“Ignorance has no place in medical schools and hospitals: Down with Agnotology!”

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Do you know in what is Mexico the world leader?
a) Food (tacos)
b) Corruption
c) Tourism spots
d) Drug traffic
e) Adult jokes
f) Educational innovation
g) None of the above
WHAT EACH COUNTRY LEADS THE WORLD IN

MAPLE SYRUP AND ASTEROID IMPACTS
- Maple syrup
- Asteroid impacts
- Nobel laureates
- Getting killed by lawnmowers

PERSONAL SPACE

RASPBERRIES AND NUCLEAR WARHEADS
- Raspberries
- Nuclear warheads

Uranium

CO2 EMISSIONS AND RENEWABLE ENERGY
- CO2 emissions
- Renewable energy

MOVIES

APRICOTS

PEARL JAM

MARINA BARDI

DANCEHALL REGGAE

YELLOW SUBMARINE

WEED

FOSSILS

SHEEP AND MUTTON

DEADLY ANIMALS AND MELANOMA

VELOCIRAPTOR BONES

DEADLY SHARK ATTACKS

ROBOTS

CAVES

VOLCANOES

EMPEROR PENGUINS

MOST COUNTRIES LEAD THE WORLD IN SOMETHING: SOMETIMES GOOD THINGS, SOMETIMES NOT SO GOOD THINGS, AND SOMETIMES FUNNY THINGS. THIS MAP SHOWS WHAT EACH COUNTRY DOES BEST COMPARED TO ALL OTHER COUNTRIES. DATA SOURCES: HTTP://THEDOGHOUSEDIARIES.COM/MAILESYRUP/

http://thedoghousediaries.com/5414
Learning objectives

✓ To reflect on the concepts of agnotology, ignorance, doubt and uncertainty and their role in clinical medicine.

✓ To identify your feelings about these concepts as a clinician, educator and human being.

✓ To discuss potential approaches to teach agnotology, uncertainty, ignorance and doubt in healthcare settings.
“Medicine is a science of uncertainty and an art of probability”
- William Osler

“Doubt is an uncomfortable condition, but certainty is a ridiculous one”
- Voltaire
I stopped trusting doctors after my third appendectomy.
“... The failure to train appropriately students for clinical uncertainty, has been the most important deficiency of medical education in the 20th century...”

"I'm sorry but there are now 16,000 medical journals, and I no longer have time to see any patients."
The Case for Teaching Ignorance

By JAMIE HOLMES  AUG. 24, 2015

www.nytimes.com/2015/08/24/opinion/the-case-for-teaching-ignorance.html?_r=1
Session overview...

✓ Personal and group views on the subject
✓ What is agnotology?
✓ Implications in medical education
✓ Conclusions and reflections...
Who said this?

“All I know is that I know nothing”

a) Socrates
b) Plato
c) D. Trump
d) Don’t know
“...as we know, 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”.

Donald Rumsfeld
THE BOOK OF
General Ignorance
EVERYTHING YOU THINK YOU KNOW IS WRONG
John Lloyd & John Mitchinson

Where is the driest place on earth?

Antarctica. Parts of the continent have seen no rain for two million years.
What is...?

- Ignorance
- Uncertainty
- Agnotology

From your perspective as...
- a person/human being
- a professional
- an educator
Group discussion
By ignorance the truth is known.

Henry Suso (1300–65), The Little Book of Truth
ignorance

noun | igno·rance | \ˈig-nə(r)-ən(t)s\

Simple Definition of IGNORANCE

: a lack of knowledge, understanding, or education : the state of being ignorant
Uncertainty: situation which involves imperfect and/or unknown information (Wikipedia).

Subtly different in many fields: insurance, philosophy, physics, statistics, economics, finance, psychology, sociology, engineering, metrology, and information science.

Uncertainty: “the subjective perception of ignorance”.

✓ **Agnotology**: the study of culturally induced ignorance or doubt, particularly the publication of inaccurate or misleading scientific data.

✓ Neologism coined by Robert N. Proctor, Stanford professor of history of science.

Derives from Greek agnōsis, “not knowing”.

The term also highlights the increasingly common condition where more knowledge of a subject leaves one more uncertain than before.

https://en.wikipedia.org/wiki/Agnatology
AGNOTOLOGY
THE MAKING & UNMAKING OF IGNORANCE
EDITED BY ROBERT N. PROCTOR & LONDA SCHEBINGER

http://www.sup.org/books/title/?id=11232
Routledge International Handbook of Ignorance Studies

Edited by Matthias Gross and Linsey McGoey
Taxonomy of ignorance

1) **As primitive or native state:** most common; prompt for knowledge; implies deficit; e.g. grant application: “We know this but not yet this - so fund me please!”

2) **As lost realm (or selective choice):** political geography, inquiry is selective; “a way of seeing is also a way of not seeing”; e.g. peer review process.

3) **As deliberately engineered and strategic ploy:** intentional maintenance of ignorance; trade secrets; e.g. tobacco industry (“doubt is our product”); WMD.

Proctor RN. Agnotology. SUP. 2008
“Don’t believe everything you read on the Internet just because there’s a picture with a quote next to it.”

—Abraham Lincoln
OH, YOU'RE A FIRST YEAR MEDICAL STUDENT?
An ignorant doctor is the aide-de-camp of death.

(Avicenna)
Why would you trust doctors and scientists with years of training and education when you can trust moms and celebrities with opinions about vaccines?
Donald J. Trump
@realDonaldTrump

Healthy young child goes to doctor, gets pumped with massive shot of many vaccines, doesn't feel good and changes - AUTISM. Many such cases!

8:35 AM - 28 Mar 2014

517 RETWEETS 301 FAVORITES
For a better start in life
START COLA earlier!

How soon is too soon?

Not soon enough. Laboratory tests over the last few years have proven that babies who start drinking soda during that early formative period have a much higher chance of gaining acceptance and "fitting in" during those awkward pre-teen and teen years. So, do yourself a favor. Do your child a favor. Start them on a strict regimen of sodas and other sugary carbonated beverages right now, for a lifetime of guaranteed happiness.

The Soda Pop Board of America
1515 W. Hart Ave. - Chicago, ILL.
According to repeated nationwide surveys,

More Doctors Smoke CAMELS than any other cigarette!

Doctors in every branch of medicine were asked, "What cigarette do you smoke?"
The brand named most was Camel!

You'll enjoy Camels for the same reasons so many doctors enjoy them. Camels have cool, cool mildness, pack after pack, and a flavor unmatched by any other cigarette. Make this sensible test: Smoke only Camels for 30 days and see how well Camels please your taste, how well they suit your throat as your steady smoke. You'll see how enjoyable a cigarette can be!

THE DOCTORS' CHOICE IS AMERICA'S CHOICE!

For 30 days, test Camels in your "T-Zone" (T for Throat; T for Taste).
Our new teacher's very ignorant... ...She's always asking questions.
How can we teach health sciences students (and teachers) to deal with ignorance, uncertainty and doubt?
Group discussion
A curriculum on medical ignorance

✓ Multifaceted curriculum on medical ignorance.
✓ Questioning seminars, clinical and laboratory experiences.
✓ Attitudes and behaviors to deal constructively with medical ignorance and the limitations of “knowledge of the day”.
✓ Prepare for uncertainty in practice.

Curriculum components

✓ Seminars and Clinics on Medical Ignorance.
✓ Summer Institute on Medical Ignorance.
✓ “Visiting Professors of Ignorance”.

Students come to understand the concept of medical ignorance as they get hands-on training and learn how to ask profound questions.

Enter the wonderful and daunting world of medical and other ignorance...

The focus of this federally funded program uses the insights and techniques of medical ignorance to improve science education and health literacy by focusing on Questions, Questioning and Questioners.

http://ignorance.medicine.arizona.edu/
Agnotology as a Teaching Tool: Learning Climate Science by Studying Misinformation

Daniel Bedford

Abstract
Despite the existence of a clear scientific consensus about global warming, opinion surveys find confusion among the American public, regarding both scientific issues and the strength of the scientific consensus. Evidence increasingly points to misinformation as a contributing factor. This situation is both a challenge and an opportunity for science educators, including geographers. The direct study of misinformation—termed agnotology (Proctor 2008)—can potentially sharpen student critical thinking skills, raise awareness of the processes of science such as peer review, and improve understanding of the basic science. This potential is illustrated with examples from a small, upper-division collegiate weather and climate class.
This Idea Must Die

“A mind-blowing gathering of innovative thinkers.”
—Booklist

Scientific Theories That Are Blocking Progress

Edited by
JOHN BROCKMAN
Editor of
This Explains Everything

EDGE.ORG Presents Today’s Leading Thinkers

Jared Diamond, Richard Thaler, Steven Pinker, Richard Dawkins, Nassim Nicholas Taleb, Ian McEwan, Rebecca Newberger Goldstein, Freeman Dyson, Daniel Goleman, Alan Guth, and more

https://www.harpercollins.com/9780062374349/this-idea-must-die
“What you do speaks so loudly that I cannot hear what you say”

Ralph Waldo Emerson
Sources of complexity in clinical decision making

- Proteomics and other effector molecules
- Functional genetics: Gene expression profiles
- Structural genetics: e.g., SNPs, haplotypes
- Decisions by clinical phenotype

Best Care at Lower Cost
The Path to Continuously Learning Health Care in America

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES
Development and implementation of a biomedical informatics course for medical students: challenges of a large-scale blended-learning program

Melchor Sánchez-Mendiola,¹ Adrián I Martínez-Franco,² Argelia Rosales-Vega,¹,² Joel Villamar-Chulin,¹,² Florina Gatica-Lara,¹,² Rocío García-Durán,¹,² Adrián Martínez-González¹,²

J Am Med Inform Assoc 2013;20:381–387.
✓ Used in 29 Mexican schools.
✓ 22 Medical.
✓ 3 Nursing.
✓ 1 Veterinary.
✓ 1 Physiotherapy.
✓ 1 Odontology.
✓ 1 Nutrition.

A typology of uncertainty derived from an analysis of critical incidents in medical residents: A mixed methods study

Conceptual model

Probability of being in a situation of uncertainty

Type of uncertainty:
- Technical
- Conceptual
- Communicational
- Systemic
- Ethical

Probability (Prob.)
- 1.0
- 0.8
- 0.6
- 0.4
- 0.2
Probability of being in a situation of uncertainty
Strategies used by type of uncertainty

Technical
- Consulted with senior physicians: 73%
- Followed the clinical guidelines: 10%
- Solve without consulting: 4%
- Consulted information sources: 6%
- Other strategies: 5%

Conceptual
- Consulted with peers or colleagues: 77%
- Followed the clinical guidelines: 7%
- Solve without consulting: 9%
- Consulted information sources: 5%
- Other strategies: 5%

Communicational
- Consulted with peers or colleagues: 73%
- Followed the clinical guidelines: 7%
- Solve without consulting: 8%
- Consulted information sources: 6%
- Other strategies: 4%

Systemic
- Consulted with peers or colleagues: 62%
- Followed the clinical guidelines: 10%
- Solve without consulting: 6%
- Consulted information sources: 17%
- Other strategies: 17%

Ethical
- Consulted with peers or colleagues: 65%
- Followed the clinical guidelines: 8%
- Solve without consulting: 9%
- Consulted information sources: 4%
- Other strategies: 9%
“It was the best of times,
It was the worst of times...”

Tale of Two Cities
Charles Dickens
IGNORANCE
Sometimes it's best not to know