Report to the Boards of Health
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Evaluating Health Information

According to the World Health Organization (WHO), we are currently fighting an infodemic in addition to the COVID-19 pandemic. An infodemic is defined as an overabundance of information occurring during an epidemic or pandemic. This and other terms often used include the following (as defined by Kavanaugh-Burke, 2021; Staats, 2021):

- **Infodemic:** too much information, including false or misleading information, during a disease outbreak.
- **Misinformation:** information that is false, inaccurate, or misleading according to the best available evidence at the time; this includes unintentional mistakes such as inaccurate photo captions, dates, statistics, translations, or when satire is taken seriously. Most people do not intentionally spread misinformation but do not have the resources to counter it.
- **Disinformation:** deliberately misleading or biased information; manipulated or fabricated messaging, audio/visual content, or facts. Intentionally created conspiracy theories, rumors, or propaganda.

There are **seven categories** most misinformation and disinformation fall into (for an excellent description of these categories with examples, see Understanding Information Disorder by First Draft):

1. **Satire:** usually in satire, it is clear to most people what is true and not, but it can be used to spread rumors and conspiracies, and if challenged later, can just be brushed off as a joke.
2. **False connection:** this is "click bait" or headlines and photos on the internet that are designed to make you want to click on them, but the content is different and falls short of expectations.
3. **Misleading content:** this can be challenging to define, but includes things like taking a quote out of context, omitting part of a quote, skewing data, cropping photos to change the message presented, etc.
4. **Imposter content**: false or misleading content that uses well-known logos or the news from established figures or journalists (in other words, generating messages to make them look like they are from a reputable news source, but they are not).
5. **False content:** content that is genuine but has been warped and reframed in dangerous ways. This is one of the most common trends relating to the infodemic. Example is taking a real photo and using it with a new message.
6. **Manipulated content:** when something genuine is altered. This is most often done to photographs, images, and video.
7. **Fabricated content:** anything that is 100% false. This is the lowest of the spectrum and the only content that can really be called 'fake' or 'synthetic media'.

https://shareverified.com/pledge-to-pause/

We are social and enjoy sharing information. We typically share information that makes us feel connected to others like us and share things that trigger our emotions. Disinformation is usually made to be sensational and trigger our emotions, so that it makes us anxious or angry. This causes us to want to comment on it and share it with others. This is also how misinformation can gain attention. Social media content with more comments or views is highlighted or prioritized by many social media platforms. In this way, the most popular, rather than the most factual information gets shared or viewed by others.

Health misinformation and disinformation can have serious bad effects on health outcomes, for us as individuals and as a community. It isn't as easy as deciding what is true or false, as misinformation and disinformation may be based on a truth but taken out of context or altered in some way. It is important that we have the tools we need to identify inaccurate information. Before liking, commenting on, or sharing things on social media, verify if it is accurate. You may need to go to the source of the information to know.

When on a website, the following questions can help determine if it provides trustworthy information:

- Who runs the site? This is usually on the main page or the "About Us" tab or page. See if the contributors have appropriate qualifications to be giving advice and information for the website.
- Is there a way to contact them? Look for the contact information on the site. You should be able to reach the site sponsor by telephone, email, or a mailing address.
- Why have they created the site? What is their mission? Are they a business with financial incentives?
- What do they want from you? Are there articles encouraging you to buy things? Do they seem interested in educating you or changing your mind to agree with them?
- Who is paying for the site? Does the site's information favor the sponsor?
- Is the information reviewed by experts? Comments in their "About Us" page that state things like "all of the material on the website was reviewed by the editorial board/selection policy/ review process" can point you in the right direction.
- Where did the information come from? If they mention research studies or evidence, do they provide links to those studies or references so you can verify their information?
- Does the site make unbelievable claims? If their information sounds too good or bad, it may be. If it causes an emotional response in you, that is also a warning sign.
- Is it up to date? There should be a "Page last update on" statement at the bottom of the webpage. If not, you don't know how current the information is.
- Do they want your personal information? What will they do with it? They should have a privacy policy link somewhere on their page. Review that before giving them any information.
- Is the information coming from a community discussion post or chat room? These discussions are not usually reviewed or regulated. The information is not from experts and likely to be incorrect, may not apply to you, or may be from people trying to sell something.
- Is this a personal story or a report of just a few people? Reports of just one person or a few people is not scientific. It may be emotional and inspiring, and may be true, but may not apply to you.
- Does this message agree with most other websites that cover this topic? Don't rely on just one source of information. Compare it with other sites. Information that is very different from what the majority of other reputable sites say is more likely to be wrong or may have an agenda of some kind.

Other clues to the identity of the publisher of a website can be found in the web address itself:

- A web address that ends in ".edu" is published by an organization that is associated with an educational institution such as a university.
- A web address that ends in ".gov" is published by a governmental organization.
- A web address that ends in ".org" is published by a nonprofit.
- A web address that ends in ".com" is published by a for-profit company.

While these neither signal if the website and their information is good or bad, it does provide more information for you to consider.

You can get the best quality information by going directly to scientific papers or articles. However, evaluating these reports can be difficult even for scientists. First and foremost, it is important to know that not all published

papers or articles are good quality science and that any scientific paper can be wrong. During the COVID-19 pandemic, there has been a huge number of papers written and many papers have been published online ahead of print and before peer review due to the volume of work and the need to share knowledge quickly.

Peer review is a process that typically happens after the editors of a journal decide they are interested in publishing an article. They then send the article on to other scientists (or "peers") in that topic to review the research, looking for any problems with the experiments, if any different experiments are needed, if the data needs to be interpreted or evaluated any differently, and so on. They may also decide the research and the paper were not good enough, didn't provide any new information, didn't interpret the data correctly, or some other issue, and reject the paper. In this way, peer review is an important part of the accuracy and honesty in science. Peer reviews are not foolproof, and don't catch all mistakes and errors, or even well-hidden falsifications.

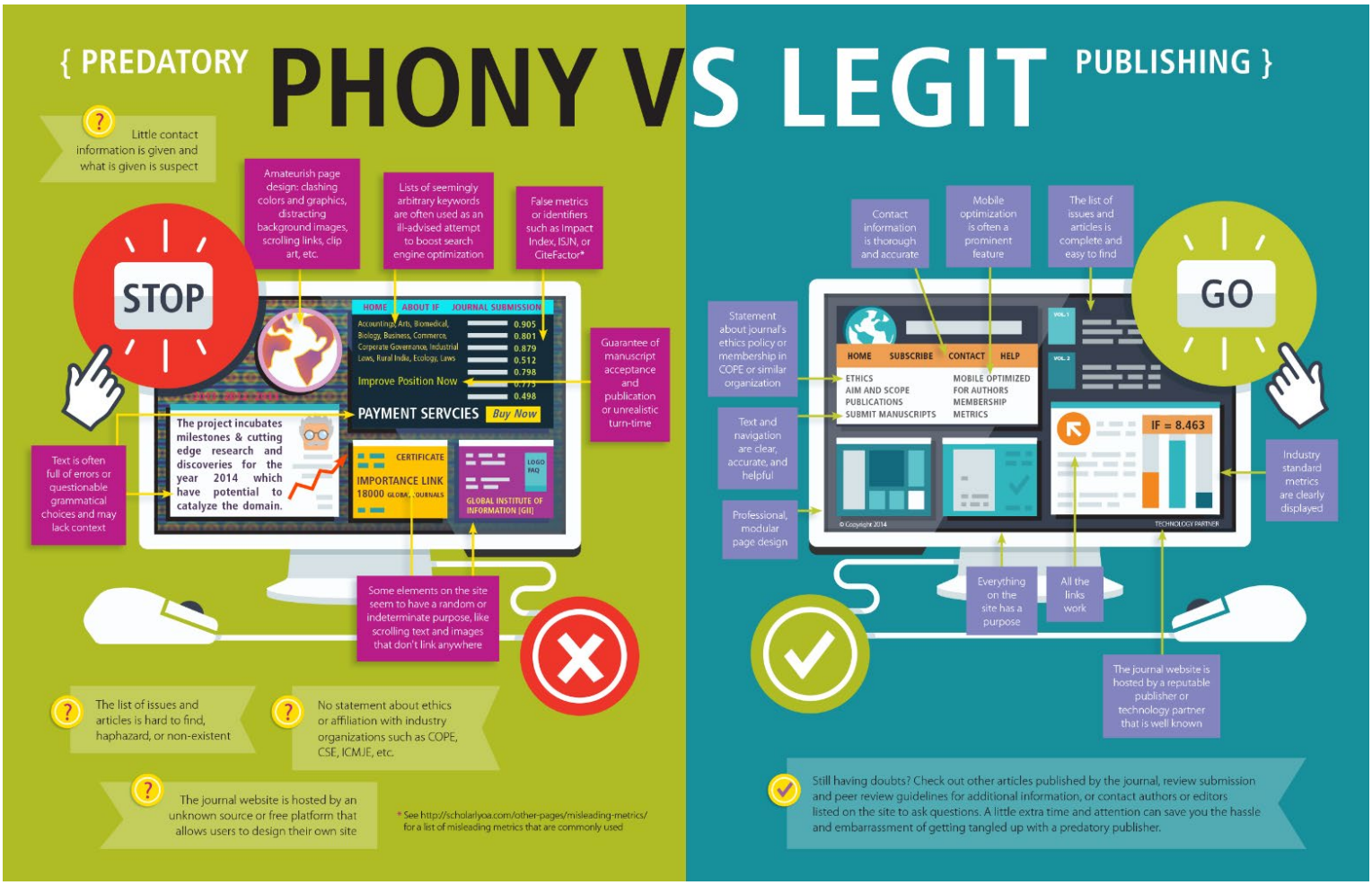
When you evaluate a scientific paper, your best hope is to determine if it seems to have been written in good faith, using the proper methods, and has been taken seriously by the scientific community. Papers that have been published in the top journals are typically those with the most credibility and are most reliable. Google Scholar provides journal rankings in the form of journal h-index scores at https://scholar.google.com/citations?view_op=top_venues.
Below is their list of most highly ranked medical journals:

Rank	Publication	h5-index
1.	The New England Journal of Medicine	410
2.	The Lancet	345
3.	Cell	288
4.	JAMA	253
5.	Proceedings of the National Academy of Sciences	245
6.	Journal of Clinical Oncology	213
7.	Nature Medicine	205
8.	The Lancet Oncology	196
9.	PLoS ONE	185
10.	Nature Genetics	184
11.	Circulation	176
12.	BMJ	175
13.	Journal of the American College of Cardiology	175
14.	Cochrane Database of Systematic Reviews	161
15.	The Lancet Infectious Diseases	160
16.	European Heart Journal	159
17.	Blood	159
18.	Immunity	158
19.	Gastroenterology	157
20.	Neuron	
https://scholar.google.com/citations?view_op=top_venues&hl=en&vq=med		

You can also search individual journals and articles at http://eigenfactor.org/projects/journalRank/journalsearch.php, a tool developed at the University of Washington. This will give you the EF (Eigenfactor score), a measure of the journal's total importance to the scientific community, as well as the AI (article Influence score), a measure of the average influence of each of its articles over the first five years after publication. This tool is described more here http://eigenfactor.org/about.php.

On the opposite end of the spectrum there are journals and publishers with very little to no credibility. There are often called predatory journals or publishers and you will want to avoid papers or articles from these sources.

Essentially, these journals and publishers take advantage of authors by promising rapid publication of their articles with little discrimination of what will be published. The authors are often promised that standards, like peer review, will take place, but do not. The authors are charged a fee to have their paper published. These are described in detail here https://beallslist.net/wp-content/uploads/2019/12/criteria-2015.pdf. There are also journals that have been hijacked, meaning they have had their branding or website co-opted by a predatory journal or publisher. Finally, there is something called vanity press, where you simply pay to have your paper published, with no pretense of any peer review or credible process. Lists of predatory publishers and journals and other non-recommended sources are listed here https://beallslist.net/.

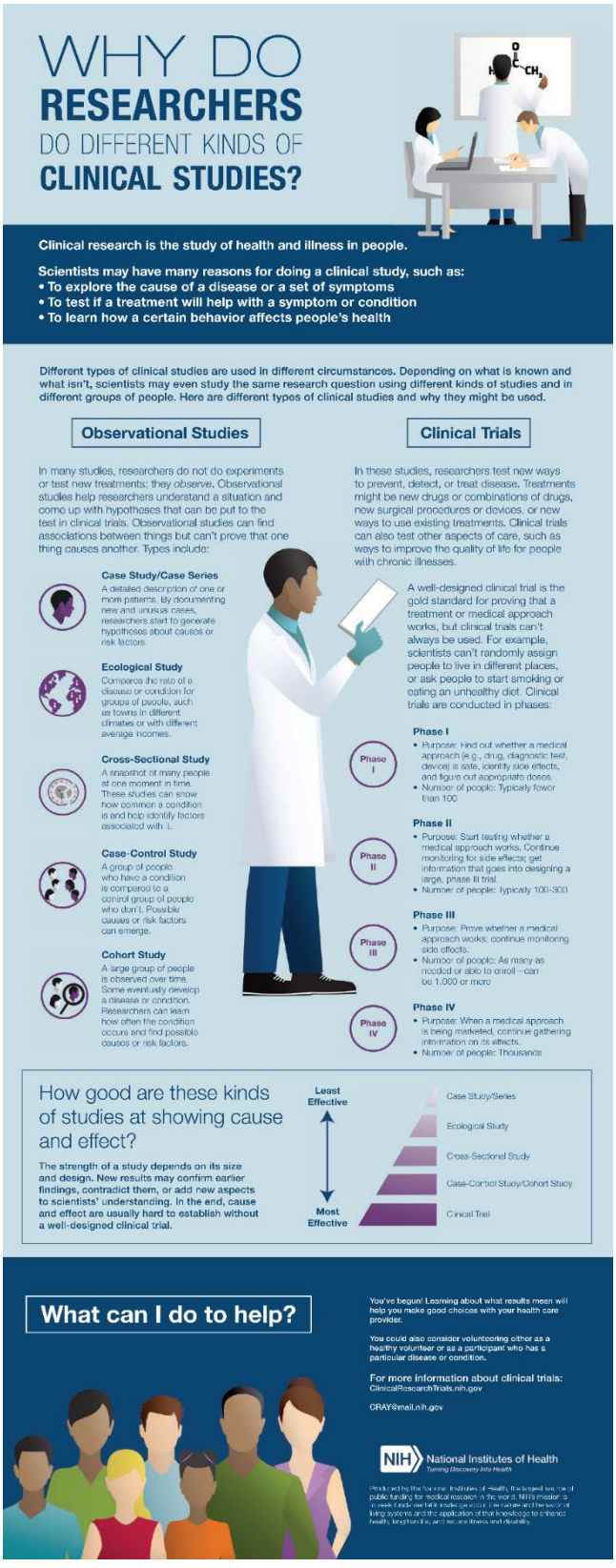


There are some tips that can help when trying to make sense of a scientific research article. First, look to see that all of the major parts of the paper are present. Most articles have the same basic format or structure. They usually include the following parts:

1. **Abstract:** this provides a brief summary of the key point the paper will cover.
2. **Methods:** this section gives detailed information about how the study was performed.
3. **Results:** this is where the data from the study is given. There may be tables, graphs, or charts and may also include some analysis of the data. However, there shouldn't be any evaluation or judgement on the meaning of the data here.
4. **Discussion and Conclusion:** this is where the author(s) discuss what they feel their results mean and where you are likely to see how the study could relate to you and others. Often, the author(s) will discuss any limitations their study may have had, that is, things about their study that may have made it biased or less accurate. They may also discuss future research that is needed on the topic.

5. **References:** this is the list of articles the author(s) reviewed to see what was known about the topic before and to help design their study.

Next when evaluating an article, look at the date of the study. If it is more than a few years old, there may be studies available that are more up to date. Then, see how large the study was. A trial needs to include enough participants that the results cannot be a matter of chance. The size needed for this in each trial is determined by statistics, but in general, large studies (hundreds to thousands of people) are much better than small studies (less than a hundred).



Knowing the type of study and whether it was controlled is the next point to determine. A controlled trial compares two groups of participants as similar as possible all ways except that one group gets the experimental treatment. Participants are usually randomly assigned to one group or another. A placebo-controlled trial includes giving one of the groups an inactive treatment that resembles the experimental treatment (a placebo) and the other half the experimental treatment.

Different types of studies can help reduce bias in a study. If the participants don't know what group they are in, whether it is the placebo or experimental group, their emotions or impressions are less likely to impact or bias the outcomes. This is called a blinded study. If the researchers don't know which group is getting the placebo or experimental treatment, they are also blinded, and this would be called a double-blinded study.

So, a randomized, double-blinded, placebo-controlled clinical trial, which is the gold standard type of study, involves volunteers that are randomly assigned to either an experimental or nonexperimental group. Neither they nor the researchers studying them know what group they are in. They get either an experimental treatment or a placebo that looks exactly the same. Other types of study models are described on the next page.

It is important to see if there are any possible conflicts of interest that might impact the study. Somewhere in the paper there should be a statement regarding how the research was funded and if the author(s) had any conflicts of interest. You can also search the author(s) on-line to see if they have any unusual affiliations that might cause a bias or conflict in their research.

Next, look to see if the results were statistically significant and if they were considered clinically significant. Some results are statistically significant, but such small difference, or associated with such side effects or cost,

that they are not clinically significant, meaning they wouldn't make a difference in the real world. Finally, does the study provide results that fit with most of the other evidence in this field? When studies or evidence is reproduced, it is much more reliable. A single study or publication, no matter how groundbreaking, almost never provides the final answer to something.

Recommendations:

1. Be aware of false information, also known as misinformation and disinformation. Learn how to spot it.
2. Take care before you share. Sharing false information on social media can cost lives.
3. If you find misinformation online, report it. Find out how to report false information to most social media platforms here.

ADDITIONAL INFORMATION

Fact Checking Websites

- https://factcheck.afp.com/
- www.factcheck.org
- https://www.factcheck.org/scicheck/
- The International Fact Checking Network https://www.poynter.org/ifcn/
- https://www.reuters.com/fact-check
- https://www.politifact.com/
- https://www.washingtonpost.com/news/fact-checker/
- https://www.snopes.com/
- https://mediabiasfactcheck.com/

Tools to help with your own fact checking:

- RevEye Chrome extension: allows to perform a reverse image* search by right-clicking onto any image in a web site.
- Google Reverse Image Search: perform reverse image search* on Google
- Tineye: perform reverse image search*
- Fake video news debunker by InVID Chrome extension: allow you to quickly get contextual information and reverse image searches*, copywrite verifications, and other things on numerous platforms
- Whois.icann.org: a free public service that gives you the ability to look up publicly available contact and other information related to a domain name or an internet number resource such as an Autonomous System number (ASN), or IP networks.
- YouTube Data Viewer (Amnesty): performs reverse image* search of YouTube videos (just paste in the web address to the video)

https://www.nih.gov/sites/default/files/health-info/clinical-trials/infographic-why-researchers-different-kinds-clinical-studies.pdf

**a reverse image search is used to find out more information about a picture or video, like if it was used before, where it is from, etc. It is helpful to find out if you are dealing with fake content (someone using an image of one thing, with a message about something else)*

Useful Resources:

- https://firstdraftnews.org/ a non-partisan organization, their mission is to protect communities from harmful misinformation. They work to empower society with the knowledge, understanding, and tools needed to outsmart false and misleading information.
- Understanding Information Disorder by First Draft https://firstdraftnews.org/wp-content/uploads/2019/10/Information_Disorder_Digital_AW.pdf?x76851

- A history of FLICC: the 5 techniques of science denial by John Cook https://skepticalscience.com/history-FLICC-5-techniques-science-denial.html
- The COVID-19 Vaccine Communication Handbook and WiKi: This project tracks behavioural science evidence and advice about COVID-19 vaccine uptake. https://hackmd.io/@scibehC19vax/home
- Fighting Disinformation Online A Database of Web Tools https://www.rand.org/research/projects/truth-decay/fighting-disinformation.html
- First Draft's Toolkit – collection of mobile friendly verification and monitoring tools https://firstdraft-toolkit.glideapp.io/
- https://www.goviralgame.com/en GO VIRAL! is a 5-minute game that helps protect you against COVID-19 misinformation. You'll learn about some of the most common strategies used to spread false and misleading information about the virus.
- Fighting Disinformation Online A Database of Web Tools https://www.rand.org/research/projects/truth-decay/fighting-disinformation.html
- Center for Countering Digital Hate CCDH https://www.counterhate.com/

"Games" to teach fact checking:

- https://www.fakeittomakeitgame.com/ Welcome to Fake It To Make It, a social-impact game about fake news.
- https://harmonysquare.game/en Harmony Square is a game about fake news. The game's setting is the idyllic Harmony Square, a small neighborhood mildly obsessed with democracy. You, the player, are hired as Chief Disinformation Officer. Over the course of 4 short levels, your job is to disturb the square's peace and quiet by fomenting internal divisions and pitting its residents against each other.
- https://trollfactory.yle.fi/ WELCOME TO TROLL FACTORY: It's your first week at the new job at Troll Factory. Your task is to grow your influence on social media — by whatever means necessary. How many people can you reel in?
- https://crankyuncle.com/game/ The Cranky Uncle game uses cartoons and critical thinking to fight misinformation. The game was developed by George Mason University scientist John Cook, in collaboration with creative agency Autonomy. The game is now available for free on iPhone and Android.
- Verifying content online challenge https://ftp.firstdraftnews.org/articulate/2020/en/OVC/story_html5.html

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- First Draft. 2020. Too much information: a public guide to navigating the Infodemic. https://firstdraftnews.org/long-form-article/too-much-information/
- U.S. National Library of Medicine. Evaluating Internet Health Information Tutorial https://medlineplus.gov/webeval/intro1.html
- University of California San Francisco. Evaluating Health Information https://www.ucsfhealth.org/education/evaluating-health-information

- U.S. National Library of Medicine. 2021. Online health information - what can you trust? https://medlineplus.gov/ency/patientinstructions/000869.htm
- NIH News In Health. 2020. Discoveries in Basic Science A Perfectly Imperfect Process https://newsinhealth.nih.gov/2020/10/discoveries-basic-science
- National Center for Complementary and Integrative Health. 2021. Know the Science: 9 Questions To Help You Make Sense of Health Research https://www.nccih.nih.gov/health/know-science/make-sense-health-research