Diagnostic Errors & Their Consequences

American Council of Life Insurers

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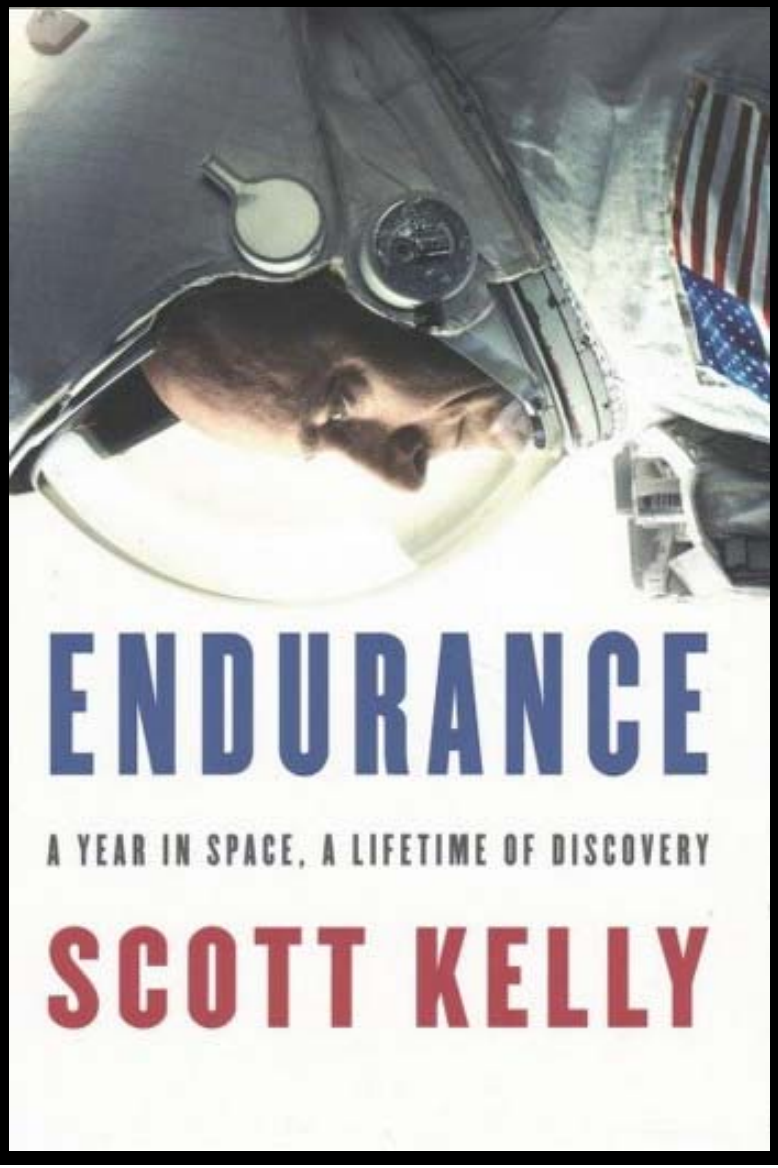
DISCLOSURES

- I have no financial conflicts of interest related to the subject matter that I am presenting today.

- I will not be discussing any off label uses of medications or medical products today.

OBJECTIVES

- Describe why diagnostic errors occur
- Identify the most common causes of diagnostic error
- Summarize several common types of cognitive biases that affect the diagnostic process
- Assess different methods of reducing the influence of bias on making diagnoses



"There is a saying in the Navy about mistakes:
There are those who have and those who will."

- Astronaut Scott Kelly
Endurance

What is a Diagnosis?

- An explanation of a pathological condition

What is a Diagnosis?

- A complete and accurate diagnosis:
  - Explains physical manifestations
  - Predicts the natural course
  - Predicts the likely outcome
  - Anticipates potential complications
  - Leads to suggested treatment options

- A ***misdiagnosis*** may lead to an adverse event
  - Delay of treatment
  - Initiation of therapy which is harmful to the patient

Joan Rivers

June 8, 1933 – September 4, 2014

Medical Examiner's Report

The cause of Ms. Rivers' death is anoxic encephalopathy due to hypoxic arrest during laryngoscopy and upper gastrointestinal endoscopy with propofol sedation for evaluation of voice changes and gastroesophageal reflux disease. The manner of death is therapeutic complication. The classification of a death as a therapeutic complication means that the death resulted from a ***predictable complication of medical therapy.***

YORKVILLE ENDOSCOPY CENTER

- Nasolaryngoscopy ***was not*** on the consent, ***was not*** included in the timeout and ***was not*** documented other than in the anesthetic record
- ENT surgeon was not credentialed at the center
- "Selfie" was taken during procedure
- Failure to identify deteriorating vital signs 
- Code sheets with conflicting information
- Prolonged arrival of EMS to the scene

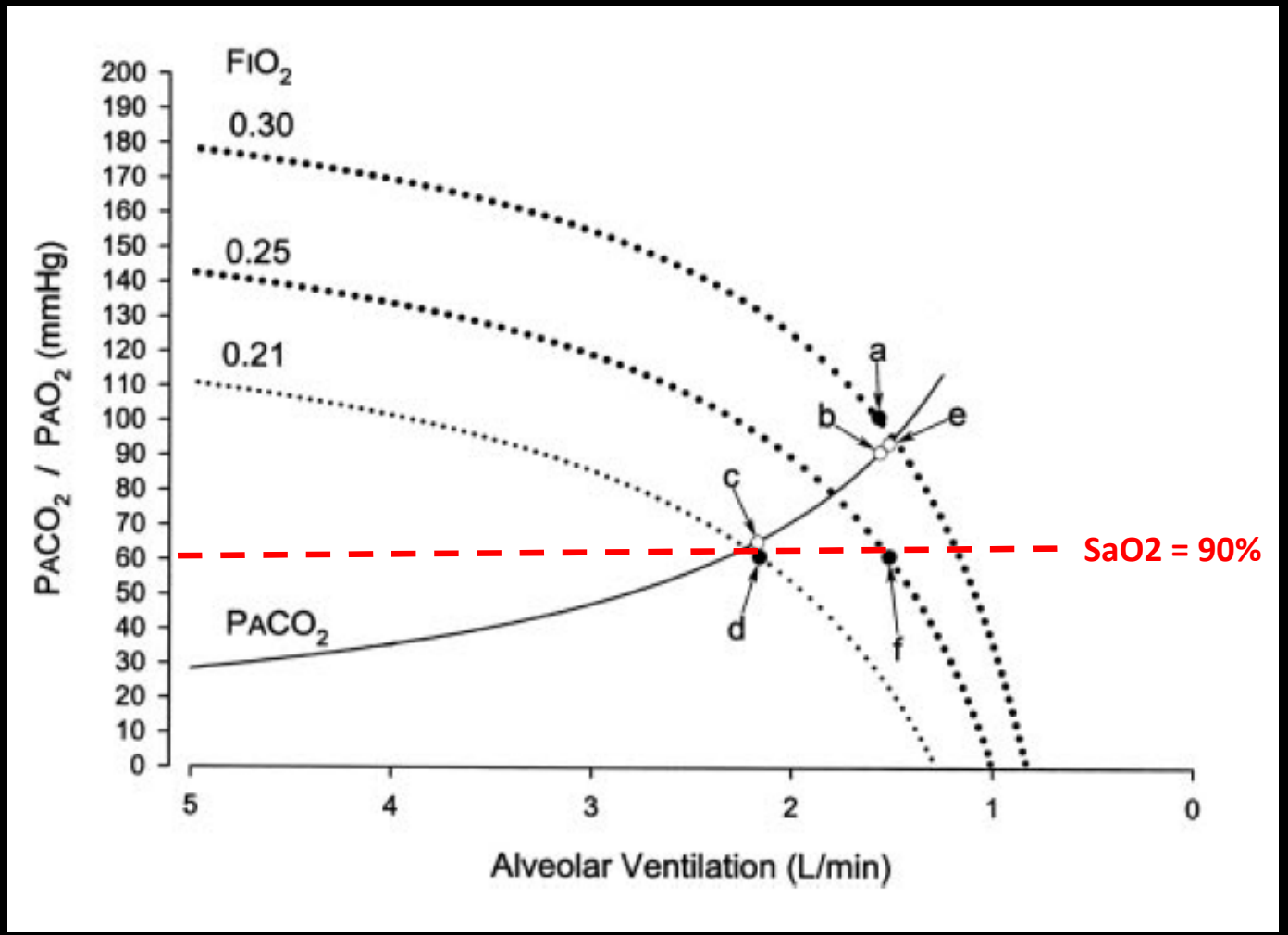
Time	Procedure	Pulse	BP	SpO_2	RR	$EtCO_2$
0844	Pre-procedure	62	118/80	100	16	
0904	Time out					
0912	Intra-procedure	71	117/60	92		?
0916		56	92/54	94	16	26
0921		54	89/44	97	17	19
0926		47	84/40	92		?
0928	Cardiac arrest					

		Pulse	BP	SpO_2		
		62	118/80	100		
	Time out					
		71	117/60	92		
		56	92/54	94		
		54	89/44	97		
		47	84/40	92		
	Cardiac arrest					

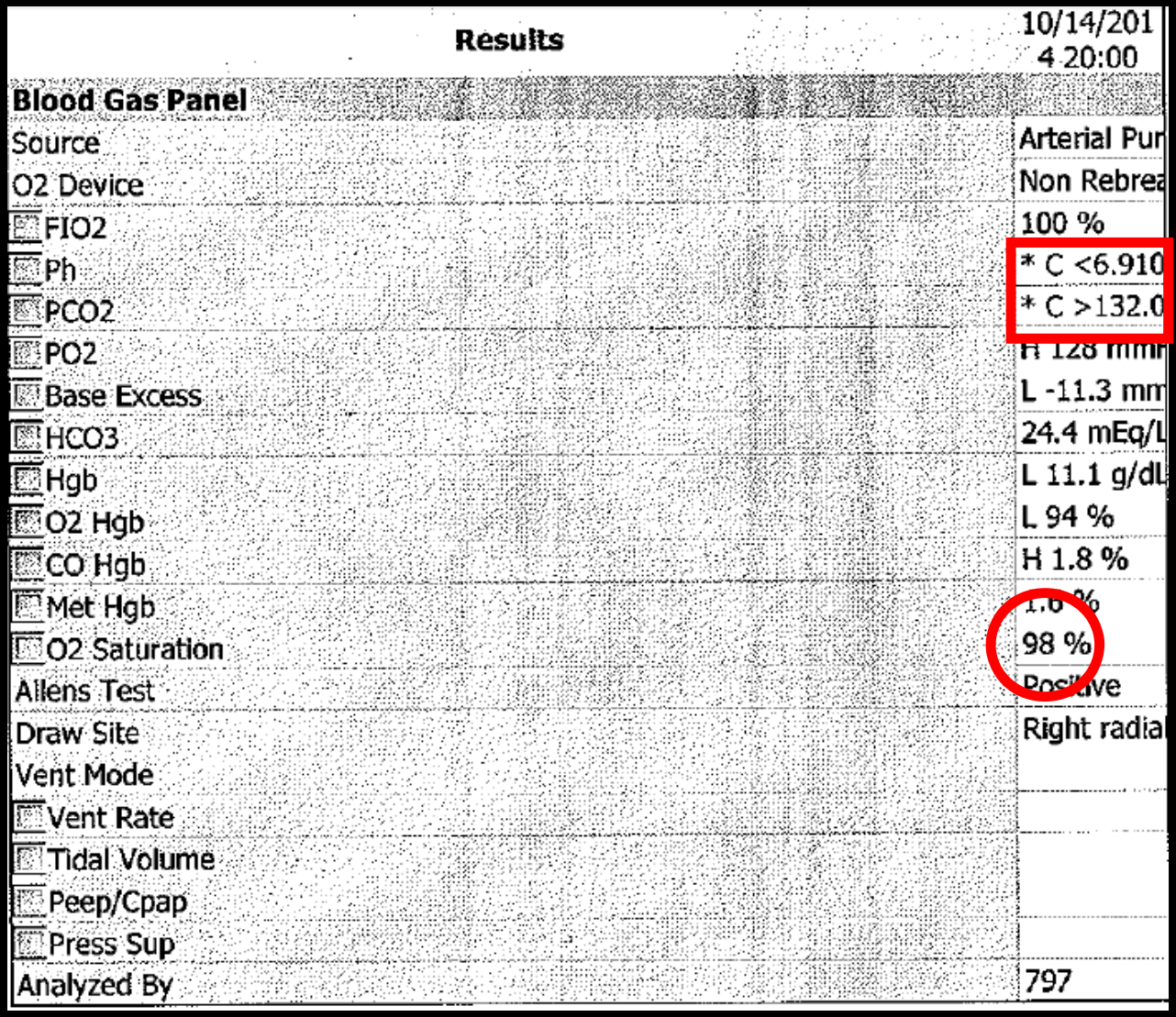
Jaw Thrust
+ ↑O_2

Understanding The Science

- Hypoxemia
  - Caused by 5 things:
    - ↓ FiO_2
    - V/Q mismatch
    - Diffusion Defect
    - True Shunt
    - Hypoventilation

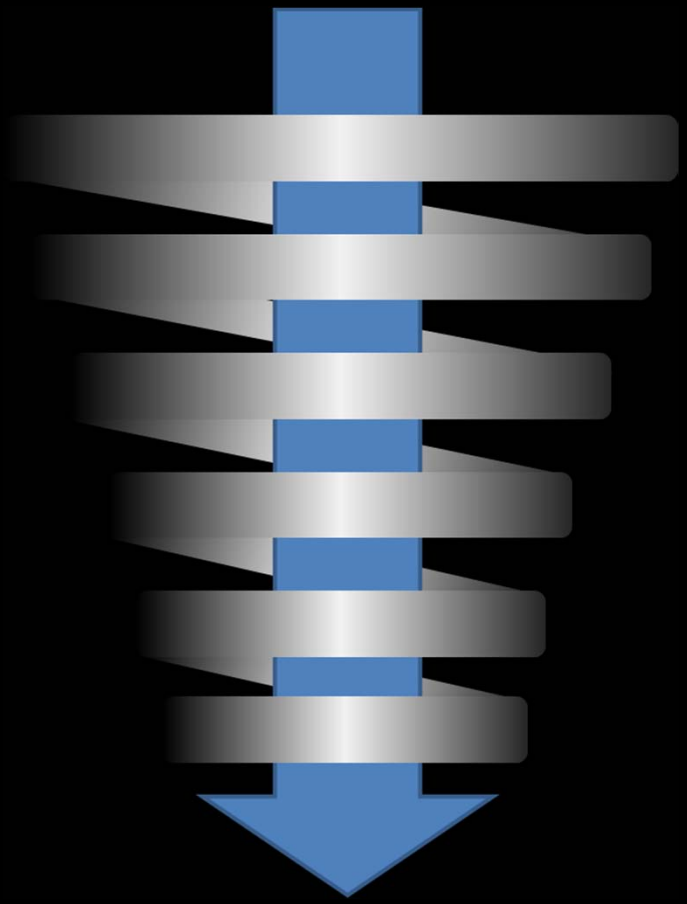


Chest. (2004); 126: 1552-1558.



Results	10/14/2014 20:00
Blood Gas Panel	
Source	Arterial Pur
O2 Device	Non Rebrea
FIO2	100 %
Ph	* C <6.910
PCO2	* C >132.0
PO2	H 128 mmH
Base Excess	L -11.3 mm
HCO3	24.4 mEq/L
Hgb	L 11.1 g/dL
O2 Hgb	L 94 %
CO Hgb	H 1.8 %
Met Hgb	1.6 %
O2 Saturation	98 %
Allens Test	Positive
Draw Site	Right radia
Vent Mode	
Vent Rate	
Tidal Volume	
Peep/Cpap	
Press Sup	
Analyzed By	797

The Common Downward Spiral



Saturations drop, placed on 2L NC

Saturations drop again, ↑ to 4L NC

Saturations drop again, ↑ to 6L NC

Saturations drop, pt. placed on Oxy-mask

Note in the chart: “Patient resting comfortably”

Patient found in cardiopulmonary arrest during rounds

Increasing the amount of oxygen given to a patient DOES NOT treat hypoventilation.

What is Diagnostic Error?

"A failure to establish an accurate and timely explanation of the patient's heatlh problem(s), or communicate that explanation to the patient"

IOM, Improving Diagnosis in Health Care, 2015

The Harms of Misdiagnosis

- Experienced by 12 000 000 Americans each year
- 40 000 – 80 000 are fatal
- Diagnostic errors are the leading cause of malpractice suits

Diagnosis: Interpreting the Shadows (2017). CRC Press.

The Harms of Misdiagnosis

- 350 000 paid claims in the NPDB
  - Diagnostic Errors:
    - Were the most common
    - Had the highest payout
    - More often resulted in death than other groups
    - Outpatient >> Inpatient
      - Errors in inpatient setting more likely to lead to death

BMJ Qual Saf. (2013);22:672-680

What Makes Up a Diagnosis?

- Depends
  - Setting
    - Phone call to PCP after hours with “Burns when I pee” = Dx: UTI
    - Hospitalist → U/A
  - Physician
    - Radiologist: “consistent with…clinical correlation necessary”
  - External factors
    - Tracheobronchitis vs. pneumonia in a ventilator patient
    - “What gets measured, gets manipulated”

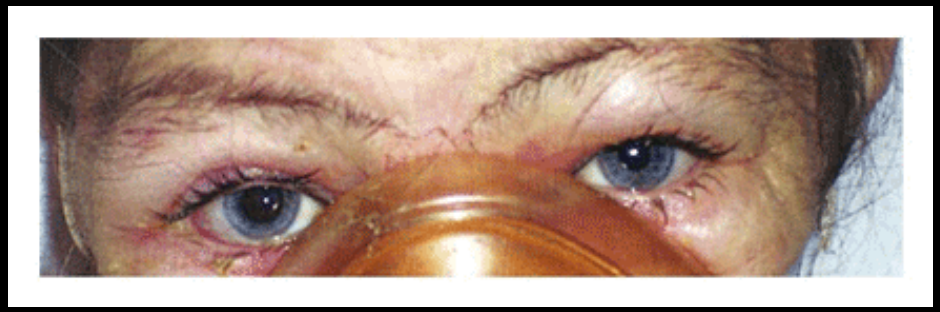
Why is Diagnosis so Hard?

- A red, painful, swollen leg
  - Fracture
  - Soft-tissue injury
  - Abscess
  - Hematoma
  - Gout
  - Arthritis
  - Venous stasis
  - Cellulitis
  - Lymphedema
  - Rash
- Edema
  - Congestive heart failure
  - Nephrotic syndrome
  - Nutritional deficiency
  - Hypothyroidism
  - Medication side effect
- Combination of the above

Diagnosis: Interpreting the Shadows (2017). CRC Press.

A 42-year-old IV drug abuser was transferred to the ICU for respiratory distress. She had been treated for fungal pneumonia and septicemia. PMH is positive for alcoholic cirrhosis, Hep C +, and COPD. She had a negative HIV test. She received oxygen and nebulized albuterol and ipratropium bromide through a face mask. The nurse noticed that her right pupil became fixed and dilated…

The Respiratory Therapists' Stroke Alert



N Engl J Med. 2006 Mar 2;354(9):e8

Respir Care. 2005 Dec;50(12):1662-4
Clin Pediatr (Phila). 1998 Jul;37(7):445-7.
Ann Intern Med. 1998 Feb 15;128(4):327
Arch Ophthalmol. 1997 Jun;115(6):806

Lancet. 2004 Jun 5;363(9424):1853

Why is Diagnosis so Hard?

- Tight coupling of organ systems, especially in those with chronic or critical illnesses
- Manifestations may lie distant from disease (iritis, clubbing)
- Presentation is incomplete or atypical
  - Forme fruste
    - (French, “crude, or unfinished, **form**”) is an atypical or attenuated manifestation of a disease or syndrome, with the implications of incompleteness, partial presence, or aborted state.)

Diagnosis: Interpreting the Shadows (2017). CRC Press.

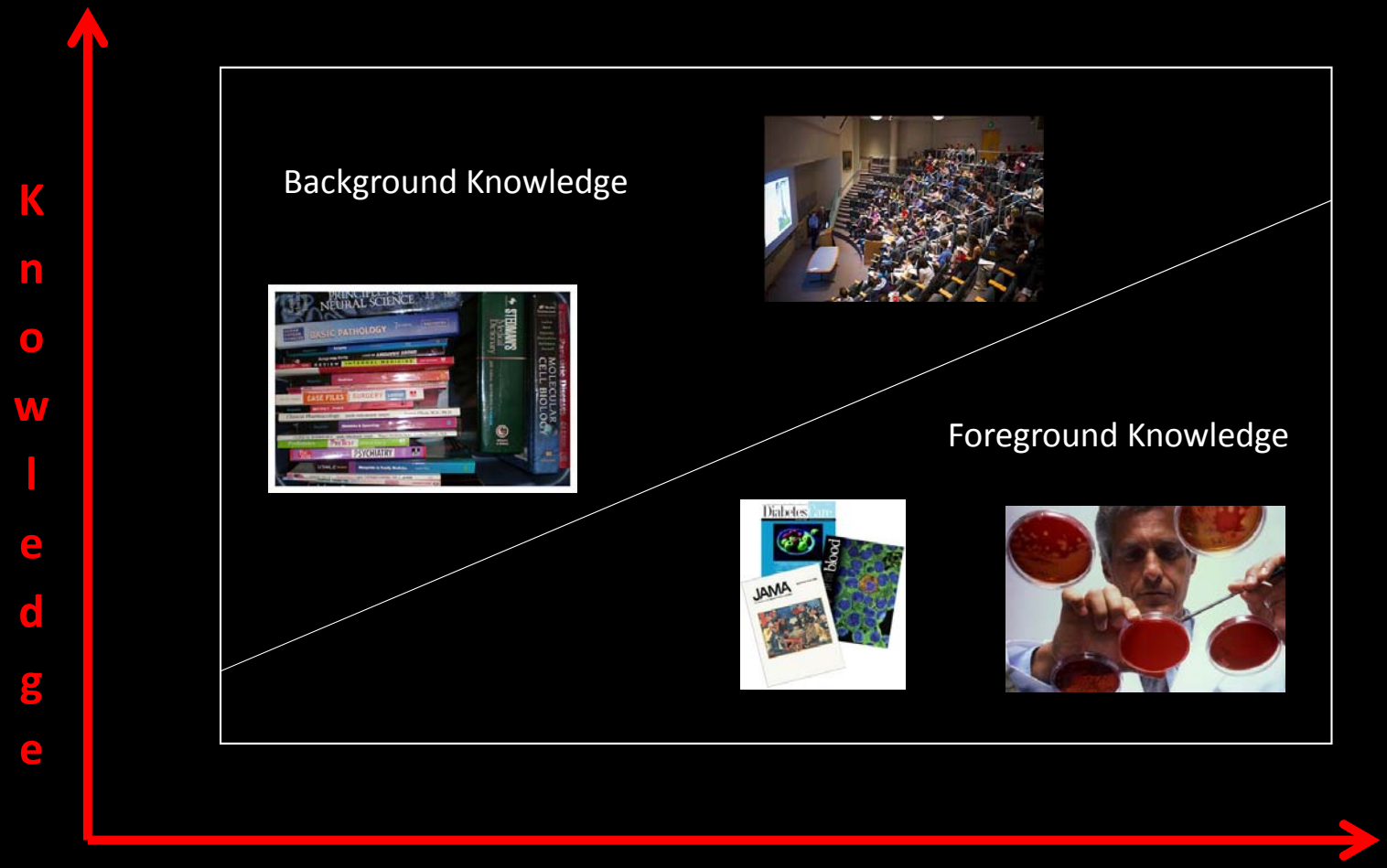
Why is Diagnosis so Hard?

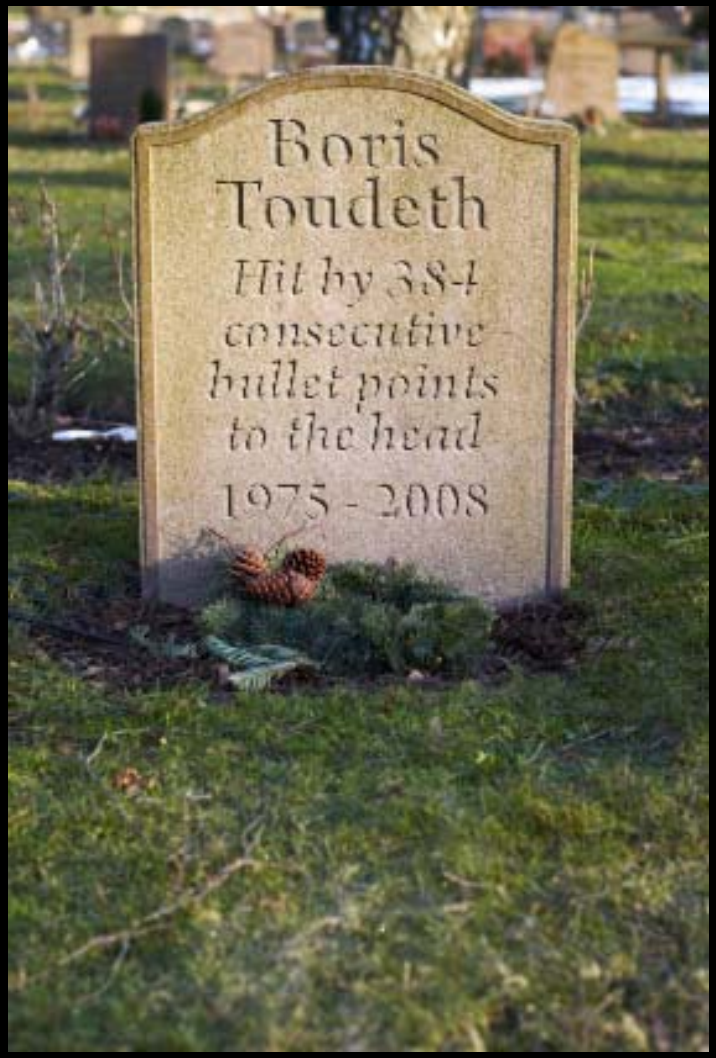
- Rapid and unrelenting progression of certain disease states

How Do Doctors Think?

Medical Decision Making

- Medical Knowledge
- Personal Experience


Knowledge
Background Knowledge
Foreground Knowledge
JAMA
Time in Practice


Boris
Toudeth
Hit by 384
consecutive
bullet points
to the head
1975 - 2008

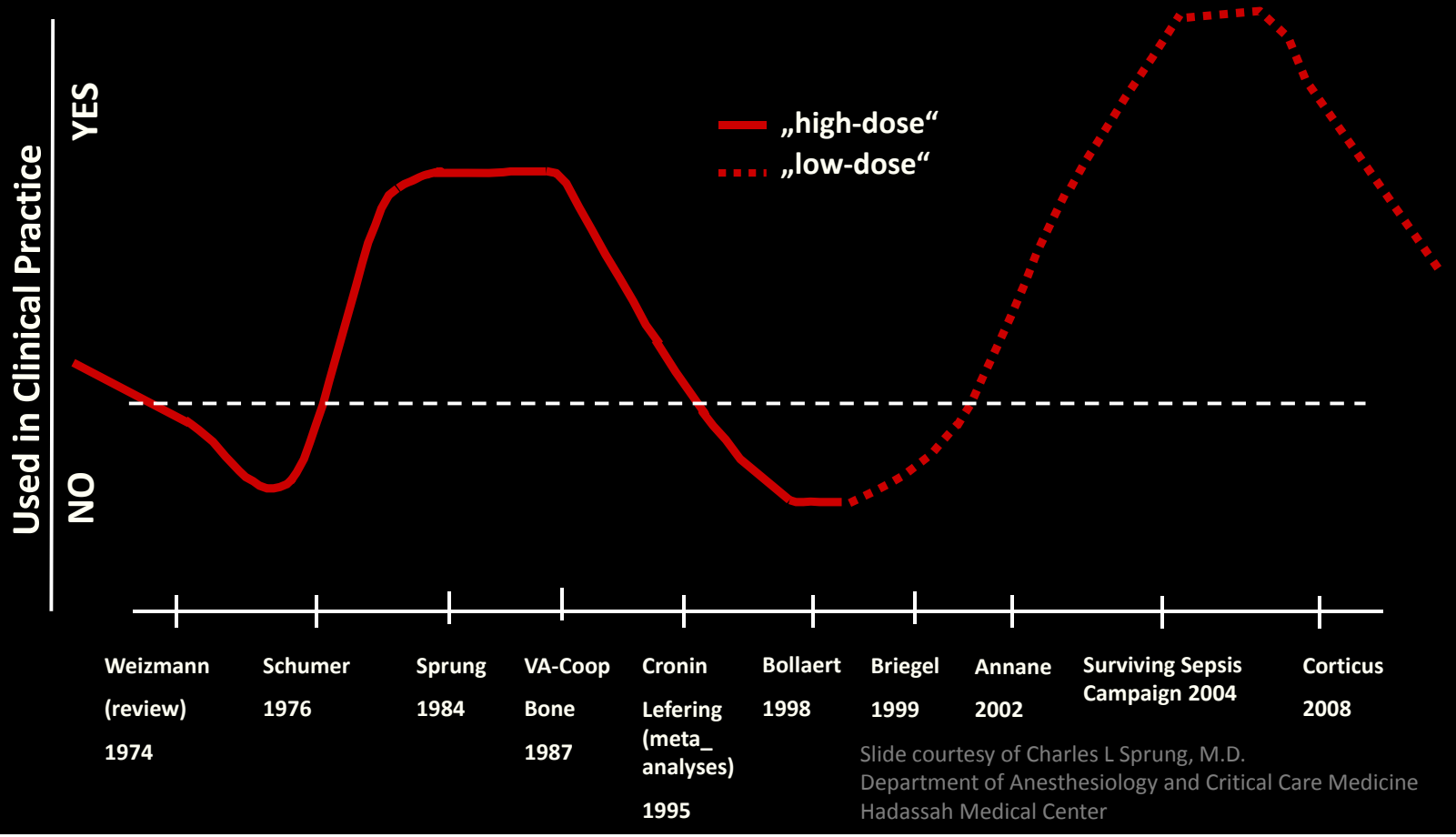
Review of Test Data Indicates Conservatism for Tile Penetration

- **The existing SOFI on tile test data used to create Crater was reviewed along with STS-87 Southwest Research data**
  - **Crater overpredicted penetration of tile coating significantly**
    - **Initial penetration to described by normal velocity**
      - Varies with volume/mass of projectile (e.g., 200ft/sec for 3cu. In)
    - **Significant energy is required for the softer SOFI particle to penetrate the relatively hard tile coating**
      - Test results do show that it is possible at sufficient mass and velocity
    - **Conversely, once tile is penetrated SOFI can cause significant damage**
      - Minor variations in total energy (above penetration level) can cause significant tile damage
  - **Flight condition is significantly outside of test database**
    - **Volume of ramp is 1920cu in vs 3 cu in for test**

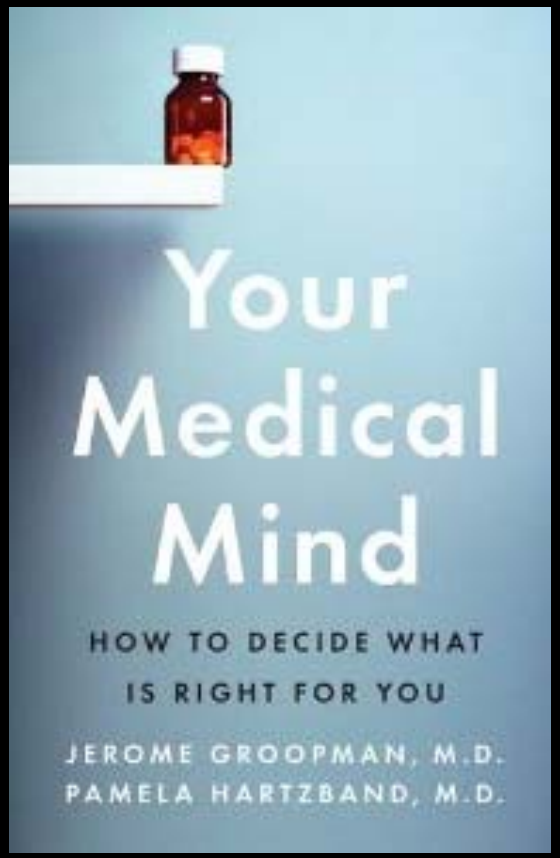
“If physicians would read two articles per day out of the six million medical articles published annually, in one year, they would fall 82 centuries behind in their reading.” -WF Miser, 1999

J Am Board Fam Prac. 12(4): 315-333, 1999

Steroids For Treatment of Infections, Sepsis and Septic Shock - *Ups and Downs*



Slide courtesy of Charles L Sprung, M.D.
Department of Anesthesiology and Critical Care Medicine
Hadassah Medical Center



- 100 committee recommendations
- 1 year = 14%
- 2 years = 23%
- 5 ½ years = 50%

ACADEMIA AND CLINIC | Annals of Internal Medicine

The Development of Clinical Practice Guidelines and Guidance Statements of the American College of Physicians: Summary of Methods

Amir Qaseem, MD, PhD, MHA; Vincenza Snow, MD; Douglas K. Owens, MD, MS; and Paul Shekelle, MD, PhD, for the Clinical Guidelines Committee of the American College of Physicians

The American College of Physicians (ACP) established its evidence-based clinical practice guidelines program in 1981. The ACP's Guidelines Committee and the staff of the Clinical Programs and Quality of Care Department develop the clinical recommendations. The ACP develops 2 different types of clinical recommendations: clinical practice guidelines and clinical guidance statements. The ACP clinical practice guidelines and guidance statements follow a multistep development process that includes a systematic review of the evidence, deliberation of the evidence by the committee, summary recommendations, and evidence and recommendation grading. All ACP clinical practice guidelines and clinical guidance statements, if not updated, are considered automatically withdrawn or invalid 5 years after publication or once an update has been issued.

Ann Intern Med. 2010;153:194-199. www.annals.org
For author affiliations, see end of text.

The American College of Physicians (ACP) established its evidence-based clinical practice guidelines program in 1981. The ACP founded the Clinical Guidelines Committee (formerly known as the Clinical Efficacy Assessment Subcommittee [CEAS] and Clinical Efficacy Assessment Technical Advisory Committee [CEATAC]) with the charge to evaluate medical advances and develop clinical rec

guidance statements, described in the "Guideline Review for Clinical Guidance Statements" section, which are based on a review of existing guidelines. Clinical recommendations may not apply to every patient or all clinical situations. The target audience for ACP clinical recommendations is all internists and other clinicians. The target patient population is persons with a clinical problem being

POSITION STATEMENT

Standards of Medical Care in Diabetes—2011

American Diabetes Association

CONTENTS

Diabetes is a chronic illness that requires continuing medical care and ongoing patient self-management education and support to prevent acute complications and to reduce the risk of long-term complications. Diabetes care is complex and requires that many issues, beyond glycemic control, be addressed. A large body of evidence exists that supports a range of interventions to improve diabetes outcomes.

These standards of care are intended to provide clinicians, patients, researchers, payors, and other interested individuals with the components of diabetes care, general treatment goals, and tools to evaluate the quality of care. While individual preferences, comorbidities, and other patient factors may require modification of goals, targets that are desirable for most patients with diabetes are provided. These standards are not intended to preclude clinical judgment or more extensive evaluation and management of the patient by other specialists as needed. For more detailed information about management of diabetes, refer to references 1–3.

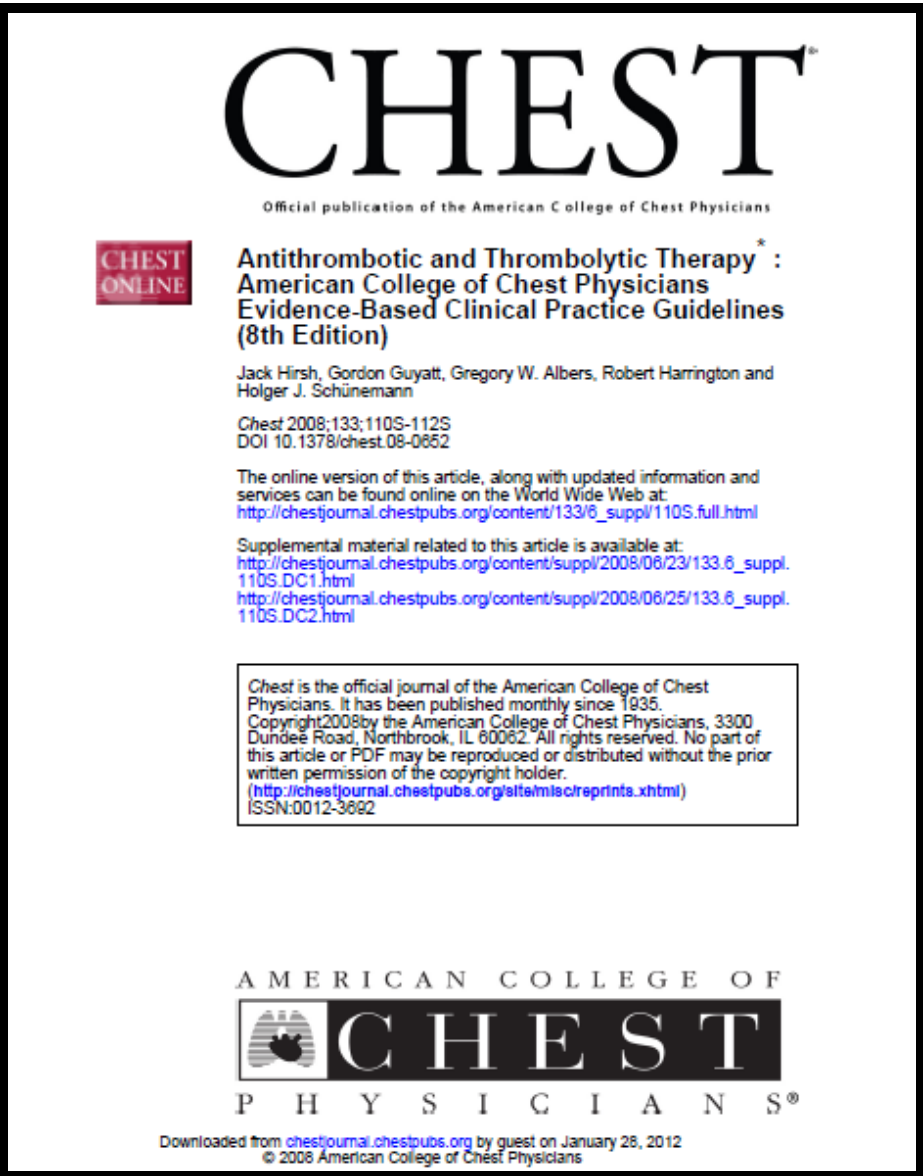
The recommendations included are screening, diagnostic, and therapeutic actions that are known or believed to favorably affect health outcomes of patients with diabetes. A grading system (Table 1), developed by the American Diabetes Association (ADA) and modeled after existing methods, was utilized to clarify and codify the evidence that forms the basis for the recommendations. The level of evidence that supports each recommenda-

Originally approved 1988. Most recent review/revision October 2010.
DOI: 10.2337/dc11-S011

Standards

Rules or minimum requirements

Deviated from under extreme circumstances



CHEST

Official publication of the American College of Chest Physicians

CHEST ONLINE

Antithrombotic and Thrombolytic Therapy*: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition)

Jack Hirsh, Gordon Guyatt, Gregory W. Albers, Robert Harrington and Holger J. Schünemann

Chest 2008;133;110S-112S
DOI 10.1378/chest.08-0652

The online version of this article, along with updated information and services can be found online on the World Wide Web at:
http://chestjournal.chestpubs.org/content/133/6_suppl/110S.full.html

Supplemental material related to this article is available at:
http://chestjournal.chestpubs.org/content/suppl/2008/06/23/133.6_suppl.110S.DC1.html
http://chestjournal.chestpubs.org/content/suppl/2008/06/25/133.6_suppl.110S.DC2.html

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ISSN:0012-3692

AMERICAN COLLEGE OF CHEST PHYSICIANS®

GUIDELINES

Basic recommendations

Supported by :

- literature
- expert opinion
- open forum commentary
- clinical feasibility data

STATEMENTS

Opinions or Beliefs

STATEMENT ON CONFLICT OF INTEREST

(Approved by the ASA House of Delegates on October 13, 1993, amended on October 15, 2003 and last updated on November 19, 2008)

Members of ASA are encouraged to serve the interests of the specialty and its practitioners by participating in activities of the Society. Participation includes, but is not limited to serving as a member of an ASA committee, as an ASA representative to another organization or as one of the Society's directors or officers. All of these represent positions of trust and require the exercise of independent personal judgment.

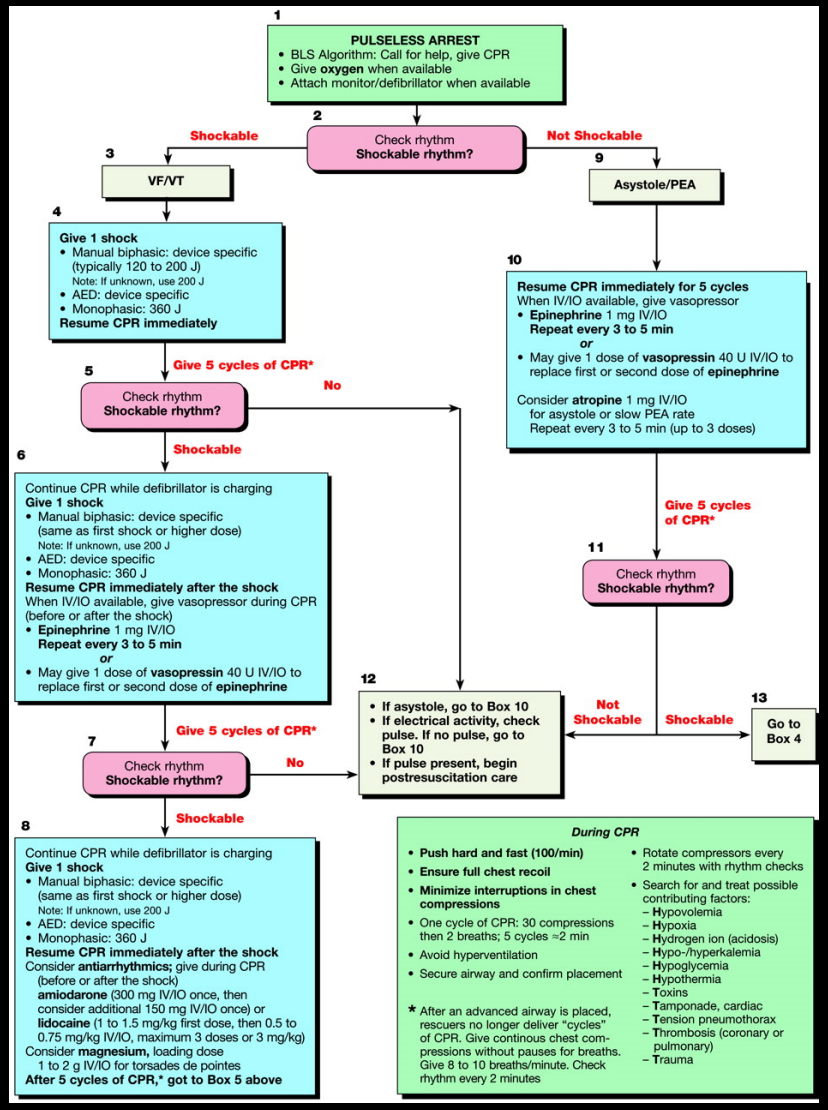
When ASA members agree to serve in any of these capacities, they have a duty to avoid involving themselves in conflicts, or apparent conflicts, between their duties to the Society and personal interests or duties they may have to other organizations. A conflict of interest may not disqualify an individual from rendering service to ASA, but may necessitate an alteration in the member's duties or disclosure of the conflict or apparent conflict so that the words or deeds of the member can be evaluated by others.

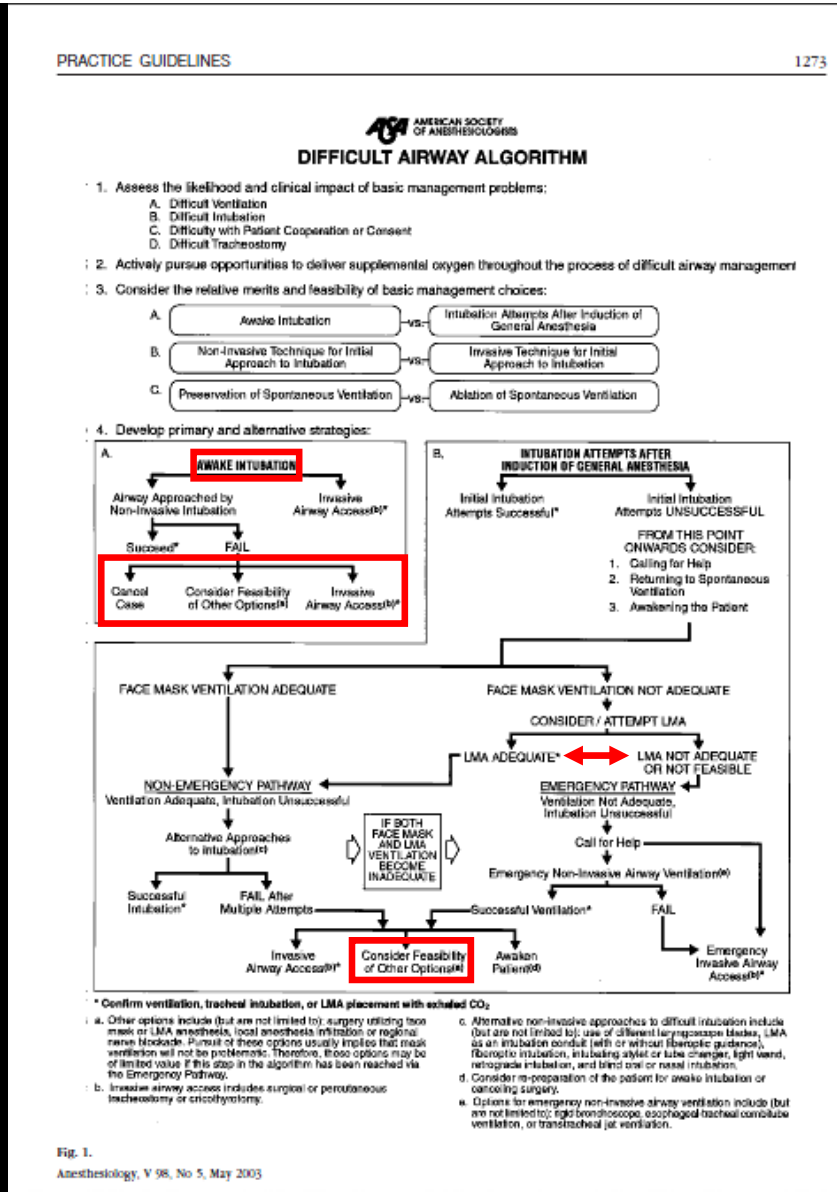
It is not possible to define all circumstances in which such a conflict of interest may arise. A conflict of interest can be assumed to exist when an ASA member or someone in the member's immediate family is involved in a relationship or arrangement, the terms of which may be inconsistent with, or appear to be inconsistent with performance of the member's duties or exercise of judgment on the Society's behalf. A conflict may also involve exploitation of a member's position with the Society for the purpose of personal gain.

To avoid such conflicts or apparent conflicts and to avoid exploitation of an office, the Society maintains a mechanism by which members nominated for or holding ASA positions, or serving on the executive staff, are required to provide the Society with information which may bear upon the member's capacity to perform contemplated duties and exercise independent judgment on the Society's behalf. The Society also requires that lecturers at ASA-sponsored scientific meetings disclose, both in the meeting program and at the time of the presentation, arrangements which could be viewed as affecting the objectivity of the lecturer's presentation.

Avoidance of conflicts requires constant sensitivity to the issue by all members and the disclosure of actual or potential conflicts for review and appropriate resolution.

ALGORITHMS


1
PULSELESS ARREST
• BLS Algorithm: Call for help, give CPR
• Give oxygen when available
• Attach monitor/defibrillator when available
2
Check rhythm
Shockable rhythm?
Shockable
Not Shockable
3
VF/VT
9
Asystole/PEA
4
Give 1 shock
• Manual biphasic: device specific (typically 120 to 200 J)
Note: If unknown, use 200 J
• AED: device specific
• Monophasic: 360 J
Resume CPR immediately
10
Resume CPR immediately for 5 cycles
When IV/IO available, give vasopressor
• Epinephrine 1 mg IV/IO
Repeat every 3 to 5 min
or
• May give 1 dose of vasopressin 40 U IV/IO to replace first or second dose of epinephrine
Consider atropine 1 mg IV/IO
for asystole or slow PEA rate
Repeat every 3 to 5 min (up to 3 doses)
Give 5 cycles of CPR*
5
Check rhythm
Shockable rhythm?
No
Shockable
Give 5 cycles of CPR*
11
Check rhythm
Shockable rhythm?
6
Continue CPR while defibrillator is charging
Give 1 shock
• Manual biphasic: device specific (same as first shock or higher dose)
Note: If unknown, use 200 J
• AED: device specific
• Monophasic: 360 J
Resume CPR immediately after the shock
When IV/IO available, give vasopressor during CPR (before or after the shock)
• Epinephrine 1 mg IV/IO
Repeat every 3 to 5 min
or
• May give 1 dose of vasopressin 40 U IV/IO to replace first or second dose of epinephrine
12
• If asystole, go to Box 10
• If electrical activity, check pulse. If no pulse, go to Box 10
• If pulse present, begin postresuscitation care
Not Shockable
Shockable
13
Go to Box 4
Give 5 cycles of CPR*
7
Check rhythm
Shockable rhythm?
No
Shockable
8
Continue CPR while defibrillator is charging
Give 1 shock
• Manual biphasic: device specific (same as first shock or higher dose)
Note: If unknown, use 200 J
• AED: device specific
• Monophasic: 360 J
Resume CPR immediately after the shock
Consider antiarrhythmics; give during CPR (before or after the shock)
amiodarone (300 mg IV/IO once, then consider additional 150 mg IV/IO once) or
lidocaine (1 to 1.5 mg/kg first dose, then 0.5 to 0.75 mg/kg IV/IO, maximum 3 doses or 3 mg/kg)
Consider magnesium, loading dose 1 to 2 g IV/IO for torsades de pointes
After 5 cycles of CPR,* got to Box 5 above
During CPR
• Push hard and fast (100/min)
• Ensure full chest recoil
• Minimize interruptions in chest compressions
• One cycle of CPR: 30 compressions then 2 breaths; 5 cycles ≈2 min
• Avoid hyperventilation
• Secure airway and confirm placement
* After an advanced airway is placed, rescuers no longer deliver "cycles" of CPR. Give continous chest compressions without pauses for breaths. Give 8 to 10 breaths/minute. Check rhythm every 2 minutes
• Rotate compressors every 2 minutes with rhythm checks
• Search for and treat possible contributing factors:
– Hypovolemia
– Hypoxia
– Hydrogen ion (acidosis)
– Hypo-/hyperkalemia
– Hypoglycemia
– Hypothermia
– Toxins
– Tamponade, cardiac
– Tension pneumothorax
– Thrombosis (coronary or pulmonary)
– Trauma



PRACTICE GUIDELINES 1273

AMERICAN SOCIETY OF ANESTHESIOLOGISTS

DIFFICULT AIRWAY ALGORITHM

1. Assess the likelihood and clinical impact of basic management problems:
   - A. Difficult Ventilation
   - B. Difficult Intubation
   - C. Difficulty with Patient Cooperation or Consent
   - D. Difficult Tracheostomy
2. Actively pursue opportunities to deliver supplemental oxygen throughout the process of difficult airway management
3. Consider the relative merits and feasibility of basic management choices:
   - A. Awake Intubation vs. Intubation Attempts After Induction of General Anesthesia
   - B. Non-Invasive Technique for Initial Approach to Intubation vs. Invasive Technique for Initial Approach to Intubation
   - C. Preservation of Spontaneous Ventilation vs. Ablation of Spontaneous Ventilation
4. Develop primary and alternative strategies:

* Confirm ventilation, tracheal intubation, or LMA placement with exhaled CO_2

a. Other options include (but are not limited to): surgery utilizing face mask or LMA anesthesia, local anesthesia infiltration or regional nerve blockade. Pursuit of these options usually implies that mask ventilation will not be problematic. Therefore, these options may be of limited value if this step in the algorithm has been reached via the Emergency Pathway.

b. Invasive airway access includes surgical or percutaneous tracheostomy or cricothyrotomy.

c. Alternative non-invasive approaches to difficult intubation include (but are not limited to): use of different laryngoscope blades, LMA as an intubation conduit (with or without fiberoptic guidance), fiberoptic intubation, intubating stylet or tube changer, light wand, retrograde intubation, and blind oral or nasal intubation.

d. Consider re-preparation of the patient for awake intubation or canceling surgery.

e. Options for emergency non-invasive airway ventilation include (but are not limited to): rigid bronchoscope, esophageal-tracheal combitube ventilation, or transtracheal jet ventilation.

Fig. 1.

Anesthesiology, V 98, No 5, May 2003

ALGORITHMS

- Non-binary
- Does not offer concurrency of rescue maneuvers
- Does not address uncooperative pts
- Options listed not always available
- Does not address out-of-OR environment

ACROSS THE RED LINE

Stories from the Surgical Life

RICHARD C. KARL

Good judgement comes from experience.
Experience comes from bad judgement.

- Jim Horning
- Will Rogers
- Rita Mae Brown
- Fred Brooks
- General Omar Bradley
- Christian Slater
- Ralph Waldo Emerson

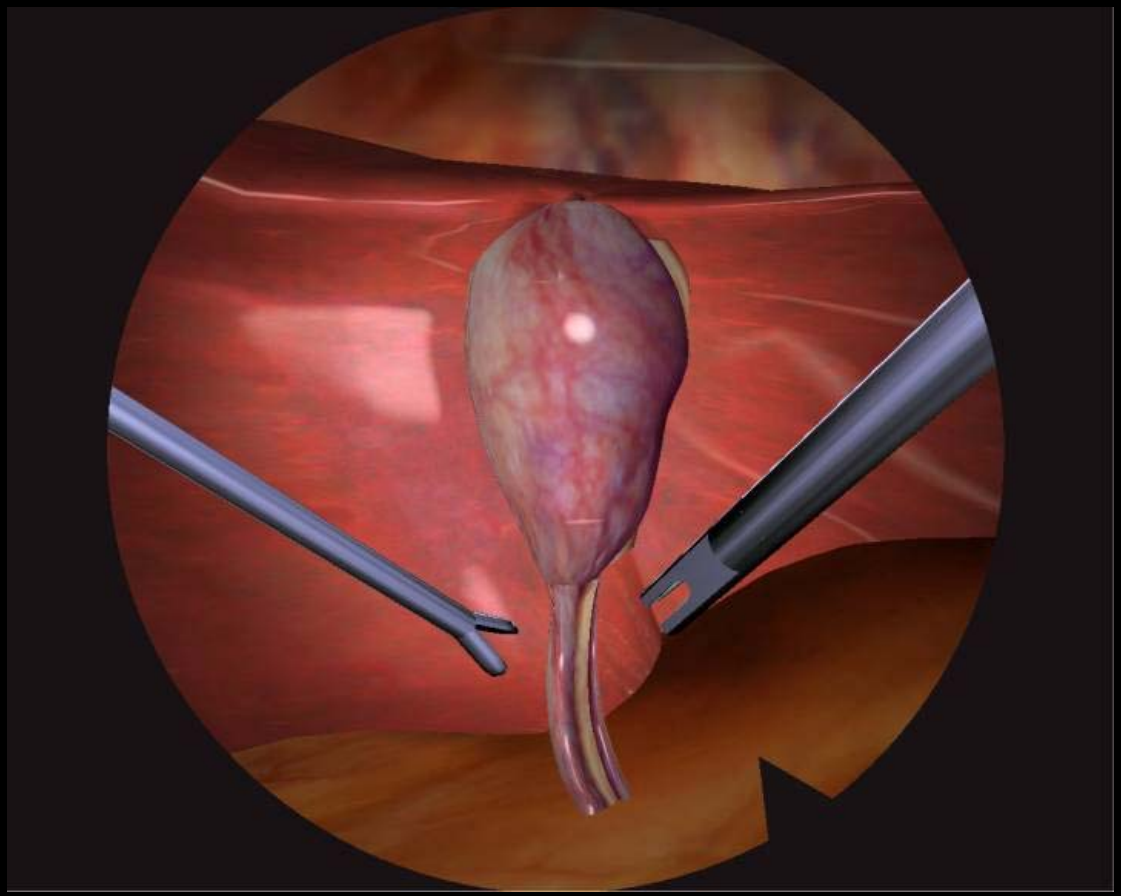
“A doctor is only a doctor when he has killed one or two patients.”

-Indian Proverb


10105 ECG LEADS OFF
10121

Experience Requires Two Things:

- Time
- Right Environment



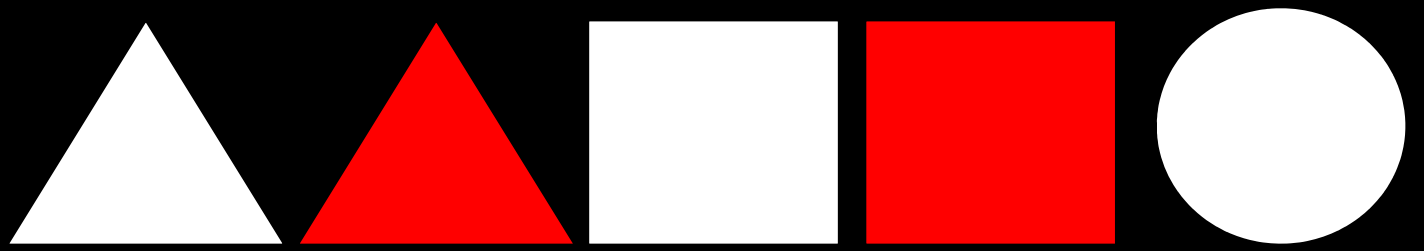
STORY-TELLING

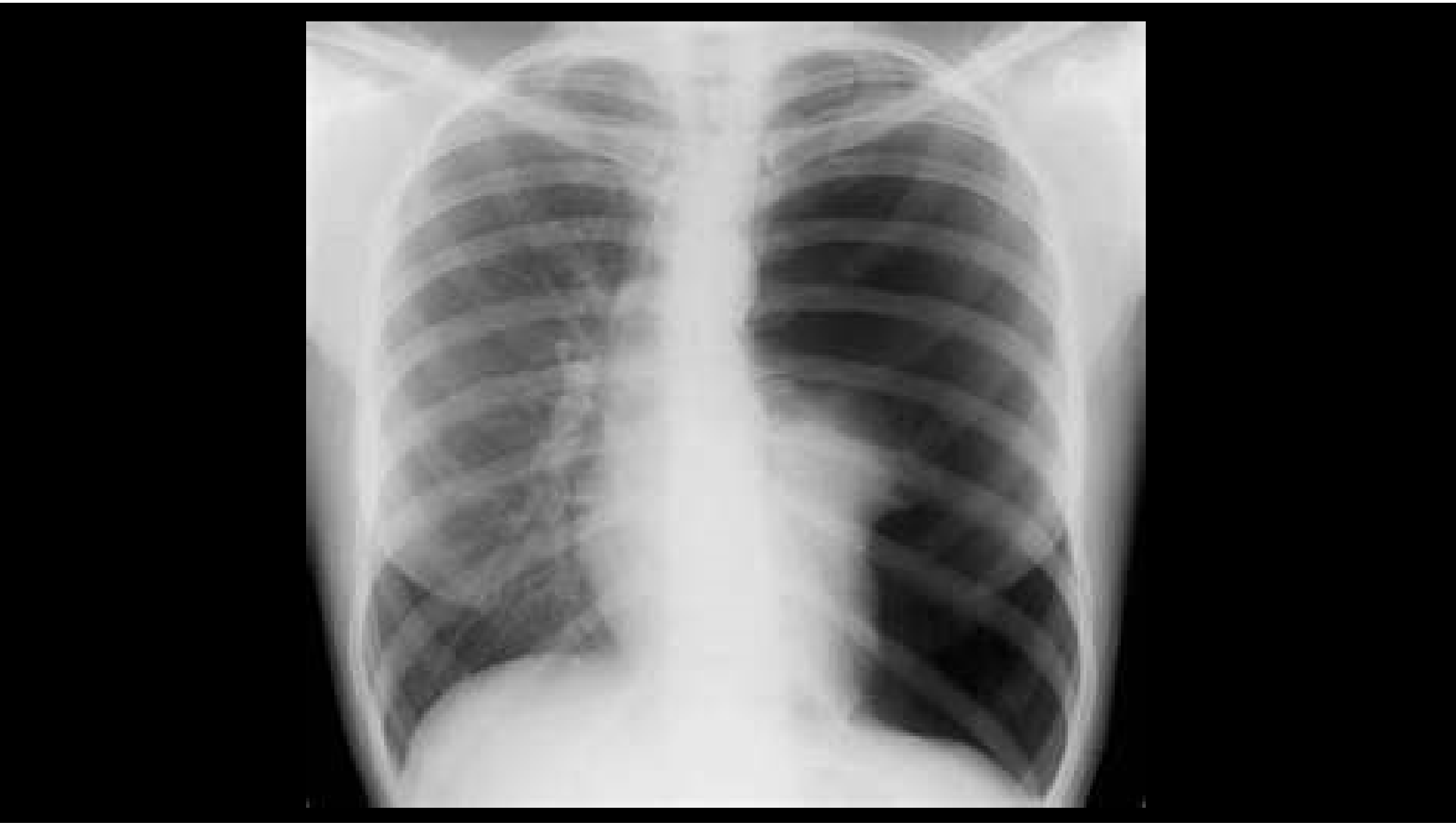
- Low-fidelity method of training decision making
- Practice is ubiquitous across high-risk fields
- Informal exchange of “war stories” becomes “vicarious experience”

Klein, G. Sources of Power: How People Make Decisions. Cambridge: MIT Press 1998.

TOOLS TO HELP

Pattern Recognition



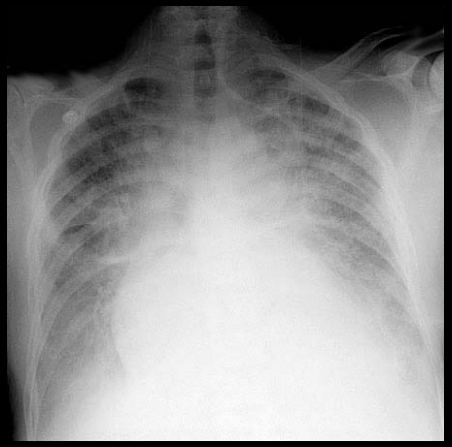


Symptoms

Orthopnea
Nocturia
Dyspnea

Signs

Tachypnea, rales
Gallop rhythm
Murmur
Hepatomegally, ascites



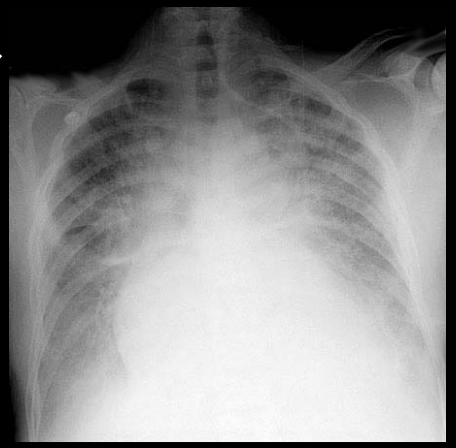
Symptoms

Orthopnea
Nocturia
Dyspnea

Congestive Heart Failure

Signs

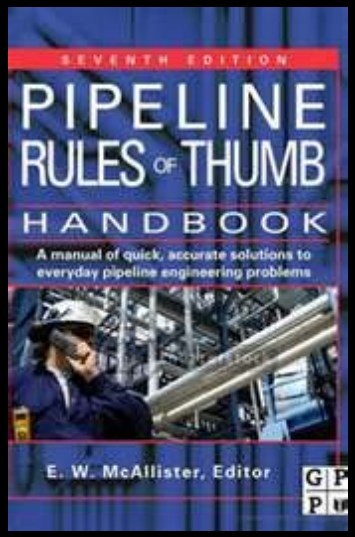
Tachypnea, rales
Gallop rhythm
Murmur
Hepatomegally, ascites

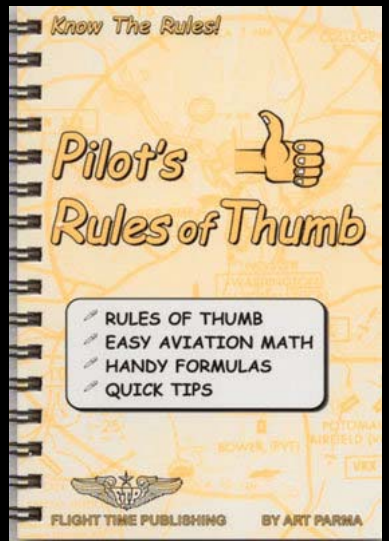


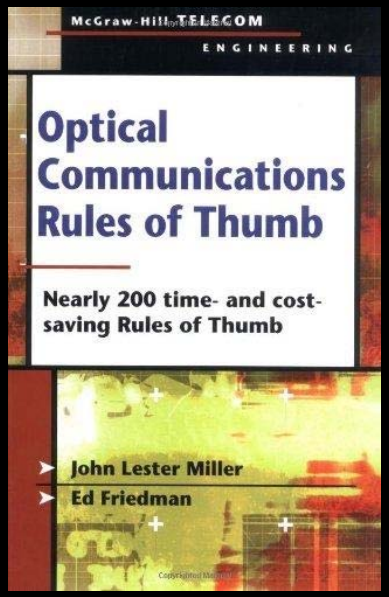
The Case of the Baby Yellow Bird

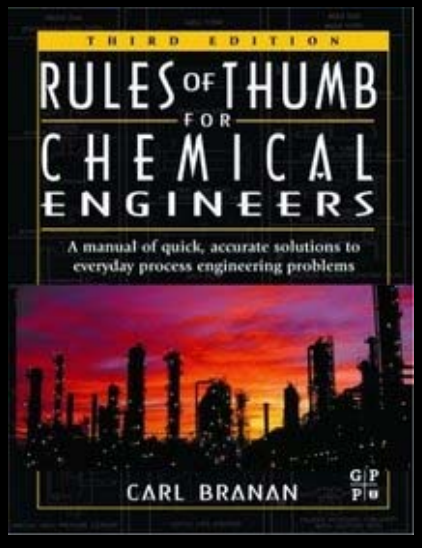
HEURISTICS

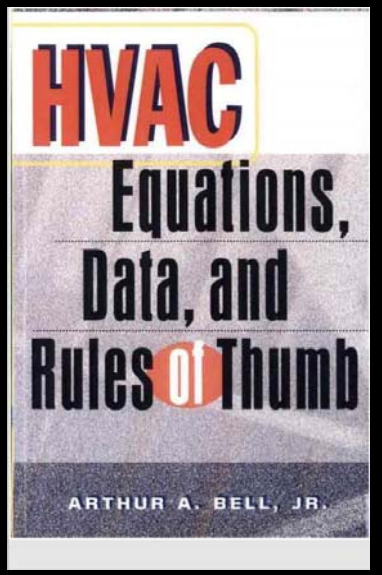
Rules of Thumb in Other Fields











Examples of Heuristics

- Every premenopausal woman with abdominal pain gets a pregnancy test
- Every patient with syncope gets an Accucheck
- High fever + RLQ pain = appendicitis
- Yes, I love your new haircut
- No, the chicken was not overcooked

Reasoning in Diagnosis

- Deductive
  - Starts with a general premise and leads to a specific conclusion
  - Conclusions are valid, if the premises are correct
  - Does not improve understanding or generate new knowledge
  - Does not fit diagnostic reasoning, which starts with the problem, and seeks a cause
- Inductive
  - Begins with specifics and concludes with the general
  - The conclusions are probably true, but depend on the amount of evidence used to arrive at it
  - Requires observation or “sense experience”
  - Generates new knowledge

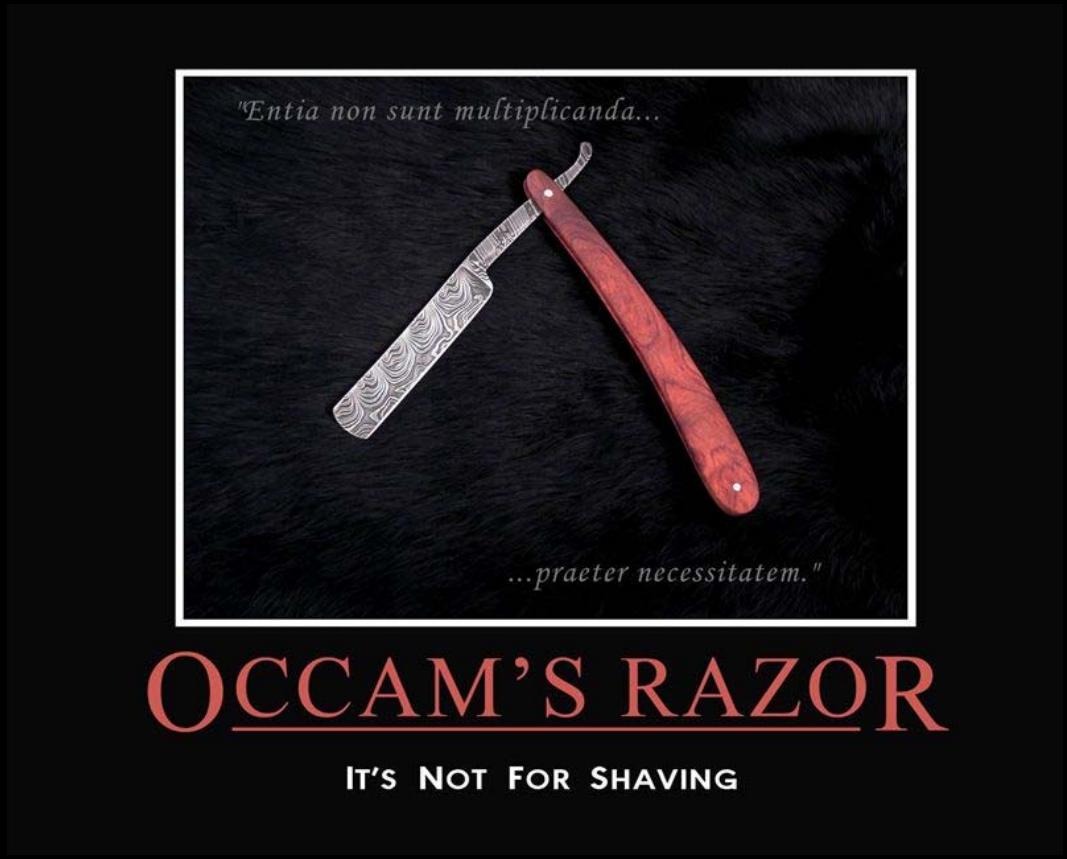
Reasoning in Diagnosis

- Abductive
  - Better fit for clinical reasoning
  - Begins with specifics and ends with a plausible explanation

Reasoning in Diagnosis

- Deductive
  - "When it rains, the grass gets wet. It is raining. Therefore, the grass is wet."
  - Determines the conclusion
- Inductive
  - "The grass has been wet every time it has rained. Therefore, when it rains, the grass gets wet."
  - Determines the rule
- Abductive
  - "When it rains, the grass gets wet. The grass is wet; it must have rained."
  - Uses conclusion and rule to determine the precondition.

Occam's Razor



"Entities must not be multiplied beyond necessity."

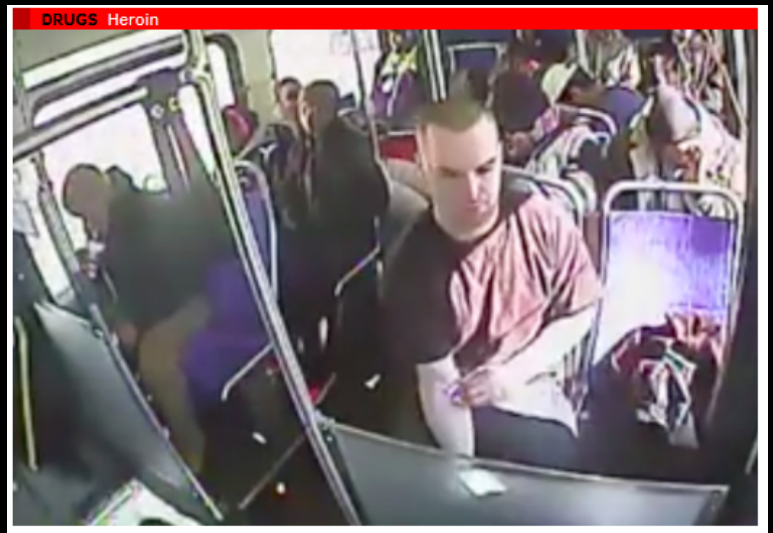
Hickam's Dictum

Crabtree's Bludgeon

"No set of mutually inconsistent observations can exist for which some human intellect cannot conceive a coherent explanation, however complicated."

Putting it All Together.
One Hospital's Story with Naloxone Use

NEWS REPORTS ABOUND...



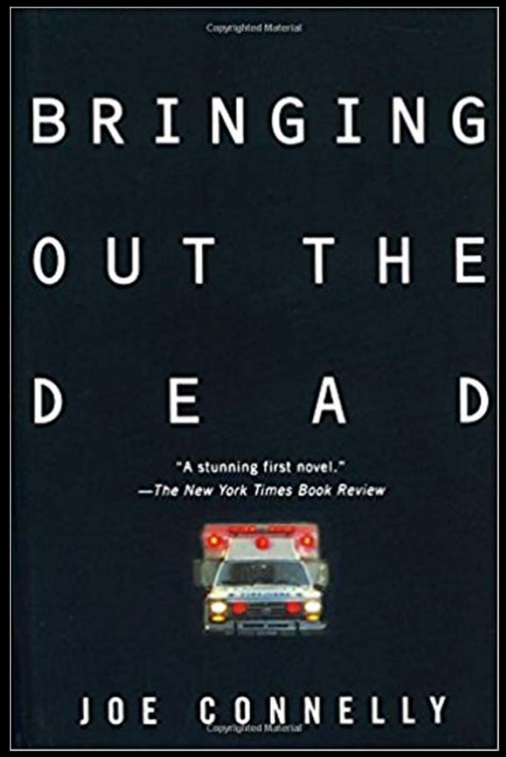
UPPER DARBY POLICE DEPARTMENT/FACEBOOK

Upper Darby police posted surveillance video of Michael Meaney, 25, of Media, who was charged on Feb. 18 with drug possession.

FEBRUARY 23, 2016

Upper Darby police video shows man overdose on heroin, then be revived with Narcan

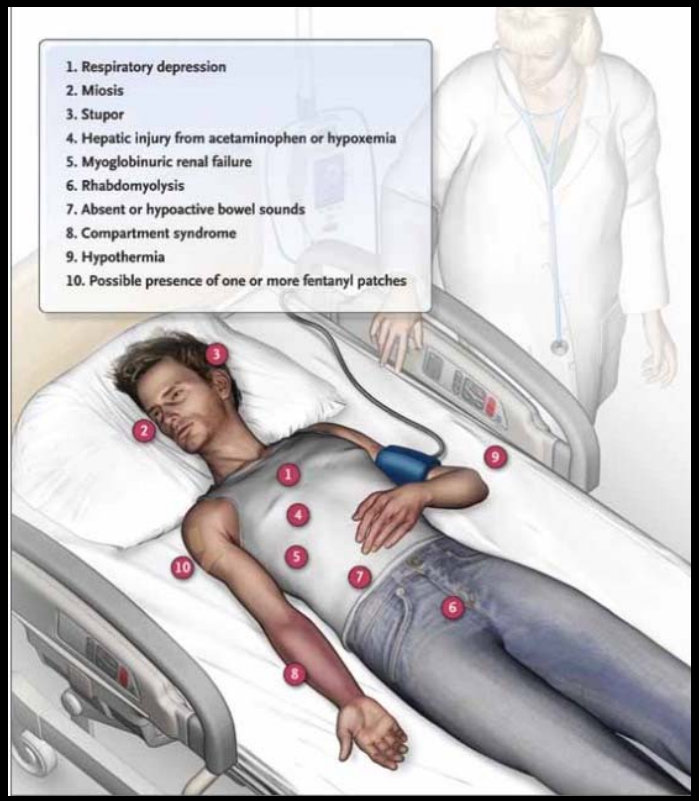
Bringing Out the Dead



Vintage Contemporaries, 1999

"Narcan is the junkie's worst nightmare, like a thousand cops sweeping through your body, closing up shop, confiscating every bag, needle, spoon, match, arresting anything that moves, until each cell in your body is sitting in jail shaking, sniffling, scratching the walls. Narcan is a medic's friend, the great resurrector, always a crowd pleaser, from corpse to standing in about twenty seconds."

From the NEJM



"Naloxone can be administered without compunction in any patient, including patients with opioid dependence."

"Concerns that naloxone will harm patients with opioid dependence are unfounded; all signs of opioid abstinence are unpleasant but not life-threatening."

Boyer, E.W. (2012). Management of Opioid Analgesic Overdose. NEJM, 367, 146-155

A Different Kettle of Fish…

Who Will Have Opioid-Induced Complications?

- Age
- Obesity
- Opioid status (ie, opioid naïve vs chronic use)
- Hepatic insufficiency
- Renal insufficiency
- Pulmonary disease (eg, COPD)
- Cardiac disease (eg, CHF)
- PCA basal use, multi-route administration

Defining Old Age

In a survey reported in the *New York Times*:

- Old age starts at 68
- Those over 65 felt differently: they said at the earliest, 75
- People under 30 said it begins at 60
- Essentially, it's always just a bit older than you are

Arnquist, S. (2009, June 30). How Old Do You Feel? It Depends on Your Age. The New York Times.

And Obesity…

"The probability of a physician recording an obesity diagnosis with their obese patients was higher when the physicians' perception of the patients' body weight met or exceeded their own personal body weight."

Bleich et al. (2012). Impact of Physician BMI on Obesity Care and Beliefs. Obesity, 20(5), 999-1005.

Can we better predict who needs opioid reversal?

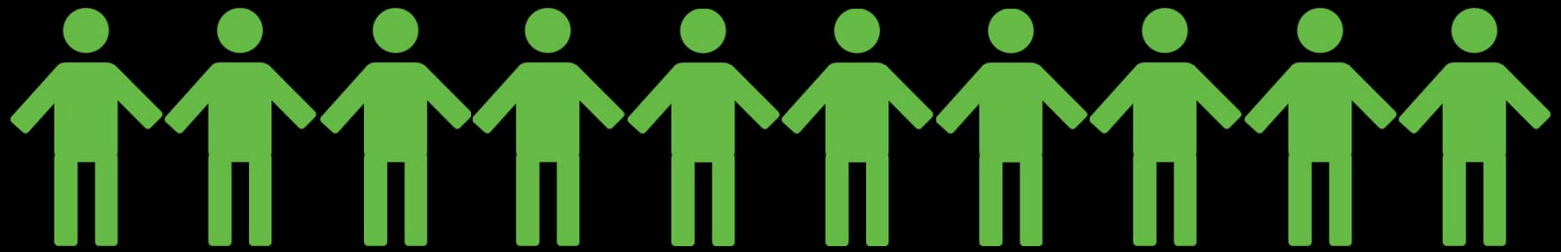
> **Opioid specific:**

- The primary use of naloxone is to reverse the effects of opioids.[17] Therefore, naloxone use can serve as a proxy for an ADE due to opioids. While naloxone is sometimes used to treat opioid-induced nausea and pruritis,[18] most physicians do not prescribe naloxone for these indications.

Secondary Driver > USE HIGH PROBABILITY LOGIC; REASONABLY LIMIT TIME SPENT VERIFYING THE CAUSE OF THE EVENT.

While there can be several causes leading to severe hypoglycemia, excessively elevated INRs, or need for naloxone administration, experience in the typical hospital shows that 90-95 percent of these situations are due to very limited causes. Verifying each and every cause is time consuming and contributes little to improvement efforts. Resist the temptation to seek "perfect data." If you can avoid opening that chart you will save precious time for other improvement activities. Read below to find easy ways to identify numerators and denominators, and therefore rates.

In 2014, Moffitt Cancer Center began to ask that question…



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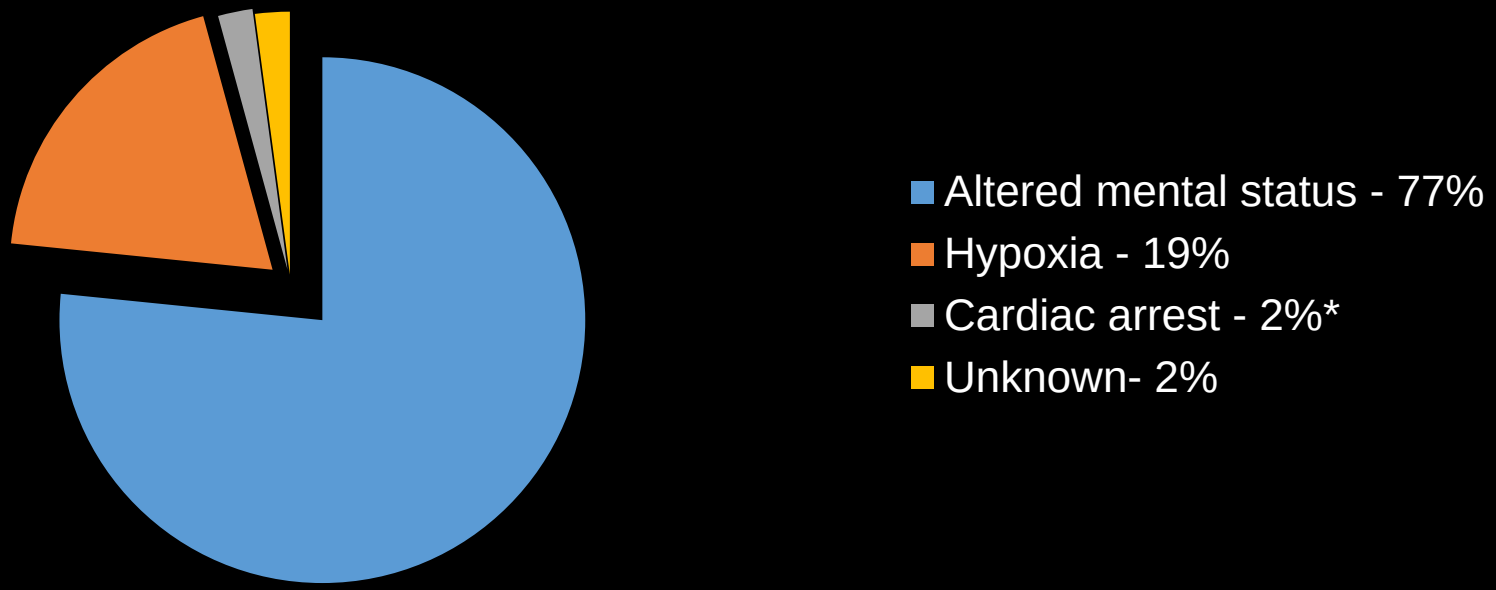
Inappropriate Naloxone Uses



Saybolt et al. (2009). Naloxone in cardiac arrest with suspected opioid overdoses. *Resuscitation, 81*, 42-46.

Breakdown of Altered Mental Status Cause

- metabolic derangement - 25%
- SIRS / sepsis - 25%
- hemorrhage / anemia - 11%
- polypharmacy - 8%
- end of life - 8%
- chemotherapy induced 6%
- stroke - 6%
- unknown - 6%
- seizure - 3%
- vasovagal - 3%

POLYPHARMACY

//AMS

The patient recieved IV zofran [redacted] and later that night was given phenergan 12.5mg IV X 1. He developed extrapyramidal side effects from the phenergan and was given Benadryl. he continued to have nausea and then recieved ativan. He devloped somnolence and required narca. By saturday am he was improved- awake but still confused. His confusion resolved by Saturday night and he has remained alert and oriented since.

HYPOXIA

RRT was called at 5:17am, Upon my arrival patient was unresponsive, O2Sat 84%. It was informed that the patient under the [redacted] team and that he is s/p surgery for a lesion on the back on [redacted] Patient was medicated with a PCA at that time, which was turned off and given Narcan 0.4mg IV before my arrival. It was ordered to complete a total of 2g of IV Narcan. Patient was placed on Oxi mask at 15L with improved O2Sat to the low 90's. EKG was ordered which didn't showed significant ischemic changes. ABG showed PH 7.1, PCO2 66, PO2 76, and HCO3 20.5. STAT BMP, Chest XRAY was ordered.

VS: BP 169/68, HR 87, RR28, BS 306
PE: Pt un responsive, and unarousable
HEART: Regular Rythm, no murmur or gallops
Lungs: Clear bilaterally no wheezes or rhonchi
Neuro: unable to assess

Given that patient after the total 2g of IV Narcan was not responsive decision was made to transfer him to the unit for possible intubation and close monitoring.

WHY CARE?

- Naloxone *is* *not* benign
  - Precipitates opioid withdrawal → "overshoot"

Narrative Notes

Narrative Note : [redacted] notified due to respiratory depression. Narcan administered, see MAR. Physician at bedside. Morphine PCA doseage changed, see MAR. Pt having withdrawl symptoms of shivering, sweating and inability to concentrate. Bolus dosages of Morphine given, see MAR. Physician spoke to huband over the phone to notify him of the current situation.

- Catecholamine surge

  arrhythmias, hyperventilation, pulmonary edema, hypertension, myocardial ischemia, heart failure, CNS injury, & death

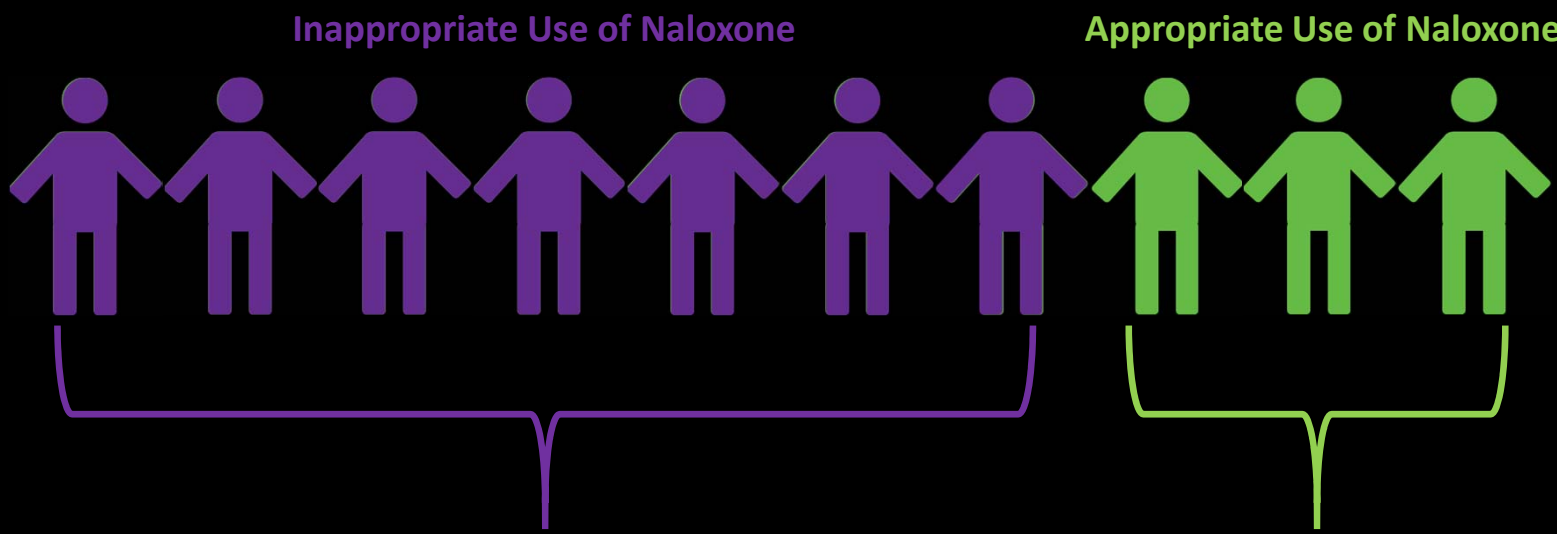
Why Care?

- Delays in diagnosis
  - What is “partial” or “mild” improvement after naloxone?

Plan

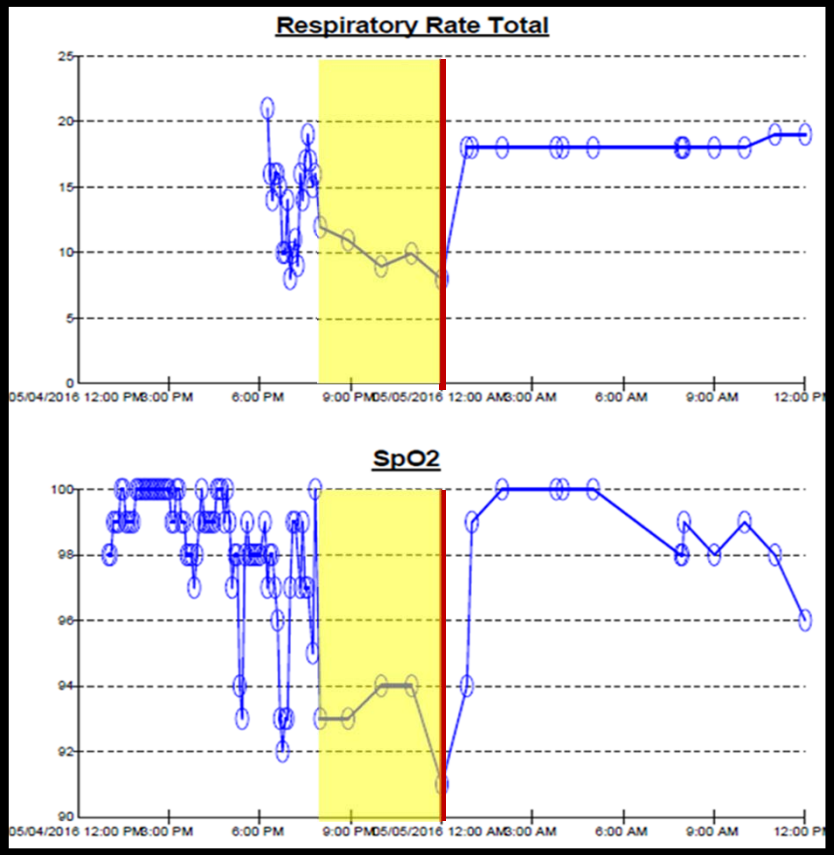
Patient received 1/2 amp Narcan with mild improvement.

In 2014, Moffitt Cancer Center began to ask that question...



*p <0.05

"Patients don't suddenly deteriorate. Clinicians just suddenly notice."



A Case of Hypotension

- 52 y/o POD #0 from nephrectomy for cancer
- Admitted to ICU
- Hgb=11.4
- ↓BP =
  - Phenylephrine gtt
  - Narcan
  - Gentle IVFs, as patient has h/o ESRD & dialysis
  - Norepinephrine gtt
  - Chart notes indicate sepsis was suspected
  - Vasopressin gtt
  - Epinephrine gtt
  - Labs sent

How Do We Combat Diagnostic Error?

- Better systems
  - Timely and accurate flow of information
  - Facilitate second opinions
- Better teams
  - Multidisciplinary
  - Engage the patient throughout
- Better medical education
  - Knowing content → Knowing how to think about content
- Better diagnostic support
  - HIT

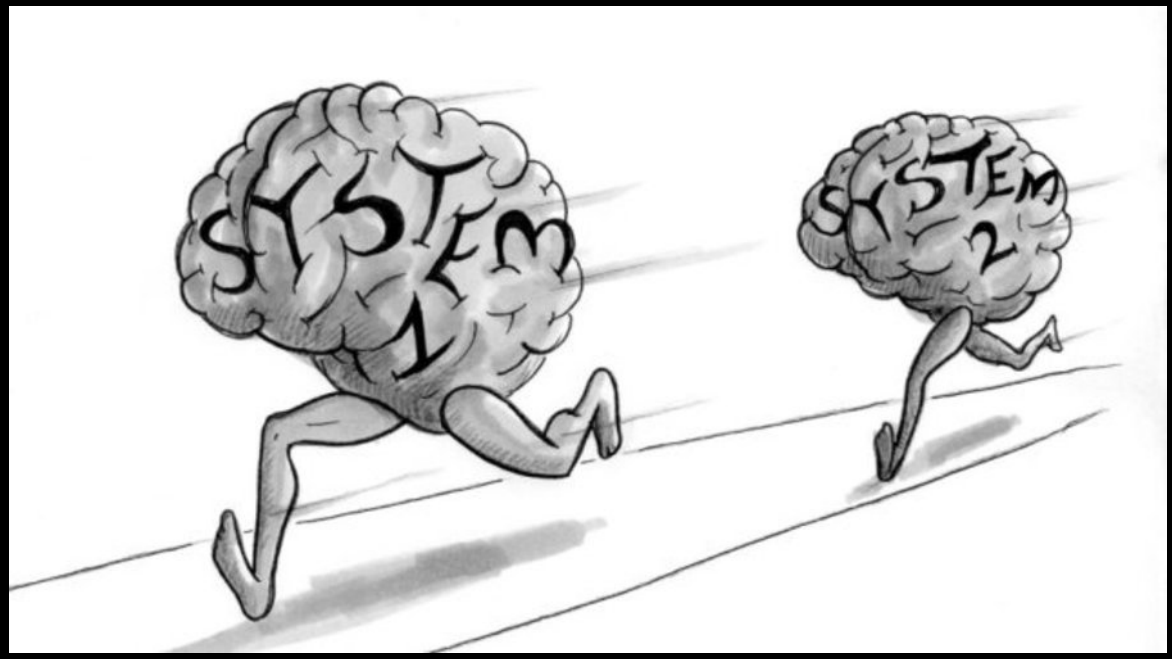
How Do We Combat Diagnostic Error?

- Diagnostic decision making is either *rational* or *intuitive*
- Rational decision making
  - Reliable, safe, but slow and resource intensive
- Intuitive decision making
  - Fast, usually effective, but more prone to failure

Thinking Fast and Slow

- Daniel Kahneman first described System I versus System II thinking

Fast, automatic, intuitive



Slower, analytical, reason driven

We Need To Think Ahead Better

- Jack is looking at Anne, but Anne is looking at George
- Jack is married, but George is not

Is a married person looking at an unmarried person?

(A) Yes (B) No (C) Cannot be determined

80% of us get this wrong. The majority of us are cognitive misers.

Thinking Fast and Slow

- 95% of our time is spent in “intuitive mode”
- Progress automatically from one task to the next with few episodes of conscious, deliberate, and focused thinking.
- Errors that occur are biases
  - Cognitive (> 100)
  - Affective (~ 12)

20 COGNITIVE BIASES THAT SCREW UP YOUR DECISIONS

1. Anchoring bias.

People are **over-reliant** on the first piece of information they hear. In a salary negotiation, whoever makes the first offer establishes a range of reasonable possibilities in each person's mind.

2. Availability heuristic.

People **overestimate the importance** of information that is available to them. A person might argue that smoking is not unhealthy because they know someone who lived to 100 and smoked three packs a day.

3. Bandwagon effect.

The probability of one person adopting a belief increases based on the number of people who hold that belief. This is a powerful form of **groupthink** and is reason why meetings are often unproductive.

4. Blind-spot bias.

Failing to recognize your own cognitive biases is a bias in itself. People notice cognitive and motivational biases much more in others than in themselves.

5. Choice-supportive bias.

When you choose something, you tend to feel positive about it, even if that **choice has flaws**. Like how you think your dog is awesome — even if it bites people every once in a while.

6. Clustering illusion.

This is the tendency to **see patterns in random events**. It is key to various gambling fallacies, like the idea that red is more or less likely to turn up on a roulette table after a string of reds.

7. Confirmation bias.

We tend to listen only to information that confirms our **preconceptions** — one of the many reasons it's so hard to have an intelligent conversation about climate change.

8. Conservatism bias.

Where people favor prior evidence over new evidence or information that has emerged. People were **slow to accept** that the Earth was round because they maintained their earlier understanding that the planet was flat.

9. Information bias.

The tendency to **seek information when it does not affect action**. More information is not always better. With less information, people can often make more accurate predictions.

10. Ostrich effect.

The decision to **ignore dangerous or negative information** by "burying" one's head in the sand, like an ostrich. Research suggests that investors check the value of their holdings significantly less often during bad markets.

11. Outcome bias.

Judging a decision based on the **outcome** — rather than how exactly the decision was made in the moment. Just because you won a lot in Vegas doesn't mean gambling your money was a smart decision.

12. Overconfidence.

Some of us are **too confident about our abilities**, and this causes us to take greater risks in our daily lives. Experts are more prone to this bias than laypeople, since they are more convinced that they are right.

13. Placebo effect.

When **simply believing** that something will have a certain effect on you causes it to have that effect. In medicine, people given fake pills often experience the same physiological effects as people given the real thing.

14. Pro-innovation bias.

When a proponent of an innovation tends to **overvalue its usefulness** and undervalue its limitations. Sound familiar, Silicon Valley?

15. Recency.

The tendency to weigh the **latest information** more heavily than older data. Investors often think the market will always look the way it looks today and make unwise decisions.

16. Salience.

Our tendency to focus on the **most easily recognizable features** of a person or concept. When you think about dying, you might worry about being mauled by a lion, as opposed to what is statistically more likely, like dying in a car accident.

17. Selective perception.

Allowing our expectations to **influence how we perceive** the world. An experiment involving a football game between students from two universities showed that one team saw the opposing team commit more infractions.

18. Stereotyping.

Expecting a group or person to have certain qualities without having real information about the person. It allows us to quickly identify strangers as friends or enemies, but people tend to **overuse and abuse** it.

19. Survivorship bias.

An error that comes from focusing only on surviving examples, causing us to **misjudge a situation**. For instance, we might think that being an entrepreneur is easy because we haven't heard of all those who failed.

20. Zero-risk bias.

Sociologists have found that **we love certainty** — even if it's counterproductive. Eliminating risk entirely means there is no chance of harm being caused.

SOURCES: Brain Biases; Ethics Unwrapped; Explorable; Harvard Magazine; HowStuffWorks; LearnVest; Outcome bias in decision evaluation, Journal of Personality and Social Psychology; Psychology Today; The Bias Blind Spot: Perceptions of Bias in Self Versus Others, Personality and Social Psychology Bulletin; The Cognitive Effects of Mass Communication, Theory and Research in Mass Communications; The less-is-more effect: Predictions and tests, Judgment and Decision Making; The New York Times; The Wall Street Journal; Wikipedia; You Are Not So Smart; ZhurnalyWiki

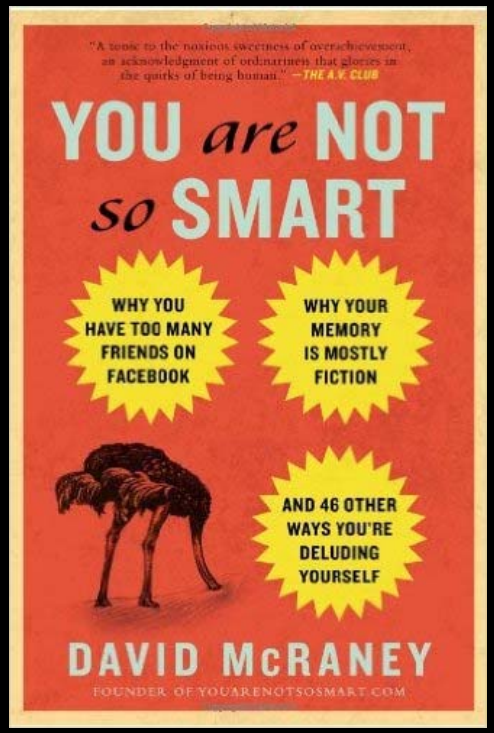
BUSINESS INSIDER

Be Not Ashamed of Mistakes and Thus Make Them Crimes -Confucius

- It's OK to be wrong
- Slip versus Mistakes
  - Occur in the midst of skilled performance (something we've done many times)
  - Flawless execution of a bad idea
- Slips are caught 85% of the time by the person making them, mistakes require time and/or others
- We have an aversion to being wrong, which inhibits learning and improvement

Fighting Bias

- 10 SECONDS FOR 10 MINUTES
  - *Bulletin of The Royal College of Anaesthetists* (2008): 2614-2616.
- DATA BLINDING
- FORCING STRATEGIES
  - ROWS
  - UPO
- RULE OF THREE
  - Have at least 3 Ddx
  - Don’t make more than 3 therapeutic attempts
- PROSPECTIVE HINDSIGHT
- UNIVERSAL ANTIDOTE


"A tonic to the noxious sweetness of overachievement, an acknowledgment of ordinariness that glories in the quirks of being human." —THE A.V. CLUB
YOU are NOT so SMART
WHY YOU HAVE TOO MANY FRIENDS ON FACEBOOK
WHY YOUR MEMORY IS MOSTLY FICTION
AND 46 OTHER WAYS YOU'RE DELUDING YOURSELF
DAVID McRANEY
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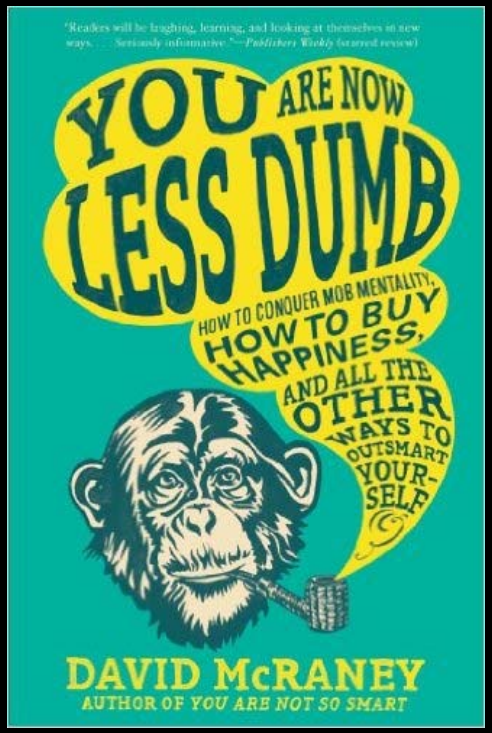
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Attention is the rarest and purest form of generosity."

- Simone Weil

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