Clinical Decision Making in the Time of COVID 19 and Choosing Wisely

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Why talk about decision making?

It’s what drives all behaviour.

Real COVID-19 Case Examples

Case 1

- 90 year old male is brought to the ED complaining of chest pain and shortness of breath. Lives in the independent section of a long-term care facility in a city in which several COVID cases have been recently diagnosed.
- Chest X-ray shows patchy infiltrates. EKG showed left ventricular hypertrophy, Troponin elevated at 297. Admitted to COVID unit, swab is negative, and troponin rises to 400 then 600 over next 6 hours.
- Discharged from COVID ward within hours with discharge diagnosis of community acquired pneumonia and treated with cefuroxime. Elevated troponins attributed to his pneumonia and possible renal failure?
- Returns to ED in 2 days. Repeat chest X Ray show florid congestive heart failure. Troponin now 1800 and some Q waves on his ECG.
- Dx. Missed acute MI

Case 2

- A 37-year-old man with fever and a headache called the Provincial 811 COVID-19 support line who referred him in to a primary assessment centre (PAC) which is staffed by RNs. They confirmed his fever (38.5), tachycardia (110/min) and history of recent travel and respiratory symptoms. The RN at the centre swabbed him for COVID-19, advised him to self isolate and discharged him home.
- Later that day, his symptoms worsened and he called an ambulance (EHS) that took him to the ED where he was triaged to the SAC (secondary assessment centre) as he met the current case definition of COIVD-19 and had risk factors (history of travel). His vital signs were: Temp.38.3, HR 103, RR 18, BP 153/109, and SpO_2 98% on room air. The patient appeared tangential when answering questions. The physician covering the centre was a Plastic Surgeon (voluntarily re-deployed to the SAC) – he was asked to assess the patient. The nurses thought the patient's reluctance to answer questions with a straight answer might have been a behavioural problem. His thought content appeared unusual and he was making reference to God and angels.

Case 2 (contd.)

- The surgeon agreed his presentation might be a behavioral issue but had reservations that something else might be going on. An emergency physician happened to be passing through the centre at the time and was told about the patient's presentation. He was asked if the patient's behaviour might be explained by a respiratory infection. He thought not, or that it would be very atypical for someone not hypoxic, and suggested the patient be sent to the Emergency Department for further assessment.

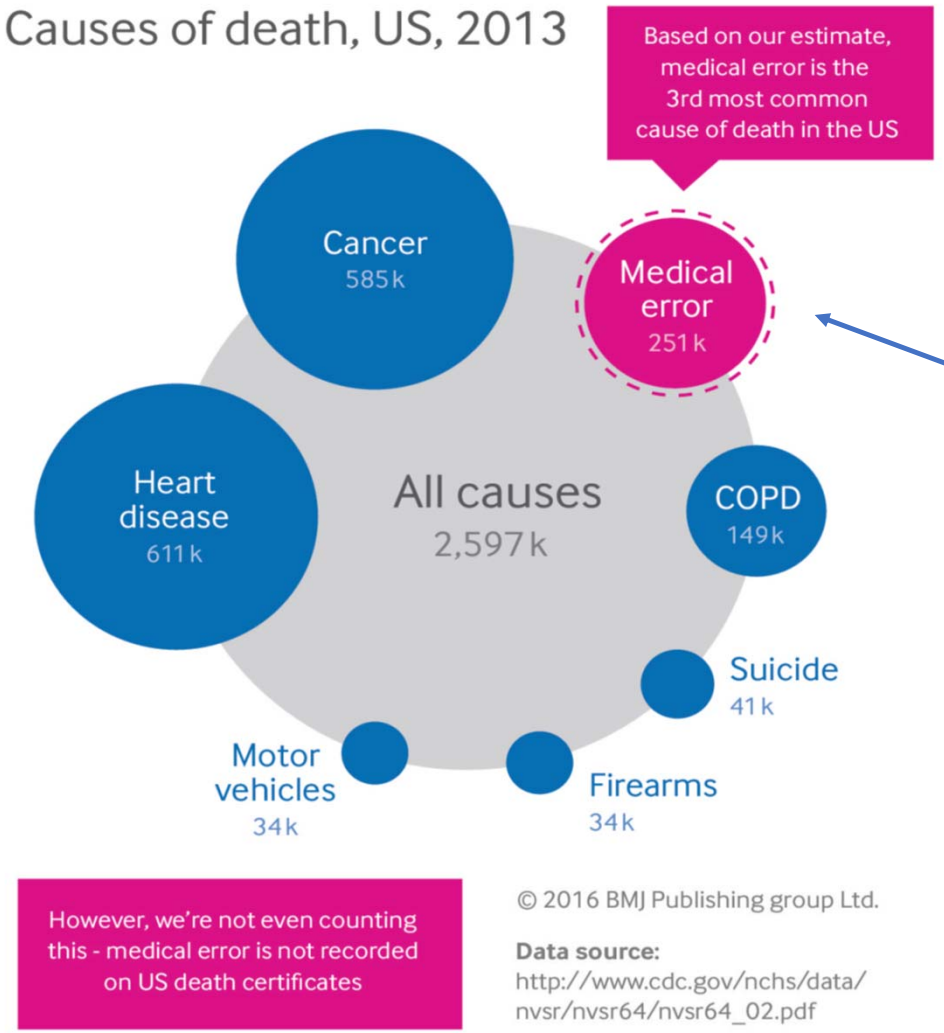
- He was transferred to ED, and noted to have meningismus. His level of consciousness subsequently decreased necessitating intubation. A lumbar puncture was performed which yielded frank pus and he was diagnosed with bacterial meningitis. CSF cultures later grew Neisseria meningitidis (meningococcus).

Case 3

- A 58 year old male calls into his family practice clinic with a complaint of constipation. Due to COVID restrictions, he is managed as a virtual patient. He has tried the usual laxatives which have been ineffective. He has not had a bowel movement for 2 weeks.
- The first physician to assess him over the phone prescribes lactulose and suggests he calls back if it is not working.
- He gets no result from the lactulose and calls back to the clinic. He is now prescribed PEG (polyethylene glycol).
- He calls back again and says that isn't working either and is advised to come into the clinic
- On exam he is found to have a protuberant abdomen with shifting dullness. He is sent for an abdominal ultrasound which reveals massive ascites. Further tests confirm peritoneal carcinomatosis with metastases to the liver.

We will return to these cases later

Medical Error



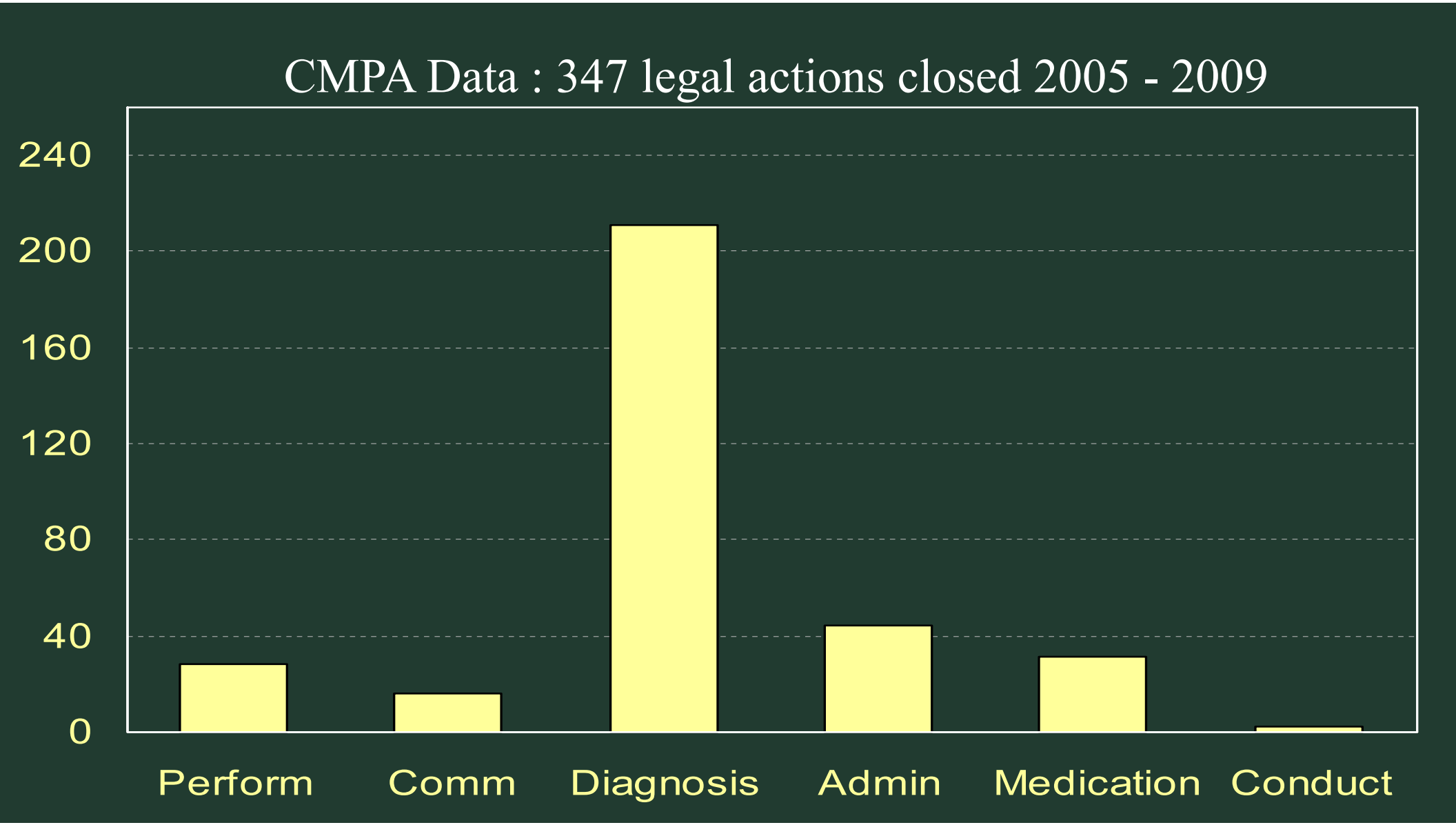
Makary and Daniel, *BMJ* 2016

Data source:
Xu et al, 2016 NVSS
(National Vital Statistics System)

Diagnostic failure is the biggest problem in patient safety

Newman-Toker, 2017


CMPA Data : 347 legal actions closed 2005 - 2009
Number of patients
240
200
160
120
80
40
0
Perform
Comm
Diagnosis
Admin
Medication
Conduct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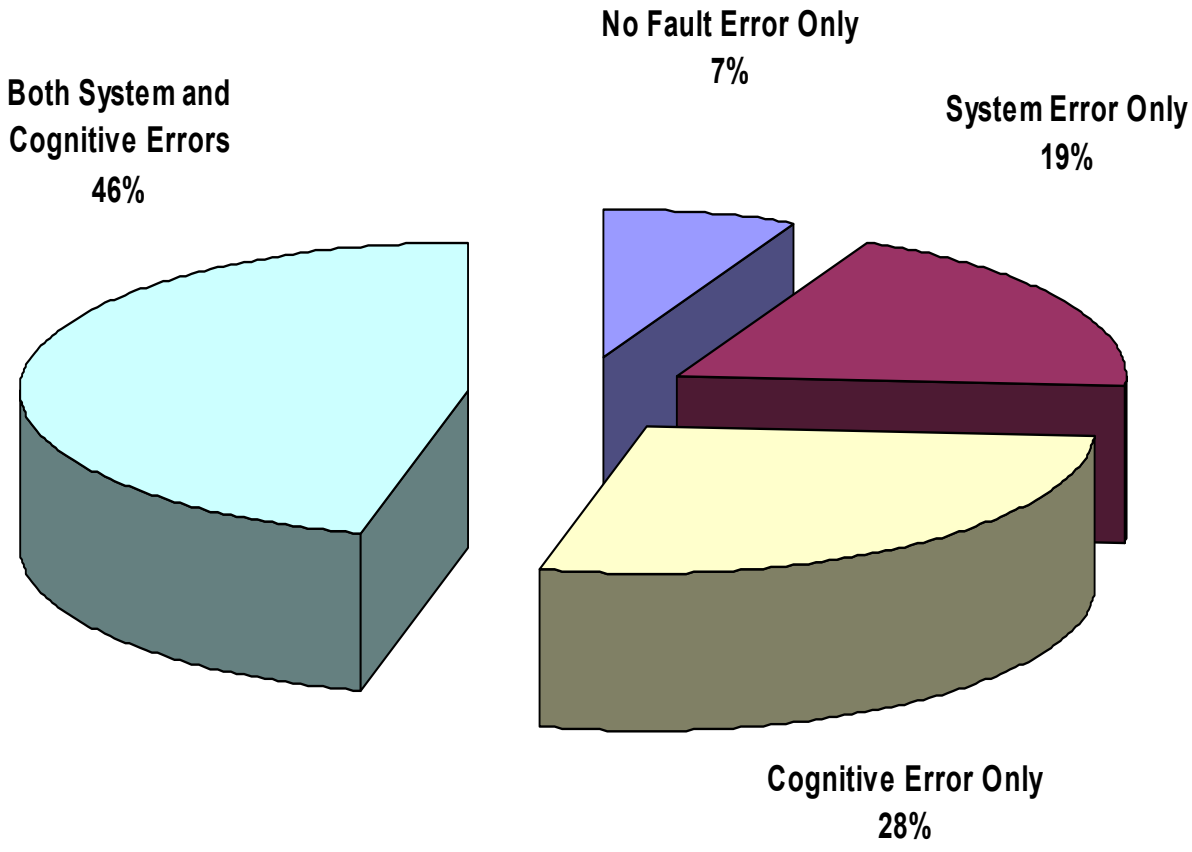
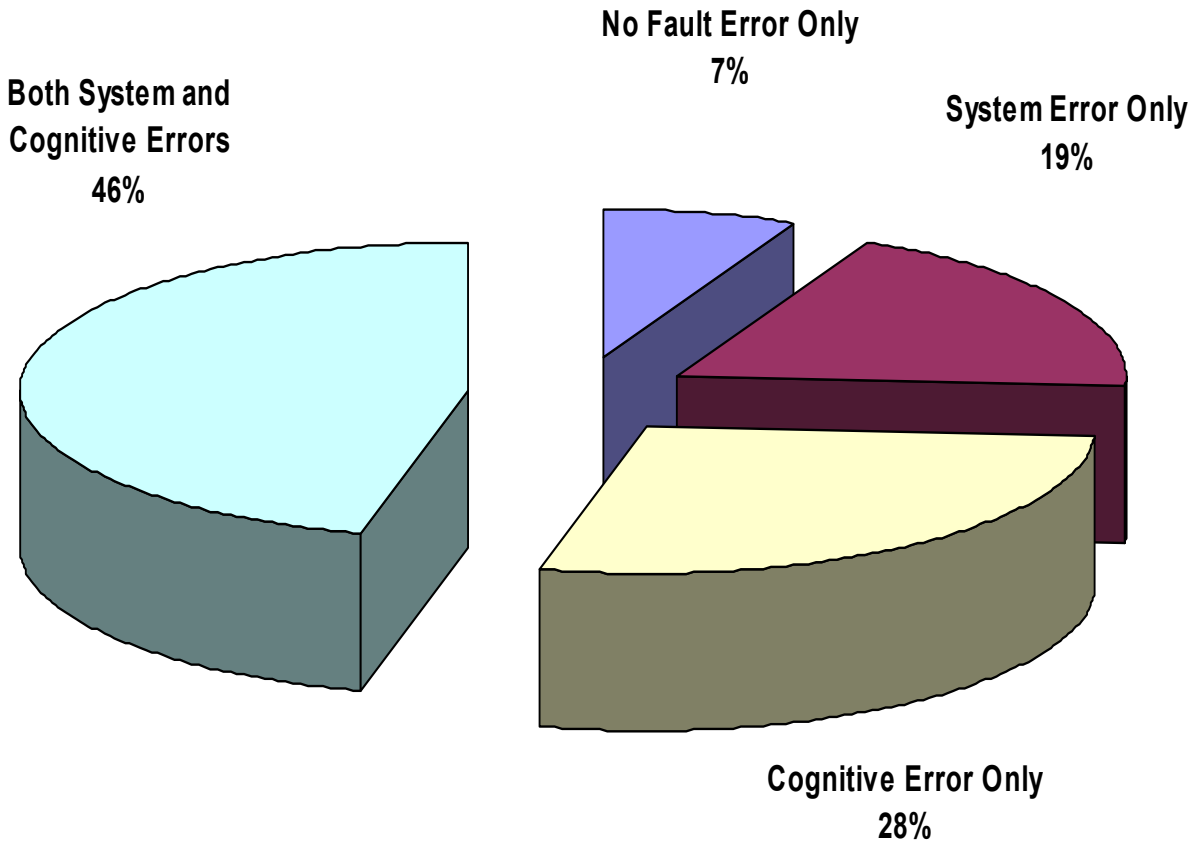
Graber et al. 2005. 100 Cases of Dx error



System-Related Drivers of Diagnostic Error

Graber et al. 2005. 100 Cases of Dx error



Cognition (how we think) is a major threat to patient safety

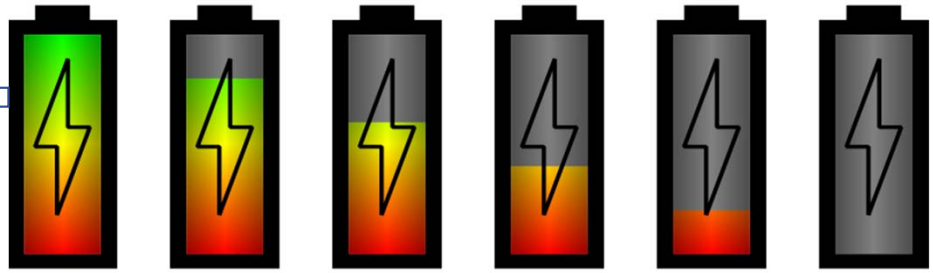
Does it change in a pandemic?

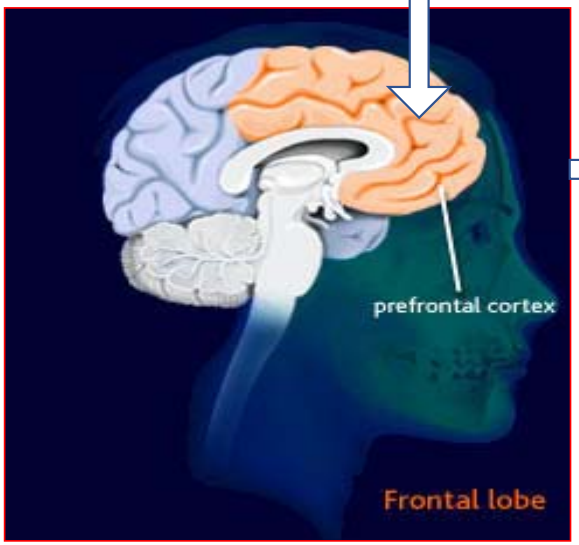
Ambient Influences on Clinical Decision Making

- Context
- Stress, fear, workload
- Fatigue
- Cognitive overloading
- Sleep deprivation/sleep debt
- Negative mood/dysphoria
- Environmental physical discomfort
- Homeostatic disruption: hunger, thirst, temperature

Important Effects on Brain Function

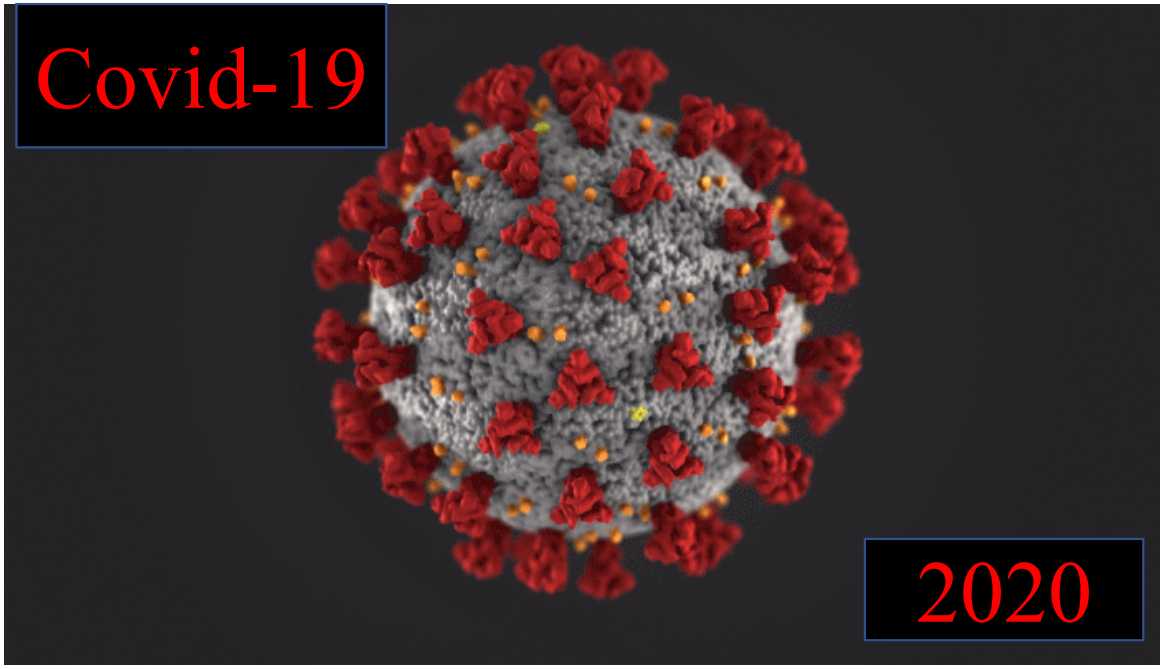
Frontal lobe battery power





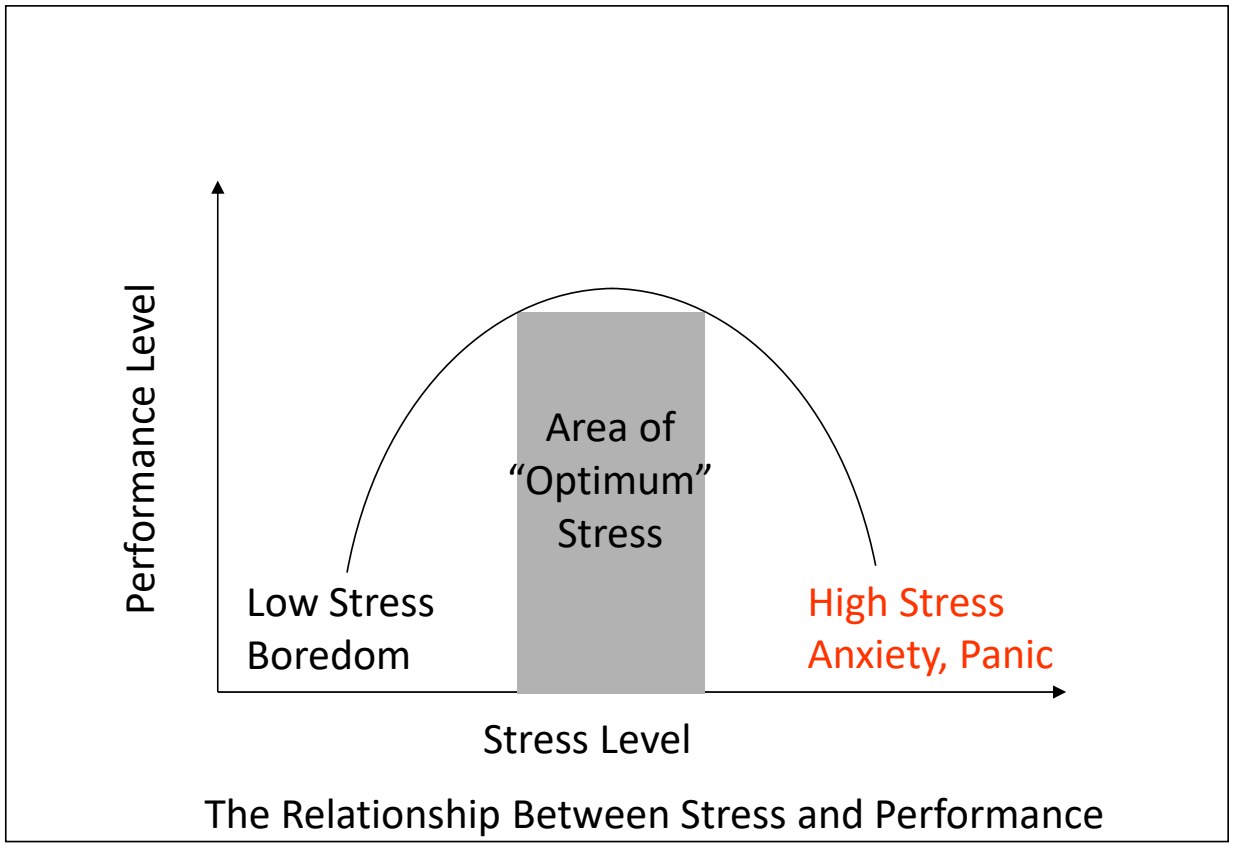
- Attention, vigilance
- Executive control
- Ability to reflect
- Capacity for mindfulness
- Promotion of good decision making

Context


Covid-19
2020

Stress
Workload
Cognitive load

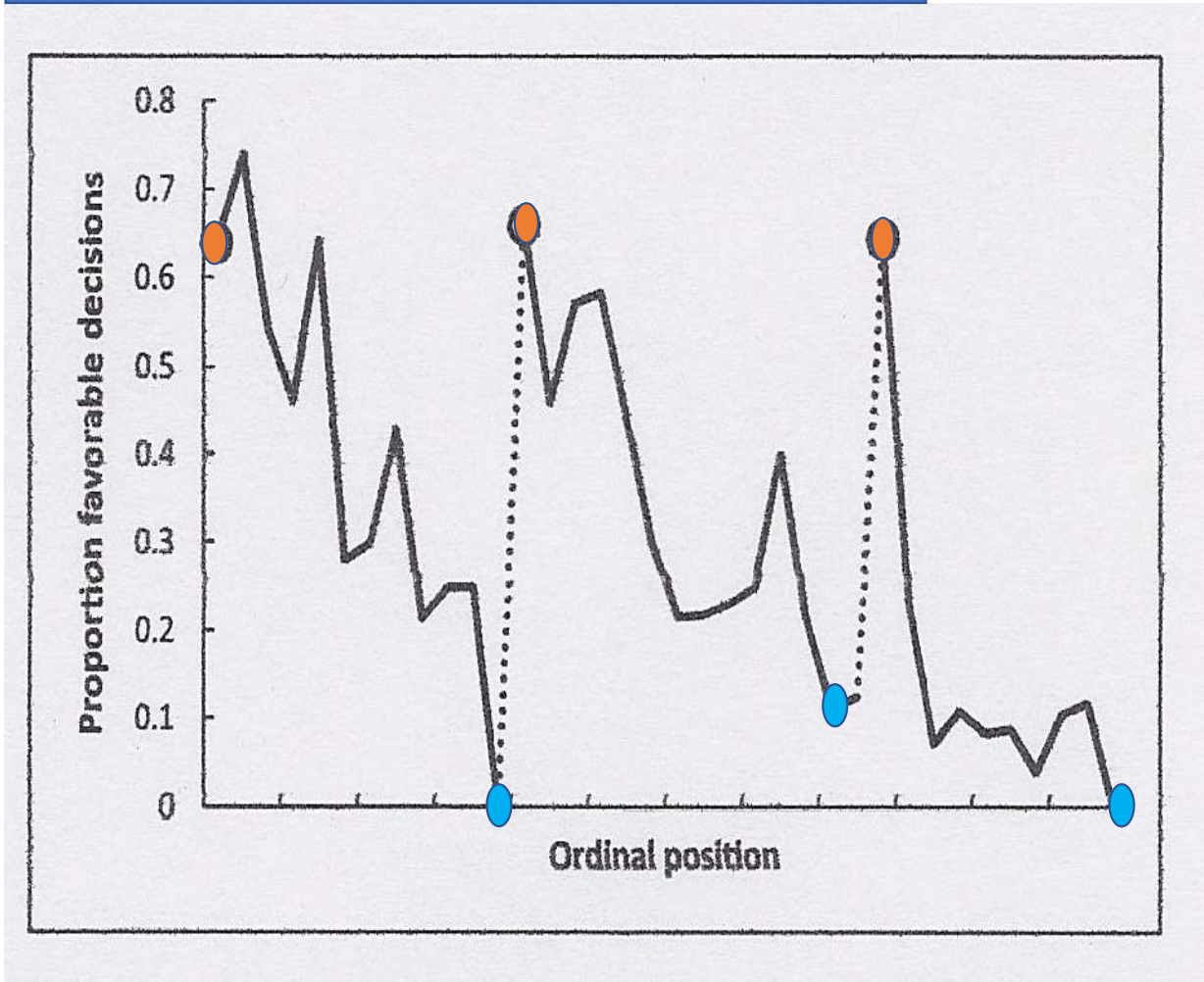
Stress and Performance



The Relationship Between Stress and Performance

Fatigue Effects

Proportion of rulings in favor of the prisoners by ordinal position



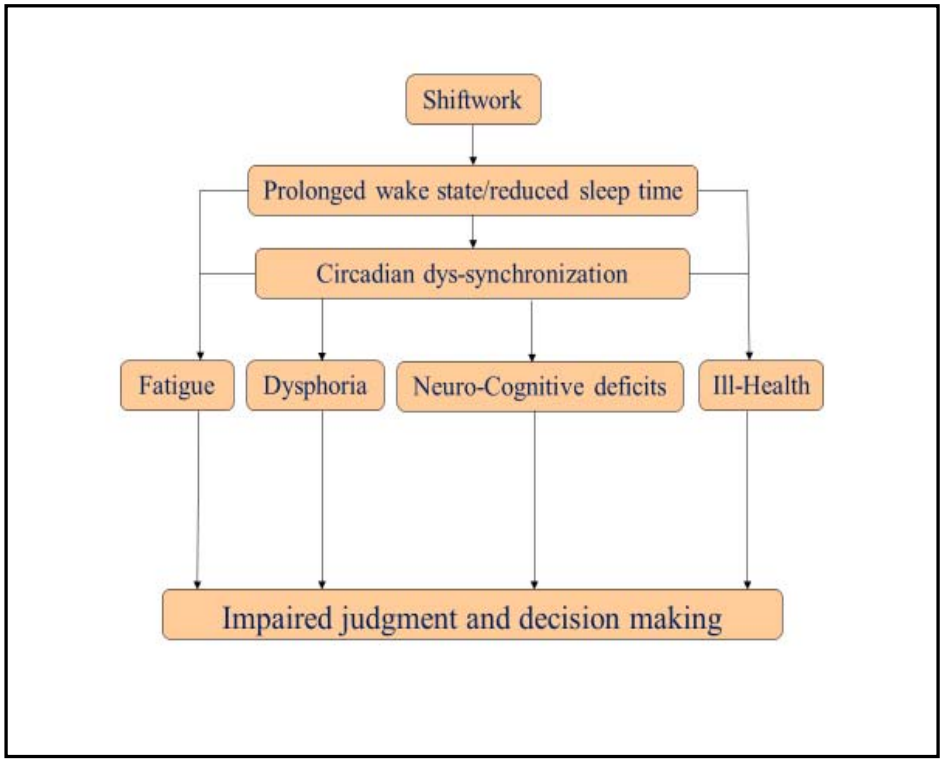
Parole decisions
1112 judicial rulings
10 month period
8 Judges

Danziger et al.,
PNAS 2011

Clinical Examples

Variable	*Observation*
Colonoscopic detection of polyps	Diurnal decline in detection rates for polyps and adenomas; more pronounced in females.
Appropriate antibiotic prescribing	Diurnal trend of increased prescribing of antibiotics for acute respiratory conditions in which they are never indicated, and in which they are sometimes indicated. Small improvements over lunch period.
Hand-washing	Examined hand hygiene compliance rates of care-providers (65% were nurses) within a 12-hour work-shift. No distinction was made between day and night shifts. Compliance declined by 8.7% from beginning to end of shift. Ameliorating effects were apparent at 4-hour and 8-hour points, probably corresponding to scheduled. breaks
Influenza vaccination rates	Diurnal decline of 12% from 8am → 4pm with small improvement from noon → 1pm.
Rx of opioids for back pain	Patients with low back pain who were seen later in the day were more likely to receive an opioid prescription than those seen earlier.
Screening for breast cancer	Diurnal decrease in physician ordering (overall decrease about 9%) and patient completion (overall decrease about 15%) of screening tests for breast cancer from 8am → 5pm. Both showed amelioration of the fatigue effect over lunch.
Colorectal cancer screening	Diurnal decrease in physician ordering (overall decrease about 13%) and patient completion (overall decrease about 10%) of screening tests for colorectal cancer from 8am→5pm. Both showed amelioration of the effect over lunch-break.

Effects of Sleep Deprivation


Shiftwork
Prolonged wake state/reduced sleep time
Circadian dys-synchronization
Fatigue
Dysphoria
Neuro-Cognitive deficits
Ill-Health
Impaired judgment and decision making

Dysphoria
(negative mood states)

Lai et al., Factors associated with mental health outcomes among health care workers exposed to Coronavirus Disease 2019. JAMA Netw Open 2020

Healthcare Workers with COVID-19 patients

- 72% reported symptoms of distress
- 50% reported symptoms of depression
- 45% reported symptoms of anxiety
- 35% reported insomnia

Environmental Physical Discomfort

The emergency department is a wicked environment

With COVID it is even more WICKED

Vulnerability to Poor Decision Making

Less rational decision making

- Diminished frontal lobe battery power
- Increased vulnerability to cognitive biases
- Increased breakdowns in logic

Less rational decision making

- Diminished frontal lobe battery power
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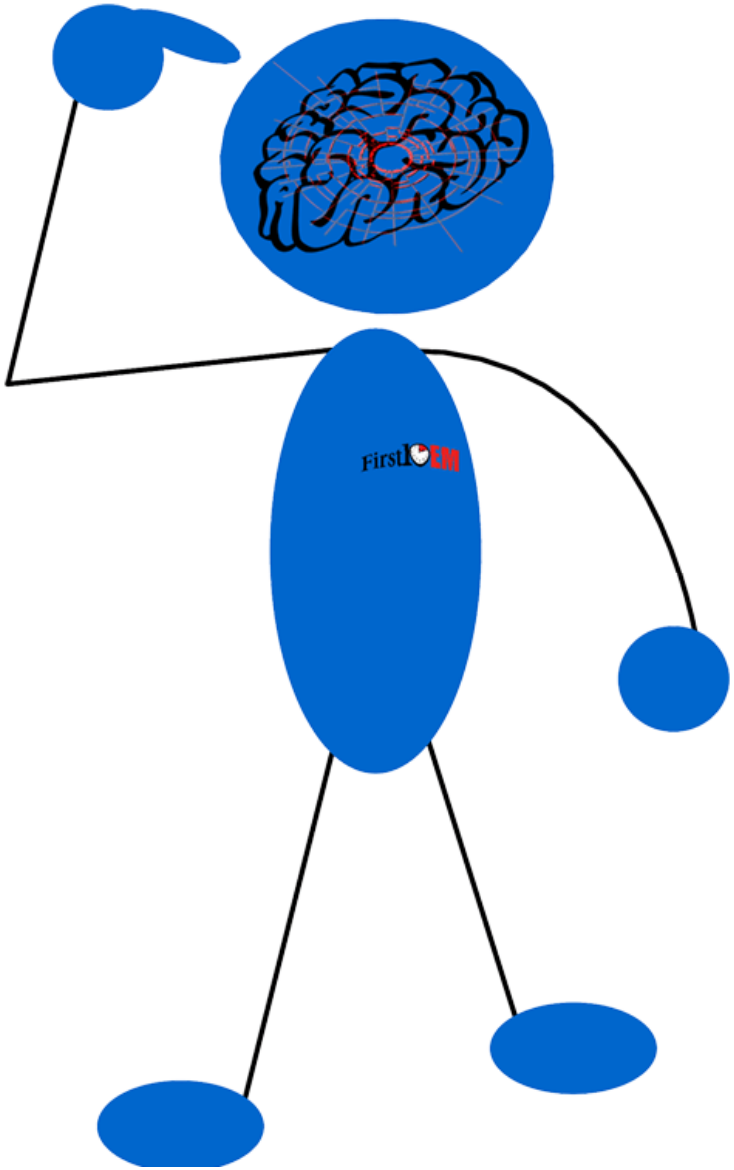
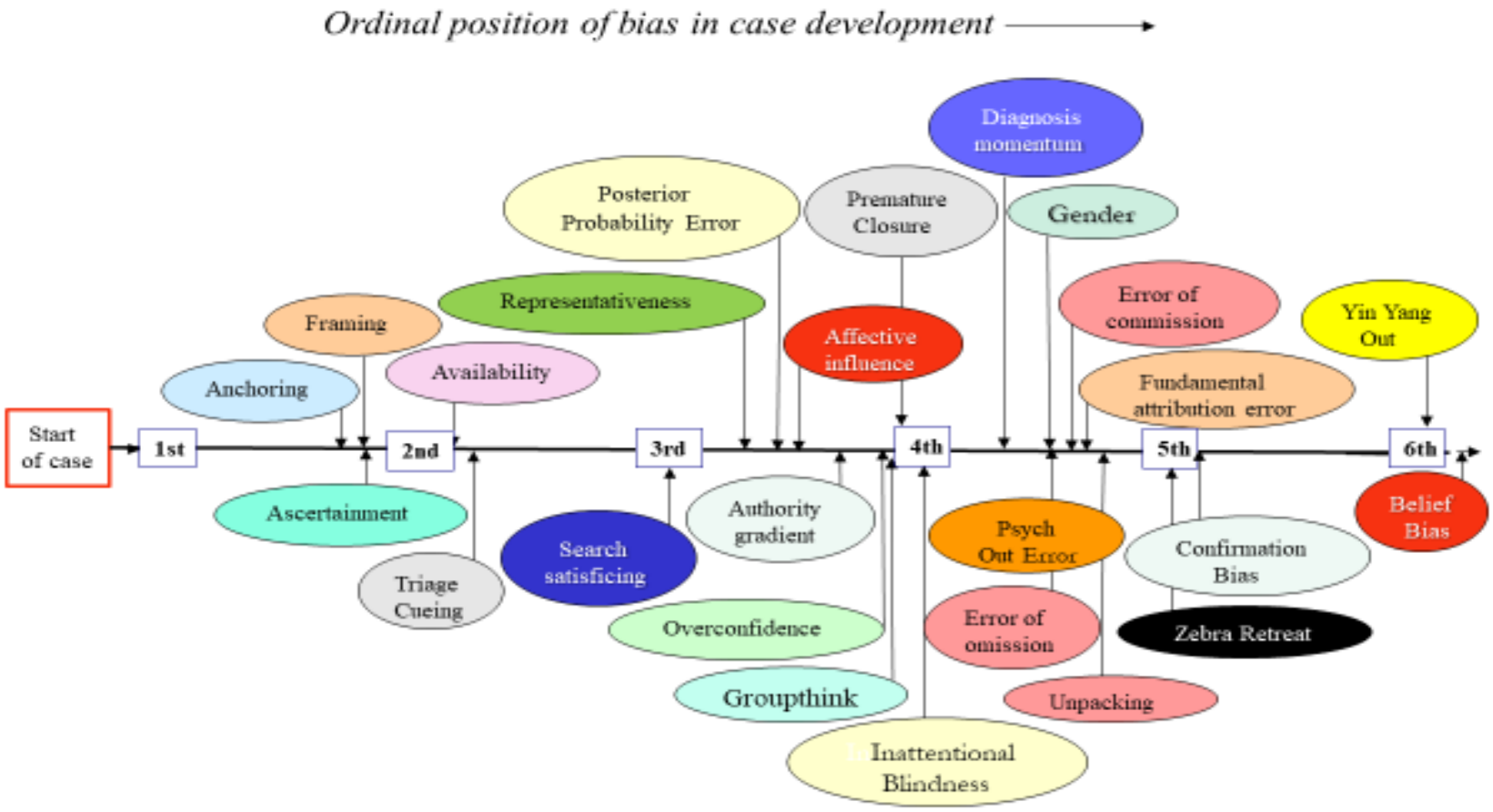


Cognitive Errors


Ordinal position of bias in case development
Diagnosis momentum
Posterior Probability Error
Premature Closure
Gender
Representativeness
Framing
Error of commission
Yin Yang Out
Affective influence
Availability
Anchoring
Fundamental attribution error
Start of case
1st
2nd
3rd
4th
5th
6th
Ascertainment
Authority gradient
Belief Bias
Search satisficing
Psych Out Error
Confirmation Bias
Triage Cueing
Overconfidence
Error of omission
Zebra Retreat
Groupthink
Unpacking
Inattentional Blindness


AVAILABILITY
Global
NEWS

anchoring

The first thing you judge influences your judgment of all that follows

Human minds are associative in nature, so the order in which we receive information helps determine the course of our judgments and perceptions

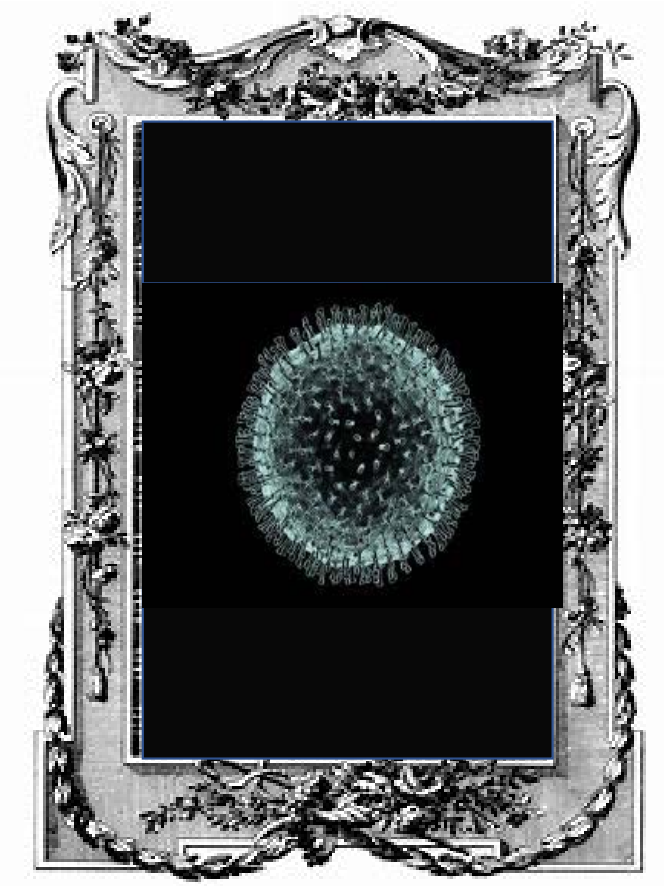
Anchoring is the most common bias in clinical medicine

Ascertainment bias

When your thinking is shaped by prior expectations. In other words, you see what you expect to see. This is the umbrella category that contains stereotyping and gender bias. For example, a homeless patient with past drug abuse is found unconscious and it is assumed that he has overdosed, when in fact he has severe hypoglycemia

Framing effect

Your decisions are affected by how you frame the question. For example, when deciding whether to order a CT, it matters whether you consider the 1/100 chance of missing a deadly condition or the 99/100 chance the patient is fine. Similarly, your decisions are influenced by the context in which the patient is seen and the source of the information. You are more likely to miss a AAA in a patient you are seeing in the ambulatory zone than if you were to see the exact same patient in a resuscitation room.



Case 1

- 90 year old male is brought to the ED complaining of chest pain and shortness of breath. Lives in the independent section of a long-term care facility in a city in which several COVID cases have been recently diagnosed.
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- Discharged from COVID ward within hours with discharge diagnosis of community acquired pneumonia and treated with cefuroxime. Elevated troponins attributed to his pneumonia.
- Returns to ED in 2 days. Repeat chest X Ray show florid pneumonia. Troponin now 1800 and some late ECG findings.
- Dx. Missed acute MI

Case 1 Probably biases identified

- 90 year-old male is brought to the ED complaining of chest pain and shortness of breath. Lives in the independent section of a long-term care facility in a city in which several COVID cases have been recently diagnosed. (Availability, Framing,)
- Chest X-ray shows patchy infiltrates. Troponin elevated at 296. EKG showed left ventricular hypertrophy but nil acute. Admitted to COVID unit, swab is negative, and troponin rises to 407 then 580 over next 6 hours.(Anchoring, Ascertainment bias, Search satisficing)
- Discharged from COVID ward within hours with discharge diagnosis of community acquired pneumonia and treated with cefuroxime. Elevated troponins attributed to his pneumonia (Confirmation bias)
- Returns to ED in 2 days. Repeat chest X Ray show florid congestive heart failure. Troponin now 1814 and some Q waves now appeared in his ECG.
- Dx. Missed acute MI

Case 2

- A 37-year-old man with fever and a headache called the Provincial 811 COVID-19 support line (patient cueing) who referred him in to a primary assessment centre (PAC) which is staffed by RNs. They confirmed his fever (38.5), tachycardia (110/min) and history of recent travel, and respiratory symptoms. The RN at the centre swabbed him for COVID-19, advised him to self isolate and discharged him home (availability, confirmation bias, unpacking failure?)
- Later that day, his symptoms worsened and he called an ambulance (EHS) that took him to the ED and he is triaged to a SAC (secondary assessment centre) (diagnosis momentum). His vital signs were: Temp.38.3, HR 103, RR 18, BP 153/109, and SpO_2 98% on room air. The patient appeared tangential when answering questions. The physician covering the centre was a Plastic Surgeon (voluntarily re-deployed to the SAC) – he was asked to assess the patient. The nurses thought the patient's reluctance to answer questions with a straight answer might have been a behavioural problem (fundamental attribution error). His thought content appeared unusual and he was making reference to God and angels.

Case 2 (contd.)

- The surgeon agreed his presentation might be a behavioral issue (groupthink) but had reservations that something else might be going on. An emergency physician happened to be passing through the centre at the time and was told about the patient's presentation. He was asked if the patient's behaviour might be explained by a respiratory infection. He thought not, or that it would be very atypical for someone not hypoxic, and suggested the patient be sent to the Emergency Department for further assessment.

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- A 58 year old male calls into his family practice clinic with a complaint of constipation. Due to COVID restrictions, he is managed as a virtual patient. He has tried the usual laxatives which have been ineffective (patient cueing) He has not had a bowel movement for 2 weeks.
- The first physician to assess him over the phone prescribes lactulose and suggests he calls back if it is not working. (playing the odds)
- He gets no result from the lactulose and calls back to the clinic. He is now prescribed PEG (polyethylene glycol) (diagnosis momentum)
- He calls back again and says that isn't working either and is advised to come into the clinic
- On exam he is found to have a protuberant abdomen with shifting dullness. He is sent for an abdominal ultrasound which reveals massive ascites. Further tests confirm peritoneal carcinomatosis with metastases to the liver.

Choosing Wisely

Primary care issues

- Telephone consultation
  - Missing body language
  - General impression
  - Patients' biases (patient cueing) may bias physicians
- Communication through masks (loss of body language)
- Anxiety/Mild COVID as confounders
  - Tachycardia
  - Chest pain
  - Shortness of breath

Resource use in a time of Pandemic

- Tests, treatments, PPE…

Rolfe A, Burton C. Reassurance after diagnostic testing with a low pretest probability of serious disease: systematic review and meta-analysis. JAMA Intern Med. 2013 ;173:407-16.

Choosing wisely and COVID-19

- Stay at home
- No non-emergency health care
- Don’t go to the ED for mild COVID-19 symptoms
- Don’t use unproven therapies
- Use virtual care
- Keep LTC patients at the LTC site
- Save blood
- Don’t intubate frail elderly patients
- Don’t prescribe unproven therapies for COVID-19

Choosing Wisely Canada™

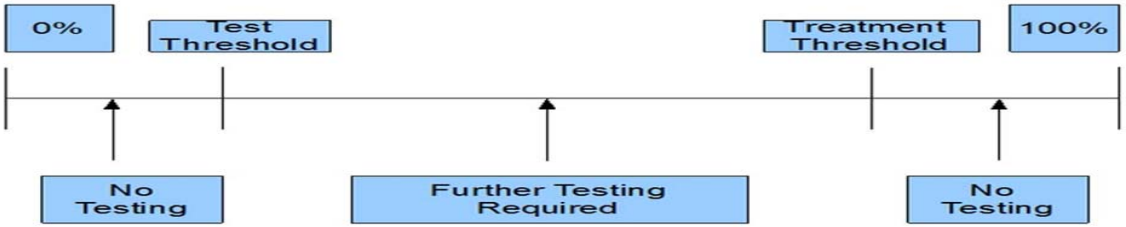
Choosing wisely and COVID-19

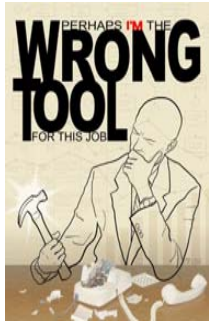
- Don’t go in person to a hospital, clinic, or health care provider for routine care (preventative visits, routine blood work) or non-essential care without calling ahead.
- Don’t self-prescribe or request unproven therapies to prevent or treat COVID-19.
- Don’t intubate frail elderly patients in the absence of a discussion with family members regarding the patient’s advance directives whenever possible.
- Don’t prescribe unproven therapies for COVID-19 patients other than in an approved clinical trial.

Choosing Wisely Canada™

Testing – what do the results mean?

- Like any test COVID testing depends on it being used properly
  - *Like antibiotic use, a lot of lab test use is driven by emotion*
- Negative results don't reassure patients

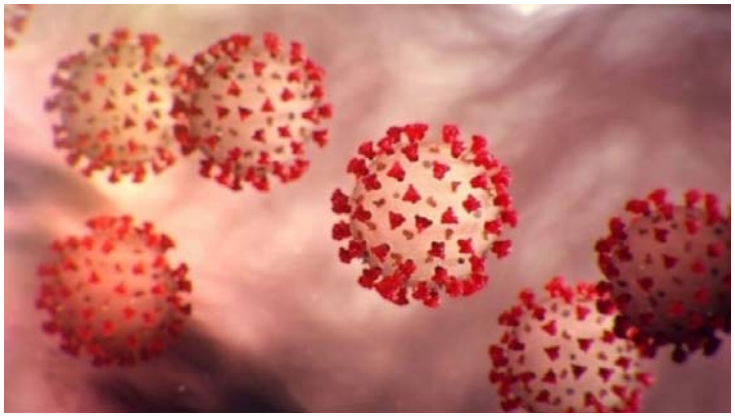




Rolfe A, et.al. Reassurance after diagnostic testing with a low pretest probability of serious disease: systematic review and meta-analysis. JAMA Intern Med. 2013 ;173:407-16.
Campbell SG,, et. al.. A five-step program for diagnostic test addiction. CJEM. 2019 Sep;21(5):576-579

Testing

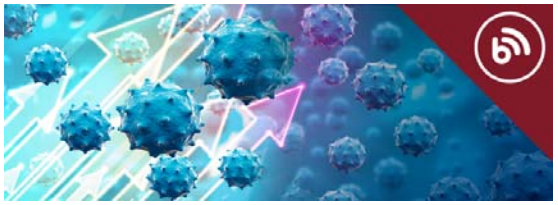
- Incubation period for COVID-19 ~ 5.2 days (varies widely)
- Virus shedding patterns are not yet well understood



Viral dynamics – still unknown:

- Optimal timing and type of clinical material to sample for molecular testing
- Dynamic of immunological response
- Disease severity in various populations, e.g. by age.
- The relationship between viral concentration and disease severity.
- The duration of shedding, and relation to clinical picture
- Development and validation of useful serological assays.
- Comparative studies of available assays.
- Percentage of positive cases that requires sequencing to monitor mutations

WHO-COVID-19-laboratory-2020.5-eng.pdf



nucleic acid amplification tests (NAAT), such as RT-PCR. (based on antigen detection)

- Requires sufficient concentrations of antigen in the sample.

- Antigen(s)are expressed only when virus is actively replicating;
  - best used to identify acute or early infection.

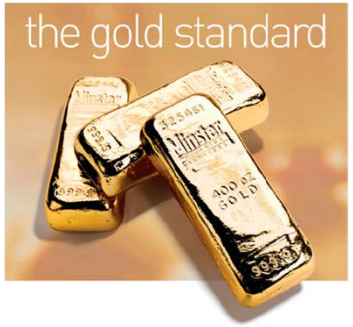
Based on experience with antigen-based RDTs for other respiratory diseases such as influenza, the sensitivity of these tests is expected to vary from 34% to 80%.

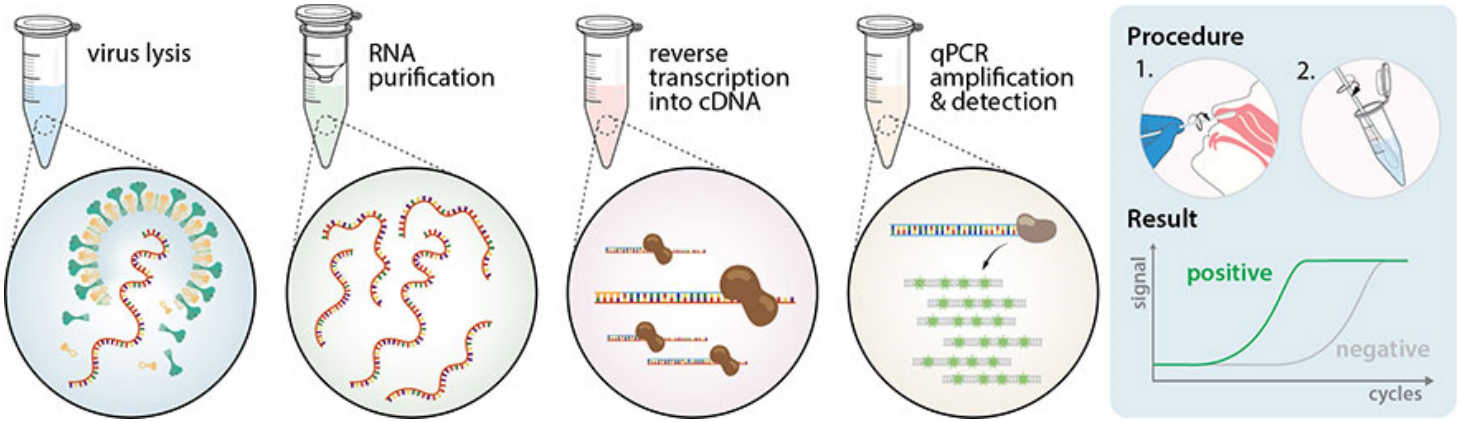
False-positive results from antigens of viruses other than COVID-19.

WHO-COVID-19-laboratory-2020.5-eng.pd

nucleic acid amplification tests (NAAT), such as RT-PCR.

- Detection of specific virus RNA
- Plenty of tests out there
- Hard to standardize
- No real gold standard





Point-of-care immunodiagnostic tests for COVID-19

- rapid (<30 min)and easy-to-use
  - lateral flow assays
    - positive or negative result
    - no quantitative information
- Detect human antibodies generated in response to COVID-19.

Theoretically, 4 possible result scenarios:

(antibody testing)

- Negative Result: No recent exposure to COV-19.
- Positive - IgM only: early stage of the virus infection
- Positive - IgG and IgM: the middle stage of infection
- Positive - IgG only: either over the infection or in its last stage

? convalescent plasma studies?

“That’s a whole new ballgame, I want to thank Abbott Labs for the incredible work they’ve done.” Donald Trump

Trump once again cleared of coronavirus, using test that gave result in minutes – March 30

In announcing the test March 27, Abbott said it was “ramping up production to deliver 50,000 ID NOW COVID-19 tests per day” starting this week to the U.S. health care system.
The price of Abbott’s stock has jumped 26.5% since March 23.

Rapid diagnostic tests based on host antibody detection

- Antibodies are produced over days to weeks after infection with the virus.
  - most people don't start producing antibodies—or seroconvert—until at least 11 -12 days after sx onset.
- The strength of antibody response depends on:
  - Age
  - nutritional status
  - severity of disease
  - Medications/immunosuppression
  - Unknown unknowns

The Promise and Peril of Antibody Testing for COVID-19
JAMA. Published online April 17, 2020. doi:10.1001/jama.2020.6170

Antibody tests – downsides?

- Reliability – understanding of utility
- Pressure to sub in for RT-PCR
  - Individuals can be PCR positive even after antibodies develop
- Antigen drift/shift
- 'Immunity passports'
  - Intentional infection (Covid parties)
- Stigmatization
- Insurance/travel restrictions

The Promise and Peril of Antibody Testing for COVID-19
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World Health Organization

- **At present, based on current evidence, WHO recommends the use of these new point-of-care immunodiagnostic tests only in research settings. They *should not be used in any other setting, including for clinical decision-making*, until evidence supporting use for specific indications is available.**

Discussion