

Finding and evaluating reputable sources of science information



Friday May 2, 2025

Wheat Retreat

Megan Racey, PhD



Learning objectives

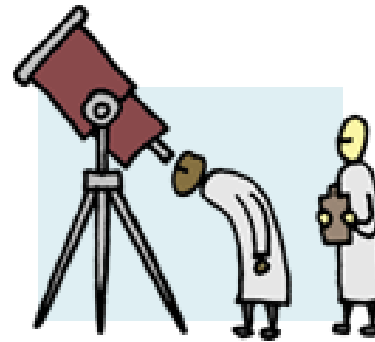
At the end of this presentation, you should be able to

Understand what to consider when looking for reputable sources of science information

Be able to apply critical thinking when looking at scientific literature



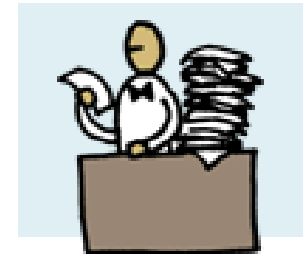
The scientific process



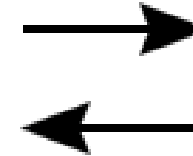
Scientists study something.



Scientists write about their results.



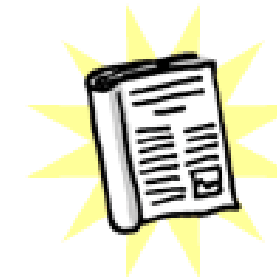
Journal editor receives an article and sends it out for peer review.



Peer reviewers read the article and provide feedback to the editor.



Editor may send reviewer comments to the scientists who may then revise and resubmit the article for further review. If an article does not maintain sufficiently high scientific standards, it may be rejected at this point.

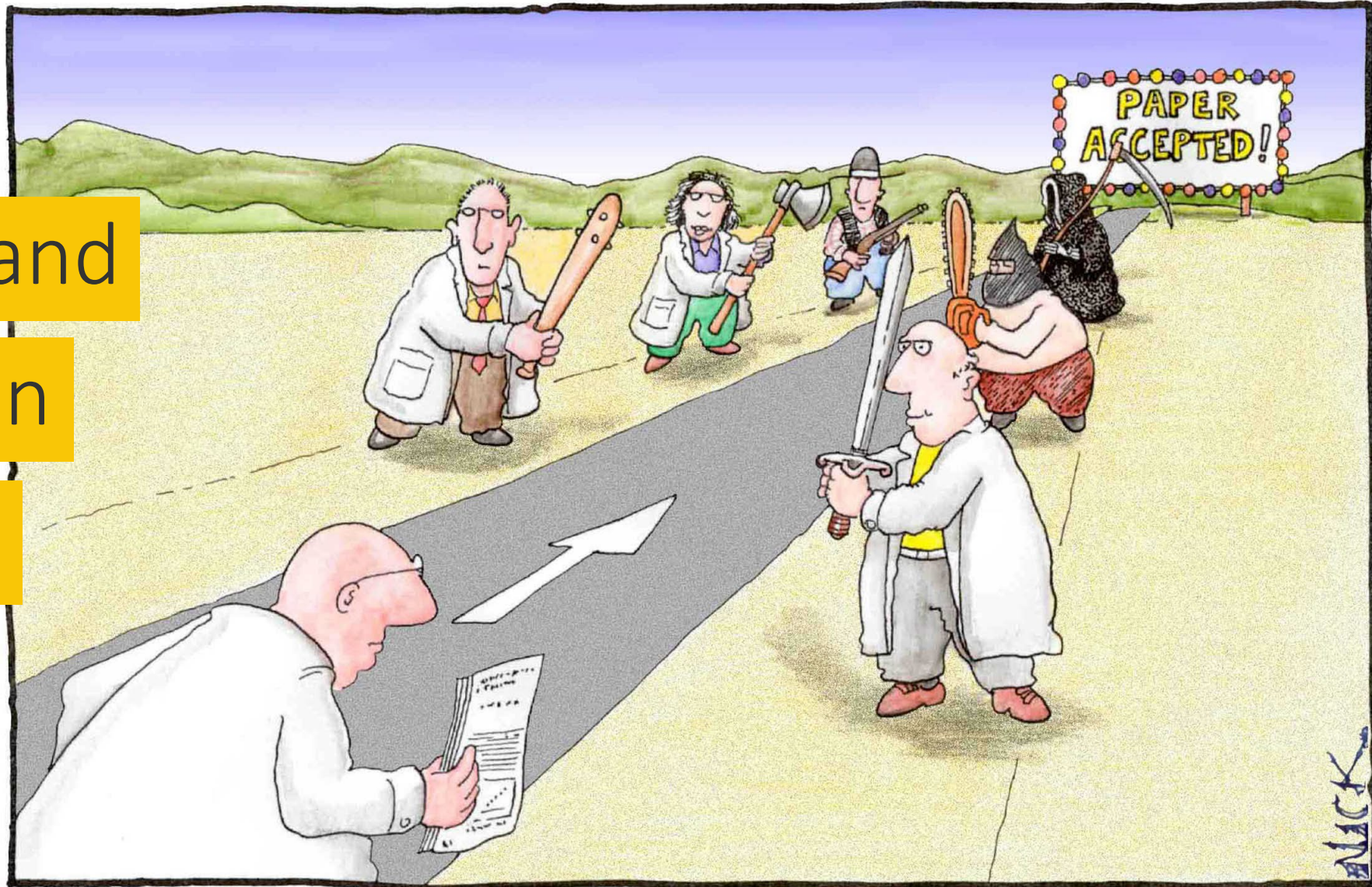


If an article finally meets editorial and peer standards it is published in a journal.

The peer review process



But as a
researcher and
author, it can
feel like this





It's not a perfect system

- Slow and costly review process
- Potential inconsistencies between reviewers
- Risk of bias or conflicts of interest
- Inadequate detection of research misconduct
- Reviewer fatigue

The 'publish or perish' mentality is fuelling research paper retractions – and undermining science

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When scientists make important discoveries, both big and small, they typically publish their findings in scientific journals for others to read. This sharing of knowledge helps to advance science: it can, in turn, lead to more important discoveries.

But published research papers can be retracted if there is an issue with their accuracy or integrity. And in recent years, the number of retractions has been rising sharply. For example, in 2023 more than 10,000 research papers were retracted globally. This marked a new record.

Author



Nham Tran

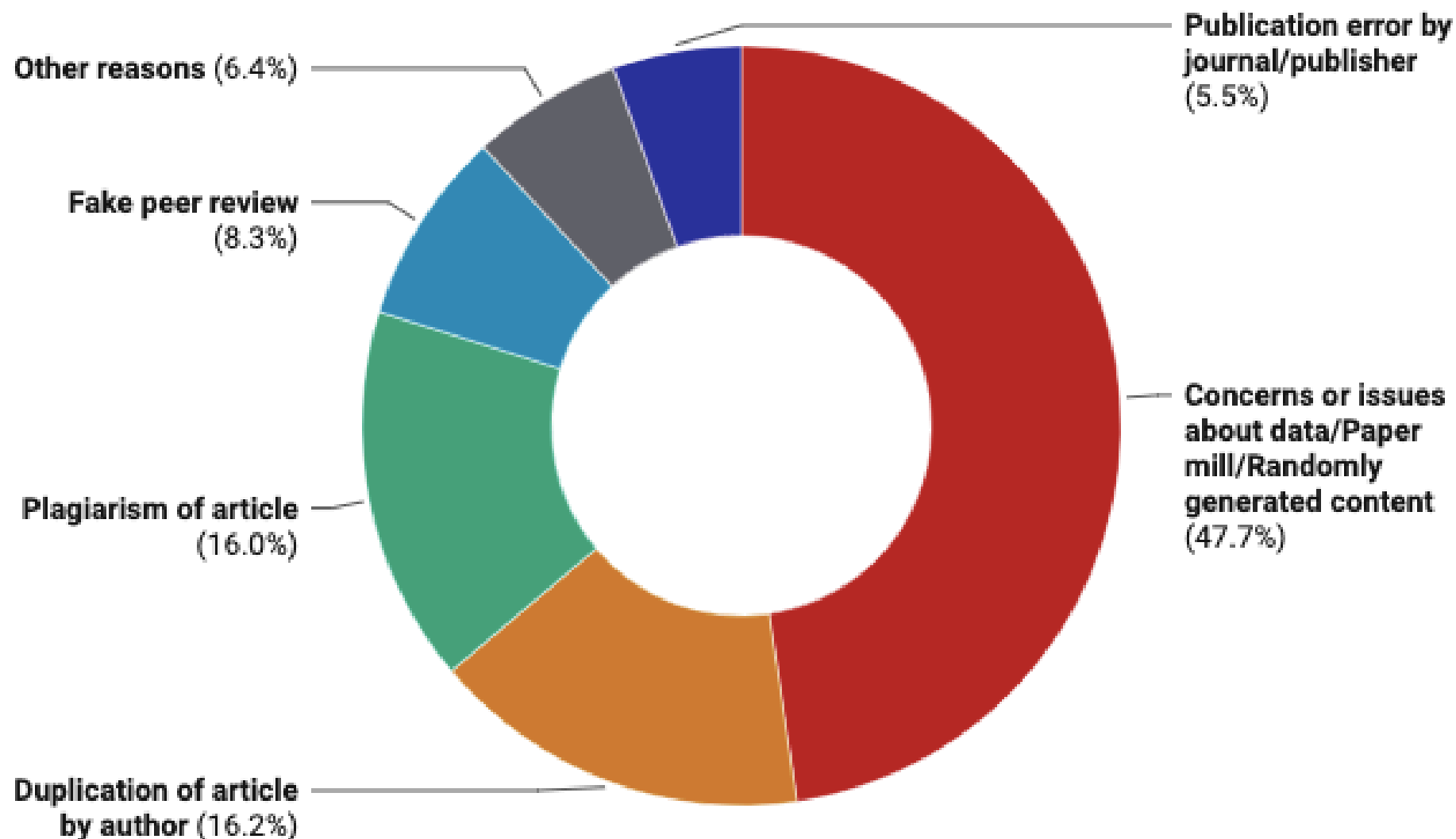
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Disclosure statement

Nham Tran receives funding from the
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Partners

Reasons for research paper retractions





How can you qualify accurate information?

- We all know what bad information looks like, but if the scientific process and publishing isn't perfect, how can you qualify accurate information?
- High-level overview of things to consider when looking for good sources of information (including science):

Source

Types of articles

Reputation

Messaging

Credentials

Bias



Source

- Ensure the source is published in a **peer-reviewed journal**. This means the research has been evaluated by experts in the field before publication.
- While not the only measure of quality, the **impact factor** of a journal can give you an idea of its influence and reputation in the field.
- **Open access** journals make their content freely available, which can be a sign of transparency and accessibility



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Reputation



- While hard to know, avoid research from predatory journals
- Consider the reputation of the publisher. Established academic publishers and institutions are more likely to produce credible content.
- Look for reputable institutions with URLs like .org, .gov, .edu



Credentials

- Do the authors seem qualified to be speaking on this topic? Look at their qualifications, affiliations, degrees, etc.
- Check the qualifications and affiliations of the authors. Are they experts in the subject area? Do they have a history of publications in reputable journals? Google them!
- Did they include any patients, public, or people with lived experience in developing or conducting their research?



Bias

- Be aware of who funded the research. Funding sources can sometimes influence the outcomes. Look for disclosures of any potential conflicts of interest.
- But know that someone has to fund research and it comes down to transparency and limited influence from funders in the research process.

FUNDING

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CONFLICT OF INTEREST

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The funders had no role in the design and conduct of the study; collection, management, analyses, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

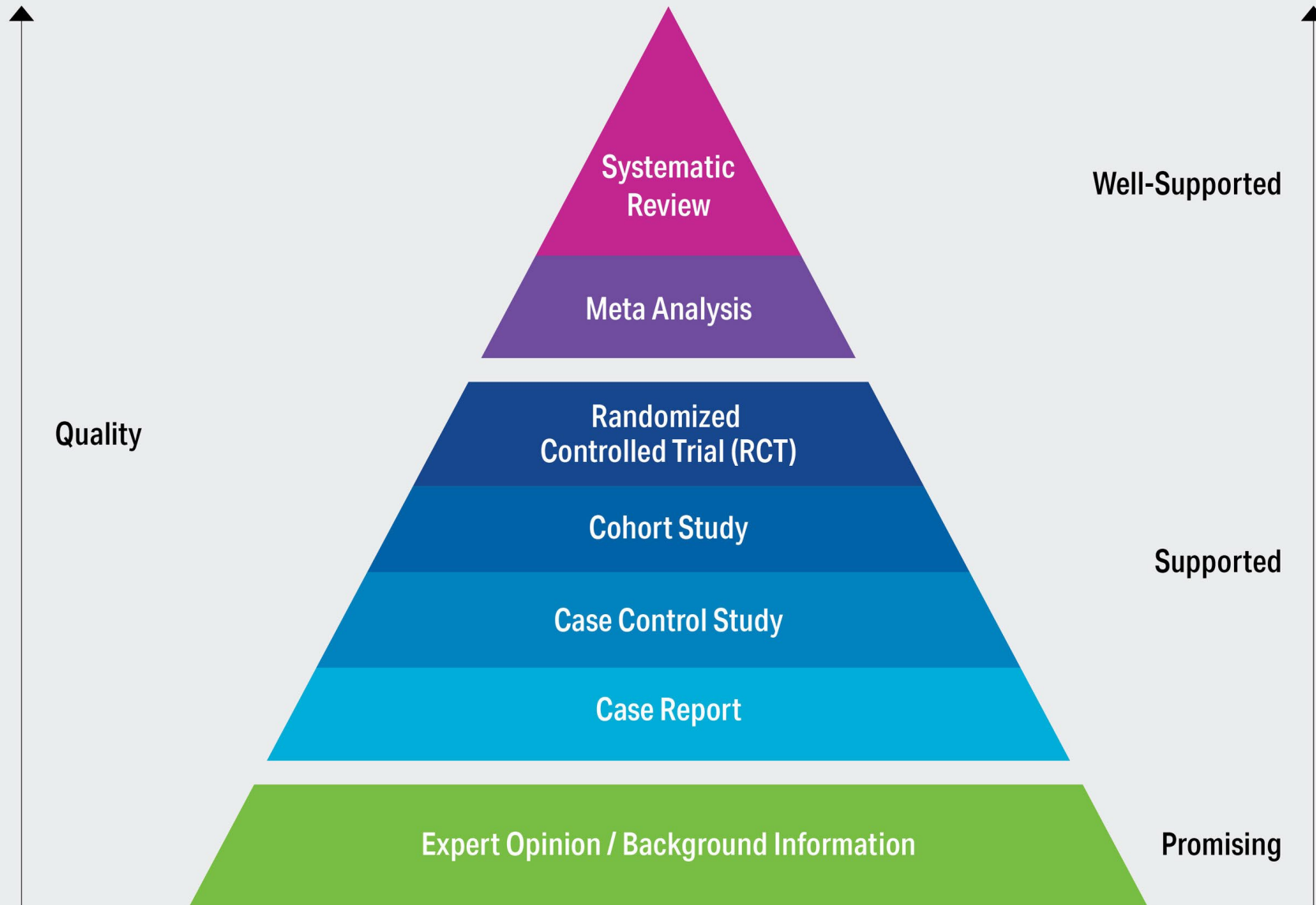
Duality of Interest. M.M.Y.L. has received research grants through his institution, the University of Glasgow, from AstraZeneca, Boehringer Ingelheim, and Roche Diagnostics and is a member of a Trial Steering Committee for Cytokinetics and a Clinical Endpoints Committee for Bayer. N.G. has received speaker honoraria from Novo Nordisk (nonpromotional activity) and Boehringer Ingelheim within the past 3 years. A.M. reports consulting/speaker honoraria from Abbott Laboratories, AstraZeneca, Boehringer Ingelheim, Janssen, Sanofi, Lupin, US Vitamins, Cipla, and Glenmark. M.K.R. reports consulting honoraria from Eli Lilly. H.C.G. holds the McMaster-Sanofi Population Health Institute Chair in Diabetes Research and Care. He reports research grants from Eli Lilly, AstraZeneca, Novo Nordisk, Hanmi, and Merck; continuing education grants from Eli Lilly, Abbott, Sanofi, Novo Nordisk, and Boehringer Ingelheim; honoraria for speaking from AstraZeneca, Eli Lilly, Novo Nordisk, DKSH, Zuellig, Sanofi, Carbon Brand, and Jiangsu Hanson; and consulting fees from Abbott, Bayer, Eli Lilly, Novo Nordisk, Pfizer, Sanofi, Kowa, and Hanmi. D.K.M. has received honoraria for trial leadership from



Types of articles

- Look for **Systematic Review Articles and Meta-Analyses**: These types of articles summarize and analyze the results of multiple studies, providing a broader perspective on the topic.
- Look for systematic reviews and meta-analyses that also assess **risk of bias** and **quality or certainty of the evidence**.
- Reliable studies will have clear, detailed, and replicable methods.

Hierarchy of Evidence



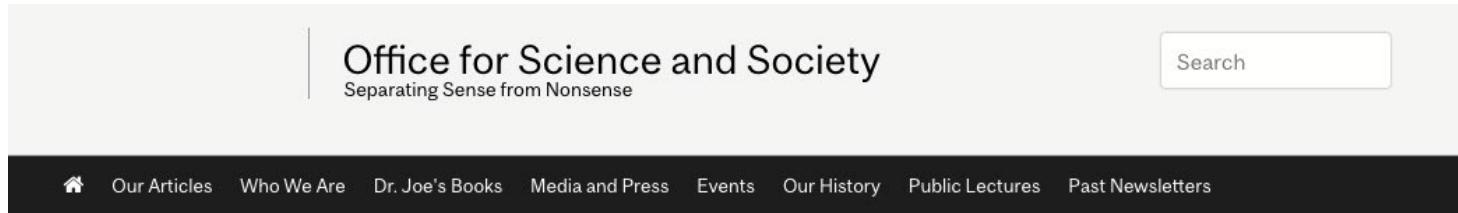


Messaging

- Look for the most recent research to ensure the information is up-to-date. Science and technology fields, in particular, evolve rapidly.
- Consider if they are making bold, inflammatory, or exaggerated statements.
- While boring, science - especially health and nutrition research - is not often clear cut and can commonly be muddy with many caveats (“it depends”). Does it seem too good to be true?



Example



Home

The Ivermectin Train Cannot Stop

As the evidence for ivermectin helping with COVID-19 crumbles, prominent promoters double down. Why?

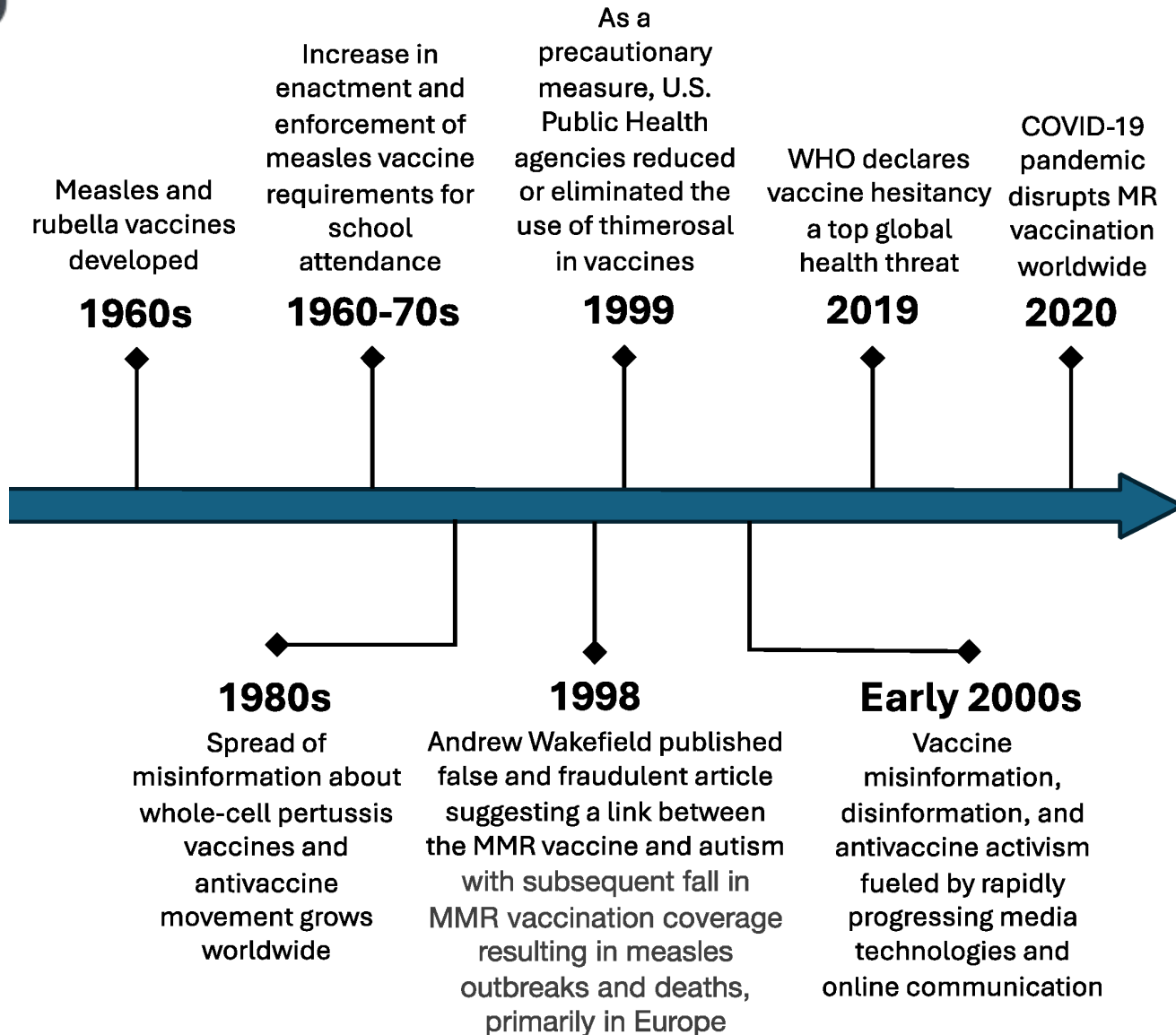


The largest and highest quality ivermectin study published so far is the Together trial at the McMaster University in Canada. It found no benefit for the drug when it comes to Covid.

- Data manipulation (copy/paste rows)
- Incorrect calculations
- The bigger the claim in terms of lives saved or infections prevented, the greater the concerns suggesting it might be faked or invalid



Example



Research fraud, tampering with results and evidence, and Wakefield's conflict of interest through his involvement with a lawsuit against manufacturers of the MMR vaccine.

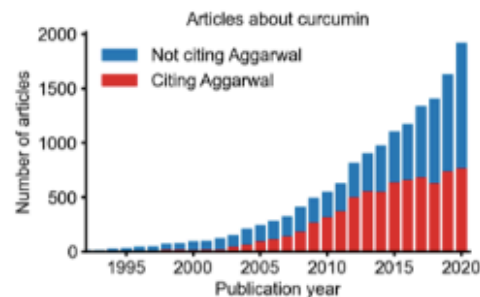
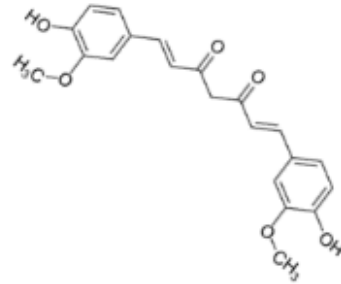


Example

The King of Curcumin: a case study in the consequences of large-scale research fraud

Published by Reese Richardson on January 30, 2024

- Manipulated images of results and unethical treatment of mice
- Unimpeded fraud can distort an entire research field to the detriment of genuine research





Summary

When searching for and reading information consider:

- Who is sharing, writing, publishing this information, how did they get this information, what type of evidence is it, why are they sharing this evidence, what are they saying

Use critical thinking skills to assess the evidence and make evidence-informed decisions

Check sites such as retractionwatch.com

Evidence-informed still considers research/science evidence, expert opinions, and individual experience, values, culture, etc.