of symptoms			
<ul style="list-style-type: none">• failure to note (available) clinical info• failure to r/out (resolve) abnormal finding• over-reliance on neg findings w/ con't complaint			
8. Receipt/transmission of test results to provider	188	17%	\$58,888,888
9. Physician follow up with results to the patient	674	21%	\$203,772,181
10. Referral management	726	23%	\$234,927,517
11. Provider-to-provider communication	534	17%	\$167,103,642
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4. Diagnostic processing	1,196	37%	\$362,056,790
<p>Narrow diagnostic focus / cognitive bias</p> <ul style="list-style-type: none">• no evidence of differential dx (by doc or testing)• previous/chronic dx presumed (default)• reliance on previous provider's dx (anchoring)• atypical / rare presentation only 3% of cases			
11. Provider-to-provider communication	534	17%	\$167,103,642
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▶ Process of ambulatory care

Misinterpretation of diagnostic tests is a key contributor to diagnostic failures in the ambulatory setting.

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▶ Radiology and Pathology



RADIOLOGY 16%

Most Common Missed Cancers

<i>Breast Ca</i>	<i>17%</i>
<i>Fractures</i>	<i>13%</i>
<i>Lung Ca</i>	<i>9%</i>
<i>Colorectal</i>	<i>2%</i>

- Misinterpretation (81%)
- Communication to Provider (18%)



PATHOLOGY 5%

Most Common Missed Cancers

<i>GYN</i>
<i>Skin</i>
<i>Breast</i>
<i>Head & Neck</i>

- Misinterpretation (75%)
- Communication to Provider (19%)

▶ Process of ambulatory care

Failures in communicating test results/follow-up needs to the patient can lead to serious, even fatal, diagnostic errors.

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12. Patient compliance with follow-up plan	551	17%	\$124,739,633

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Clinical judgment is the key component of missteps during assessment and follow up.

PHASE 1
INITIAL DIAGNOSTIC ASSESSMENT
 68% OF CASES, 79% OF LOSSES

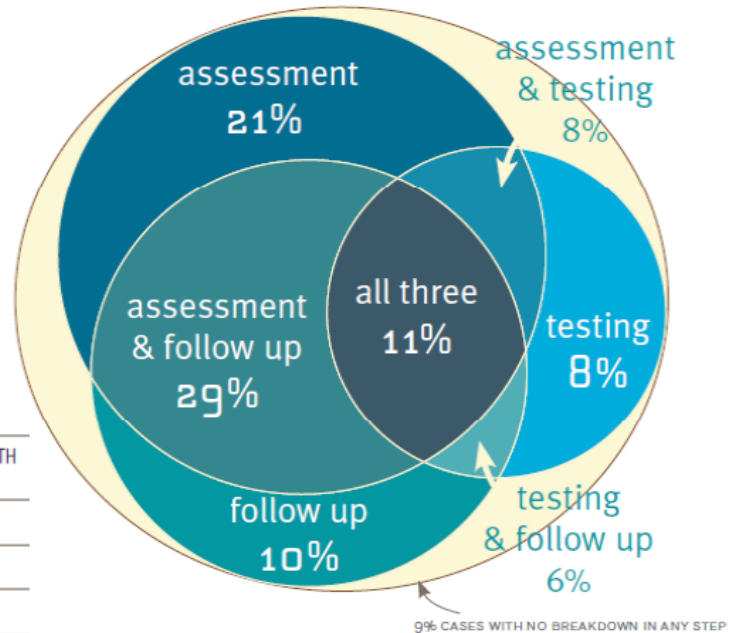
PHASE 2
TESTING AND RESULTS PROCESSING
 32% OF CASES, 38% OF LOSSES

PHASE 3
FOLLOW UP AND COORDINATION
 54% OF CASES, 61% OF LOSSES

BREAKDOWNS IN ALL THREE PHASES

ODDS RATIOS compared to no phase failures	HIGH-SEVERITY INJURY*	CLOSING WITH PAYMENT†
breakdown in one phase	1.99	4.32
breakdown in any two phases	3.42	7.26
breakdown in all three phases	5.13	9.33

OVERLAP OF ERRORS IN INDIVIDUAL CASES
 PERCENT OF CASES*



▶ Process of ambulatory care

41% of cases with provider-provider communication events resulted in a high-severity injury

Key factors:

- ▶ Lack of communication re: patient clinical status
- ▶ Lack of clarity (need for)/follow-up in tests, consults
- ▶ Lack of role clarity (who “owns” it)
- ▶ Hierarchical and team barriers
- ▶ Failure to document and/or *read* record

▶ Communication

COMMUNICATION FAILURES WITHIN SELECTED SERVICES

Vulnerability to communication lapses differs by clinical service.



38%
of all
general medicine cases

involve a
communication failure
N=2,488 cases



34%
of all
obstetrics cases
involve a
communication failure

N=1,102 cases



32%
of all
nursing cases
involve a
communication failure

N=2,019 cases



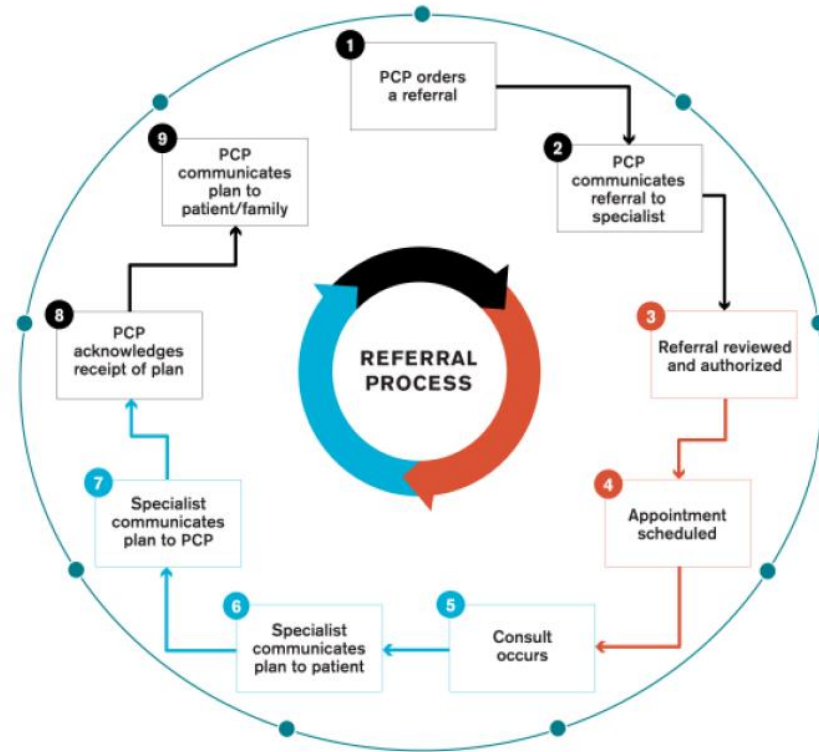
26%
of all
surgery cases
involve a
communication failure

N=7,536 cases



▶ Closing the loop

Figure 1. The Nine Steps of the Closed-Loop EHR Referral Process



Institute for Healthcare Improvement / National Patient Safety Foundation

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▶ Emergency department cases

RESPONSIBLE SERVICE	23% CASES
Emergency Medicine	74%
w/ secondary service: Medicine (General Medicine & Hospitalist)	15%
Nursing	11%
Radiology	11%
Radiology	13%
Medicine	5%
Neurology	1%
Cardiology	1%
Surgery	5%

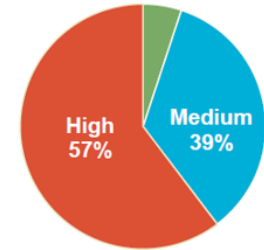
▶ Top Diagnoses

- ▶ Cardiac events
- ▶ CVAs
- ▶ Fractures
- ▶ Acute Abdomen
- ▶ Infection

▶ ED process of Care

- ▶ 62% Ordering diagnostic tests
- ▶ 50% Ongoing assessment/monitoring of clinical status
- ▶ 35% Development of discharge plan
- ▶ 24% Interpretation of tests
- ▶ 23% Referral management

ED
31% of ED dx cases
result in deaths



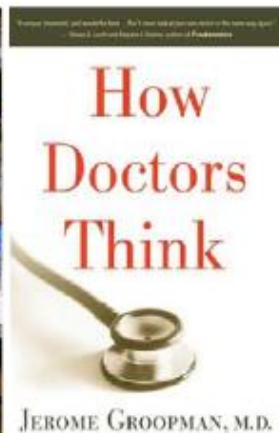
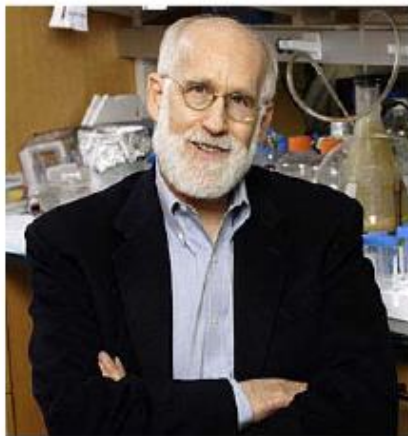
▶ Opportunities for learning

Solutions to diagnostic error must address both human and system vulnerabilities

- ▶ Understanding the **cognitive vulnerabilities** of the diagnostic process in order to define and implement solutions that support/enhance provider decision making in diagnostic medicine
 - ▶ Decision support tools: drive differential dx and pathways
 - ▶ Checklists and clinical algorithms: testing and consult decisions
 - ▶ Awareness: education by data sharing and case study
- ▶ Understanding the **role and impact of systems** that support the cognitive process and ensure providers have access to all the information required to drive diagnostic decision making
 - ▶ Closing the system loops: test results and consult requests
 - ▶ Effective communication:
 - Provider-Provider
 - Provider-Patient

“ Every physician—even the most brilliant—makes a misdiagnosis or chooses a wrong therapy.

About 80 to 85 percent of the time, an experienced clinician will make the correct diagnosis...choose the right treatment...”



...about 15 to 20 percent of the time we're wrong.

Diagnostic Error

Human Expertise and Cognitive Biases

Diagnostic Error

- ❁ A recent article by Abraham Verghese looked at self-reported diagnostic error Verghese *et al* *A. J. Med.* December 2015; 128:1322-1324
- ❁ Inadequate physical exam (failure to examine) caused 2/3 of the errors, 1/10 was misinterpretation of an exam finding
- ❁ The errors caused missed/delayed Dx, increased cost, unnecessary exposure to radiation/medications, and in 1/25 cases, complications
- ❁ **Of note:** It took an average of 5 days to discover the error (range 1-66 days) and the number of physicians making the same error in diagnosis was 1 to more than 6, median 3, with treatment choices governed most often by key individuals or familiar colleagues rather than data See Also: O'Donoghue "What influences your therapeutic choices?" *Medscape* Jan 4, 2016
- ❁ *As a way of beginning: What are the take home messages of this article?*

Diagnostic Error

- ⊗ In addition: *MedScape (January 2016)* published a survey of 27,000 physicians, looking largely at “burnout,” which ranged from 22% among cardiologists to 62% for ED physicians
- ⊗ They found that a demeaning personal bias [bias or negative “attitude” toward the patient being seen] was: (1) greatest for patients who had emotional issues > obesity > lower intelligence (45-66%), and (2) such bias increased the “burnout rate” on average for all specialties by 19%
- ⊗ They also found that most physicians did not admit to having such a bias or were certain they did not

Diagnostic Error

- ❁ Six Sources for more information:
- ❁ Nikhil Mull, James Reilly and Jennifer Myers “An elderly woman with ‘heart failure’: Cognitive biases and diagnostic error” *Cleveland Clinic Journal of Medicine* 82:745-753 (November 2015)
- ❁ HOW PHYSICIANS THINK Jerome Groppman Houghton and Miffin 2007
- ❁ THINKING, FAST AND SLOW Daniel Kahneman, Farrar, Straus and Giroux New York 2009
- ❁ BLINK: THE POWER OF THINKING WITHOUT THINKING Malcolm Gladwell, Little, Brown and Company New York 2005
- ❁ Norman, Monteiro, Sherbino *et al Academic Medicine* 92:1 23-30 (January 2017)
- ❁ Brush, Sherbino and Norman “How Expert Clinicians Intuitively Recognize a Medical Diagnosis” *The American Journal of Medicine* (2017) 130, 629-634

Diagnostic Error

- ⊗ Both Kahneman and Gladwell agree with a model of human thought...
- ⊗ Two “Systems” we use to reach a conclusion
- ⊗ **System 1** operates automatically and quickly with little or no effort and no sense of voluntary control, based on associations between new information and memories of like things, related to the strength of the association
- ⊗ **System 2** is effortful mental activity, associated with the subjective experience of choice and concentration, often used in complex computations, uncertain situations that force us to think deeply, and is considered “rational” and laborious, consistent with logical rules
- ⊗ All of us believe we use System 2 [when necessary] to make important decisions, when in fact we use System 1 and usually avoid using System 2

Diagnostic Error

- ⊗ But before discussing System 1 or System 2...
- ⊗ ...there is **Inductive** or **Deductive Reasoning**
 - ⊗ Which is better?
 - ⊗ Which is based on facts?

Diagnostic Error

- ⊗ Overlying all of what we will say next is the idea of **how data is applied to reach a conclusion**
- ⊗ **Sherlock Holmes [Arthur Conan Doyle]** is said to have used Deductive Reasoning, when in fact he used both Inductive and Deductive Reasoning
- ⊗ **Inductive Reasoning:** A logical process by which a conclusion is proposed that contains more information than the **observations or experience** on which it is based
- ⊗ “Every crow ever seen was black. Therefore, all crows are black”
- ⊗ Notice that the fact of the observations of crows is not in doubt, only the method of reaching a conclusion... that all crows are *necessarily* black
- ⊗ A white crow is possible with more observations, but “the odds are low” ...the **zebra verses the horse** argument in medicine... “when you hear hoof beats, think of a horse not a zebra”

Diagnostic Error

- ⊗ **Deductive Reasoning:** A logical process by which a conclusion is drawn from a set of premises the contains no more information than the premises taken collectively
- ⊗ *The truth of the conclusion depends only on the method to reach the conclusion*
- ⊗ “All dogs are animals. This is a dog. Therefore this is an animal.”
- ⊗ In this example, the definitions of the words “animal” and “dog” are not in doubt, they are “self contained,” self defined to include the other...our “facts” are that good

Diagnostic Error

- ⊗ Inductive or Deductive Reasoning...and Diagnosis/Treatment in Medicine
- ⊗ Do we wait until all possible observations are made (e.g. all crows are observed and all of them are in fact black)
- ⊗ Or do we “apply the art of medicine” and wait until our experience satisfies our uncertainty “enough” to proceed?
- ⊗ Now: Back to System 1 And 2

Diagnostic Error

- ⊗ **Very importantly: The debate among authorities is...**
- ⊗ Do **errors** arise (1) from mistakes *generated* by System 1 and *not corrected* by System 2 (Kahneman) or (2) from both Systems
- ⊗ **But the most persistent fallacy in the common literature and teaching of residents is that Type I processes are the reason for all bad thinking and Type II processes necessarily lead to corrective (or correct) responses**
- ⊗ Good/Bad thinking is far too simplistic and not helpful

Diagnostic Error

- ⊗ Experience and Expertise create the basis of System 1
- ⊗ Some skills are acquired quickly and easily, such as a hot stove, the meaning of simple sentences and words, and easily understood facial expressions (disgust or anger)
- ⊗ Other skills take practice and learning (knowledge), such as nuanced social situations, strong chess moves, and third and fourth level English words
- ⊗ Many values and operations of System 1 are broadly shared among all of us, such as turning toward a loud and unexpected sound, or knowing that $2 + 2 = 4$
- ⊗ Others are trained or experiential, such as knowing that Paris is the capital of France (common) but disliking the city or the Eifel Tower is experiential

Diagnostic Error

- ⊗ What we know from Neurophysiology is that our brain processes over 11 million bytes/sec of input (largely System 1) but the ability to process new or unfamiliar information is 40-60 bytes/sec (largely System 2)
- ⊗ For Example, from the experience of reading (using System 1) we see patterns easily in:
- ⊗ I cdnuolt blveiee tahat I cluod aulacly uesdnatnrd wahat I was rdanieg. The phaonmneal pweor of the hmuan mnid! Aoccdrnig to rscheearch at Cmabrigde Uinervtisy, ity deson't mttar in wahat oredr the ltteers in a word are, the olny iprmoatnt tihng is tahat the frist and lsat ltteer be in the rghit pclae. Tshis is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrord as a wlohe

Diagnostic Error

- ⊗ System 1 knowledge is often called “experiential” since it is recalled from prior experiences, and stored as “*exemplars*”, *context driven prior experiences that have been categorized and stored in memory*
- ⊗ Assigning an experience to a category gives it meaning
- ⊗ With time and experience, categories will contain a nearly limitless number of “exemplars” that are automatically retrievable
- ⊗ Exemplars are unique products of memory and not generalizable among clinicians... and provide a rich and overlapping ability to compare and contrast within a category

Diagnostic Error

- ⊗ The operations of System 2 are highly diverse but have one single feature in common: System 2 requires attention and is disrupted when attention is drawn away
- ⊗ Simple examples of the operation of System 2 are: Focusing on the voice of a particular person in a crowded and noisy room, looking for a woman with white hair, searching memory for a surprising (uncommon) sound, counting the number of times the letter “a” appears in this paragraph, or checking the validity of a complex, logical argument [fact checking, for example]
- ⊗ It is the phrase we use with our children: “pay attention!”
- ⊗ But: We have a limited “budget” of attention and cannot “pay” much at any one moment without losing attention
- ⊗ It is difficult to impossible to compute the product of 23×17 while making a left turn into dense traffic with construction barriers

Diagnostic Error

- ⊗ Intense focusing on a task can make us “blind” to stimuli that normally attract attention
- ⊗ Note: Chabris and Simons THE INVISIBLE GORILLA, a short film in which counting the number of white shirts on basketball players required the “full” attention of subjects such that they did not “see” a woman wearing a gorilla suit for over 9 seconds, thumping her chest, then moving on
- ⊗ But: Distraction of nudity uniformly caused wide miscounting
- ⊗ “Blindness” and “Distraction” are common problems in System 2, allowing System 1 to be dominant when they occur

Diagnostic Error

- ⊗ Errors made by System 1 are usually due to poor input, distraction, fatigue or little experience in the thing we are trying to recognize and process; here, **knowledge matters**
- ⊗ One of the real problems is that we persist in our conclusions, even if in error and even after being shown we are wrong
- ⊗ We rationalize, and say “yes, but...”
- ⊗ System 1 is where we live everyday life, and System 2 is often [some would say usually] “lazy” even when challenged
- ⊗ Recall: **System 1 is the core of expertise and expert opinion**

Diagnostic Error

- ⊗ One proposed interaction between System 1 and System 2 are what are termed “illness scripts”
- ⊗ Illness scripts link exemplars and formal knowledge/learning about a subject, such as linking the category “chest pain” [and all its exemplars] with pathophysiology and epidemiology to reach an integrated diagnosis
- ⊗ Medical students rely on causal reasoning and formal knowledge, residents rely on illness scripts, and experts rely on exemplars for early hypothesis generation and diagnosis
- ⊗ Expertise requires authentic clinical experiences informed by patient feedback and outcomes, with a new case integrated into a diagnostic category that increases speed and accuracy
- ⊗ “The ability to access experiential knowledge to inform a diagnostic hypothesis depends on both storage and retrieval of illness scripts and exemplars.” *ibid* Brush et al (2017) page 632

Diagnostic Error

Illness Scripts can act as a check and balance

on

Expertise-driven **Exemplars**...

An Exemplar and a Script ...

Diagnostic Error

- ❁ The Error of Representativeness (System 1)
- ❁ Assume we know that (1) On occasion people who act friendly are in fact friendly; (2) A professional athlete who is very tall and thin is much more likely to play basketball than football; (3) People with a PhD are more likely to subscribe to *The New York Times* than people who ended their education after high school (4) Young men are more likely than elderly women to drive aggressively
- ❁ You see a person on the New York subway reading *The New York Times*. Which is the most likely bet?
- ❁ She (1) has a PhD or she (2) does not have a college degree

Diagnostic Error

- ❁ The usual answer is “she has a PhD”...but that ignores the “base rate” of how many people on the subway have a PhD and would normally be wrong...we use a “hunch” rather than statistical analysis
- ❁ What if I told you that she is both a student and a shy poetry lover...which is more likely...that she studies Chinese literature or business administration?
- ❁ In making a diagnosis, we often use experience with past cases to “frame” a current case, ignoring the base rate of an occurrence
- ❁ If you diagnose a patient with hypertension as a patient with a pheochromocytoma, you will measure urinary metanephrines far more often for nearly 3 years after the diagnosis, even if not indicated
- ❁ Case Bias...the medical practice way of ignoring the “base rate”

Diagnostic Error

- ⊗ In addition, we tend to be insensitive to the quality of the evidence we use to decide between alternatives, extrapolating from information that has marginal utility, a hunch upon a hunch without realizing we are doing it
- ⊗ If I ask you (outside this discussion) “What color is hot” or “how long is short” you will have an opinion
- ⊗ How about “He won’t go far as an academic; too many tattoos” ...based on what? “Birds of a feather flock together” has truth in it, but have we generalized from a second level abstraction when we focus on tattoos?
- ⊗ We take a question that we cannot answer, and answer another question that was not asked, based on something that we have- in fact- experienced
- ⊗ What color is hot? How long is short?

Diagnostic Error

- ⊗ Consider: “Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in antinuclear demonstrations”
- ⊗ Is Linda: (1) is a teacher in elementary school; (2) works in a bookstore and takes yoga classes; (3) is active in the feminist movement; (4) is a psychiatric social worker; (5) is a volunteer member of Hillary for President ; (6) is a bank teller; (7) is an insurance salesperson; (8) is a bank teller and is active in the feminist movement [decide] Then...
- ⊗ Which is more probable: (1) Linda is a bank teller or (2) Linda is a feminist bank teller

Diagnostic Error

- ⊗ When Dr. Kahneman asked that question of undergraduates of all training and experience, 85%-90% said she was a feminist bank teller
- ⊗ When he confronted the students with the error (a violation of an elementary rule of logic)...
- ⊗ **Let me ask: what is the error?**
- ⊗ ...he was greeted with indignation and “so what, I thought you asked my opinion” and “she can’t just be a bank teller; read the description!”
- ⊗ Las Vegas builds large hotels based on such logical fallacy, confusing coherence and plausibility with probability

Diagnostic Error

- ⊗ A more controversial example:
- ⊗ A 27 year old woman comes into an emergency room with her child. She has recent bruising over her arms, and redness over the skin of her right cheek, consistent with recent “slap” injury; she tells you her husband has been abusing her and her 3 year old child while he has been drunk, shaking the child. She is fed up with it, needs help in leaving her home. The child is fretful and needs a new diaper.
- ⊗ You diagnose Spousal Abuse, and refer her to Social Services for immediate placement in a “safe place” home near the hospital
- ⊗ You go home after your shift and tell your husband how much you appreciate him for being so loving...
- ⊗ Have you made the world a better place?
- ⊗ *Let's spend a moment integrating exemplars and illness scripts...*

Diagnostic Error

- ⊗ In the article by Mull, Reilly and Myers, an elderly woman was admitted to the Cleveland Clinic Hospital late one evening with heart failure, and died nearly 3 weeks later with tuberculosis and pulmonary embolus
- ⊗ In the ED, she had a CXR, exam and history, and initial lab including ABG's consistent with heart failure, was admitted on Lasix
- ⊗ She was diabetic, hypertensive and had arthritis, received medications for all of those conditions. She spoke Spanish only, and her Son provided the history and all translation
- ⊗ She c/o shortness of breath, weakness and a non-productive cough, all of which have worsened over the last 2 weeks
- ⊗ The ED department Resident signed out to the Night Float Medicine Resident that **“she is an elderly woman with hypertension, diabetes, and heart failure being admitted for a heart failure exacerbation.”**

Diagnostic Error

- ⊗ The initial diagnosis of CHF was made more difficult by non-specific and vague symptoms, an atypical presentation of a common disease and confounding comorbidities...and contextual factors, including a chaotic ED, frequent interruptions, time pressure, poor handoff, insufficient data and multitasking
- ⊗ And the expectations in the ED of rapid evaluation to reach a “working diagnosis” for the purposes of triage as much as patient care
- ⊗ The contextual issues are commonly referred to as “**Systems Errors,**” disasters waiting to happen
- ⊗ Systems Errors were made most famous by Lucian Leape, *JAMA* 272:1851 (1994) ...for example, the sinking of the Titanic

Diagnostic Error

- ⊗ **Physician Factors** (early and late)
- ⊗ “Physician certainty and uncertainty at the time of the initial diagnosis does not uniformly appear to correlate with diagnostic accuracy.” Mull et al page 746; *however see Friedman et al J.Gen.Int.Med. 20:334-339 (2005)*
- ⊗ Here, **inappropriate selectivity in reasoning** (a simple error) occurred by not considering other diagnoses, selecting the “low lying fruit” as if that is all that needs to happen, a form of intellectual laziness (in a non-judgmental sense) with reliance on System 1 *coherence and plausibility*
- ⊗ How much better it would have been if the patient were admitted with “respiratory failure and a history of diabetes and hypertension”?
- ⊗ In essence, Linda could be a bank teller, a feminist bank teller, or maybe even work in a bookstore and take yoga classes, “rule out” or “rule in”
- ⊗ Confidence in a diagnosis remains high regardless of the difficulty of the case or the eventual findings Meyer et al *JAMA Intern Med 2013; 173:1952-1958*

Diagnostic Error

- ⊗ After 3 days, the woman did not improve, and the residents look at the admitting CXR again, bring up the possibility that the patient might have something other than CHF, but the attending “dismisses their concerns and comments that heart failure is the clinical diagnosis.” Mull, page 747 (System 1 pattern thinking)
- ⊗ Cognitive Errors are usually found on retrospective review, going back to “first principles,” thinking “out of the box”
- ⊗ The debate among experts revolves around the dispute between how physicians use System 1 or System 2, as binary or continuum... here, it was apparently binary

Diagnostic Error

- ⊗ **Naming the Cognitive Errors**
- ⊗ **The Framing Effect:** Began when the ED Resident labeled the patient with “heart failure” ...note experiments with chocolate yogurt and another with red wine
- ⊗ **Anchoring Bias (Premature Closure):** Selective use of early diagnostic features and failing to adjust the initial diagnosis when those “facts” change or fail *Croskerry Acad Med* 2003: 88:775 Selective history taking is common; attribute [attribution] characteristics to persons based on experience; “pigeon-holing”
- ⊗ Have you ever heard “First impressions matter”?

Diagnostic Error

- ⊗ **Naming the Errors**
- ⊗ **Diagnostic Momentum:** A “copy and paste” mental shortcut made prevalent by handovers in care and barriers in care, such as a language difference or personality difference
- ⊗ **Availability Bias:** By reading the page of a previous physician, we are more likely to recall heart failure than a thought we may have had while reading; what “springs to mind”; also, a common problem is seen commonly, and CHF is “available” in our thinking
- ⊗ **Confirmation Bias:** Probably the strongest bias, looking for facts that confirm a diagnosis rather than facts that make it less likely; a form of “personal investing” in an outcome that is rewarded by a sense of being correct... “I can rest now, go home and feel good.”

Diagnostic Error

⊗ Confirmation Bias

⊗ “It takes far more mental effort to contemplate disconfirmation than confirmation. The physician can only be confident that something isn’t disease A by considering all of the other things it might be.”

Pat Croskerry “Overconfidence in Clinical Decision Making” May 2008 *Am J Med*
121(5A):S24-29

⊗ One factor not commonly discussed: The more the patient is like us, the more likely we are to believe him, credit what he is saying as true and of weight, data worth knowing

Diagnostic Error

🎬 Naming the Errors

- 🎬 **Blind Obedience:** Deferring to a person in authority, a problem far too common in Medicine. Occurred when the attending dismissed the possibility of another diagnosis
- 🎬 **Overconfidence Bias:** An inappropriate belief in a person's ability to be correct, often present even when a conclusion has been shown to be wrong; prevalent in all of us
- 🎬 The problem with naming and studying the cognitive biases is that it does not reduce error and can lead to “second guessing” and more error
- 🎬 **The good news:** cognitive biases tend to disappear as people develop expertise

Diagnostic Error

“...[G]ood medicine is less about brilliant diagnoses being made or missed and more about mundane mechanisms to ensure adequate follow-up...I believe [a missed diagnosis] is most often about the failure to establish a diagnosis that was considered by one or more physicians...

Gordon Schiff *Am J Med* May 2008: 121; S38-42

Diagnostic Error

- ⊙ Let me tell you about the case of the “Profane Attorney”

Diagnostic Error

- ⊗ Having thought about my thinking, recognized my emotions, and embraced uncertainty over more than 40 years of medical care, I would add:
- ⊗ I know I am intellectually lazy, and I try to use System I thinking (my expertise and experience) whenever and wherever I can
- ⊗ When I use or hear the words “clinical diagnosis” I think of a near random finding, one I hold lightly in my mind and one I subject to free criticism. I welcome uncertainty as a friend rather than something I must resist
- ⊗ I do not invest my personality in making a diagnosis or recommending a treatment. I do not think of gain or loss when I think about what I have written on a page. I learn to put my thinking into words I can share

Diagnostic Error

- ⊗ I realize that my patient is the best source of information throughout any treatment course, and do what I can to lower ordinary barriers to speech
- ⊗ I avoid making a treatment decision that has finality, and anything “final” must involve the patient’s full understanding, both of what I am proposing and what I am thinking
- ⊗ I realize that cognitive bias is ordinary, common and unavoidable, and that my personal values determine how I *use* my cognitive bias
- ⊗ How cognitive bias can be used (positive or negative) is a matter of deeply held moral values that influence the application of my hard-won expertise...which means I must ask myself what I really believe and what I really value...I cannot fake it

Diagnostic Error

⊗ In conclusion:

- ⊗ The key is to realize that we usually use **Inductive Reasoning** in medicine
- ⊗ and to build in time, recognize the value of uncertainty, and put in place systems redundancy to revisit our errors
- ⊗ The **emotional challenge** is to be comfortable with uncertainty

Diagnostic Error

⊗ What I would say in closing is...

⊗ Good Luck

⊗ (and I hope I am not the subject of your mistake...)

Diagnostic Error

⊙ Thank You...

⊙ Any Questions?

EXPLORE Healthcare Summit

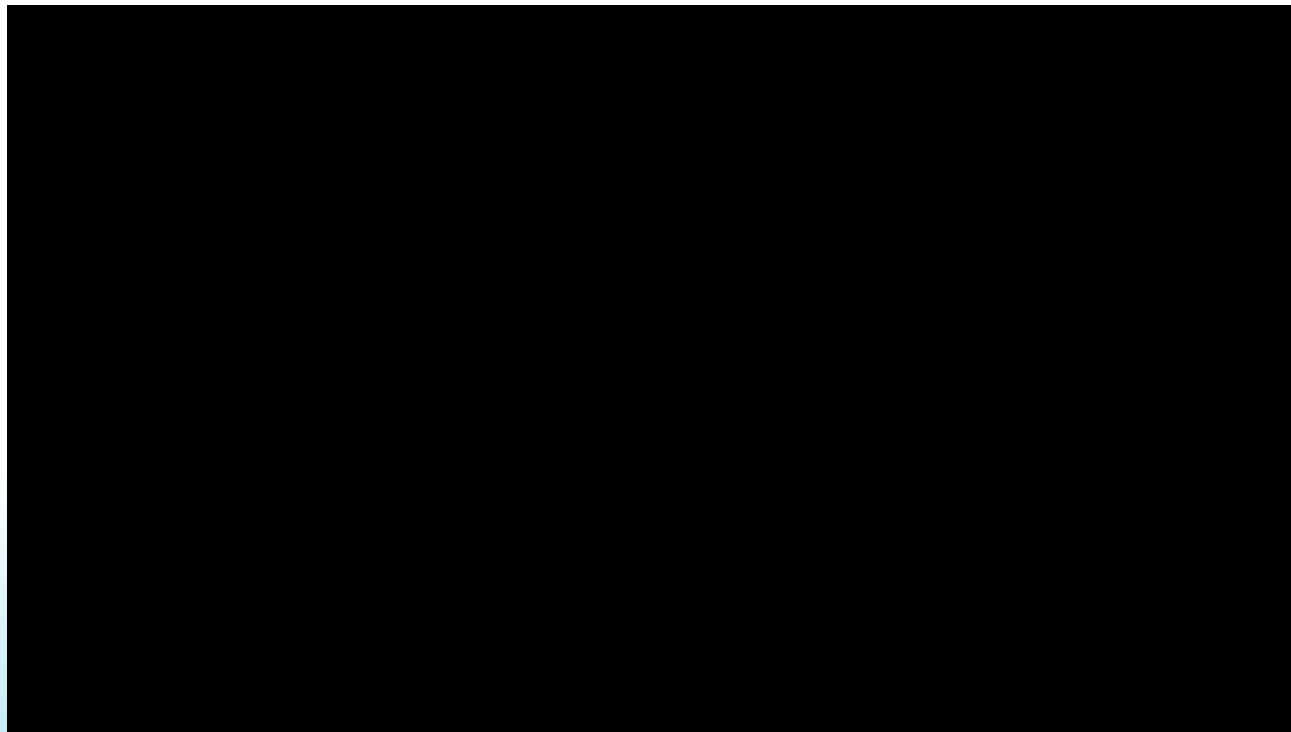
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Thank you!

Shari Moore, RN, BSN
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