

STOP Caring about the Study Results

Why you should use

NUMBERS

1234567890

instead of

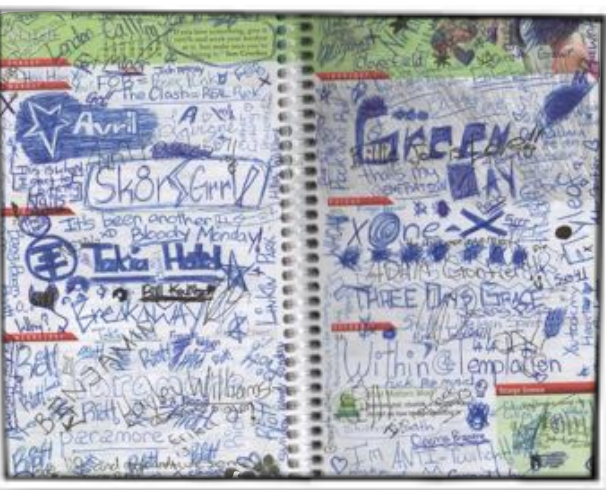
superlatives and *ADJECTIVES*

in your *JOURNALISM*

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therapeuticseducation.org
medicationmythbusters.com

FOR LINKS AND HANDOUT MATERIAL PLEASE GO TO
<https://therapeuticseducation.org/handouts>



My Agenda

- Put evidence into the context of the media
- Talk about some beliefs/BS
- Come to terms with misleading terminology
- Suggest a better? way
- Answer questions as we go along



**YOU ARE PRIMARILY A
KNOWLEDGE BROKER
NOT A
STORYTELLER**

science journalism

SCIENCE: NOT JUST FOR SCIENTISTS

*We believe that science is a human endeavour; it's a way to ask questions about the world and test them out. It's not just a list of facts; **it's a mindset owned by anyone who approaches the world in an open-minded, sceptical, logical, systematic, empirically-oriented, tentative and curious way.** It applies in the natural and social sciences, as well as technology, engineering and mathematics.*



Start Caring
about KNOWING
what the data show

It's simple, just ignore media reports...but

“90% of the general public gets most of its
information about science from the mass media”

“press releases are a major source of
information for 1/3 of medical reports in US
Newspapers”

The association between exaggeration in health related science news and academic press releases: retrospective observational study

Press releases (n=462) on biomedical and health-related science issued by 20 leading UK universities



“Although it is common to blame media outlets - our principle findings were that most of the inflation detected in our study did not occur de novo in the media but was already present in the text of the press releases produced by academics and their establishments”

”most of the responsibility for exaggeration must lie with the scientific authors”

THREE PARTS



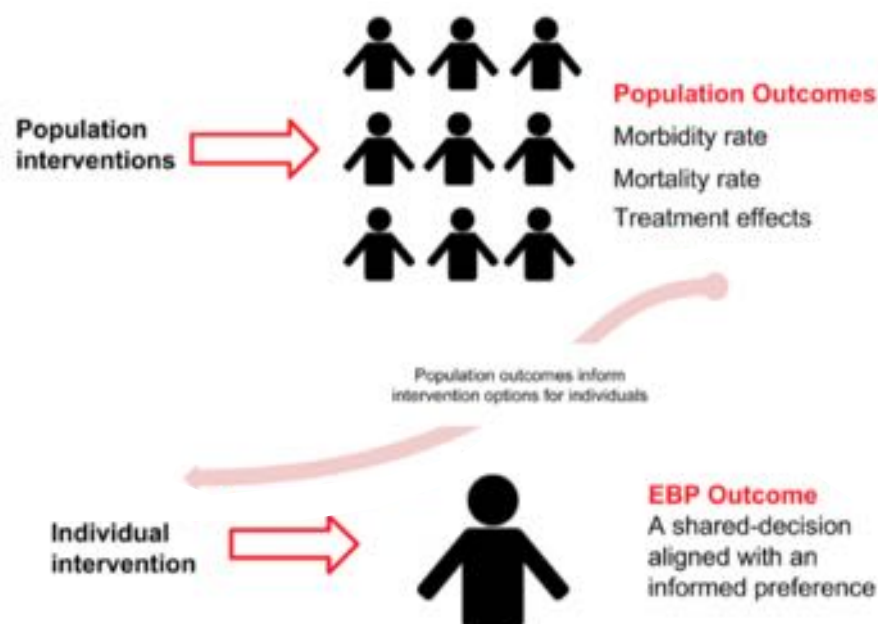
*Best
Available
Evidence*



Shared decision is the only outcome that matters when it comes to evaluating evidence-based practice

James McCormack,¹ Glyn Elwyn²

“in the vast majority of circumstances, the only outcome of relevance for EBP is to measure whether a shared decision was made”



doi:10.1136/ bmjebm-2018-110922

DOUBT



Sam Guglani

Oncology Centre, Cheltenham General Hospital, Cheltenham

“We should doubt more, doubt better, interrogate medicine’s loud convictions and quiet biases”

“Perhaps it’s time for medicine to revere doubt as much as it applauds assertion, and to encourage self-doubt as a means to self-knowledge.”

Lancet Oct 14, 2017

IMPORTANT!
Finish all medication
unless otherwise
directed by prescriber.



BMJ

EDITORIALS

A prescription for improving antibiotic prescribing in primary care

Comprehensive education programmes can reduce antibiotic prescriptions, but the impact on clinical outcomes is unclear

BMJ 2012;344:d7955 doi: 10.1136/bmj.d7955 (Published 2 February 2012)
James McCormack professor¹, & Michael Allan associate professor²

**“If you say it enough
it becomes the truth”**

“a reasonable approach for most primary care infections would be to tell the patient to continue the antibiotic until they have been asymptomatic or afebrile for 72 hours and then to stop”

General Sports Injury Recommend

R = rest

I = ice



– +/- NSAIDs/acetaminophen
Heat after 48 hours

RICE - coined in 1978

“Coaches have used my “RICE” guideline for decades, but now it appears that both Ice and complete Rest may delay healing, instead of helping.”
– Gabe Mirkin, MD, March 2014

M - Move safely when you can as much as you can
C - Compress
E - Elevate

Questioning Ice/Cryotherapy

J Strength Con Res 2013;27:1354-61

Am J Sport Med 2004;32:251-61

Sports Med 2012;42:69-87

J App Phys 2011;110:382-8

J Athl Train 2012;47:435-4

Who thinks broccoli is good for you?



Rhubarb



RHUBARB LEAVES



Rhubarb leaves contain **oxalic acid**, toxins that form deadly crystals in your kidneys.



Symptoms of rhubarb poisoning include **trouble breathing, nausea, diarrhoea, eye pain, burning in the mouth and throat, red urine.**

WORLDWIDE

20 “NEGATIVE” STUDIES IN A ROW

2008-2015

LIPIDS

AIM-HIGH, HPS2-THRIVE (niacin)
ACCORD (fibrates)
dalcetrapib (dalcetrapib)
STABILITY (darapladib)

BLOOD PRESSURE
ALTITUDE (aliskiren)
VALISH, AASK, ACCORD
(aggressive BP lowering)

DIABETES

ACCORD, ADVANCE, VADT
(aggressive A1c lowering)
ROADMAP (olmesartan)
ORIGIN (insulin)
SAVOR-TIMI 53 (saxagliptin)
EXAMINE (alogliptin)
ALECARDIO (aleglitazar)

GENERAL

ACTIVE (irbesartan/afib)
CRESCENDO (rimonabant)
VISTA-16 (varespladib)

182,000+
patients



FINALLY!!!!!!2015

- 1) EMPA-REG OUTCOME (empagliflozin) -1.6% ARR over 3 years
- 2) LEADER (liraglutide) - 1.8% ARR over 4years
- 3) SPRINT (120mmHg vs 140mmHg) - 1.6% ARR (CVD) over 3 years but also 1.8% ARI (Kidney)
- 4) HOPE 3 - statins YES, BUT blood pressure no benefit
- 5) FOURIER - 1.6% ARR over 2 years BUT \$15,000/year

BUT!!!!!!

- 1) ACCELERATE (evacetrapib - increased HDL (130%), reduced LDL (40%) - no CVD benefit



Golden Pill Award

PRESCRIBE AWARDS

	Major therapeutic advance	Clear advantage	Modest improvement
2011	0	0	0
2012	0	0	2 abiraterone (prostate CA) boceprevir (Hep C)
2013	0	0	1 meningococcal conjugate vaccine (infant immunization)
2014	1 cholic acid (hereditary bile acid deficiency)	3 imatinib (ALL) artesunate (malaria) sofosbuvir (HepC conjugate vaccine - infant immunization)	1 sodium phenylbutyrate coated granules (urea cycle disorders)
2015	0	1 propranolol (severe infantile hemangioma)	2 permethrin (scabies) ketoconazole HRA (endogenous Cushing's syndrome)
2016	0	0	2 nivolumab (inoperable melanoma) trametinib (inoperable melanoma)
2017	0	1 asfotase alfa (perinatal and infantile forms of hypophosphatasia)	2 pertuzumab (metastatic breast cancer) emtricitabine/tenofovir (HIV transmission)

Typically “evidence-based” guideline recommendations are not based on “solid” evidence

JAMA[®]

Online article and related content
current as of March 17, 2009.

Scientific Evidence Underlying the ACC/AHA Clinical Practice Guidelines

Pierluigi Tricoci; Joseph M. Allen; Judith M. Kramer; et al.
JAMA. 2009;301(8):831-841 (doi:10.1001/jama.2009.205)

Analysis of Overall Level of Evidence Behind Infectious Diseases Society of America Practice Guidelines

Dong Hyun Lee, MD; Ole Vielmeyer, MD Arch Intern Med. 2011;171(1):18-22

Clinical Endocrinology (2013) 78, 183–190

doi: 10.1111/j.1365-2265.2012.04441.x

METHODOLOGICAL ASSESSMENT IN ENDOCRINOLOGY

A comparative quality assessment of evidence-based clinical guidelines in endocrinology

EVIDENCE LEVEL	Cardiology	Infectious disease	Endocrinology
1 or A based on RCTs	11%	14%	6%
3 or C based on opinion	48%	55%	35%

The Bullshit Asymmetry



The amount of energy needed to refute bullshit is an order of magnitude bigger than to produce it.

Misleading
Terminology
Magnifies



The

**Bull
Shit**

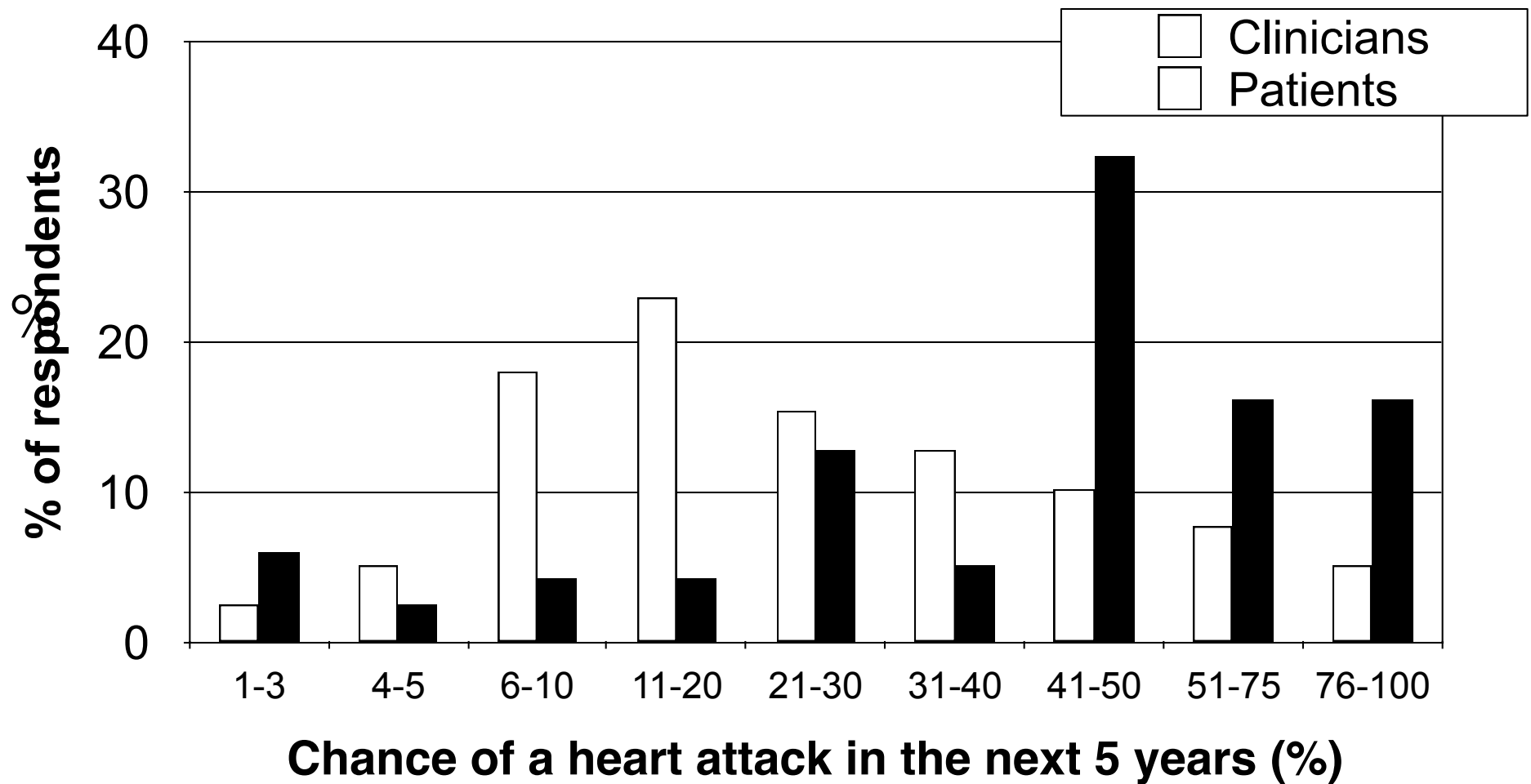
Asymmetry

The Magnitudinous Problem

More	Superior	Inferior
Increased	Rare	Lesser
Reduced	Smaller	Small
Improved	Larger	Bigger
Decreased	Least	Major
Higher	Common	Severe
Lower	Quicker	Weak
High	Slower	Strong
Low	Important	Different
Significant	Considerable	Faster
Less	Strong	Shorter
Fewer	Moderate	Longer
Worsened	Minor	Shortened
Better	Big	Lengthened
Worse	Unimportant	Extreme
Greater	Huge	Unlikely
Uncommon	Tiny	Short

NEVER USE THESE WORDS
WHEN DESCRIBING RESULTS

What is "High Risk"



Beware of “qualitative quantification”

Qualitative descriptor	EU assigned frequency	Mean frequency estimated by participants (n=200)
Very common	>10%	65% (24.2)
Common	1–10%	45% (22.3)
Uncommon	0.1–1%	18% (13.3)
Rare	0.01–0.1%	8% (7.5)
Very rare	<0.01%	4% (6.7)

Values are mean (SD).

Drugs in the News

How well do Canadian newspapers report the good, the bad and the ugly of new prescription drugs?

by Alan Cassels, Merrilee Atina Hughes, Carol Cole,
Barbara Mintzes, Joel Lexchin and James McCormack

April 2003



Canadian Centre for Policy Alternatives



Drugs in the news: an analysis of Canadian newspaper coverage of new prescription drugs

Alan Cassels, Merrilee A. Hughes, Carol Cole, Barbara Mintzes, Joel Lexchin,
James P. McCormack

193 articles - 5 selected “new” drugs
2/3 - of the articles gave NO
quantification of the benefits or
harms

The Use of Superlatives in Cancer Research

Matthew V. Abola, BA¹; Vinay Prasad, MD, MPH^{2,3}

[➤ Author Affiliations](#) | [Article Information](#)

JAMA Oncol. 2016;2(1):139-141. doi:10.1001/jamaoncol.2015.3931

Prespecified terms - breakthrough, game changer, miracle, cure, home run, revolutionary, transformative, life saver, groundbreaking, marvel

Searched news articles - 94 articles used 97 superlatives for 36 specific drugs

Speakers credited with using the superlative - journalists - 55%, physicians - 27%, industry experts - 9%, patients - 8%, member of US Congress - 1%

55% of the time the superlative was used without attribution

50% of the medications were not approved

14% of drugs had no clinical data (just mouse/cell culture)

Examples that probably require further clarification

Your salary will be **INCREASED**

Turn left after a **MODERATE** number of miles

You will be getting a **SHORT** jail sentence

You have an **UNLIKELY** chance of getting an STD

You have a **SIGNIFICANT** chance of a heart attack

A **SMALL** tube will be placed a **CONSIDERABLE** distance into your rectum

His penis is **LARGER** than an orangutan's

Be Wary of the “Relatives”

Anyone who says that “anything”
was reduced by a
number GREATER than 10%
is almost always talking
about a relative reduction

Numbers greater than 10% are
misleading unless they are put into
the proper context

Let's assume the study results are true -
no disease mongering, no marketing, no
agendas, no anything but the facts

% of people who benefit

(assuming the study results are true)

General anesthesia/local anesthesia ~100%

PPIS, sildenafil - heartburn/“successful” intercourse ~50%

NSAIDs, opioids - pain ~20-30%

Steroids - sore throat ~30%, Bell’s palsy ~10%

Antibiotics - acute COPD exacerbation ~20%

Topical antibiotics - bacterial conjunctivitis ~15%

Antidepressants - severe depression ~10%

Ipratropium - asthma attack ~10%

Cholinesterase inhibitors - ADAS-Cog >4 ~10%

Sleeping pills - improvement in sleep quality ~5-10%

Don’t forget
about side
effects, cost,
inconvenience

**% of people who benefit (heart attack, strokes, death, fractures etc) from 5 years treatment
(assuming the study results are true)**

Blood pressure ~ 2-3%

Statins ~ 1-2%

Glucose ~ 2% - for 2 or 3 out of
~ 8 classes of medications

Osteoporosis ~ 2-3%

Don't forget
about side
effects, cost,
inconvenience

IMHO the majority of your articles should have a tone that is:

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***open-minded, sceptical, logical, systematic,
empirically-oriented, tentative and curious***

Do you have, or can you find out, a rough estimate of ...

The Chance (%)
WITH NO
TREATMENT
VS

The Chance (%)
WITH
TREATMENT

Symptom resolution

(pain, heartburn, depression)

Cancer recurrence

Mortality

Heart Attacks

Strokes

ETC

CAN'T DO THIS FOR
SURROGATE MARKERS

BP, CHOL, GLUCOSE, BONE DENSITY

ASK ABOUT HEART ATTACK/STROKE/FRACTURE RISK

The Absolute CVD Risk/Benefit Calculator

Framingham US Data, 10 Year Risk

Heart attacks + angina/coronary
insufficiency + heart failure +
strokes + intermittent claudication

QRISK[®]2-2014 UK Data, 10 Year Risk

Heart attacks + strokes

ACC/AHA ASCVD US Data, 10 Year Risk

CHD death + nonfatal heart attacks
+ fatal/nonfatal strokes

PREDICT New Zealand Data, 5 Year Risk

Heart attacks + angina + heart failure
+ strokes/TIs + peripheral vascular
disease

Age

50 years

Gender

Male ☒ Female

Smoker

Yes ☒ No

CVD risk is reversed after 5-10 years of no smoking

Diabetes

Yes ☒ No

Systolic Blood Pressure

120 mmHg

Enter present blood pressure regardless of
treatment

120 mmHg is used for baseline risk

On treatment for BP

Yes ☒ No

Click YES if taking blood pressure medication

Only applies if SBP is greater than 120 mmHg

Total Cholesterol

3 mmol/L

Cholesterol should be prior to drug treatment

3 mmol/L is used for baseline risk.

[Click to change to mg/dL.](#)

HDL Cholesterol

1.3 mmol/L

HDL should be prior to drug treatment

1.3 mmol/L is used for baseline risk.

Chronic Kidney Disease

CKD status is not part of the risk

Yes ☒ No

algorithm but is used for calculating the benefit of
certain therapies

Relative Benefit: 0%

Benefit often has nothing to do with the effect on
the surrogate marker. At present, you can only
select one intervention at a time.

Physical Activity

Mediterranean Diet vs Low fat

Vitamin/Omega-3 supplements

BP meds (not atenolo/doxazosin)

Low-mod intensity statins

High intensity statins

Fibrates

Niacin

Ezetimibe

Metformin

Sulfonylureas

Insulins

Glitazones

GLPs

DPP-4s

Meglitinides

SGLT2

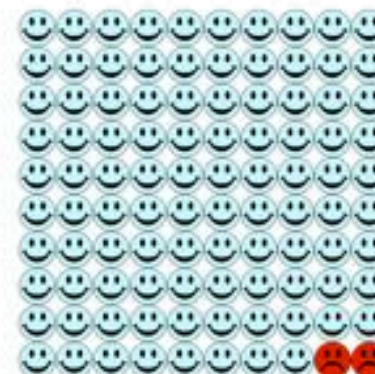
Smoking Cessation

ASA

[Benefit Estimate Details](#)

Risk Time Period

10 years



97.9% No event

2.1% Total with an event

0.0% Number who benefit
from treatment

NNT ∞ Number needed to treat

2.1% Baseline events using
baseline factors alone

0.0% Additional events
"caused" by risk factors

As with all risk calculators, calculated risk numbers are +/-
5% at best. [More information.](#)

[Print Report](#)

cvdcalcuator.com



“The best defense against
bullshit is vigilance.
So if you smell something,
say something.”

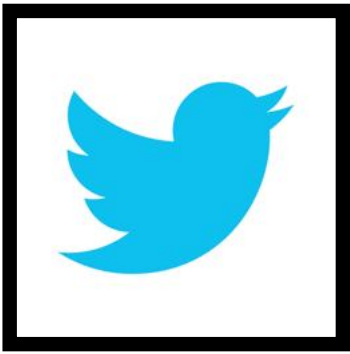




Common Sense

So rare that it's a super power.

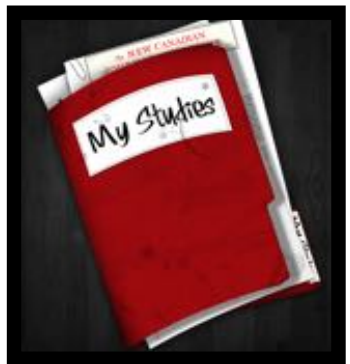
“So rare
that it’s a
super
power”



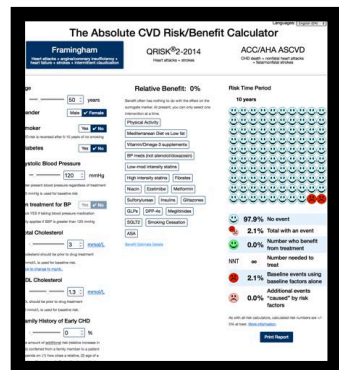
James McCormack@medmyths



The Best Science (BS) Medicine
Podcast
therapeuticseducation.org



mystudies.org



cvdcalculator.com