

# Supplements, Complementary and Alternative Medicine (SCAM) Myths

Mark Crislip MD

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so i don't understand  
why promises are snapped in two  
and words are made to bend  
(the bigger, the better)  
some stolen from japan  
collected from around the world,  
they'll catch you if they can  
(chorus)  
lies lies lies yeah  
lies lies lies yeah  
lies lies lies yeah

Thompson Twins

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# Conflicts of Interest

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- ❖ None
- ❖ First myth: we are all big pharma shills
- ❖ Unfortunately, enough are.



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# Me

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- ❖ Infectious Disease Doctor for 25 years and a proud member of the medical industrial complex
- ❖ Pastime is Supplements Complementary and Alternative Medicine (SCAM)
- ❖ I am an editor / contributor for Science Based Medicine, the Medscape ID blogger and have several podcasts: Quackcast, Puscast and Gobbet o' Pus.
- ❖ [www.edgydoc.com](http://www.edgydoc.com)
- ❖ [www.sciencebasedmedicine.org](http://www.sciencebasedmedicine.org)

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# Bias

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Horatio:

O day and night, but this is wondrous strange!

Hamlet:

And therefore as a stranger give it welcome.  
There are more things in heaven and earth, Horatio,  
Than are dreamt of in your philosophy

- ❖ Maybe. But if you propose a theory that goes beyond what is known, you better have pretty good data to support.

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# Beat Poetry Bias

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There are known knowns;  
there are things  
we know  
we know.

We also know  
there are known unknowns;  
that is to say '  
we know there are some things  
we do not know.

But there are also unknown unknowns –  
the ones  
we don't know  
we don't know.

- ❖ Former United States Secretary of Defense Donald Rumsfeld

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# Bias

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- ❖ Physics, chemistry, biochemistry, anatomy, physiology, embryology, evolution, etc i.e. the sciences and the scientific method, define out understanding of reality.

Science is the Concept  
by which we measure our reality  
I don't believe in magic  
I don't believe in I-ching...  
I just believe in science...and that reality.

John Lennon. Sort of.

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# Myth 1

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- ❖ SCAMs are popular
  - ❖ the corollary: because SCAMs are popular, SCAMs are effective

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# SCAM Popularity

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- ❖ Unconventional Medicine in the United States -- Prevalence, Costs, and Patterns of Use David M. Eisenberg, Ronald C. Kessler, Cindy Foster, Frances E. Norlock, David R. Calkins, and Thomas L. Delbanco N Engl J Med 1993; 328:246-252
- ❖ One in three respondents (34 percent) reported using at least one unconventional therapy in the past year, and a third of these saw providers for unconventional therapy.

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# Is it representative of the population?

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- ❖ The 1539 people interviewed were a subset of 2295 respondents who agreed to participate and actually finished the interview.
- ❖ The 2295 people were, in turn, found by calling 5158 telephone numbers and excluding more than half of them because they were not working, were "not assigned to households," did not speak English, or were cognitively or physically impaired.

# Representative?

**Table 1**

Medical Condition	From Table 3 of Eisenberg Article.	CDC Vital and Health Statistics, Prevalence of Selected Chronic Conditions 1990-92
"Back problems" Deformities/impairments of back Intervertebral disc disorders	20%	7.3% 2.0%
Allergies Chronic sinusitis Hayfever Asthma	16%	13.5% 9.7% 4.6%
Arthritis	16%	12.8%
Insomnia	14%	
Strains/sprains Deformities/impairments of Upper Extremities Shoulder Lower Extremities	13%	1.5 .2 5.0%
Headache Migraine Other Headache not tension	13%	4% 4.1%
High blood pressure	11%	11.1%

"Digestive problems" Ulcer Hernia Indigestion/other functional disorders of stomach and digestive system Constipation Hemorrhoids	10%	1.7% 1.9% 2.6% 1.7% 3.8%
Anxiety	10%	
Depression	8%	
Deafness/Hearing Impairment		9.3%
Skin disorders Dermatitis Dry skin Ingrown nails Corns/calluses		3.7% 2.1% 2.4% 1.9%
Heart Disease		8.2%
Diabetes		2.8%
Thyroid disorders Goiter Other thyroid		1.9% 1.3%
Chronic bronchitis		5.2%

The Eisenberg Data: Flawed and Deceptive Timothy N. Gorski, MD,  
FACOG

# Not

30% did self  
chiropractic?

9% were  
doing self  
acupuncture?

DIY Acupuncture  
For When TSHTF,  
by Rose R.  
SurvivalBlog.com

TYPE OF THERAPY	USED IN PAST 12 Mo (%)*	SAW A PROVIDER (%)*	MEAN NO. OF VISITS PER USER IN PAST 12 Mo
Relaxation techniques	13	9	19
Chiropractic	10	70	13
Massage	7	41	15
Imagery	4	15	14
Spiritual healing	4	9	14
Commercial weight-loss programs	4	24	23
Lifestyle diets (e.g., macrobiotics)	4	13	8
Herbal medicine	3	10	8
Megavitamin therapy	2	12	13
Self-help groups	2	38	21
Energy healing	1	32	8
Biofeedback	1	21	6
Hypnosis	1	52	3
Homeopathy	1	32	6
Acupuncture	<1	91	38
Folk remedies	<1	0	0
Exercise†	26	—	—
Prayer†	25	—	—
≥1 Unconventional therapy‡	34	36	19
95% Confidence interval	31–37	31–41	14–24

\*Percentages are of those who used that type of unconventional therapy.

†Respondents who used exercise or prayer were not asked for details about this use.

‡Excluding exercise and prayer.

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# Bait and Switch

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- ❖ What is a SCAM?
- ❖ Justice Stevens?
- ❖ I know it when I see it



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# Its all in the Definition

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- ❖ Type 1: Total nonsense with zero prior plausibility. These are SCAMs based on ideas divorced from reality as I understand it, cannot have efficacy and do not have efficacy. It includes, but is not limited to, homeopathy, acupuncture, chiropractic, ayurvedic, reiki and other energy therapies, iridology, applied kinesiology, craniosacral therapy, water therapy, and on and on and on. Whenever I makes this kind of list I am amazed at how
- ❖ age cannot wither SCAM,  
nor custom stale  
It's infinite variety.
- ❖ People who inflict these modalities on others may be well intentioned, but as we all know "the road to Hell is paved with frozen type 1 providers. On weekends, many of the younger demons go ice skating down it."
- ❖ All type 1 SCAMs are useless, non-reality based magic. I would think anyone who proposes any type I SCAM for diagnosis and treatment should be kept as far from providing medical care as is feasible.

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# Type 2

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- ❖ Those SCAMs that may or may not have efficacy. These are mostly various herbs, whose reasons for use are often historical or related to aggressive marketing.
- ❖ The prior plausibility that a given herb will actually have efficacy for a given disease is small, but not zero, and occasionally an herb or supplement, like red rice, is discovered to have actual active ingredients and effect.
- ❖ Unlike pharmaceuticals, the actual contents of most herbs may be unknown and and efficacy is based on experience.

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# Type 3

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- ❖ Those SCAMs where a little efficacy in the test tube or in a small poorly done study is blown out of all proportion to its real effect.
- ❖ The effects are perhaps real, often small, and usually not clinically relevant.
- ❖ Green coffee beans are a recent example, thank you very much Dr. Oz.

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# Type 4:

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- ❖ SCAMs that are not SCAMs at all.
- ❖ For example diet and exercise. Diet and exercise are often part of the marketing of SCAM, and there is nothing alternative about diet and exercise as such.
- ❖ Often interventions that are not SCAMs are labeled as such in inflate popularity or used as a trojan rabbit as entry level 'integration': diet and exercise.

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# A Spectrum

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- ❖ Diet and exercise, lifestyle interventions, are the tip of the spear that results in integration of nonsense into medical care.
- ❖ Integrative medicine, the new phrase, bleeds from the legitimate (diet) to the marginal (some herbs) to the wackaloon (homeopathy or acupuncture)
- ❖ If you integrate fantasy with reality, you do not instantiate reality. If you mix cow pie with apple pie, it does not make the cow pie taste better; it makes the apple pie worse.

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❖ Myth 2: Placebo is Powerful

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# Myths: Words for Snow

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- ❖ Pullum cites several sources on how many words certain Inuit dialects actually have for snow. The two main ones are:
- ❖ The Dictionary of the West Greenlandic Eskimo Language (C. W. Schultz-Lorentzen, Copenhagen: Reitzels, 1927) gives just two words: qanik for snowflakes in the air, and aput for snow on the ground.
- ❖ The Yup'ik Eskimo Dictionary (Steven A. Jacobson, Fairbanks: University of Alaska, 1984) has, according to Pullum's colleague Anthony Woodbury, about 24 if you're very generous. By "very generous", I mean including words for "stuff for sinking habitually into", "blizzard", "avalanche", and so on.
- ❖ So 24 seems to be the outer limit that could be defended, at least for Yup'ik. Unless there are speakers somewhere who make a living by coining new snow-words and selling them.... No one seems to have checked on that possibility.

# Myths



- ❖ We use 10% of our brain



## Bachmann: HPV Vaccine Could Cause Mental Retardation

Michele Bachmann said this morning that the HPV vaccination Rick Perry had mandated in an executive order as governor of Texas could potentially cause mental retardation in children. “I had a mother last night come up to me here in Tampa, Fla., after the debate,” Bachmann said on the Today show this morning. “She told me that her little daughter took that vaccine, that injection, and she suffered from mental retardation thereafter. It can have very dangerous side effects. The mother was crying when she came up to me last night. I didn’t know who she was before the debate. This is a very real concern and people have to draw their own conclusions.”

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# What is Placebo?

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- ❖ Depends. It is many things, depending on the situation
- ❖ My son said that it was a sugar pill that when you took it was just as good as a real medicine.
- ❖ “Placebo effects, as measured in clinical trials, includes a host of factors – everything other than a physiological response to an active treatment.
- ❖ These placebo effects include the bias of the researchers, the desire of the subjects to please the researchers and to get well, non-specific effects of receiving medical intervention and attention, and other artifacts of the research process.
- ❖ When we remove all of these biases and artifacts, is there a real effect left behind – what most people think of when they think of “the” placebo effect: a mind-over-matter but real improvement?

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# What is the placebo 'effect'

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- ❖ Combination of the
- ❖ natural history of the disease: most diseases get better or wax and wane,
- ❖ regression to the mean;
- ❖ Nonspecific effects of treatment, attributable to factors other than specific active components. These include physician attention, interest, and concern in a healing setting; patient and physician expectations of treatment effects; the reputation, expense, and impressiveness of the treatment; and characteristics of the setting that influence patients to report improvement

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## Powerful Placebo: An enduring myth.

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- ❖ Placebos have been reported to improve subjective and objective outcomes in up to 30 to 40 percent of patients with a wide range of clinical conditions, such as pain, asthma, high blood pressure, and even myocardial infarction.
- ❖ In his 1955 article “The Powerful Placebo,” Beecher concluded, “It is evident that placebos have a high degree of therapeutic effectiveness in treating subjective responses, decided improvement, interpreted under the unknowns technique as a real therapeutic effect, being produced in  $35.2 \pm 2.2\%$  of cases.”
- ❖ Beecher's article and the 35 percent figure are often cited as evidence that a placebo can be an important medical treatment. The vast majority of reports on placebos, including Beecher's article, have estimated the effect of placebo as the difference from base line in the condition of patients in the placebo group of a randomized trial after treatment.
- ❖ With this approach, the effect of placebo cannot be distinguished from the natural course of the disease, regression to the mean, and the effects of other factors. The reported large effects of placebo could therefore, at least in part, be artifacts of inadequate research methods.
- ❖ NEJM

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# And Placebo Effect?

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- ❖ We did not find that placebo interventions have important clinical effects in general. However, in certain settings placebo interventions can influence patient-reported outcomes, especially pain and nausea, though it is difficult to distinguish patient-reported effects of placebo from biased reporting. The effect on pain varied, even among trials with low risk of bias, from negligible to clinically important. Variations in the effect of placebo were partly explained by variations in how trials were conducted and how patients were informed.
- ❖ Cochrane Database Syst Rev. 2010 Jan 20;(1):CD003974. Placebo interventions for all clinical conditions

N Engl J Med. 2001 May 24;344(21):1594-602.

Is the placebo powerless? An analysis of clinical trials comparing placebo with no treatment.

#### BACKGROUND:

Placebo treatments have been reported to help patients with many diseases, but the quality of the evidence supporting this finding has not been rigorously evaluated.

#### METHODS:

We conducted a systematic review of clinical trials in which patients were randomly assigned to either placebo or no treatment. A placebo could be pharmacologic (e.g., a tablet), physical (e.g., a manipulation), or psychological (e.g., a conversation).

#### RESULTS:

We identified 130 trials that met our inclusion criteria. After the exclusion of 16 trials without relevant data on outcomes, there were 32 with binary outcomes (involving 3795 patients, with a median of 51 patients per trial) and 82 with continuous outcomes (involving 4730 patients, with a median of 27 patients per trial). As compared with no treatment, placebo had no significant effect on binary outcomes (pooled relative risk of an unwanted outcome with placebo, 0.95; 95 percent confidence interval, 0.88 to 1.02), regardless of whether these outcomes were subjective or objective. For the trials with continuous outcomes, placebo had a beneficial effect (pooled standardized mean difference in the value for an unwanted outcome between the placebo and untreated groups, -0.28; 95 percent confidence interval, -0.38 to -0.19), but the effect decreased with increasing sample size, indicating a possible bias related to the effects of small trials. The pooled standardized mean difference was significant for the trials with subjective outcomes (-0.36; 95 percent confidence interval, -0.47 to -0.25) but not for those with objective outcomes. In 27 trials involving the treatment of pain, placebo had a beneficial effect (-0.27; 95 percent confidence interval, -0.40 to -0.15). This corresponded to a reduction in the intensity of pain of 6.5 mm on a 100-mm visual-analogue scale.

#### CONCLUSIONS:

**We found little evidence in general that placebos had powerful clinical effects. Although placebos had no significant effects on objective or binary outcomes, they had possible small benefits in studies with continuous subjective outcomes and for the treatment of pain.** Outside the setting of clinical trials, there is no justification for the use of placebos.

## Supplementary Appendix 2. Trials with Binary Outcomes.

### SUPPLEMENTARY APPENDIX 2. TRIALS WITH BINARY OUTCOMES.\*

TRIAL	NO. OF PATIENTS	CLINICAL PROBLEM	PLACEBO-NO TREATMENT	RELATIVE RISK (95% CI)
<b>Internal medicine</b>				
Tyler, 1946 <sup>19</sup>	563	Seasickness	Sham barbiturate capsule-no capsule	0.98 (0.78 to 1.23)
Thomas, 1987 <sup>20</sup>	200	No diagnosis	Thiamine tablet-no tablet	0.94 (0.71 to 1.25)
Hutton et al., 1991 <sup>21</sup>	54	Rhinorrhea	Sham antihistamine-no antihistamine	0.39 (0.17 to 0.91)
Guglielmi et al., 1982 <sup>22</sup>	24	Raynaud's disease	Sham biofeedback-no biofeedback	1.09 (0.92 to 1.29)
Watzl et al., 1986 <sup>23</sup>	70	Alcohol abuse	Saline injection-no injection	2.27 (1.06 to 4.88)
Wilson et al., 1980 <sup>24</sup>	50	Alcohol abuse	Sham disulfiram implants-no implants	0.78 (0.66 to 0.92)
Killen et al., 1990 <sup>25</sup>	618	Smoking	Sham nicotine gum-no gum	1.03 (0.94 to 1.14)
Malcolm et al., 1980 <sup>26</sup>	121	Smoking	Sham nicotine gum-no gum	0.84 (0.66 to 1.06)
Jacobs et al., 1971 <sup>27</sup>	54	Smoking	Sham imipramine tablet-no tablet	1.95 (1.04 to 3.65)
Williams and Hall, 1988 <sup>28</sup>	40	Smoking	Attention-waiting list	1.00 (0.87 to 1.15)
Hyman et al., 1986 <sup>29</sup>	30	Smoking	Attention-waiting list	0.60 (0.40 to 0.91)
Elliott and Denney, 1978 <sup>30</sup>	24	Smoking	Attention-waiting list	0.33 (0.17 to 0.64)
<b>Surgery and anesthesiology</b>				
Faas et al., 1993 <sup>31</sup>	317	Pain	Sham ultrasonography-no ultrasonography	0.95 (0.81 to 1.10)
Walton and Chiappinelli, 1993 <sup>32</sup>	54	Pain	Sham penicillin tablet-no tablet	1.13 (0.83 to 1.54)
McMillan, 1994 <sup>33</sup>	72	Nausea	Sham TCES-no TCES	1.03 (0.66 to 1.62)
Najningier et al., 1997 <sup>34</sup>	60	Nausea	Sham ondansetron tablet-no tablet	0.88 (0.77 to 1.16)
Dundee et al., 1986 <sup>35</sup>	50	Nausea	Sham acupuncture-no acupuncture	1.00 (0.68 to 1.46)
<b>Gynecology and obstetrics</b>				
Adriaanse et al., 1995 <sup>36</sup>	654	Infection	Sham chlorhexidine gel-no gel	1.31 (0.88 to 1.94)
Harrison et al., 1975 <sup>37</sup>	58	Infertility	Sham doxycycline therapy-no therapy	1.03 (0.83 to 1.28)
Aune et al., 1998 <sup>38</sup>	40	Infection	Sham acupuncture-no acupuncture	0.66 (0.36 to 1.19)
Heinzl and Andor, 1981 <sup>39</sup>	262	Cervical dilatation	Sham prostaglandin gel-no gel	0.77 (0.64 to 0.94)
<b>Psychiatry</b>				
Tarrier et al., 1998 <sup>40</sup>	54	Schizophrenia	Sham counseling-no counseling	0.95 (0.77 to 1.17)
Whittaker and Hay, 1963 <sup>41</sup>	26	Schizophrenia	Sham perphenazine elixir-no elixir	0.43 (0.14 to 1.30)
Frank et al., 1990 <sup>42</sup>	52	Depression	Sham imipramine tablet-no tablet	1.00 (0.60 to 1.65)
Klerman et al., 1974 <sup>43</sup>	50	Depression	Sham amitriptyline tablet-no tablet	1.06 (0.71 to 1.68)
Rabkin et al., 1990 <sup>44</sup>	50	Depression	Sham tablet-no tablet	0.99 (0.78 to 1.34)
Roughan and Kunst, 1981 <sup>45</sup>	26	Orgasmic difficulties	Relaxation-no relaxation	1.17 (0.70 to 1.94)
Berg et al., 1983 <sup>46</sup>	26	Fecal soiling	Sham laxative tablet-no tablet	1.36 (0.83 to 2.24)
Blackman et al., 1964 <sup>47</sup>	24	Enuresis	Sham imipramine tablet-no tablet	1.00 (0.45 to 2.23)
<b>Neurology</b>				
Double et al., 1993 <sup>48</sup>	44	Parkinson's disease	Sham anticholinergic capsule-no capsule	1.00 (0.23 to 4.42)
Stransky et al., 1989 <sup>49</sup>	9	CTS	Sham vitamin B6 tablet-no tablet	0.80 (0.07 to 9.18)
Tan and Bruni, 1986 <sup>50</sup>	19	Seizures	Counseling-no counseling	0.90 (0.61 to 1.32)

\*CI denotes confidence interval, TCES transcutaneous electrical stimulation, and CTS carpal tunnel syndrome. Relevant outcomes could not be extracted from a number of studies.<sup>135,150</sup>

Hróbjartsson A, Gøtzsche PC. N Engl J Med  
2001;344:1594-1602.



The NEW ENGLAND  
JOURNAL of MEDICINE

## Effect of Three Types of Placebo.

**TABLE 4.** EFFECT OF THREE TYPES OF PLACEBO.\*

TYPE OF PLACEBO	NO. OF PARTICIPANTS	NO. OF TRIALS	POOLED RELATIVE RISK (95% CI)†
<b>Binary</b>			
Pharmacologic	3099	21	0.97 (0.88 to 1.07)
Physical	479	4	0.94 (0.83 to 1.08)
Psychological	217	7	0.88 (0.72 to 1.08)
			<b>POOLED STANDARDIZED MEAN DIFFERENCE (95% CI)‡</b>
<b>Continuous</b>			
Pharmacologic	2363	24	-0.20 (-0.37 to -0.04)
Physical	1378	22	-0.31 (-0.50 to -0.13)
Psychological	989	36	-0.34 (-0.49 to -0.19)

\*CI denotes confidence interval.

†The relative risk was defined as the ratio of the number of patients with an unwanted outcome to the total number of patients in the placebo group, divided by the same ratio in the untreated group. A value below 1.0 indicates a beneficial effect of placebo.

‡The standardized mean difference was defined as the difference between the mean values for unwanted outcomes in the placebo and untreated groups, divided by the pooled standard deviation. A negative value indicates a beneficial effect of placebo.

Hróbjartsson A, Gøtzsche PC. *N Engl J Med* 2001;344:1594-1602.



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# Placebo: subjective or objective?

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N Engl J Med. 2011 Jul 14;365(2):119-26.

Active albuterol or placebo, sham acupuncture, or no intervention in asthma.

## BACKGROUND:

In prospective experimental studies in patients with asthma, it is difficult to determine whether responses to placebo differ from the natural course of physiological changes that occur without any intervention. We compared the effects of a bronchodilator, two placebo interventions, and no intervention on outcomes in patients with asthma.

## METHODS:

In a double-blind, crossover pilot study, we randomly assigned 46 patients with asthma to active treatment with an albuterol inhaler, a placebo inhaler, sham acupuncture, or no intervention. Using a block design, we administered one each of these four interventions in random order during four sequential visits (3 to 7 days apart); this procedure was repeated in two more blocks of visits (for a total of 12 visits by each patient). At each visit, spirometry was performed repeatedly over a period of 2 hours. Maximum forced expiratory volume in 1 second (FEV(1)) was measured, and patients' self-reported improvement ratings were recorded.

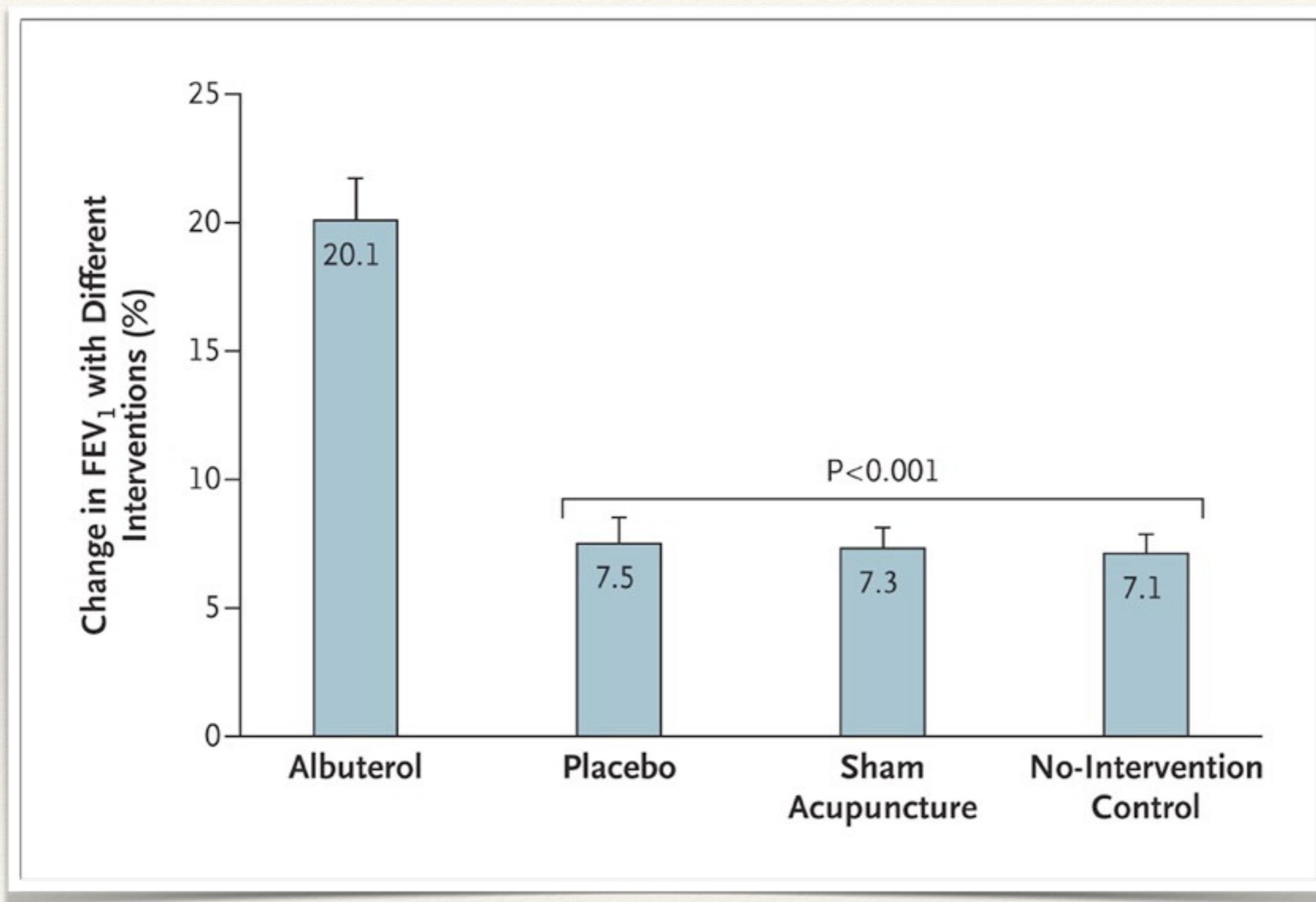
## RESULTS:

Among the 39 patients who completed the study, albuterol resulted in a 20% increase in FEV(1), as compared with approximately 7% with each of the other three interventions ( $P < 0.001$ ). However, patients' reports of improvement after the intervention did not differ significantly for the albuterol inhaler (50% improvement), placebo inhaler (45%), or sham acupuncture (46%), but the subjective improvement with all three of these interventions was significantly greater than that with the no-intervention control (21%) ( $P < 0.001$ ).

## CONCLUSIONS:

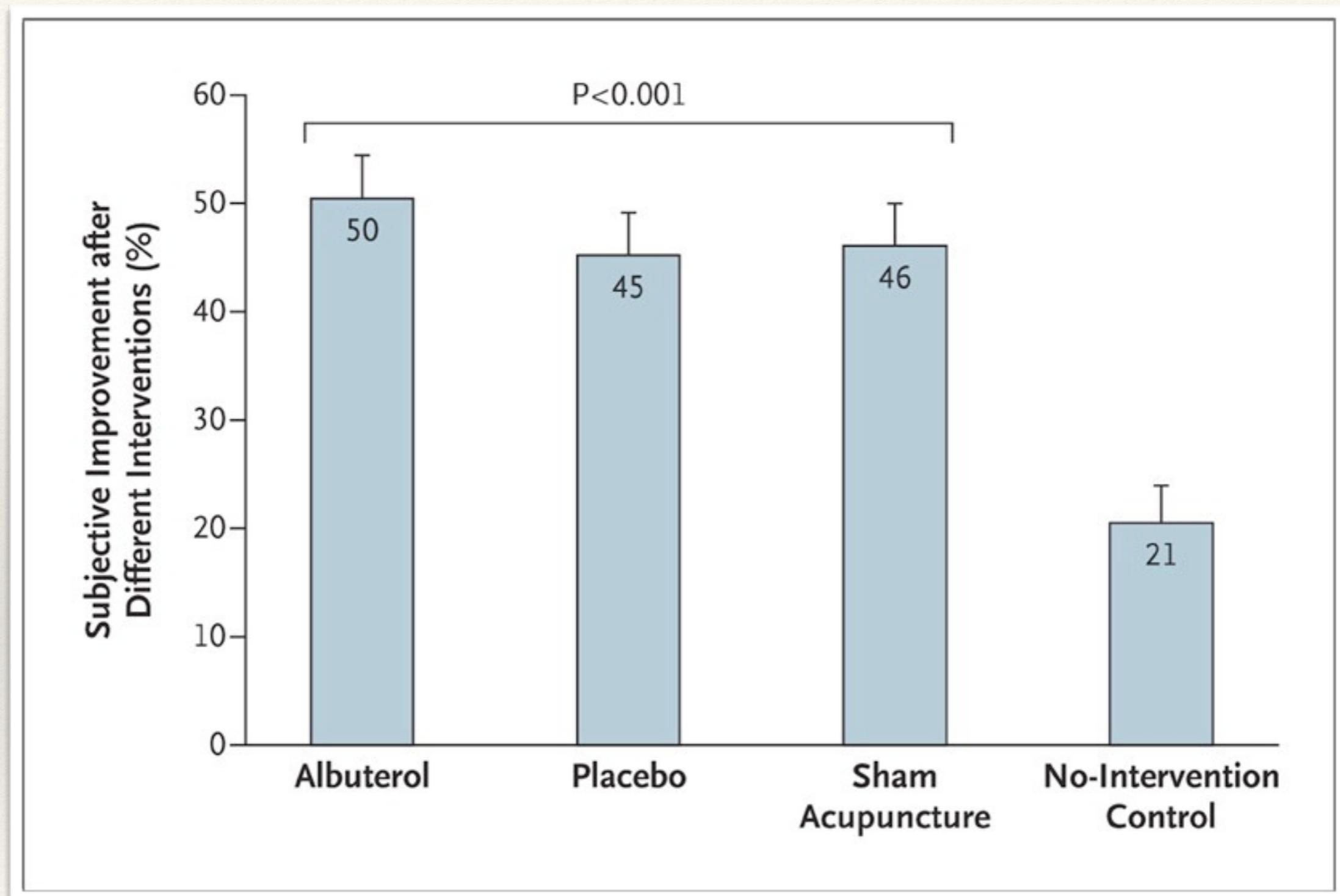
Although albuterol, but not the two placebo interventions, improved FEV(1) in these patients with asthma, albuterol provided no incremental benefit with respect to the self-reported outcomes. Placebo effects can be clinically meaningful and can rival the effects of active medication in patients with asthma. However, from a clinical-management and research-design perspective, patient self-reports can be unreliable. An assessment of untreated responses in asthma may be essential in evaluating patient-reported outcomes. (Funded by the National Center for Complementary and Alternative Medicine.).

Percent Change in Maximum Forced Expiratory Volume in 1 Second (FEV<sub>1</sub>) with Each of the Four Interventions.



Wechsler ME et al. N Engl J Med 2011;365:119-126.

Percent Change in Subjective Improvement with Each of the Four Interventions.



Wechsler ME et al. N Engl J Med 2011;365:119-126.

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# Placebo

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- ❖ “Placebo effects plus disease natural history and regression to the mean can result in high rates of good outcomes, which may be misattributed to specific treatment effects” JAMA 1995
- ❖ The old saw that 35% of illnesses get better with placebo is a myth; there is no mysterious mind/body connection.
- ❖ That being said, healing rituals are important. They have to be based on honesty.
- ❖ “I have not yet found any case in which a lie does not do more harm than good”

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# Placebo effects require lying

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PLoS One. 2010 Dec 22;5(12):e15591. doi: 10.1371/journal.pone.0015591.

Placebos without deception: a randomized controlled trial in irritable bowel syndrome.

Placebos administered without deception may be an effective treatment for IBS. Further research is warranted in IBS, and perhaps other conditions, to elucidate whether physicians can benefit patients using placebos consistent with informed consent.

Before randomization and during the screening, the placebo pills were truthfully described as inert or inactive pills, like sugar pills, without any medication in it. Additionally, patients were told that “**placebo pills, something like sugar pills, have been shown in rigorous clinical testing to produce significant mind-body self-healing processes.**”

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# Zen Koan

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- ❖ Since pain is subjective, if a patient says they are better, are they not better?
- ❖ Placebo in medicine are beer goggles.
- ❖ Or kissing a boo boo.

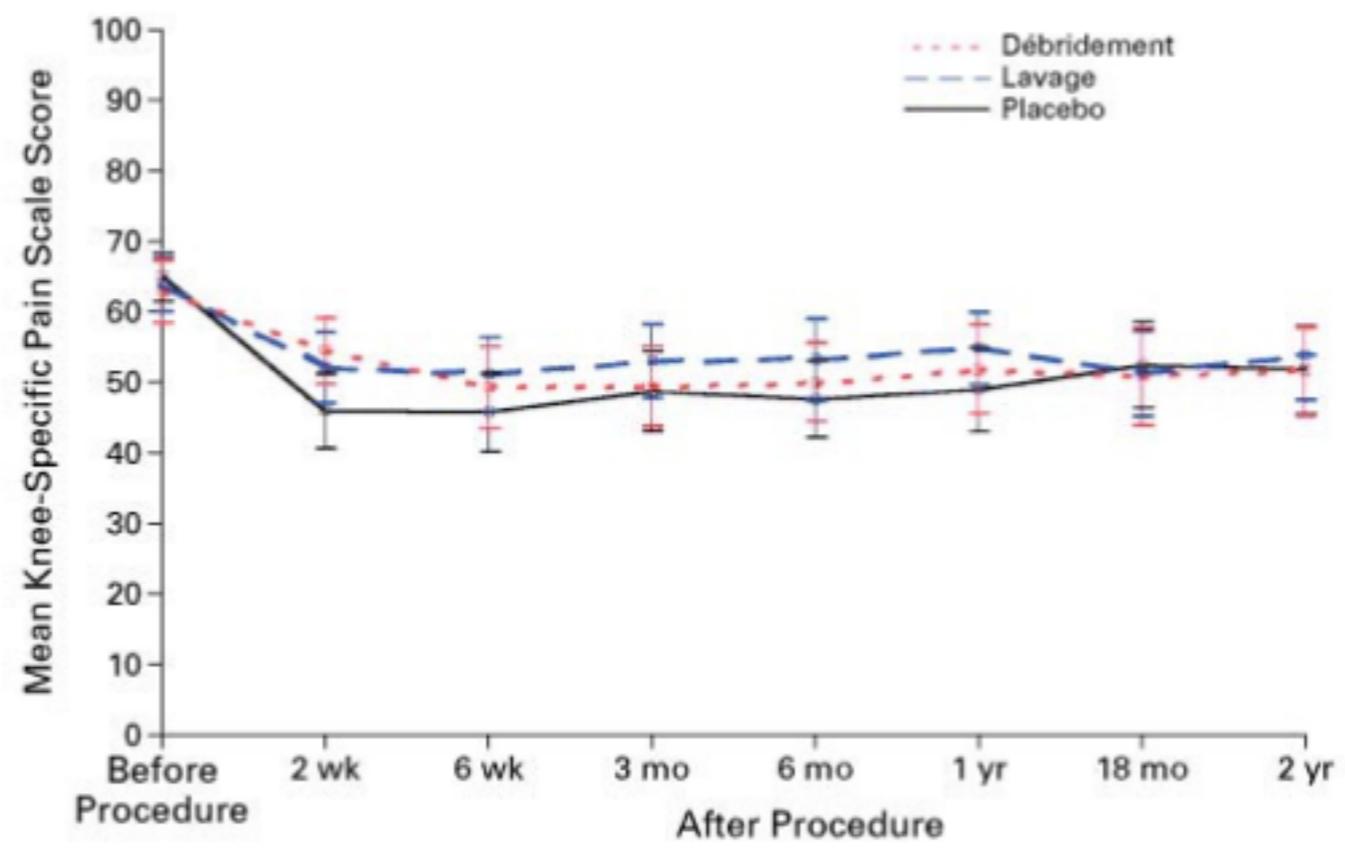
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## In real clinical trials

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- ❖ Placebos are used to see if an intervention is effective:
- ❖ Internal mammary artery ligation for angina
- ❖ A Controlled Trial of Arthroscopic Surgery for Osteoarthritis of the Knee





No. AT RISK	Before Procedure	2 wk	6 wk	3 mo	6 mo	1 yr	18 mo	2 yr
Placebo	60	59	57	56	57	53	52	55
Lavage	61	59	57	59	59	57	56	55
Débridement	58	59	59	58	56	50	51	53

**Figure 1. Mean Values (and 95 Percent Confidence Intervals) on the Knee-Specific Pain Scale.**

Assessments were made before the procedure and 2 weeks, 6 weeks, 3 months, 6 months, 12 months, 18 months, and 24 months after the procedure. Higher scores indicate more severe pain.

If an intervention is no better than placebo, the  
intervention does  
NOTHING

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# Myth 2 is True

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- ❖ SCAM = placebo effect
- ❖ Placebo effect = nothing
- ❖ therefore
- ❖ SCAM = Nothing

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- 
- ❖ CAM advocates tend to pass through these stages:
  - ❖ They accept testimonial evidence and see no need for scientific testing.
  - ❖ They recognize that the scientific community will not accept their claims without scientific testing.
  - ❖ They do some studies.
  - ❖ When flaws in the studies are pointed out, they try to do better studies.
  - ❖ A systematic analysis of all studies fails to support their claims.
  - ❖ They are forced to admit that there is no convincing scientific evidence that their treatment works better than placebo.
  - ❖ They argue that even if the treatment is only a placebo, it should be used for its placebo benefit.
  - ❖ They argue that placebos are “effective” and that it is acceptable to lie to patients

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# Myth 3

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- ❖ Anecdotes are data: It worked for me.
  - ❖ Corollaries:
    - ❖ My Aunts cousins best friend tried it for their disease that no one could get better and they improved, what do you say to that Mr. Know it all smarty pants skeptic?
    - ❖ Try it yourself.
    - ❖ Huge numbers of people use X, and they couldn't all be wrong.
    - ❖ It's been used for centuries so it must be effective

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# How do we know what works?

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- ❖ Personal experience? Anecdote?
- ❖ But this long history of learning how not to fool ourselves--of having utter scientific integrity--is, I'm sorry to say, something that we haven't specifically included in any particular course that I know of. We just hope you've caught on by osmosis.
- ❖ The first principle is that you must not fool yourself--and you are the easiest person to fool. So you have to be very careful about that. After you've not fooled yourself, it's easy not to fool other scientists. You just have to be honest in a conventional way after that.
  - ❖ --Richard Feynman.

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# How do we know what works?

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- ❖ "There's an old saying in Tennessee — I know it's in Texas, probably in Tennessee — that says, fool me once, shame on — shame on you. Fool me — you can't get fooled again."
- ❖ G. Bush Nashville, Tenn., Sept. 17, 2002

**Harmful to the brian** ★☆☆☆☆

by criggs2013 – May 20, 2013

Didn't need to listen. Read the synopsis of proven treatments (now 2013) such as Acupuncture. Dinosaur thinker this guy. Glad the meteor is coming for him.

Was this review helpful? [Yes](#) | [No](#) | [Report a Concern](#)

**lies** ★☆☆☆☆

by dr jeff smith – Jun 15, 2013

lies, mostly lies

Was this review helpful? [Yes](#) | [No](#) | [Report a Concern](#)

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# N-Rays

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- ❖ In 1903, Blondlot, a distinguished physicist who was one of eight physicists who were corresponding members of the French Academy of Science announced his discovery attempting to polarize X-rays.
- ❖ He had perceived changes in the brightness of an electric spark in a spark gap placed in an X-ray beam which he photographed and he later attributed to the novel form of radiation, naming it the N-ray.
- ❖ 120 other scientists in 300 published articles claimed to be able to detect N-rays emanating from most substances
- ❖ Most researchers of the subject at the time used the perceived light of a dim phosphorescent surface as "detectors", although work in the period clearly showed the change in brightness to be a physiological phenomenon rather than some actual change in the level of illumination

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# N Rays

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- ❖ In the darkened room, Wood secretly removed an essential prism from the experimental apparatus, yet the experimenters still said that they observed N-rays.
- ❖ He also secretly replaced a large file that was supposed to be giving off N-rays with an inert piece of wood, yet the N-rays were still "observed".
- ❖ His report on these investigations, published in Nature, suggested that N-rays were a purely subjective phenomenon, with the scientists involved having recorded data that matched their expectations. By 1905 no one outside Nancy believed in N-rays.
- ❖ The spirit of N Rays lives on in CAM

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# Clever Hans

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- ❖ was an Orlov Trotter horse that was claimed to have been able to perform arithmetic and other intellectual tasks.
- ❖ showed that as the horse's taps approached the right answer, the questioner's posture and facial expression changed in ways that were consistent with an increase in tension, which was released when the horse made the final, correct tap. This provided a cue that the horse could use to tell it to stop tapping.

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# Clever Hans

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- ❖ Humans are probably more sensitive and skilled than horses at reading nonverbal cues, leading to
- ❖ The observer-expectancy effect (also called the experimenter-expectancy effect, expectancy bias, observer effect, or experimenter effect) is a form of reactivity in which searcher's cognitive bias causes them to unconsciously influence the participants of an experiment. It is a significant threat to a study's internal validity, and is therefore typically controlled using a double-blind experimental design.
- ❖ Both N-rays and clever Hans are examples of the importance of blinding the researcher and the patient and why if blinding is not adequate then any results are suspect, especially if the end points are subjective.

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# Cognitive Errors/Logical Fallacies

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- ❖ There are several dozen of each.
- ❖ Beware the Jabberwock and the *Post hoc ergo propter hoc*,
- ❖ Latin for "after this, therefore because of this", is a logical fallacy (of the questionable cause variety) that states, "Since that event followed this one, that event must have been caused by this one".
- ❖ It is often shortened to simply post hoc and is also sometimes referred to as false cause, coincidental correlation, or correlation not causation

Anchoring – the common human tendency to rely too heavily, or "anchor," on one trait or piece of information when making decisions.

Attentional Bias – implicit cognitive bias defined as the tendency of emotionally salient stimuli in one's environment to preferentially draw and hold attention.

Bandwagon effect – the tendency to do (or believe) things because many other people do (or believe) the same. Related to groupthinkand herd behavior.

Bias blind spot – the tendency to see oneself as less biased than other people.[2]

Choice-supportive bias – the tendency to remember one's choices as better than they actually were.

Confirmation bias – the tendency to search for or interpret information in a way that confirms one's preconceptions.[3]

Congruence bias – the tendency to test hypotheses exclusively through direct testing, in contrast to tests of possible alternative hypotheses.

Contrast effect – the enhancement or diminishing of a weight or other measurement when compared with a recently observed contrasting object.[4]

Denomination effect – the tendency to spend more money when it is denominated in small amounts (e.g. coins) rather than large amounts (e.g. bills).[5]

Distinction bias – the tendency to view two options as more dissimilar when evaluating them simultaneously than when evaluating them separately.[6]

Endowment effect – "the fact that people often demand much more to give up an object than they would be willing to pay to acquire it".[7]

Experimenter's or Expectation bias – the tendency for experimenters to believe, certify, and publish data that agree with their expectations for the outcome of an experiment, and to disbelieve, discard, or downgrade the corresponding weightings for data that appear to conflict with those expectations.[8]

Focusing effect – the tendency to place too much importance on one aspect of an event; causes error in accurately predicting the utility of a future outcome.[9]

Framing effect – drawing different conclusions from the same information, depending on how that information is presented.

Hostile media effect - the tendency to see a media report as being biased due to one's own strong partisan views.

Hyperbolic discounting – the tendency for people to have a stronger preference for more immediate payoffs relative to later payoffs, where the tendency increases the closer to the present both payoffs are.[10]

Illusion of control – the tendency to overestimate one's degree of influence over other external events.[11]

Impact bias – the tendency to overestimate the length or the intensity of the impact of future feeling states.[12]

Information bias – the tendency to seek information even when it cannot affect action.[13]

Irrational escalation – the phenomenon where people justify increased investment in a decision, based on the cumulative prior investment, despite new evidence suggesting that the decision was probably wrong.

Loss aversion – "the disutility of giving up an object is greater than the utility associated with acquiring it".[14] (see also Sunk cost effectsand Endowment effect).

Mere exposure effect – the tendency to express undue liking for things merely because of familiarity with them.[15]

Money illusion – the tendency to concentrate on the nominal (face value) of money rather than its value in terms of purchasing power.[16]

Moral credential effect – the tendency of a track record of non-prejudice to increase subsequent prejudice.

Negativity bias – the tendency to pay more attention and give more weight to negative than positive experiences or other kinds of information.

Neglect of probability – the tendency to completely disregard probability when making a decision under uncertainty.[17]

Normalcy bias – the refusal to plan for, or react to, a disaster which has never happened before.

Omission bias – the tendency to judge harmful actions as worse, or less moral, than equally harmful omissions (inactions).[18]

Outcome bias – the tendency to judge a decision by its eventual outcome instead of based on the quality of the decision at the time it was made.

Planning fallacy – the tendency to underestimate task-completion times.[12]

Post-purchase rationalization – the tendency to persuade oneself through rational argument that a purchase was a good value.

Pseudocertainty effect – the tendency to make risk-averse choices if the expected outcome is positive, but make risk-seeking choices to avoid negative outcomes.[19]

Reactance – the urge to do the opposite of what someone wants you to do out of a need to resist a perceived attempt to constrain your freedom of choice.

Restraint bias – the tendency to overestimate one's ability to show restraint in the face of temptation.

Selective perception – the tendency for expectations to affect perception.

Semmelweis reflex – the tendency to reject new evidence that contradicts an established paradigm.[20]

Social comparison bias – the tendency, when making hiring decisions, to favour potential candidates who don't compete with one's own particular strengths.[21]

Status quo bias – the tendency to like things to stay relatively the same (see also loss aversion, endowment effect, and system justification).[22][23]

Unit bias — the tendency to want to finish a given unit of a task or an item. Strong effects on the consumption of food in particular.[24]

Wishful thinking – the formation of beliefs and the making of decisions according to what is pleasing to imagine instead of by appeal to evidence or rationality.[25]

Zero-risk bias – preference for reducing a small risk to zero over a greater reduction in a larger risk.

[edit]

Biases in probability and belief

Many of these biases are often studied for how they affect business and economic decisions and how they affect experimental research.

Ambiguity effect – the tendency to avoid options for which missing information makes the probability seem "unknown." [26]

Anchoring effect – the tendency to rely too heavily, or "anchor," on a past reference or on one trait or piece of information when making decisions (also called "insufficient adjustment").

Attentional bias – the tendency to neglect relevant data when making judgments of a correlation or association.

Availability heuristic – estimating what is more likely by what is more available in memory, which is biased toward vivid, unusual, or emotionally charged examples.

Availability cascade – a self-reinforcing process in which a collective belief gains more and more plausibility through its increasing repetition in public discourse (or "repeat something long enough and it will become true").

Base rate neglect or Base rate fallacy – the tendency to base judgments on specifics, ignoring general statistical information.[27]

Belief bias – an effect where someone's evaluation of the logical strength of an argument is biased by the believability of the conclusion [28]

Clustering illusion – the tendency to see patterns where actually none exist.

Conjunction fallacy – the tendency to assume that specific conditions are more probable than general ones.[29]

Forward Bias - the tendency to create models based on past data which are validated only against that past data.

Gambler's fallacy – the tendency to think that future probabilities are altered by past events, when in reality they are unchanged. Results from an erroneous conceptualization of the Law of large numbers. For example, "I've flipped heads with this coin five times consecutively, so the chance of tails coming out on the sixth flip is much greater than heads."

Hindsight bias – sometimes called the "I-knew-it-all-along" effect, the tendency to see past events as being predictable[30] at the time those events happened.

Illusory correlation – inaccurately perceiving a relationship between two events, either because of prejudice or selective processing of information.[31]

Observer-expectancy effect – when a researcher expects a given result and therefore unconsciously manipulates an experiment or misinterprets data in order to find it (see also subject-expectancy effect).

Optimism bias – the tendency to be over-optimistic about the outcome of planned actions.[32]

Ostrich effect – ignoring an obvious (negative) situation.

Overconfidence effect – excessive confidence in one's own answers to questions. For example, for certain types of questions, answers that people rate as "99% certain" turn out to be wrong 40% of the time.[33][34]

Positive outcome bias – the tendency of one to overestimate the probability of a favorable outcome coming to pass in a given situation (see also wishful thinking, optimism bias, and valence effect).

Pareidolia – a vague and random stimulus (often an image or sound) is perceived as significant, e.g., seeing images of animals or faces in clouds, the man in the moon, and hearing hidden messages on records played in reverse.

Pessimism bias – the tendency for some people, especially those suffering from depression, to overestimate the likelihood of negative things happening to them.

Primacy effect – the tendency to weigh initial events more than subsequent events.[35]

Recency effect – the tendency to weigh recent events more than earlier events (see also peak-end rule).

Disregard of regression toward the mean – the tendency to expect extreme performance to continue.

Stereotyping – expecting a member of a group to have certain characteristics without having actual information about that individual.

Subadditivity effect – the tendency to judge probability of the whole to be less than the probabilities of the parts.

Subjective validation – perception that something is true if a subject's belief demands it to be true. Also assigns perceived connections between coincidences.

Well travelled road effect – underestimation of the duration taken to traverse off-traveled routes and over-estimate the duration taken to traverse less familiar routes.

[edit]

Social biases

Most of these biases are labeled as attributional biases.

Actor–observer bias – the tendency for explanations of other individuals' behaviors to overemphasize the influence of their personality and underemphasize the influence of their situation (see also Fundamental attribution error). However, this is coupled with the opposite tendency for the self in that explanations for our own behaviors overemphasize the influence of our situation and underemphasize the influence of our own personality.

Dunning–Kruger effect – a twofold bias. On one hand the lack of metacognitive ability deludes people, who overrate their capabilities. On the other hand, skilled people underrate their abilities, as they assume the others have a similar understanding.[36]

Egocentric bias – occurs when people claim more responsibility for themselves for the results of a joint action than an outside observer would.

Forer effect (aka Barnum effect) – the tendency to give high accuracy ratings to descriptions of their personality that supposedly are tailored specifically for them, but are in fact vague and general enough to apply to a wide range of people. For example, horoscopes.

False consensus effect – the tendency for people to overestimate the degree to which others agree with them.[37]

Fundamental attribution error – the tendency for people to over-emphasize personality-based explanations for behaviors observed in others while under-emphasizing the role and power of situational influences on the same behavior (see also actor-observer bias, group attribution error, positivity effect, and negativity effect).[38]

Halo effect – the tendency for a person's positive or negative traits to "spill over" from one area of their personality to another in others' perceptions of them (see also physical attractiveness stereotype).[39]

Illusion of asymmetric insight – people perceive their knowledge of their peers to surpass their peers' knowledge of them.[40]

Illusion of transparency – people overestimate others' ability to know them, and they also overestimate their ability to know others.

Illusory superiority – overestimating one's desirable qualities, and underestimating undesirable qualities, relative to other people. (Also known as "Lake Wobegon effect," "better-than-average effect," or "superiority bias").[41]

Ingroup bias – the tendency for people to give preferential treatment to others they perceive to be members of their own groups.

Just-world phenomenon – the tendency for people to believe that the world is just and therefore people "get what they deserve."

Moral luck – the tendency for people to ascribe greater or lesser moral standing based on the outcome of an event rather than the intention

Outgroup homogeneity bias – individuals see members of their own group as being relatively more varied than members of other groups.[42]

Projection bias – the tendency to unconsciously assume that others (or one's future selves) share one's current emotional states, thoughts and values.[43]

Self-serving bias – the tendency to claim more responsibility for successes than failures. It may also manifest itself as a tendency for people to evaluate ambiguous information in a way beneficial to their interests (see also group-serving bias).[44]

System justification – the tendency to defend and bolster the status quo. Existing social, economic, and political arrangements tend to be preferred, and alternatives disparaged sometimes even at the expense of individual and collective self-interest. (See also status quo bias.)

Trait ascription bias – the tendency for people to view themselves as relatively variable in terms of personality, behavior and mood while viewing others as much more predictable.

Ultimate attribution error – similar to the fundamental attribution error, in this error a person is likely to make an internal attribution to an entire group instead of the individuals within the group.

[edit]

Memory errors

Further information: Memory bias

Cryptomnesia – a form of misattribution where a memory is mistaken for imagination.

Egocentric bias – recalling the past in a self-serving manner, e.g. remembering one's exam grades as being better than they were, or remembering a caught fish as being bigger than it was.

False memory – confusion of imagination with memory, or the confusion of true memories with false memories.

Hindsight bias – filtering memory of past events through present knowledge, so that those events look more predictable than they actually were; also known as the "I-knew-it-all-along effect." [30]

Reminiscence bump – the effect that people tend to recall more personal events from adolescence and early adulthood than from other lifetime periods.

Rosy retrospection – the tendency to rate past events more positively than they had actually rated them when the event occurred.

Self-serving bias – perceiving oneself responsible for desirable outcomes but not responsible for undesirable ones.

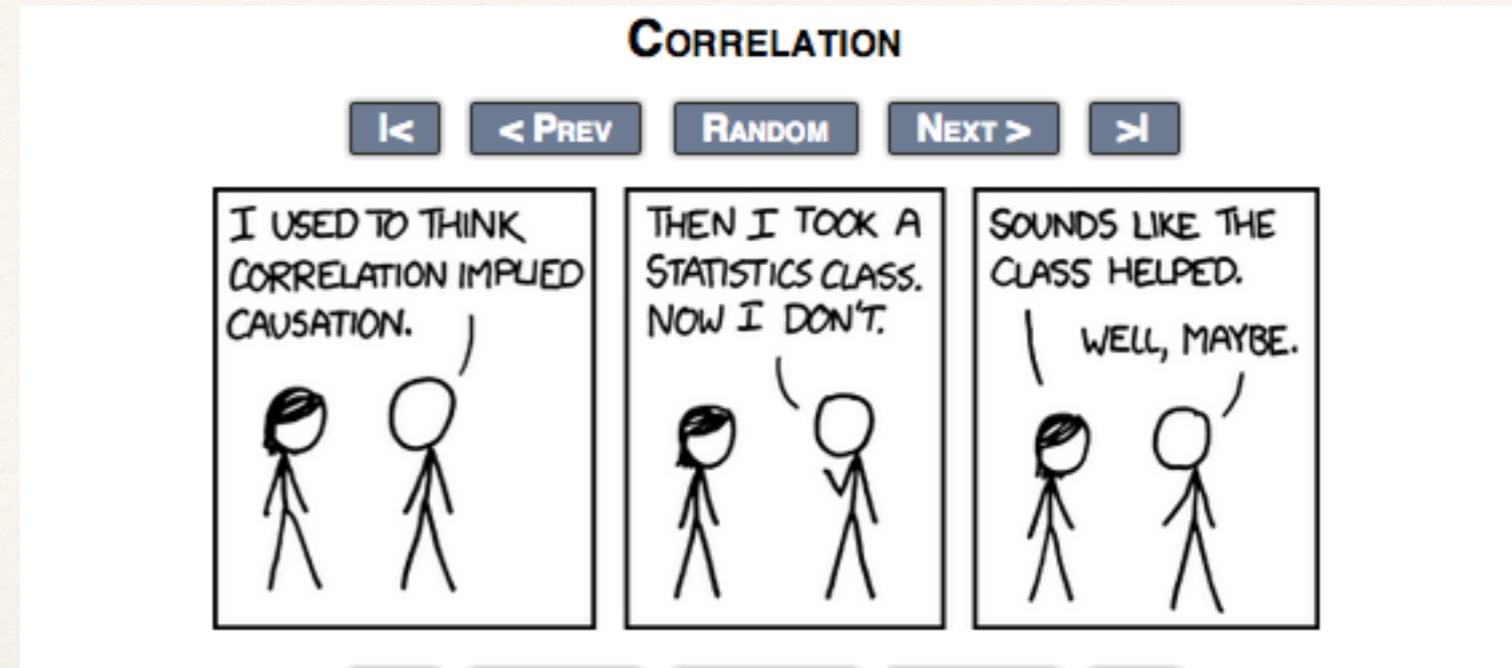
Suggestibility – a form of misattribution where ideas suggested by a questioner are mistaken for memory.

Telescoping effect – the effect that recent events appear to have occurred more remotely and remote events appear to have occurred more recently.

Von Restorff effect – the tendency for an item that "stands out like a sore thumb" to be more likely to be remembered than other items.

Focusing effect – the tendency to place too much importance on one aspect of an event; causes error in accurately predicting the utility of a future outcome

Illusory correlation – inaccurately perceiving a relationship between two events, either because of prejudice or selective processing of information



Confirmation bias – the tendency to search for or interpret information in a way that confirms one's preconceptions

Clustering illusion – the tendency to see patterns where actually none exist.

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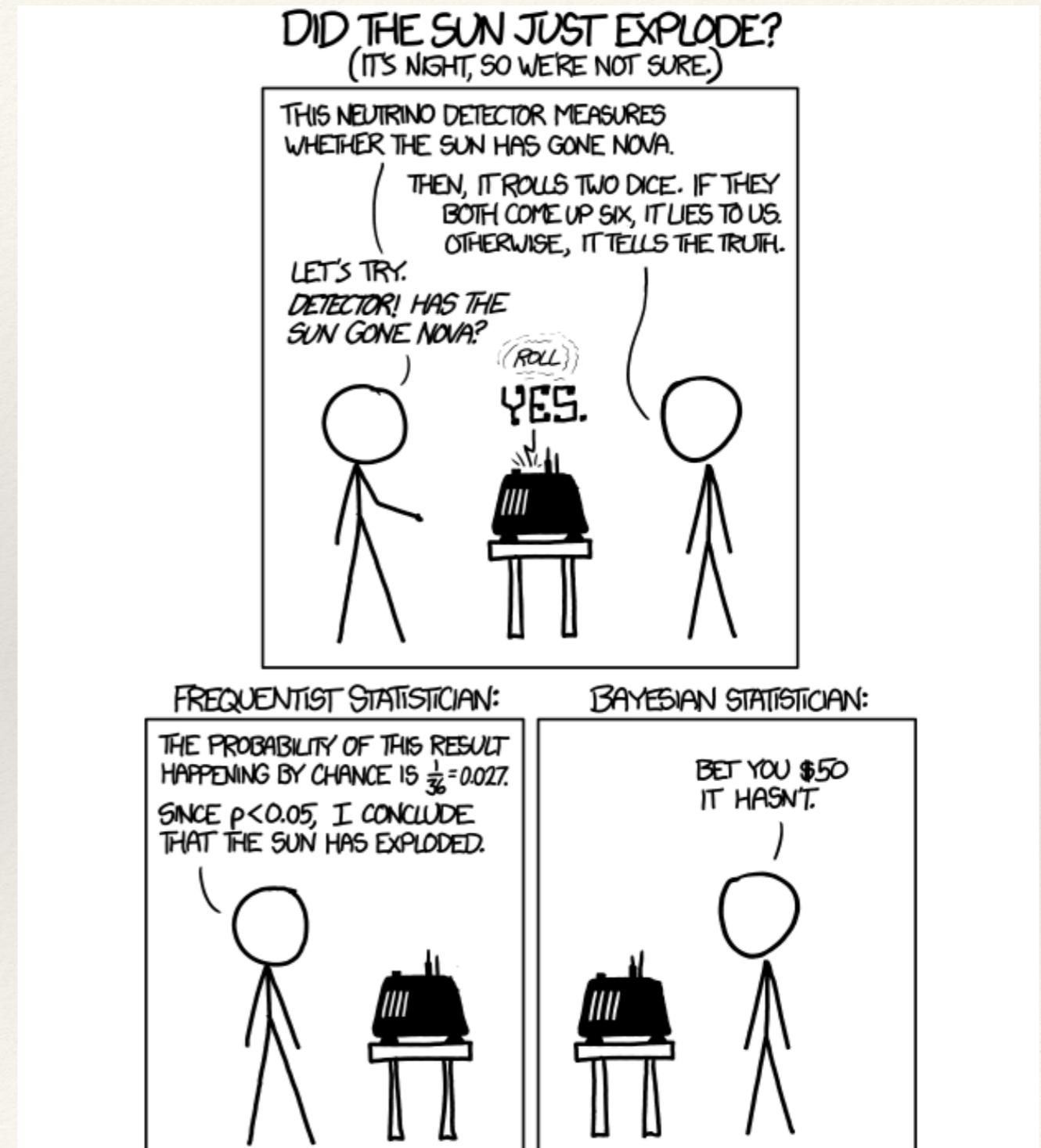
# Wait. There More

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- ❖ The Dunning–Kruger effect is a cognitive bias in which unskilled people make poor decisions and reach erroneous conclusions, but their incompetence denies them the metacognitive ability to recognize their mistakes.
- ❖ The unskilled therefore suffer from illusory superiority, rating their ability as above average, much higher than it actually is, while the highly skilled underrate their own abilities, suffering from illusory inferiority.
- ❖ Actual competence may weaken self-confidence, as competent individuals may falsely assume that others have an equivalent understanding. As Kruger and Dunning conclude, "the miscalibration of the incompetent stems from an error about the self, whereas the miscalibration of the highly competent stems from an error about others" (p. 1127).
- ❖ The effect is about paradoxical defects in cognitive ability, both in oneself and as one compares oneself to others.

# Bayes' theorem

In the Bayesian (or epistemological) interpretation, probability measures a degree of belief. Bayes' theorem then links the degree of belief in a proposition before and after accounting for evidence.



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# At the end of the day

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- ❖ It is often very difficult to know if an intervention works, in what populations and under what circumstances
- ❖ It is why the three most dangerous words in Medicine?
- ❖ I lack insurance
- ❖ In my experience
- ❖ a negative study is more likely true than a positive one

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# The Problem

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- ❖ We have almost countless ways to fool ourselves and only one, un-natural, way to determine reality and efficacy.
- ❖ We have evolved to survive reality, not to understand it.

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# Why Most Published Research Findings Are False

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- ❖ It can be proven that most claimed research findings are false

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# Wait. There's More

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- ❖ PLoS Med. 2005 August; 2(8): e124. Why Most Published Research Findings Are False  
John P. A. Ioannidis
- ❖ There is increasing concern that most current published research findings are false. The probability that a research claim is true may depend on study power and bias, the number of other studies on the same question, and, importantly, the ratio of true to no relationships among the relationships probed in each scientific field. In this framework, a research finding is less likely to be true when the studies conducted in a field are smaller; when effect sizes are smaller; when there is a greater number and lesser preselection of tested relationships; where there is greater flexibility in designs, definitions, outcomes, and analytical modes; when there is greater financial and other interest and prejudice; and when more teams are involved in a scientific field in chase of statistical significance. Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true. Moreover, for many current scientific fields, claimed research findings may often be simply accurate measures of the prevailing bias. In this essay, I discuss the implications of these problems for the conduct and interpretation of research.

"IT HAS LONG BEEN KNOWN"	I didn't look up the original reference.
"A DEFINITE TREND IS EVIDENT"	The data are practically meaningless.
"WHILE IT HAS NOT BEEN POSSIBLE TO PROVIDE DEFINITE ANSWERS TO THE QUESTIONS"	An unsuccessful experiment, but I still hope to get it published.
"THREE OF THE SAMPLES WERE CHOSEN FOR DETAILED STUDY"	The other results didn't make any sense.
"TYPICAL RESULTS ARE SHOWN"	This is the prettiest graph.
"THESE RESULTS WILL BE IN A SUBSEQUENT REPORT"	I might get around to this sometime, if published/funded.
"A CAREFUL ANALYSIS OF OBTAINED DATA"	Three pages of notes were obliterated when I knocked over a glass of beer.
"AFTER ADDITIONAL STUDY BY MY COLLEAGUES"	They didn't understand it, either.
"THANKS ARE DUE TO JOE BLOTZ FOR ASSISTANCE WITH THE EXPERIMENT AND TO CINDY ADAMS FOR VALUABLE DISCUSSIONS"	Mr. Blotz did the work and Ms. Adams explained to me what it meant.
"A HIGHLY SIGNIFICANT AREA FOR EXPLORATORY STUDY"	A totally useless topic selected by my committee.
"IN MY EXPERIENCE"	Once
"IN CASE AFTER CASE"	Twice
"IN A SERIES OF CASES"	Three times
"IT IS BELIEVED THAT"	I think.
"IT IS GENERALLY BELIEVED THAT"	A couple of others think so, too.
"CORRECT WITHIN AN ORDER OF MAGNITUDE"	Wrong.
"ACCORDING TO STATISTICAL ANALYSIS"	Rumor has it.
"IT IS CLEAR THAT MUCH ADDITIONAL WORK WILL BE REQUIRED BEFORE A COMPLETE UNDERSTANDING OF THIS PHENOMENON OCCURS"	I don't understand.
"A STATISTICALLY-ORIENTED PROJECTION OF THE SIGNIFICANCE OF THESE FINDINGS"	A wild guess.
"IT IS HOPED THAT THIS STUDY WILL STIMULATE FURTHER INVESTIGATIONS IN THIS FIELD"	I quit.

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# Why Most Published Research Findings Are False

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- ❖ Corollary 1: The smaller the studies conducted in a scientific field, the less likely the research findings are to be true.
- ❖ Corollary 2: The smaller the effect sizes in a scientific field, the less likely the research findings are to be true.
- ❖ Corollary 3: The greater the number and the lesser the selection of tested relationships in a scientific field, the less likely the research findings are to be true.
- ❖ Corollary 4: The greater the flexibility in designs, definitions, outcomes, and analytical modes in a scientific field, the less likely the research findings are to be true.
- ❖ Corollary 5: The greater the financial and other interests and prejudices in a scientific field, the less likely the research findings are to be true.
- ❖ Corollary 6: The hotter a scientific field (with more scientific teams involved), the less likely the research findings are to be true.

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# Wait. There's More

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- ❖ 1) In evaluating any study try to take into account the amount of background noise. That is, remember that the more hypotheses which are tested and the less selection which goes into choosing hypotheses the more likely it is that you are looking at noise.
- ❖ 2) Bigger samples are better. (But note that even big samples won't help to solve the problems of observational studies which is a whole other problem).
- ❖ 3) Small effects are to be distrusted.
- ❖ 4) Multiple sources and types of evidence are desirable.
- ❖ 5) Evaluate literatures not individual papers.
- ❖ 6) Trust empirical papers which test other people's theories more than empirical papers which test the author's theory.

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# Myth 4

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- ❖ What's the harm?
  - ❖ Corollary: Real Medicine is dangerous
    - ❖ Only if you don't understand how it works

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# Real Medicine is Dangerous

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- ❖ **To Err is Human: Building a Safer Health System** is a report issued in November 1999 by the U.S. Institute of Medicine that may have resulted in increased awareness of U.S. medical errors which concluded that between 44,000 to 98,000 people die each year as a result of preventable medical errors.

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- 
- ❖ No good deed goes unpunished.
  - ❖ What we do on medicine (one hopes) not as dangerous as the disease.
  - ❖ I always tell patients that in medicine there is often not a good solution, only the least bad solution.

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# Response of Medicine?

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- ❖ Using evidence from clinical trials, Institute for Healthcare Improvement's 100,000 Lives Campaign, which in 2006 claimed to have prevented an estimated 124,000 deaths in a period of 18 months through patient-safety initiatives in over 3,000 hospitals.
- ❖ My own system improving care: 2000 infections prevented, 200 death prevented.

The ten countries with the highest crude death rate, according to the 2012 [CIA World Factbook](#) estimates, are:<sup>[4]</sup>

Rank	Country	Death rate (annual deaths/1000 persons)
1	 South Africa	17.23
2	 Ukraine	15.76
3	 Lesotho	15.18
4	 Chad	15.16
5	 Guinea-Bissau	15.01
6	 Central African Republic	14.71
7	 Afghanistan	14.59
8	 Somalia	14.55
9	 Bulgaria	14.32
10	 Swaziland	14.21

See [list of countries by death rate](#) for worldwide statistics.

According to the [World Health Organization](#), the 10 leading causes of death in 2002 were:

1. 12.6% Ischaemic heart disease
2. 9.7% Cerebrovascular disease
3. 6.8% Lower respiratory infections
4. 4.9% HIV/AIDS
5. 4.8% Chronic obstructive pulmonary disease
6. 3.2% Diarrhoeal diseases
7. 2.7% Tuberculosis
8. 2.2% Trachea/bronchus/lung cancers
9. 2.2% Malaria
10. 2.1% Road traffic accidents

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# # of top 10 of Diseases cured or altered by SCAM

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- ❖ 1)
- ❖ 2)
- ❖ 3)
- ❖ 4)
- ❖ 5)
- ❖ 6)
- ❖ 7)
- ❖ 8)
- ❖ 9)
- ❖ 10)

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# Years Added to US life expectancy by SCAMs

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# SCAM practices changed by application of clinical trials or other evidence

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- ❖ 1) Sterile and disposable acupuncture needles
- ❖ 2)
- ❖ 3)
- ❖ 4)
- ❖ 5)
- ❖ 6)
- ❖ 7)

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# What's the harm

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- ❖ there is the harm of not using reality / science based medicine:
  - ❖ avoiding standard treatment for cancer etc
  - ❖ avoiding vaccines
    - ❖ Vaccine preventable illnesses are on the upswing

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# What is the harm

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- ❖ False hope
- ❖ \$\$ and time wasted
- ❖ Direct harm from the nonsense

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# Direct Harm

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- ❖ Bull World Health Organ. 2010 Dec 1;88(12):915-921C. Epub 2010 Aug 27.
- ❖ Acupuncture-related adverse events: a systematic review of the Chinese literature.
- ❖ OBJECTIVE:
  - ❖ to systematically review the Chinese-language literature on acupuncture-related adverse events.
- ❖ METHODS:
  - ❖ we searched three Chinese databases (the Chinese Biomedical Literature Database, 1980-2009; the Chinese Journal Full-Text Database, 1980-2009; and the Weipu Journal Database, 1989-2009) to identify Chinese-language articles about the safety of traditional needle acupuncture. Case reports, case series, surveys and other observational studies were included if they reported factual data, but review articles, translations and clinical trials were excluded.
- ❖ FINDINGS:
  - ❖ the inclusion criteria were met by 115 articles (98 case reports and 17 case series) that in total reported on 479 cases of adverse events after acupuncture. Fourteen patients died. Acupuncture-related adverse events were classified into three categories: traumatic, infectious and "other". The most frequent adverse events were **pneumothorax, fainting, subarachnoid haemorrhage and infection, while the most serious ones were cardiovascular injuries, subarachnoid haemorrhage, pneumothorax and recurrent cerebral haemorrhage.**
- ❖ CONCLUSION:
  - ❖ many acupuncture-related adverse events, most of them owing to improper technique, have been described in the published Chinese literature. Efforts should be made to find effective ways of monitoring and minimizing the risks related to acupuncture.



Doug Beghtel/The Oregonian

The new National College of Natural Medicine clinic will treat roughly 20,000 patients and train hundreds of students like Alysha Barbour, who gives an acupuncture treatment as instructor Youping Qin watches.

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# Direct Harm

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- ❖ Infect Control Hosp Epidemiol. 2008 Sep;29(9):859-65.
- ❖ Outbreak of invasive methicillin-resistant Staphylococcus aureus infection associated with acupuncture and joint injection.
- ❖ OBJECTIVE:
  - ❖ To describe an outbreak of invasive methicillin-resistant Staphylococcus aureus (MRSA) infection after percutaneous needle procedures (acupuncture and joint injection) performed by a single medical practitioner.
- ❖ SETTING:
  - ❖ A medical practitioner's office and 4 hospitals in Perth, Western Australia.
- ❖ PATIENTS:
  - ❖ Eight individuals who developed invasive MRSA infection after acupuncture or joint injection performed by the medical practitioner.
- ❖ METHODS:
  - ❖ We performed a prospective and retrospective outbreak investigation, including MRSA colonization surveillance, environmental sampling for MRSA, and detailed molecular typing of MRSA isolates. We performed an infection control audit of the medical practitioner's premises and practices and administered MRSA decolonization therapy to the medical practitioner.
- ❖ RESULTS:
  - ❖ Eight cases of invasive MRSA infection were identified. Seven cases occurred as a cluster in May 2004; another case (identified retrospectively) occurred approximately 15 months earlier in February 2003. The primary sites of infection were the neck, shoulder, lower back, and hip: 5 patients had septic arthritis and bursitis, and 3 had pyomyositis; 3 patients had bacteremia, including 1 patient with possible endocarditis. The medical practitioner was found to be colonized with the same MRSA clone [ST22-MRSA-IV (EMRSA-15)] at 2 time points: shortly after the first case of infection in March 2003 and again in May 2004. After the medical practitioner's premises and practices were audited and he himself received MRSA decolonization therapy, no further cases were identified.

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## Acupuncture needle found in ex-S.Korea president's lung

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– Wed May 4, 11:23 am ET

SEOUL (Reuters) – Former South Korean president Roh Tae-woo was admitted to hospital with a bad cough and ended up on the operating table to remove an acupuncture needle from his right lung.

Local media reports said Roh, 78, was released from Seoul National University Hospital Monday after surgery to remove the 6.5 cm needle.

Doctors are puzzled how the needle ended up in his lung, and acupuncturists say that none of their procedures involved penetrating the lung.

"I can't figure out how the needle got into there," Dr Sung Myung-whun was quoted as telling reporters at the hospital after the operation. "It is a mystery for me, too."

Roh, who served as president from 1988 to 1993, has been in poor health since 2002 when he received surgery for prostate cancer.

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# Harm

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- ❖ Journal of Neurology August 1999, Volume 246, Issue 8, pp 683-688 Stroke following chiropractic manipulation of the cervical spine
- ❖ A. Hufnagel, Alexander Hammers, Paul-Walter Schönle, Klaus-Dieter Böhm, Georg Leonhardt
- ❖ We analyzed the clinical course and neuroradiological findings of ten patients aged 27–46 years, with ischemic stroke secondary to vertebral artery dissection (VAD; n = 8) or internal carotid artery dissection (CAD; n = 2), all following chiropractic manipulation of the cervical spine. The following observations were made: (a) All patients had uneventful medical histories, no or only mild vascular risk factors, and no predisposing vascular lesions. (b) VAD was unilateral in five patients and bilateral in three. VAD was located close to the atlantoaxial joint in all eight patients and showed additional involvement of lower sections in six, as well as temporary occlusion of one vertebral artery in three. (c) Nine of ten patients had brain infarction documented by magnetic resonance imaging or computed tomography. (d) Onset of symptoms was immediately after the manipulation (n = 5) or within 2 days (n = 5). (e) Progression of neurological deficits occurred within the following hours to a maximum of 3 weeks. (f) Maximum neurological deficits were severe in nine of ten patients. (g) Outcome after 4 weeks–3 years included no or mild neurological deficits in five patients, marked deficits in three, persistent locked-in syndrome in one, and persistent vegetative state in one. (h) Informed consent was obtained in only one of ten patients. Thus, patients at risk for stroke after chiropractic manipulation may not be identified a priori. Neurological deficits may be severely disabling and are potentially life threatening.

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- ❖ Deaths Associated with Hypocalcemia from Chelation Therapy --- Texas, Pennsylvania, and Oregon, 2003--2005
  - ❖ Chelating agents bind lead in soft tissues and are used in the treatment of lead poisoning to enhance urinary and biliary excretion of lead, thus decreasing total lead levels in the body (1). During the past 30 years, environmental and dietary exposures to lead have decreased substantially, resulting in a considerable decrease in population blood lead levels (BLLs) (2) and a corresponding decrease in the number of patients requiring chelation therapy. Chelating agents also increase excretion of other heavy metals and minerals, such as zinc and, in certain cases, calcium (1). This report describes three deaths associated with chelation-therapy--related hypocalcemia that resulted in cardiac arrest
  - ❖ one was for autism, one was by an ND

N Engl J Med. 1982 Aug 5;307(6):339-42.

An outbreak of amebiasis spread by colonic irrigation at a chiropractic clinic.

Istre GR, Kreiss K, Hopkins RS, Healy GR, Benziger M, Canfield TM, Dickinson P, Englert TR, Compton RC, Mathews HM, Simmons RA.

#### Abstract

From June 1978 through December 1980, at least 36 cases of amebiasis occurred in persons who had had colonic-irrigation therapy at a chiropractic clinic in western Colorado. Of 10 persons who required colectomy, six did. Of 176 persons who had been to the clinic in the last four months of 1980, 80 had received other forms of treatment. Twenty-one per cent of the colonic-irrigation group had bloody diarrhea, as compared with 1 per cent of the non-irrigation group ( $P = 0.00013$ ). Thirty-seven per cent of the colonic-irrigation group who submitted specimens had evidence of amebic infection on either stool examination or serum titer, as compared with 2.4 per cent in the non-irrigation group ( $P = 0.00012$ ). Persons who were given colonic irrigation immediately after a person with bloody diarrhea received it were at the highest risk for the development of amebiasis. Tests of the colonic-irrigation machine after routine cleaning showed heavy contamination with fecal coliform bacteria. The severity of disease in this outbreak may have been related to the route of inoculation.

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# more myths and misconceptions

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- ❖ 1. Big Pharma is paying you to promote their products and discredit CAM.
- ❖ 2. You're biased.
- ❖ 3. You're afraid of the competition.
- ❖ 4. **Science isn't everything: there are other ways of knowing.**
- ❖ 5. It worked for me.
- ❖ 6. Try it yourself.
- ❖ 7. Huge numbers of people use X, and they couldn't all be wrong.
- ❖ 8. It's been used for centuries.
- ❖ 9. It's natural, therefore it's safe.
- ❖ 10. There is proof that X is correlated with Y (cites study).

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# more myths and misconceptions

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- ❖ 11. There are hundreds of studies that show X works.
- ❖ 12. You are just robotically supporting the official party line of mainstream medicine.
- ❖ 13. **Doctors only treat symptoms, not the underlying cause of disease.**
- ❖ 14. Science-based medicine can't explain why some people get a disease and others don't.
- ❖ 15. Conventional medicine kills patients.
- ❖ 16. Your minds are closed.
- ❖ 17. You are too prejudiced against CAM to look objectively at our evidence for it. No amount of evidence would change your minds.
- ❖ 18. **Science keeps changing its mind.**
- ❖ 19. Doctors are only out to make money.
- ❖ 20. Alternative treatments are individualized and can't be subjected to the same tests as pharmaceuticals.

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# more myths and misconceptions

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- ❖ 21. Doctors don't do prevention.
- ❖ 22. Doctors don't know anything about nutrition.
- ❖ 23. **CAM is better because it's holistic.**
- ❖ 24. We don't need studies; we have plenty of testimonials.
- ❖ 25. Why won't you believe us?
- ❖ 26. If you think X doesn't work, why don't you do a study to prove it?
- ❖ 27. **Natural remedies don't get tested because they can't be patented and there's no profit in it.**
- ❖ 28. The medical establishment would drum out any doctor who tried to publish studies going against the party line, showing that X worked or that condition Y was real.
- ❖ 29. You can't know about it if you haven't experienced it.
- ❖ 30. If CAM makes people feel better, why deny them that? Even if it's just a placebo, isn't that a good thing?
- ❖ 31. X is officially approved by...so it must work.
- ❖ 32. I can't afford conventional medicine; CAM costs less.
- ❖ 33. Studies show it doesn't work, but what if it only works for me and a small minority of people like me?
- ❖ 34. My doctor said nothing was wrong with me, but my CAM provider did a test conventional medicine doesn't do, and found a condition that needed to be treated.
- ❖ 35. Conventional medicine doesn't have an effective treatment for my disease.
- ❖ 36. Why do you concentrate so obsessively on CAM instead of attacking the abuses of conventional medicine and Big Pharma?

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# Conclusions

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- ❖ None really
- ❖ It is all a big, complicated mess.
- ❖ [www.sciencebasedmedicine.org](http://www.sciencebasedmedicine.org)
- ❖ [www.edgydoc.com](http://www.edgydoc.com)
- ❖ want a pdf of the talk, email me [mcrislip@mac.com](mailto:mcrislip@mac.com)





