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Alliance for Risk Assessment

Beyond Science and  
Decisions, Workshop XII

Debunking Junk Risk  
Assessment Science

# Junk Science News Is a Big Problem

SEARCH **NEW YORK POST**

## How scientists actually could bring dinosaurs back to life

By **Larry Getlen** January 7, 2017 | 2:57pm | Updated

**FOX NEWS**

HEALTHY MAMA · Published February 15, 2015 · Last Update March 27, 2015

## Homeopathy: A natural alternative for pregnancy & postpartum issues

By Julie Revelant, | Fox News



**THE Sun** THE SUN, A NEWS UK COMPANY  
NEWS WEBSITE OF THE YEAR

< EWS | **FABULOUS** | MONEY | MOTORS | TRAVEL | TECH | DEAR DEID

< ty | Celebrity | Health & Fitness | Parenting | Relationships

## BREWER'S BREAST Guys watch out! Your favourite pint of beer could be giving you MAN BOOBS

Search jobs Sign in Search US edition

**The Guardian**

**The Washington Post**  
Democracy Dies in Darkness

Opinions

## Ocasio-Cortez says the world will end in 12 years. She is absolutely right.

SEARCH **NEW YORK POST**

## 'Breatharian' couple survives on 'the universe's energy' instead of food

By Lauren Windle, The Sun June 15, 2017 | 2:19pm | Updated



The New York Times

## Broken Promises of Genetically Modified Crops

**USA TODAY**

NEWS SPORTS LIFE MONEY TECH TRAVEL OPINION 49° CROSSWORDS WASHINGTON VIDEO STOCKS APPS MORE

## Nutella, bacon and other foods you love that are linked to cancer

on Sport Culture Lifestyle More

ronment Soccer US Politics Business Tech Science

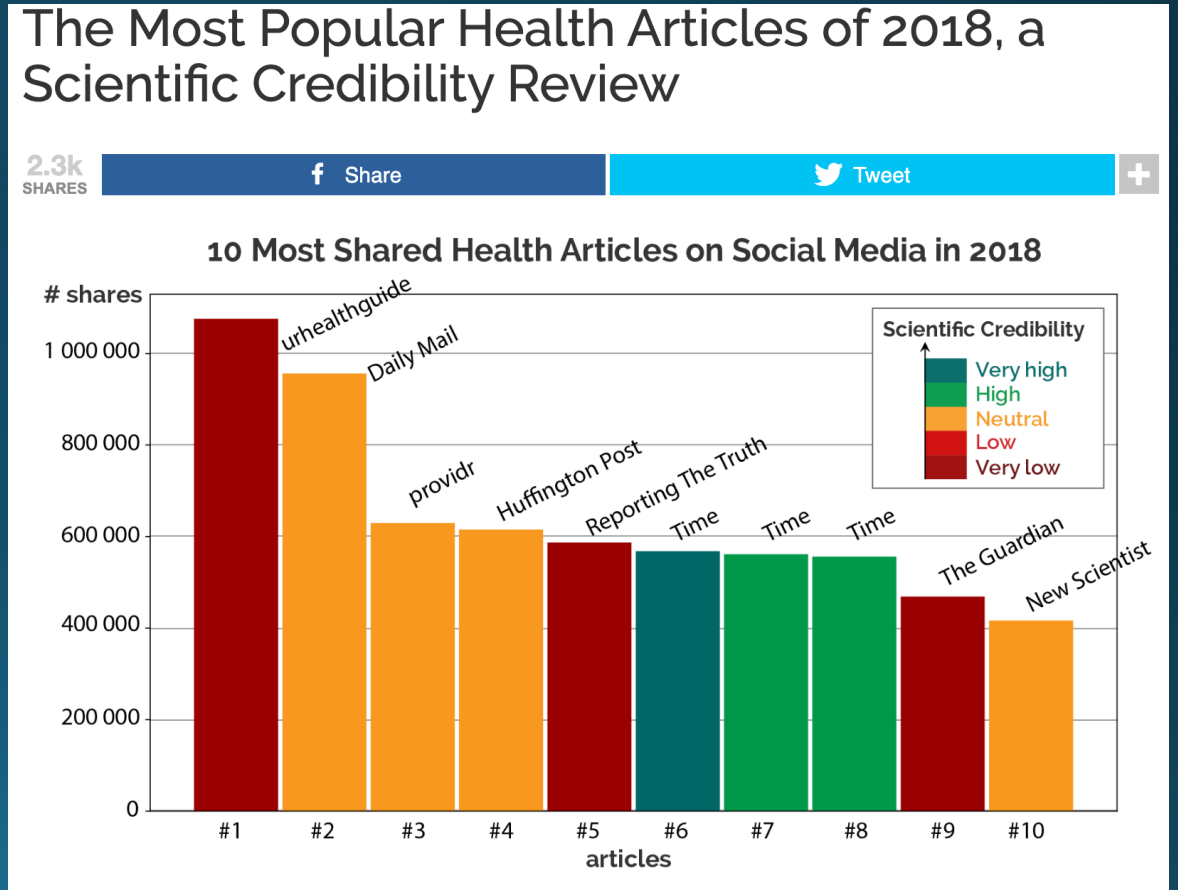
This article is more than 1 year old

## Spread of breast cancer linked to compound in asparagus and other foods

Read The Guardian without interruption on your devices

# All Those Headlines Are Inaccurate

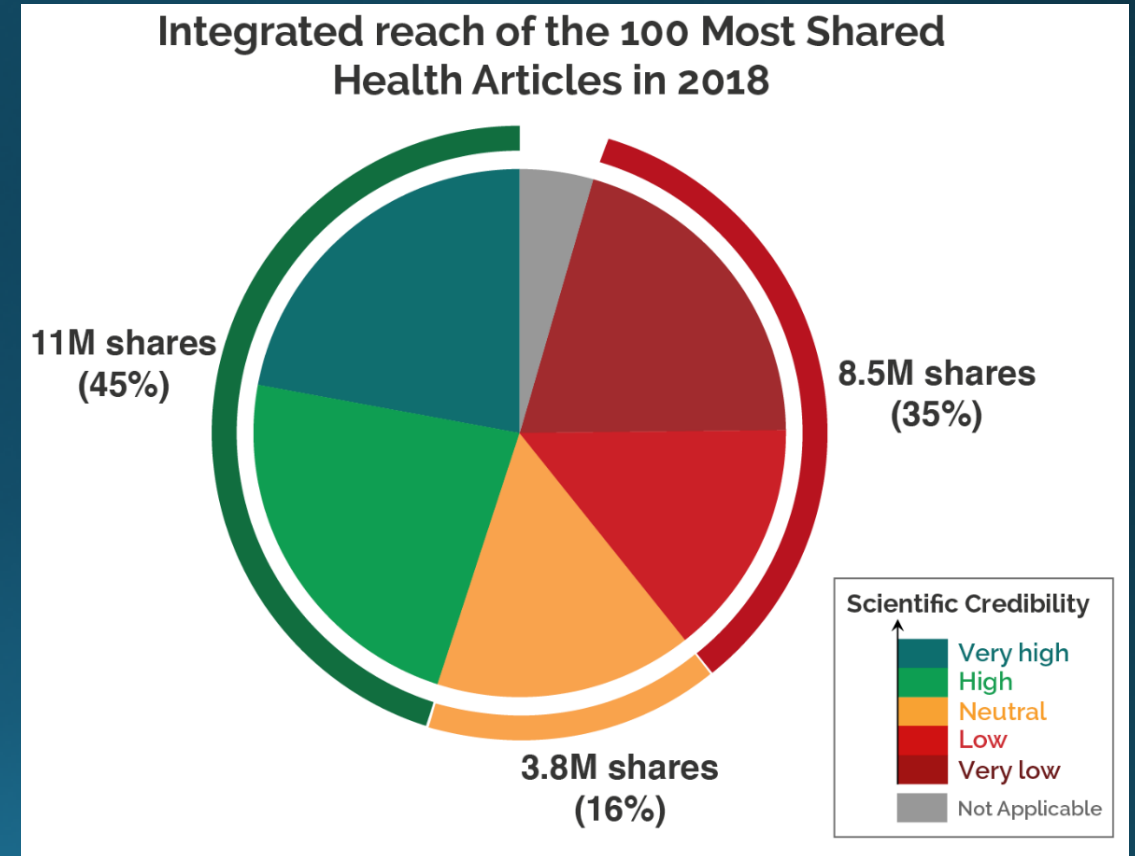
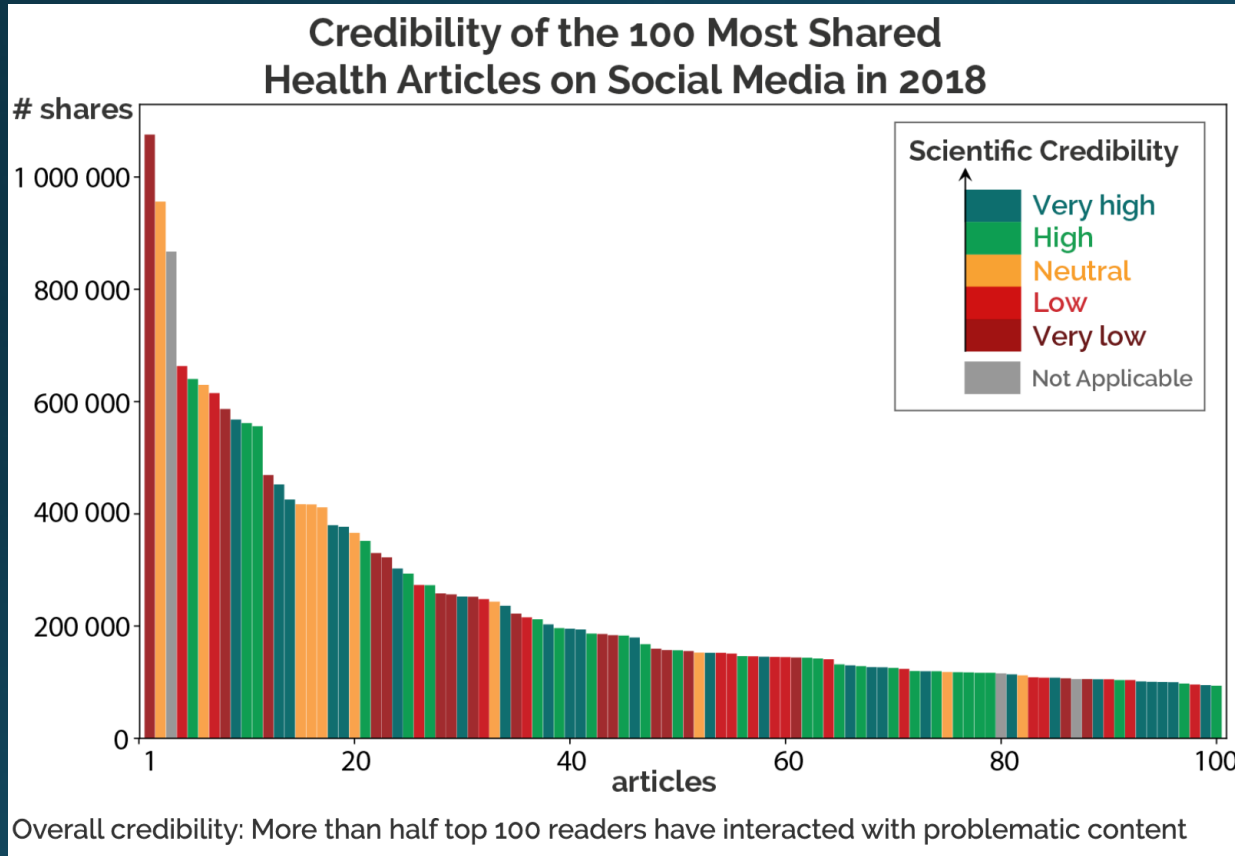
- Like a fish in water, we are swimming in B.S.
- This is true for many of the science and health headlines you read
- One study showed that 7 of the top 10 most popular health stories in 2018 were at least partially misleading
  - Note: Neutral stories “may not be factually wrong, [but] they may also contain problems such as exaggerations, misleading content and logical fallacies... [They] have a long way to go in terms of providing highly credible information to readers.”



Source: Health Feedback (<https://healthfeedback.org/the-most-popular-health-articles-of-2018-a-scientific-credibility-review/>)

# How About the Top 100?

96% of these shares were on Facebook



Source: Health Feedback (<https://healthfeedback.org/the-most-popular-health-articles-of-2018-a-scientific-credibility-review/>)



# Risk Assessment: Health News

- Health news coverage is particularly bad, especially when it involves explaining risk (or benefit)
- Health news coverage usually comes in one of two flavors:
  - Chemical X is found everywhere in the environment and we're all dying
  - X is the new superfood and will prevent cancer and dementia
- No wonder the public thinks that scientists and doctors often don't know what they're doing

# Risk Assessment: Sensationalism

- Facebook
- Wine
- Catching a cold (in childhood)
- Antiperspirants
- French Fries
- Vitamin Supplements
- Red Food Dyes
- Sugar
- Salt
- Coffee
- Hair Dyes
- Mouthwash
- Sun Tan Lotions
- Potato Chips
- Moisturizers
- Cell Phones
- Talcum Powder
- Chicken
- Alcohol
- Smoked Salmon
- Baby Shampoo
- Eggs
- Milk
- Corn
- Cheese
- Butter
- Bread
- Bacon
- Chicken
- Grapefruit
- Vegetable Oils
- Coca-Cola
- Flying on an Airplane
- Airport Scanners
- Male Hair-Loss Pills
- Artificial Sweeteners
- Cholesterol-lowering Drugs
- Bras
- Household Cleaning Products
- Air Fresheners
- Aspirin
- Milk
- Microwave Ovens
- Fluoridated Water
- Burnt Toast
- Brushing your teeth poorly
- Marijuana
- Modern Life (Yes, life, itself.)

Source:

RealClear Science

# Consequences: Risk Misunderstood

- People fear exotic things...
  - GMOs
  - Vaccines
  - Nuclear power
  - 5G technology
- ...But not actual threats
  - Car crashes
  - Influenza/pneumonia
  - Food poisoning
- People stop believing journalists and scientists

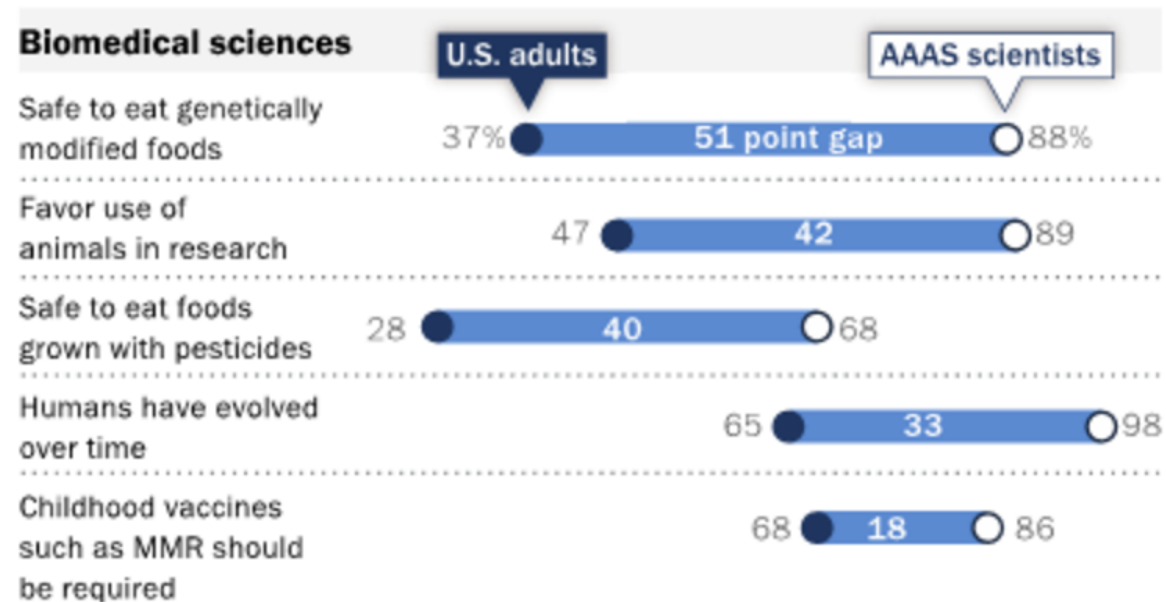


# Consequences: Public vs. Scientists

## Opinion Differences Between Public and Scientists

### Opinion Differences Between Public and Scientists

*% of U.S. adults and AAAS scientists saying each of the following*



Source: Pew



# Consequences: Conspiracy Theories



The image is a screenshot of a BBC News article. At the top left is the BBC logo. To its right are 'Sign in' and 'Menu' options. Below this is a red navigation bar with the word 'NEWS' in white. Underneath the navigation bar are links for 'Home', 'Video', 'World', 'UK', 'Business', 'Tech', 'Science', 'Magazine', and 'Entertainment & Arts'. The article is categorized under 'Science & Environment'. The main headline reads 'Maths study shows conspiracies 'prone to unravelling''. The author is identified as 'By Alex Berezow, Science writer'. At the bottom left, the date is '26 January 2016' and the category is 'Science & Environment'. On the bottom right, there are social media sharing icons for Facebook, Twitter, Messenger, Email, and a general 'Share' button.

- FDA and pharmaceutical industry is hiding a cure for cancer
- About half of Americans believe in at least one conspiracy theory
- Conspiracy theorists believe mutually incompatible conspiracies

# Consequences: Jackpot Lawsuits

- Companies are getting sued – and losing billions of dollars – for diseases they did not cause

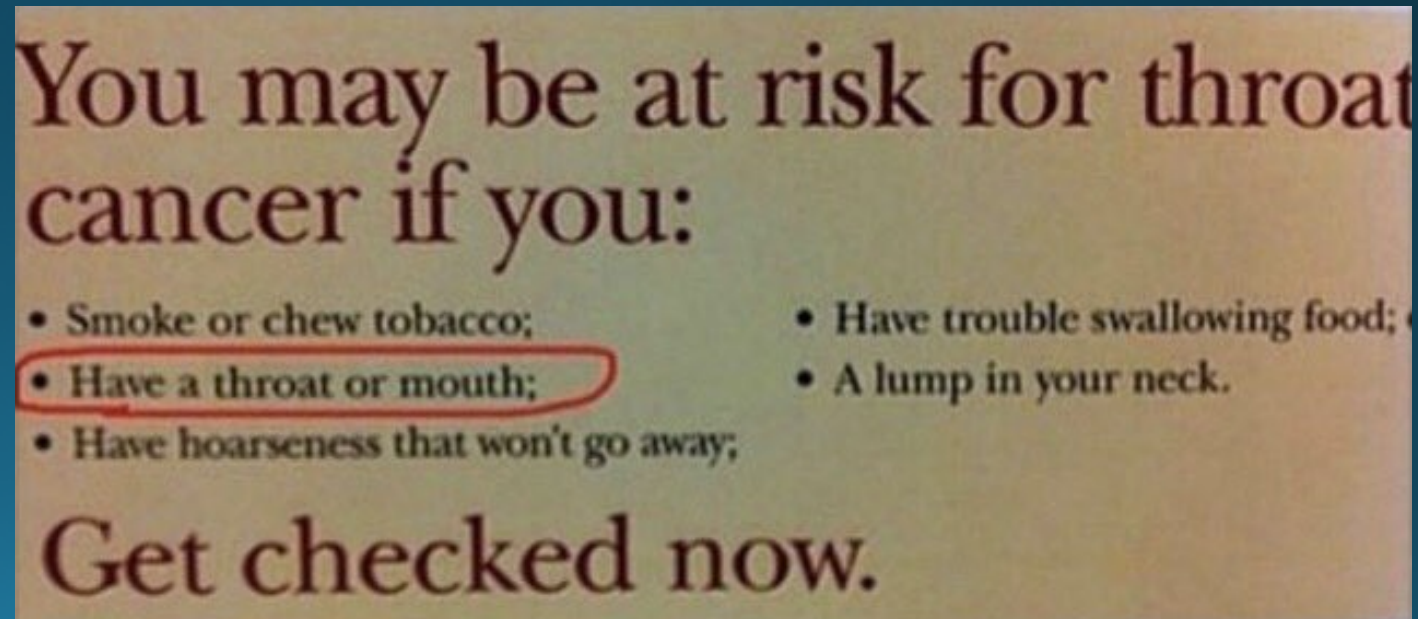
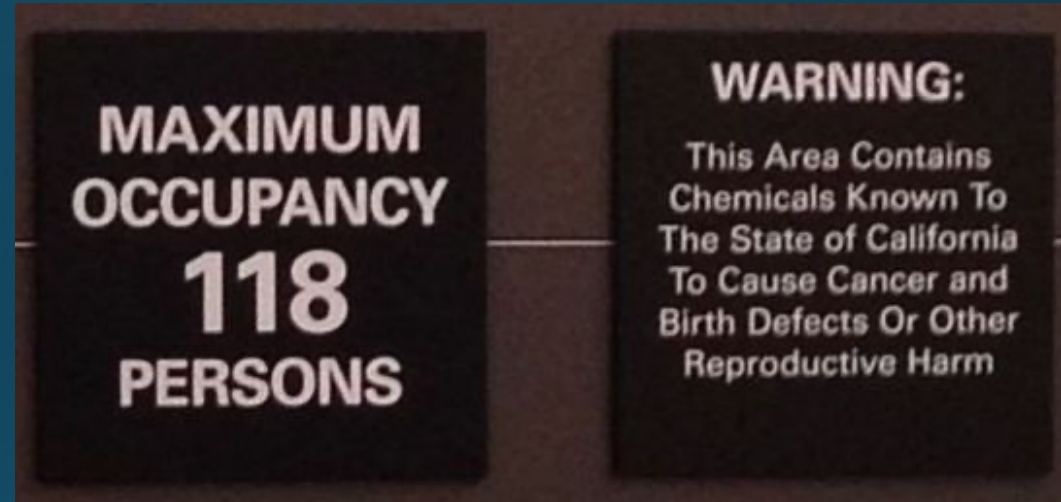
*The New York Times*

***\$2 Billion Verdict Against Monsanto Is Third to Find Roundup Caused Cancer***

*The New York Times*

***Johnson & Johnson Loses Bid to Overturn a \$4.7 Billion Baby Powder Verdict***

# Consequences: Bizarre Warning Signs





Fixing Things

# 12 Solutions to Junk Science

(How Scientists & Journalists Can Fight Back!)

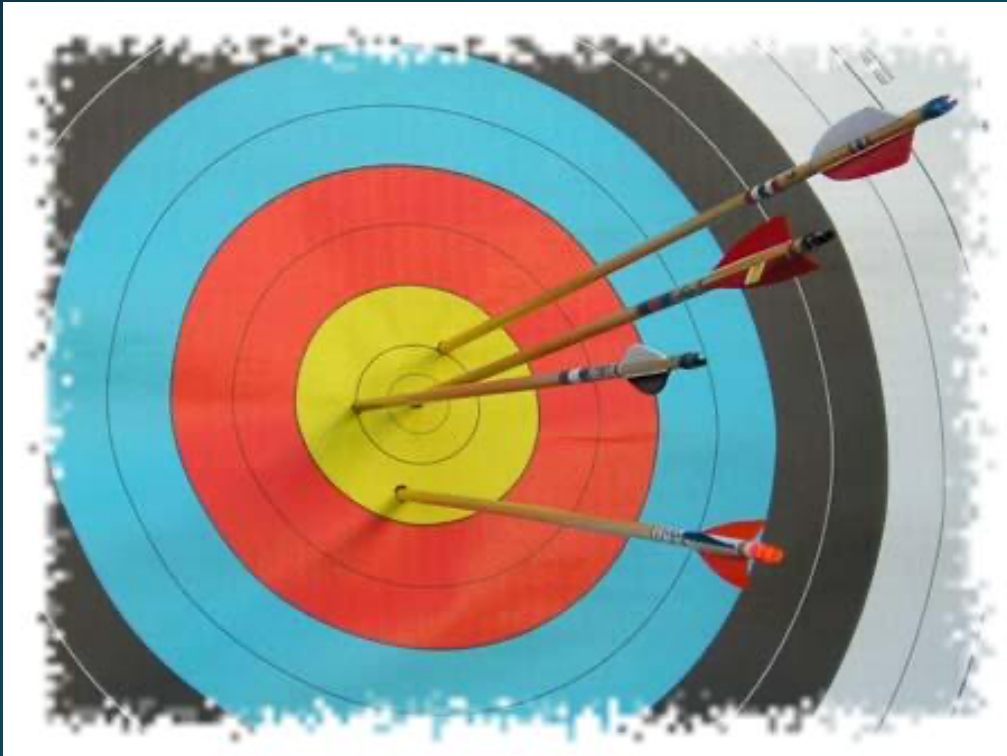


# #1. Use Facts AND Emotion



- Facts alone do not persuade people
  - People would rather hold on to incorrect information rather than admit being wrong
- People like stories. Use them!
- You must first convince people that you care. Then, you might convince them they are wrong.

# #2. Demand Better Science Writing



- Media can't even get basic facts right. Why?
- Most reporters have no science background
  - Don't understand scientific terminology
    - The "E. coli virus"
    - Theories, hypotheses, certainty, significance have different colloquial meanings
  - Don't understand differences in methodology
  - No ability to read or understand papers
- People are bad at risk assessment
  - Put risk into a context that people understand
  - Example: Compare risk of death from X to risk of death from cancer, car accidents, etc.

# #3. Stop Presenting “Both Sides”



- Media treats science like politics or entertainment
  - Present “both sides” of the story
  - But science does not work like that
  - Mainstream (“Consensus”) vs. Fringe



- Fringe opinions don’t deserve equal time
  - Humans play no role in climate change
  - Genetic modification is dangerous
  - Vaccines cause autism



# #4. Understand that “Half True” Is Still a Lie

- Politifact and other fact-checkers frequently call statements “mostly true” or “half true”
- But is that really possible?
- The most effective lies incorporate some truth





# #5. Never Sensationalize!

- Americans are particularly bad at this
  - Everything is either the “best ever” or “worst ever”
  - Lacks context and historical perspective
- Examples of hype:
  - Chemical X is poisoning us all!
  - Miracle vegetable will cure cancer!
  - New exoplanet probably has life on it!



# #6. Reestablish Expertise

- Science is an elite activity
  - Everybody is welcome...
  - But you must play by the rules
- Internet is blessing and curse
  - Confirmation bias
    - Do not read opposing information
    - Echo chamber
  - Information is easy to find
    - Includes bad information
    - “Wikiexperts”
    - Rejection of real experts



# #7. Apply Epistemic Standards Equally

- Hold your intellectual allies and opponents to the same epistemic standard
- Anything less is dishonest





# #8. Be Transparent



- Explicitly identify your values & priorities
  - Every person should do this
  - It will help you learn more about yourself and your own biases
- News sources
  - Preface them with: "This is a conservative outlet," or this is a "center-left think tank"
  - Assume you might learn something from any legitimate news source
  - Don't pretend that you read the "truth" and everybody else reads "lies"

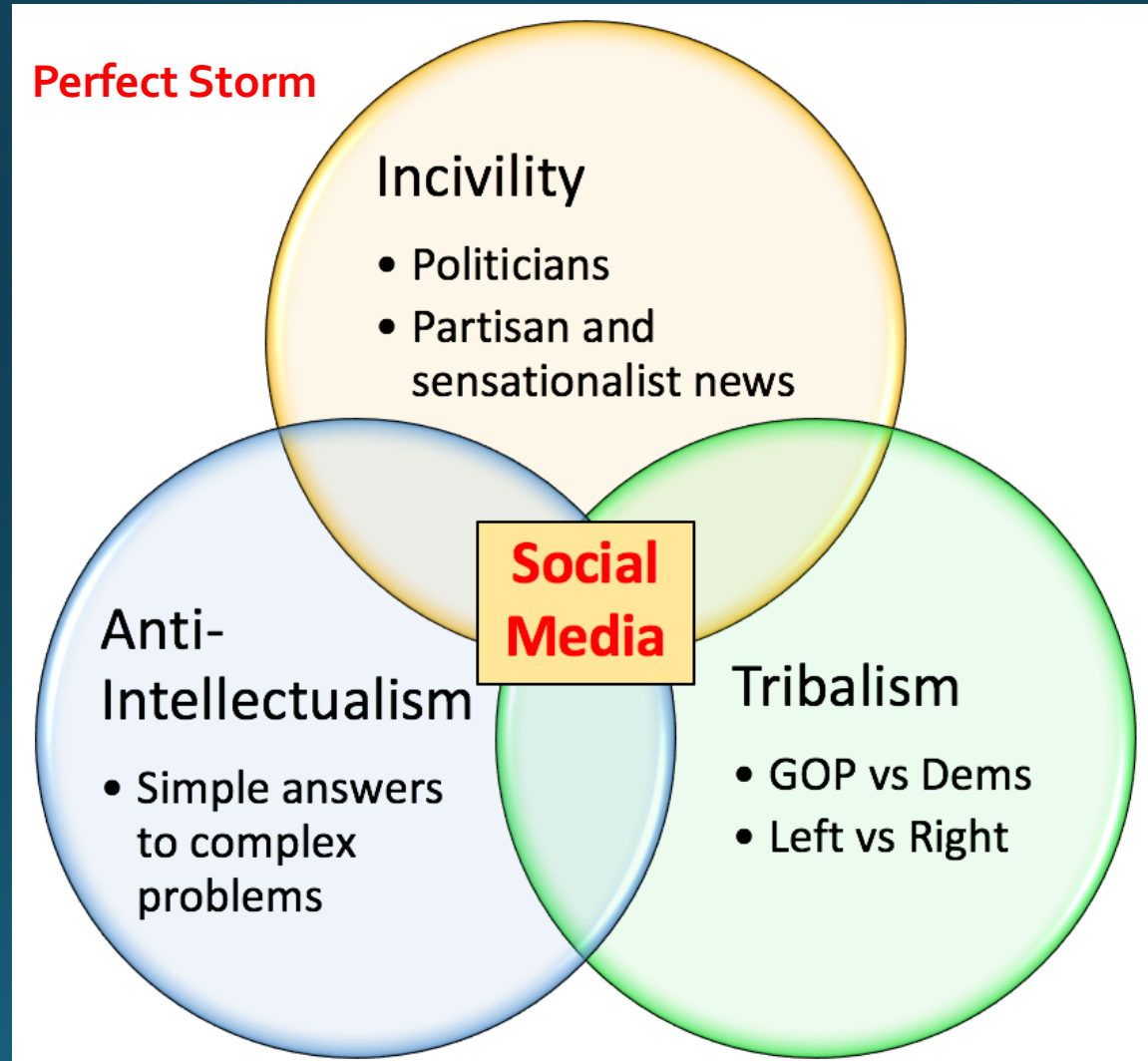


# #9. Be Skeptical of Viral Stories

- Especially if...
  - It's about politics
  - It's meant to frighten you or provoke action
  - It's a science story that reads like a press release
  - It makes wide, sweeping conclusions based on limited information
  - It ties the research to something only tangentially related
- Check to see if other trustworthy outlets have also covered the story



# #10. Use Social Media for Good, Not Evil



# #11. Adhere to a Sensible “News Diet”

- Eliminate “junk news” from your diet
- Eliminate constant bad news (which is bad for your health)
- Keep your diet of overtly partisan news sources to a minimum
- Avoid “outrage du jour” stories





# #12. Distinguish Science from Policy

- We can agree on science, but disagree on policy
  - Climate change
  - Cloning extinct animals
  - Colonizing space
- Policy involves differences in priorities & values
  - Economics
  - Ethics
  - Law





# Question Time!

