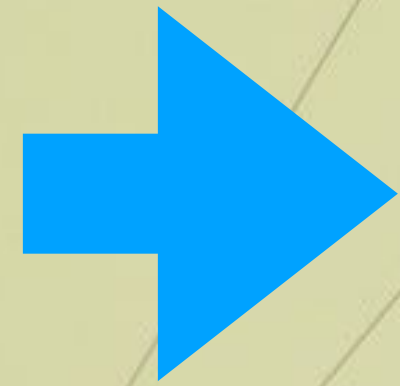


A man with dark hair and glasses is shown from the chest up, looking slightly to the right with a thoughtful expression. He is wearing a light blue shirt and a patterned jacket. The background is a dark chalkboard with faint, handwritten text in white chalk. The text on the chalkboard includes "sc", "om", "cy", "po", "fer", and "s".

**What is one
of your
biases?**

Bias



“Truth”



Random Noise



Type of Bias in Diagnostic Studies



1. Incorporation
2. Partial Verification
3. Differential Verification
4. Spectrum
5. Imperfect Gold Standard



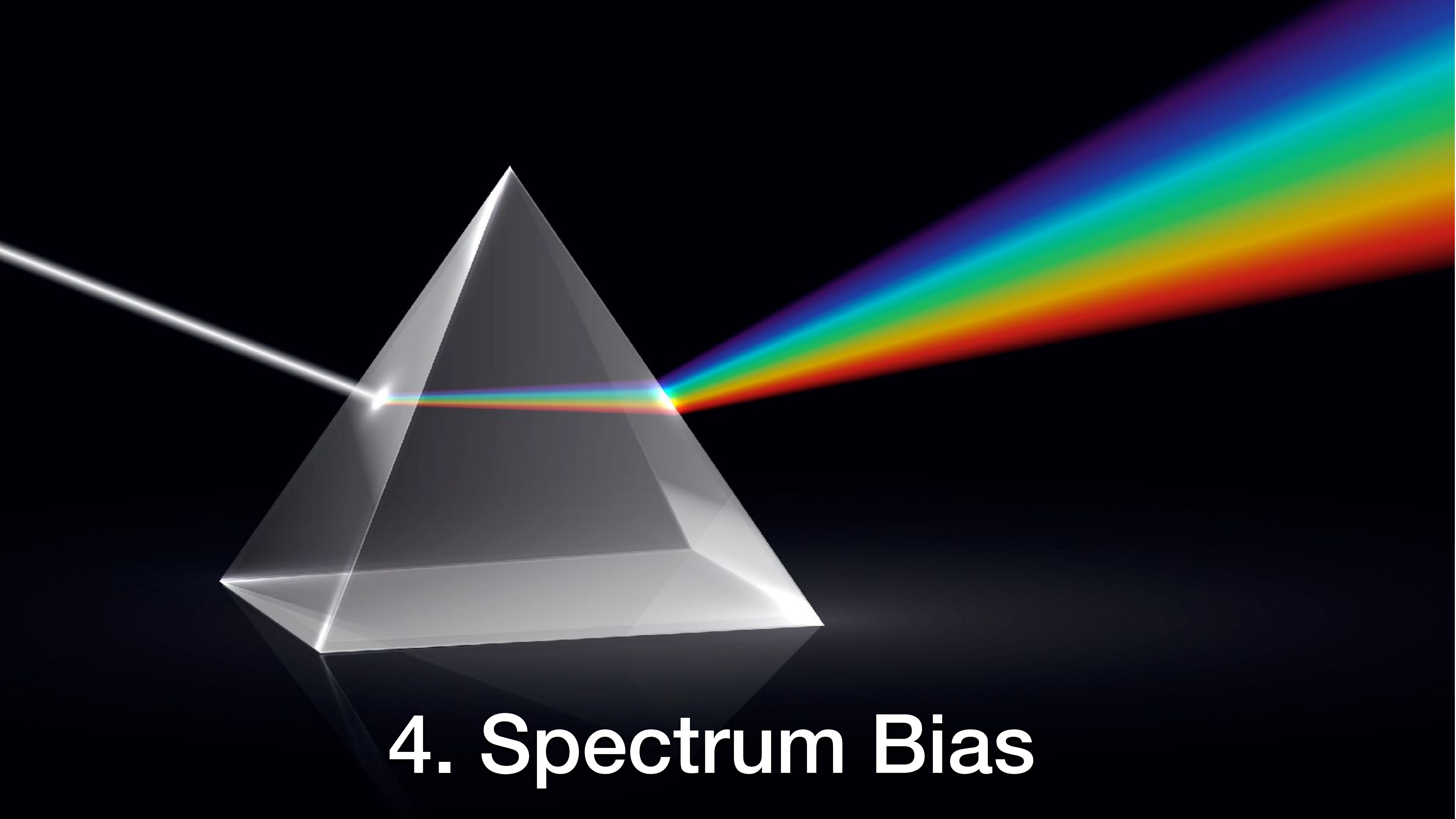
1. Incorporation Bias

A photograph showing a medical or research setting. On the left, a shirtless man stands with several white adhesive sensors and wires attached to his chest. On the right, a man in a white lab coat is adjusting a black wrist-worn device on the first man's left wrist. The background is dark and out of focus, with a white metal frame visible.

2. Partial Verification Bias

3. Differential Verification Bias (Double Gold Standard)





4. Spectrum Bias

5. Imperfect Gold Standard Bias



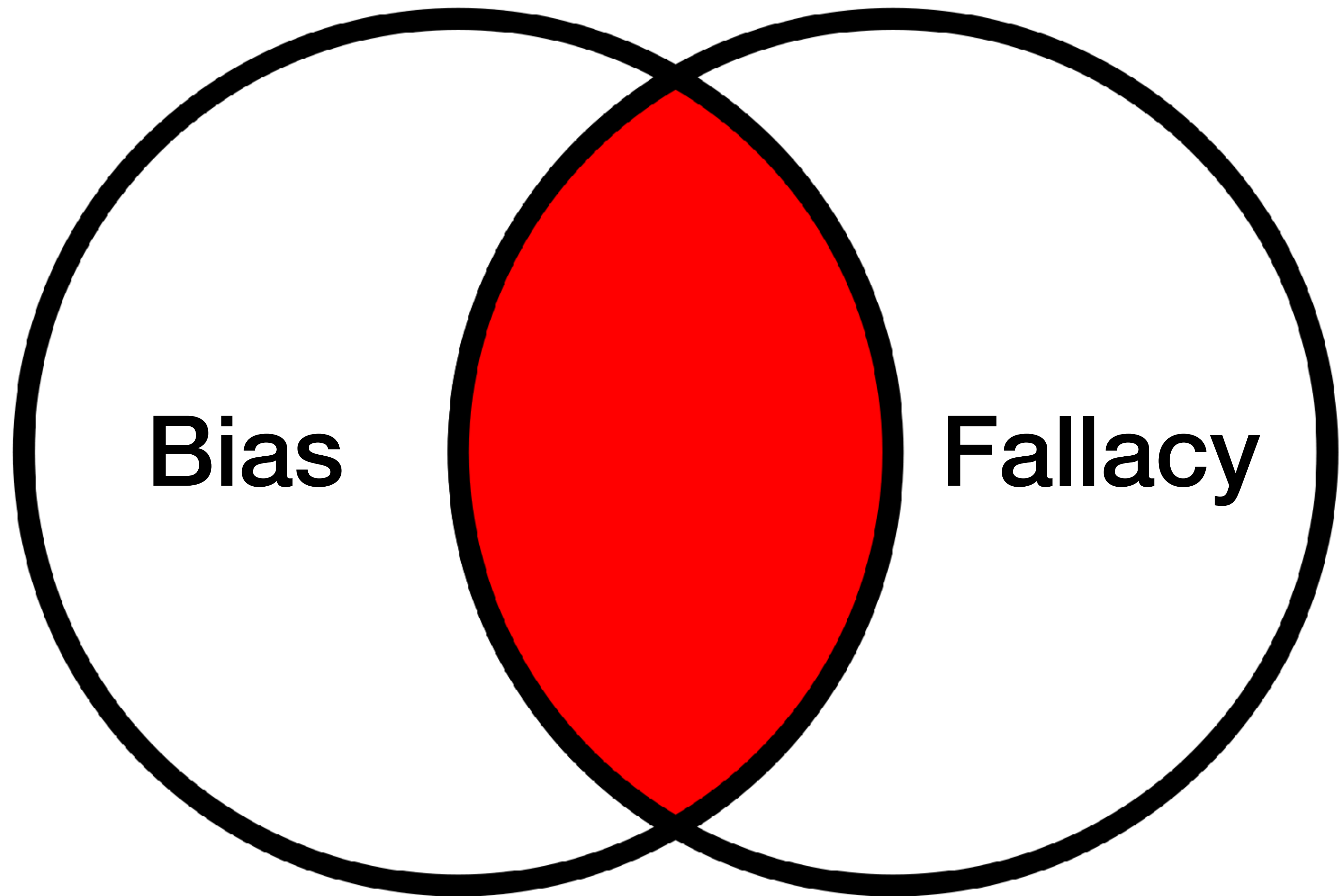


RESEARCH METHODS & STATISTICS

Understanding the Direction of Bias in Studies of Diagnostic Test Accuracy

Michael A. Kohn, MD, MPP, Christopher R. Carpenter, MD, MSc, and Thomas B. Newman, MD, MPH





strawman

Misrepresenting someone's argument to make it easier to attack.

After Will said that we should put more money into health and education, Warren responded by saying that he was surprised that Will hates our country so much that he wants to leave it defenceless by cutting military spending.

slippery slope

Asserting that if we allow A to happen, then Z will consequently happen too, therefore A should not happen.

Colin Closet asserts that if we allow same-sex couples to marry, then the next thing we know we'll be allowing people to marry their parents, their cars and even monkeys.

special pleading

Moving the goalposts to create exceptions when a claim is shown to be false.

Edward Johns claimed to be psychic, but when his 'abilities' were tested under proper scientific conditions, they magically disappeared. Edward explained this saying that one had to have faith in his abilities for them to work.

the gambler's fallacy

Believing that 'runs' occur to statistically independent phenomena such as roulette wheel spins.

Red had come up six times in a row on the roulette wheel, so Greg knew that it was close to certain that black would be next up. Suffering an economic form of natural selection with this thinking, he soon lost all of his savings.

black-or-white

Where two alternative states are presented as the only possibilities, when in fact more possibilities exist.

Whilst rallying support for his plan to fundamentally undermine citizens' rights, the Supreme Leader told the people they were either on his side, or on the side of the enemy.

false cause

Presuming that a real or perceived relationship between things means that one is the cause of the other.

Pointing to a fancy chart, Roger shows how temperatures have been rising over the past few centuries, whilst at the same time the numbers of pirates have been decreasing; thus pirates cool the world and global warming is a hoax.

ad hominem

Attacking your opponent's character or personal traits in an attempt to undermine their argument.

After Sally presents an eloquent and compelling case for a more equitable taxation system, Sam asks the audience whether we should believe anything from a woman who isn't married, was once arrested, and smells a bit weird.

loaded question

Asking a question that has an assumption built into it so that it can't be answered without appearing guilty.

Grace and Helen were both romantically interested in Brad. One day, with Brad sitting within earshot, Grace asked in an inquisitive tone whether Helen was having any problems with a fungal infection.

bandwagon

Appealing to popularity or the fact that many people do something as an attempted form of validation.

Shamus pointed a drunken finger at Sean and asked him to explain how so many people could believe in leprechauns if they're only a silly old superstition. Sean, however, had had a few too many Guinness himself and fell off his chair.

begging the question

A circular argument in which the conclusion is included in the premise.

The word of Zorbo the Great is flawless and perfect. We know this because it says so in The Great and Infalible Book of Zorbo's Best and Most Truest Things that are Definitely True and Should Not Ever Be Questioned.



appeal to emotion

Manipulating an emotional response in place of a valid or compelling argument.

Luke didn't want to eat his sheep's brains with chopped liver and brussels sprouts, but his father told him to think about the poor, starving children in a third world country who weren't fortunate enough to have any food at all.

tu quoque

Avoiding having to engage with criticism by turning it back on the accuser - answering criticism with criticism.

The blue candidate accused the red candidate of committing the tu quoque fallacy. The red candidate responded by accusing the blue candidate of the same, after which ensued an hour of back and forth criticism with not much progress.

burden of proof

Saying that the burden of proof lies not with the person making the claim, but with someone else to disprove.

Bertrand declares that a teapot is, at this very moment, in orbit around the Sun between the Earth and Mars, and that because no one can prove him wrong his claim is therefore a valid one.

no true scotsman

Making what could be called an appeal to purity as a way to dismiss relevant criticisms or flaws of an argument.

Angus declares that Scotsmen do not put sugar on their porridge, to which Lachlan points out that he is a Scotsman and puts sugar on his porridge. Furious, like a true Scot, Angus yells that no true Scotsman sugars his porridge.

the texas sharpshooter

Cherry-picking data clusters to suit an argument, or finding a pattern to fit a presumption.

The makers of Sugarette Candy Drinks point to research showing that of the five countries where Sugarette drinks sell the most units, three of them are in the top ten healthiest countries on Earth, therefore Sugarette drinks are healthy.

the fallacy fallacy

Presuming that because a claim has been poorly argued, or a fallacy has been made, that it is necessarily wrong.

Recognising that Amanda had committed a fallacy in arguing that we should eat healthy food because a nutritionist said it was popular, Alyse said we should therefore eat bacon double cheeseburgers every day.

personal incredulity

Saying that because one finds something difficult to understand that it's therefore not true.

Kirk drew a picture of a fish and a human and with effusive disdain asked Richard if he really thought we were stupid enough to believe that a fish somehow turned into a human through just, like, random things happening over time.

ambiguity

Using double meanings or ambiguities of language to mislead or misrepresent the truth.

When the judge asked the defendant why he hadn't paid his parking fines, he said that he shouldn't have to pay them because the sign said 'Fine for parking here' and so he naturally presumed that it would be fine to park there.

genetic

Judging something good or bad on the basis of where it comes from, or from whom it comes.

Accused on the 6 o'clock news of corruption and taking bribes, the senator said that we should all be very wary of the things we hear in the media, because we all know how very unreliable the media can be.

middle ground

Saying that a compromise, or middle point, between two extremes is the truth.

Holly said that vaccinations caused autism in children, but her scientifically well-read friend Caleb said that this claim had been debunked and proven false. Their friend Alice offered a compromise that vaccinations cause some autism.

thou shalt not commit logical fallacies



Formal



Informal

A man with dark hair and glasses is speaking, looking slightly to the right. He is wearing a light blue shirt and a patterned jacket. The background is a chalkboard with faint, illegible chalk writing. The text "Examples of Logical Fallacies" is overlaid on the right side of the image in a large, white, bold font.

Examples of Logical Fallacies

Ad Hominem





Anecdotal



Appeal to Authority



Bandwagon

Black or White





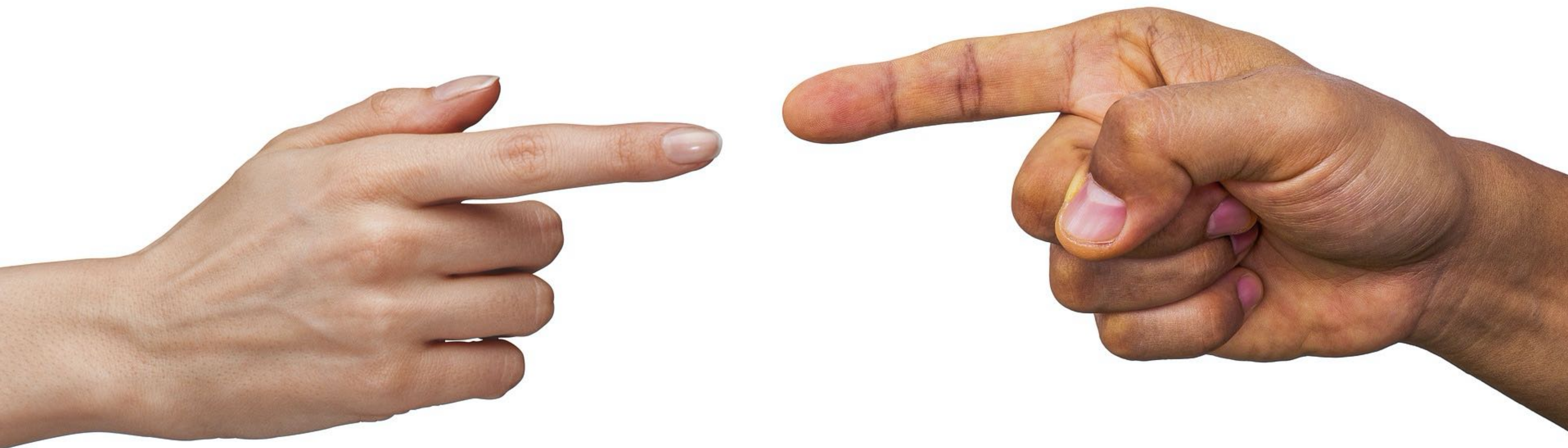
Appeal to Emotion

Special Pleading





Texas Sharpshooter



Tu Quoque



Personal Incredulity

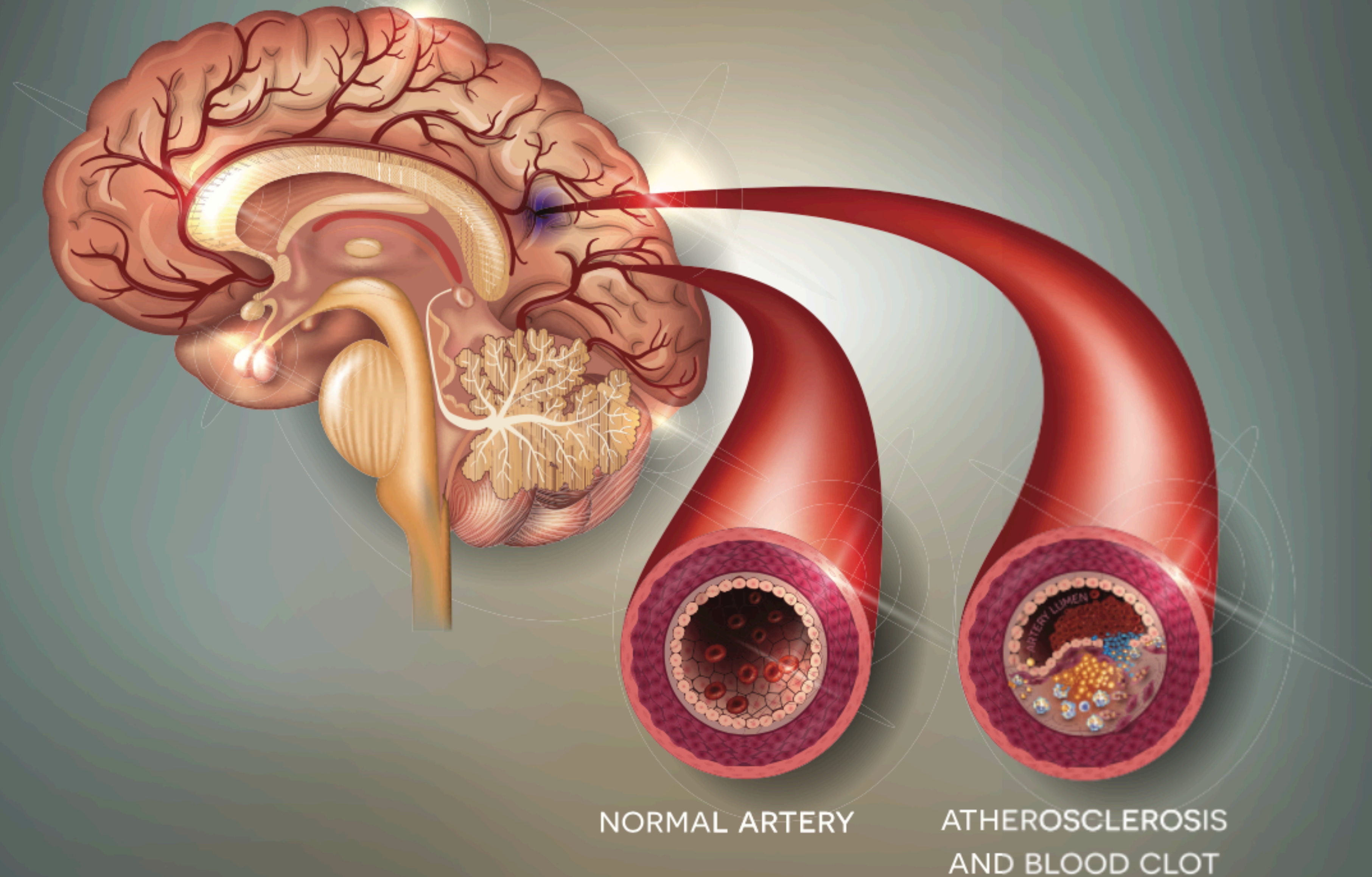


No True Scotsman



Strawman

Appeal to Pathophysiology





RCT Critical Appraisal



Methods

Checklist

- ☒
- ☒
- ☒
- ☒
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

SGEM Xtra:
Make it So

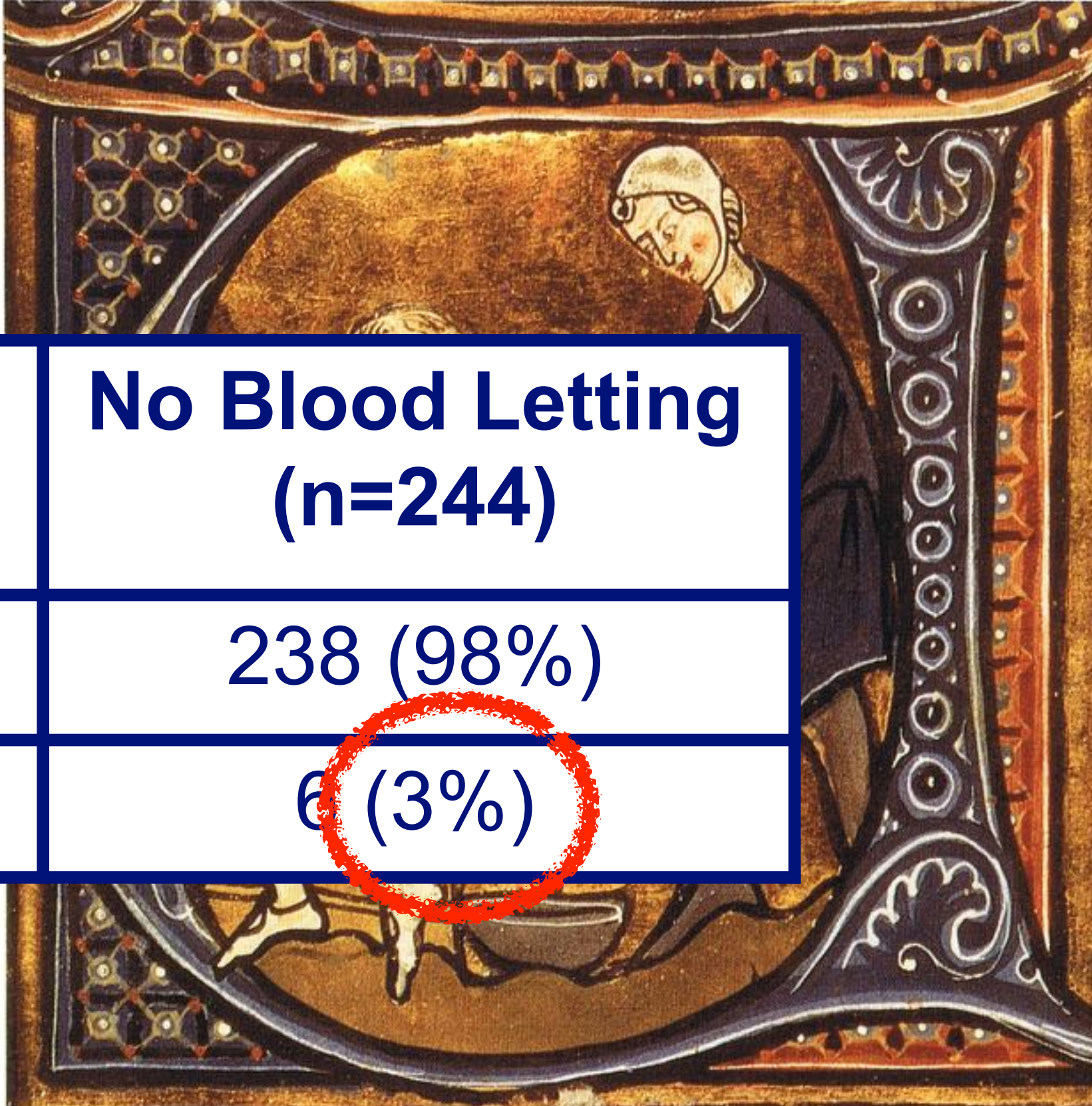
Right Patients



Randomization

	Blood Letting (n=122)	No Blood Letting (n=244)
Alive	87 (71%)	238 (98%)
Dead	35 (29%)	6 (3%)

DISSERTATIO MEDICA
INAUGURALIS
DE
SYNOCHO CASTRENSI;
QUAM,
ERUDITORUM EXAMINI SUBJICIT
ALEXANDER HAMILTON,
Scotus,
AD EXERCITUM BRITANNICUM
CHIRURGUS.



NNH 4

Consecutive



Similar



Blinding



**Treated
Equal**



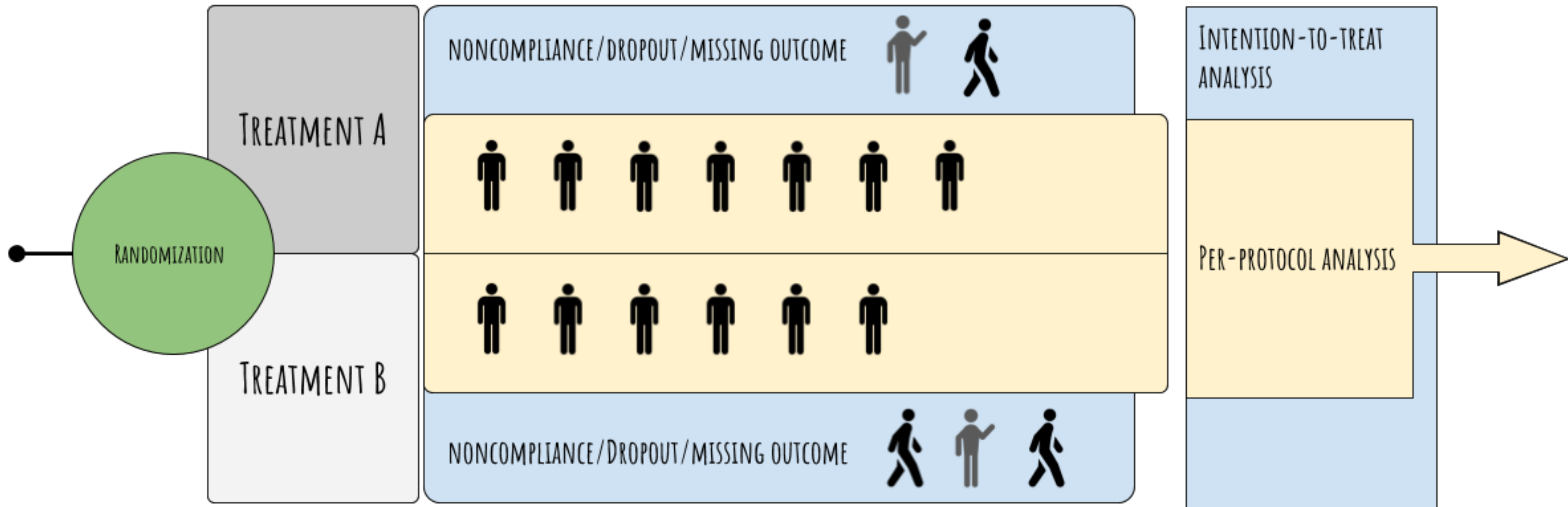


Follow



Up

ITT vs. PP



Outcome (POO/DOO/LOO/MOO)



Large and Precise



Practice Changing?



NNT & NNH





Sackett et al BMJ 1996

There are 13 RCTs of thrombolytics for acute ischemic stroke, 4 were stopped early for harm (bleeding) or futility, and all 13 failed to show a statistical benefit after the reanalysis of NINDS-2 & ECASS-III.

Summary of Thrombolytics for Acute Ischemic Stroke

Trial	Number of patients	Journal	Time to treatment	Results
MAST - Italy	622	Lancet 1995	<6 hours	No difference in primary benefit, increased chance of early death
ECASS-I	620	JAMA 1995	<6 hours	No difference on disability scores and 7% increase in mortality
NINDS-I	291	NEJM 1995	<3 hours	No difference in symptoms or 3-month outcomes
NINDS-II *	333	Annals of EM 2009	<3 hours	No difference in favorable mRS at 90 days, 6% absolute increase in brain bleeds and no mortality difference
MAST-Europe	310	NEJM 1996	<6 hours	No difference in death or disability at 3 to 6 months, 18% increase in brain bleed and stopped early due to harm
ASK	340	JAMA 1996	<4 hours	No difference in death or disability at 3 months, 10% increase in brain bleeds and stopped early due to harm
ECASS-II	800	Lancet 1998	<6 hours	No difference in outcomes on the mRS or mortality and 7% increase in brain bleeds
ATLANTIS-B	613	JAMA 1999	3-5 hours	No difference in neurologic recovery and stopped early because <i>"unlikely to prove beneficial"</i>
ATLANTIS-A	142	Stroke 2000	<6 hours	No benefit in NIH stroke scale at 30 days, 18% greater risk of mortality and stopped early due to harm
ECASS-III **	821	BMJ_EBM 2020	3-4.5 hours	No difference in favorable mRS score after 90 days and 9% increased rate of brain bleed
DIAS-2	193	Lancet 2009	3-9 hours	No difference in clinical response and increased rate of brain bleed
IST-3	3035	Lancet 2012	<6 hours	No difference in mortality or independence after 6 months, 4% increase in death at 1 week and 6% increase in fatal or non-fatal brain bleeding
DIAS-III	492	Lancet Neuro 2015	3-9 hours	No difference in favorable mRS at 90 days and no difference in major adverse events

* Reanalysis of NINDS-2 by Hoffman and Schrager Annals of EM 2009

** Reanalysis of ECASS-III by Alper et al BMJ_EBM 2020

This list does not include two newer RCTs looking at extending the therapeutic window to 4.5-9hrs. These newer trials were done with more advanced brain imaging selecting patients with a perfusion mismatch. Both RCTs were stopped early which can introduce bias towards efficacy. In addition, the majority of patients included in these trials would now qualify for endovascular therapy (EVT) clot retrieval. EVT has more evidence for efficacy than systemic thrombolysis and a recent RCT has shown that EVT alone is non-inferior to EVT plus tPA.

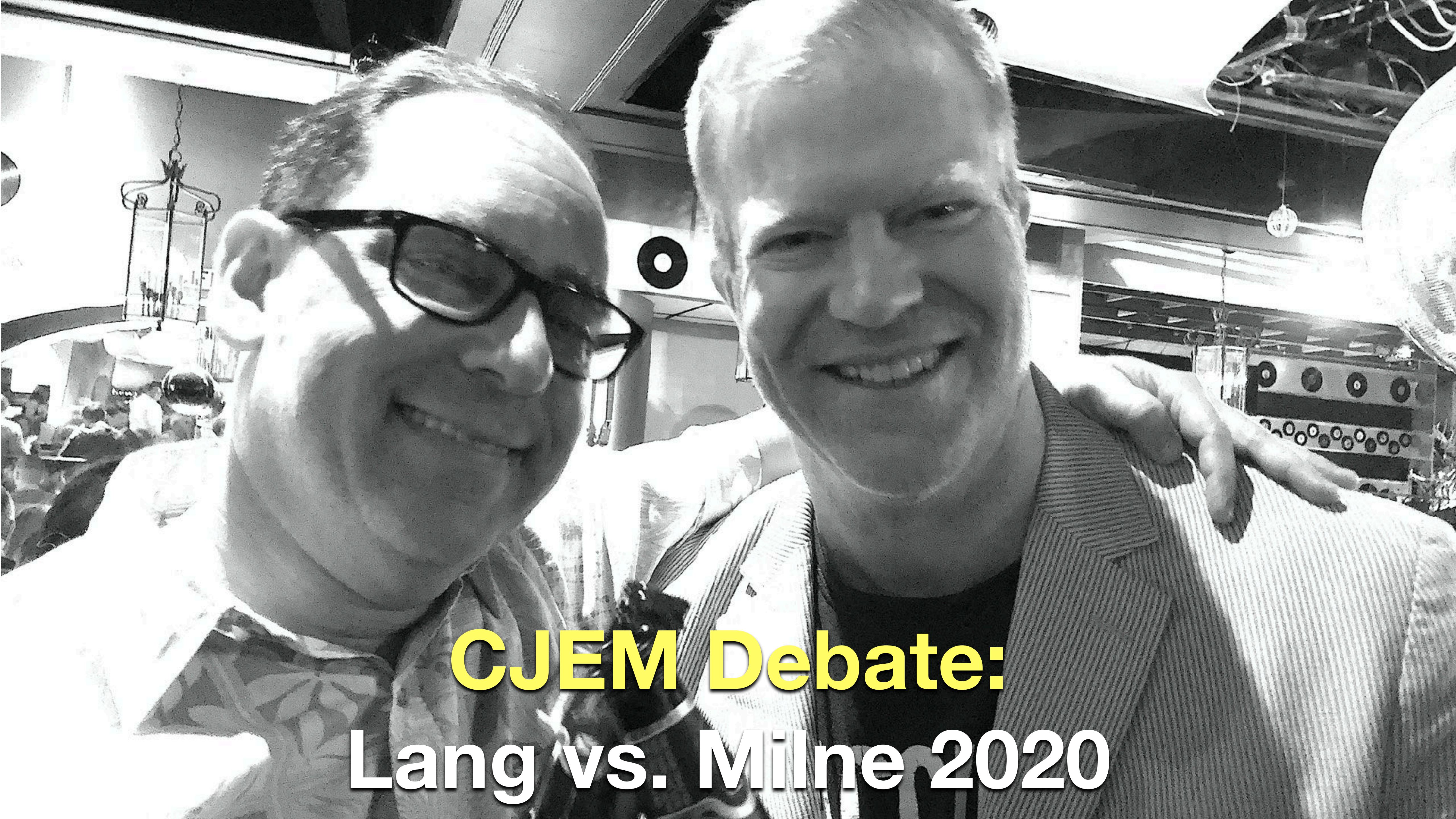
Lytics and AIS?

- 13 RCTs
- Zero Show Efficacy*
- Four Stopped Early Due to Harm or Futility
- Not Include Wake-Up

Lytics for AIS?

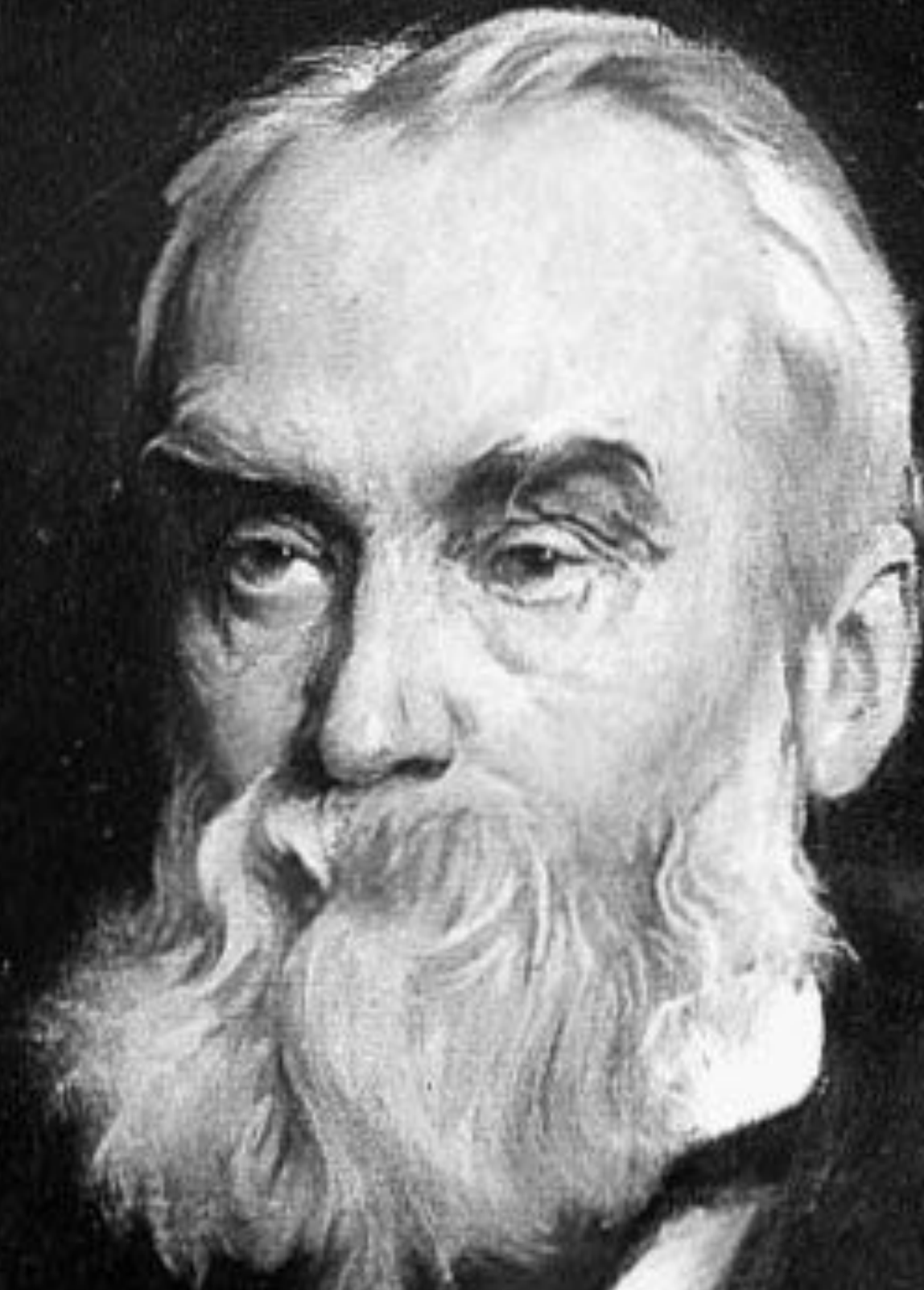


Burden of Proof



CJEM Debate:
Lang vs. Milne 2020

*“It takes 50
years to get a
wrong idea out
of medicine,
and 100 years
a right one into
medicine.”*




Dr. John H. Jackson



COVID-19

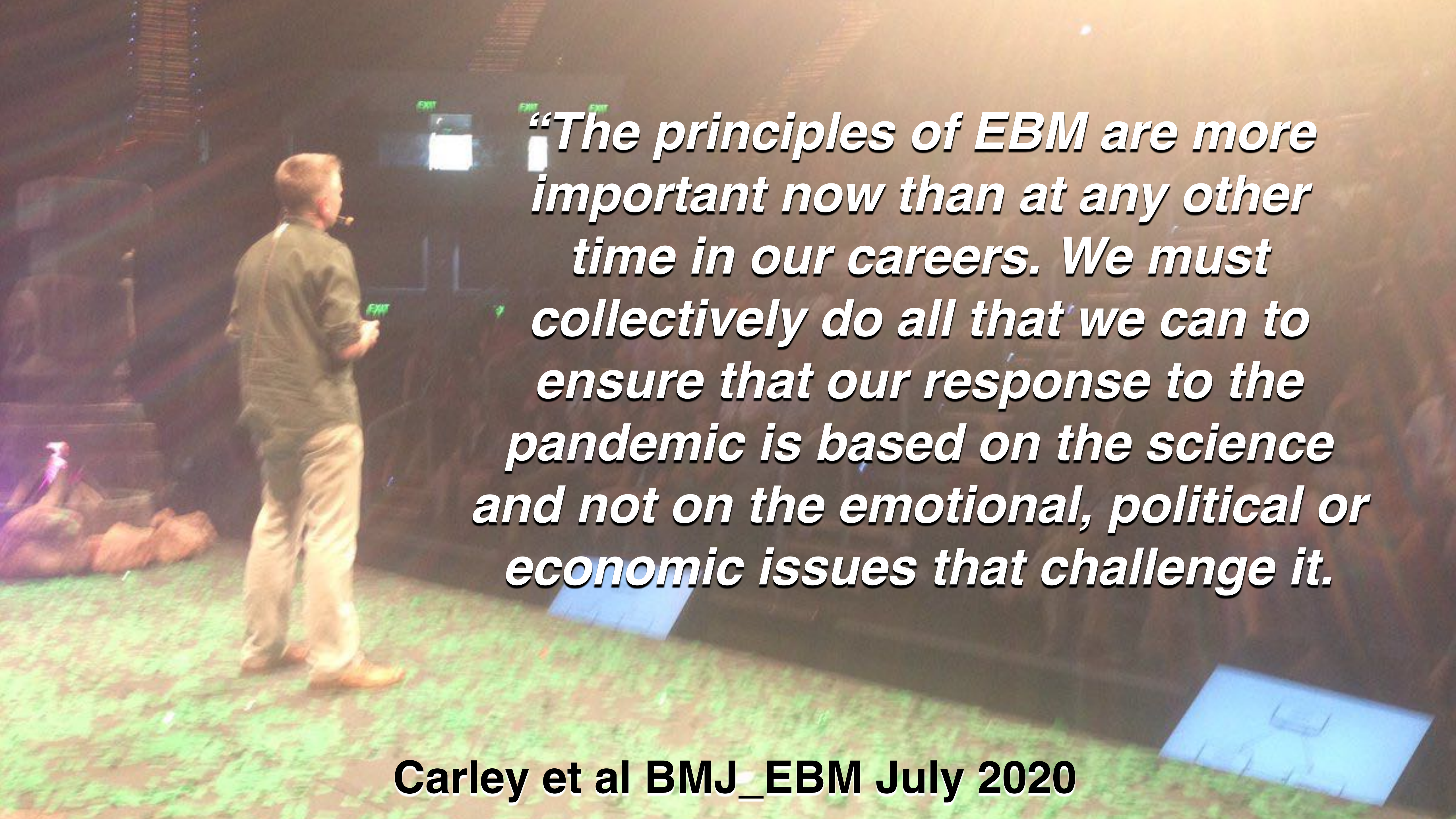


**Masking, distancing, HCQ, remdesivir,
convalescent plasma, vaccines, etc...**



“The urgency and severity of the COVID-19 pandemic contains threats and opportunities to clinicians wishing to practise EBM.”

**Carley et al
BMJ_EBM July 2020**



***“The principles of EBM are more important now than at any other time in our careers. We must collectively do all that we can to ensure that our response to the pandemic is based on the science and not on the emotional, political or economic issues that challenge it.*”**

Carley et al BMJ_EBM July 2020



***“We echo the call of others for
critical reasoning, critical
appraisal and critical thinking
during these challenging times.”***

Carley et al BMJ_EBM July 2020

Take Home Message

