

# What can I do?

## Addressing the challenge of health misinformation online

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University of Minnesota



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# Overview

1. Prevalence of misinformation on social media
2. Why misinformation spreads on social media platforms
3. Journalistic norms
4. Strategies for addressing misinformation



# Prevalence of social media misinformation



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# Vaccine misinformation on SNS

**33%**

of vaccine content  
on social media is  
misinformation

**37%**

of vaccine content  
on YouTube is  
misinformation

**26%**

of vaccine content  
on Twitter is  
misinformation

- Complicated by:
  - Vaccine type
  - Platform of study
  - Temporal nature
  - Platform access

Suarez-Lledo, V., & Alvarez-Galvez, J. (2021). Prevalence of health misinformation on social media: Systematic review. *Journal of medical Internet research*, 23(1), e17187.



# Cancer misinformation on SNS

**Table 1.** The association between cancer article misinformation, harm, and total engagements and Facebook engagements

Analysis and categories	Articles No. (%)	Total engagements Median No. (IQR)	Facebook engagements Median No. (IQR)
Total	200 (100)	1900 (941-4700)	1800 (903-4650)
Misinformation analysis			
Factual	135 (67.5)	1600 (819-4700)	1500 (769-4700)
Misinformation	65 (32.5)	2300 (1200-4700)	2300 (1200-4600)
$p^a$		.05	.03
Harm analysis			
Safe	139 (69.5)	1500 (810-4700)	1500 (746-4700)
Harmful	61 (30.5)	2300 (1400-4700)	2300 (1400-4600)
$p^a$		.007	.005

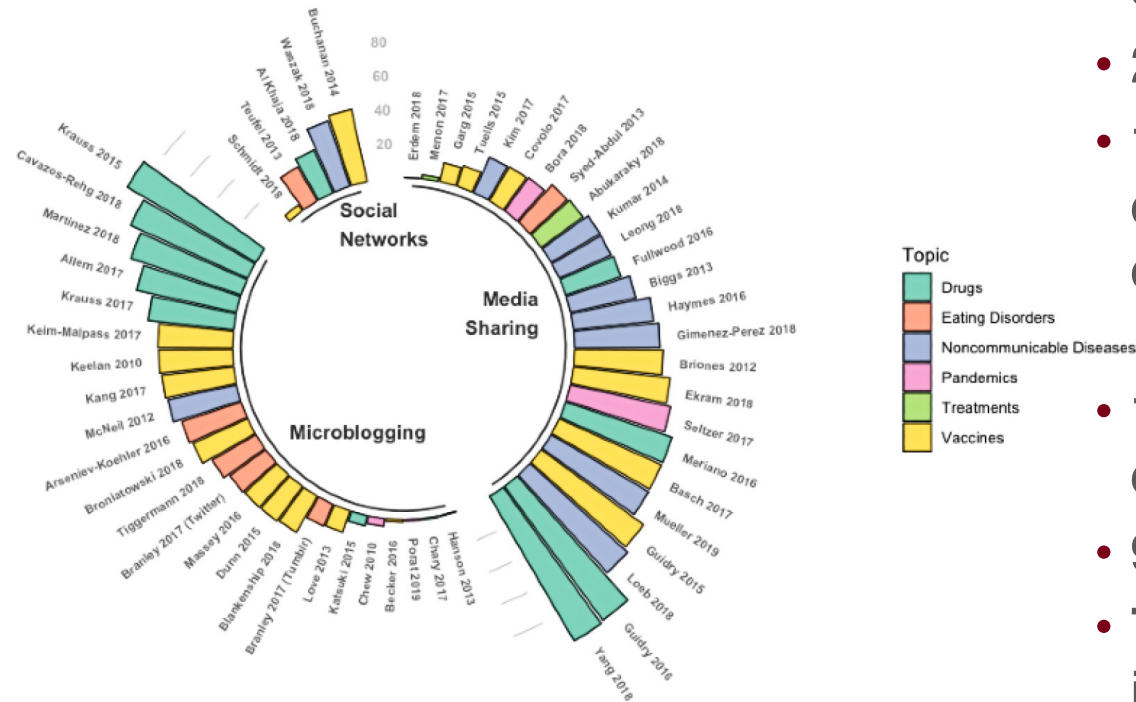
<sup>a</sup>Two-sided 2-sample Wilcoxon rank sum (Mann-Whitney) test. Expert reviewers demonstrated substantial agreement on presence of misinformation ( $\kappa = 0.63$ ; 95% confidence interval = 0.50 to 0.77) and harmful information ( $\kappa = 0.66$ ; 95% confidence interval = 0.52 to 0.80). IQR = interquartile range.

Johnson, S. B., Parsons, M., Dorff, T., Moran, M. S., Ward, J. H., Cohen, S. A., ... & Fagerlin, A. (2022). Cancer misinformation and harmful information on Facebook and other social media: a brief report. *JNCI: Journal of the National Cancer Institute*, 114(7), 1036-1039.



# Unequal attention

Figure 2. Prevalence of health misinformation grouped by different topics and social media type.



- **32%** vaccines
- **22%** drugs/smoking
- **19%** noncommunicable diseases (cancer, diabetes)
- **10%** communicable diseases: Zika, Ebola
- **9%** diet/eating disorders
- **7%** therapies & medical interventions

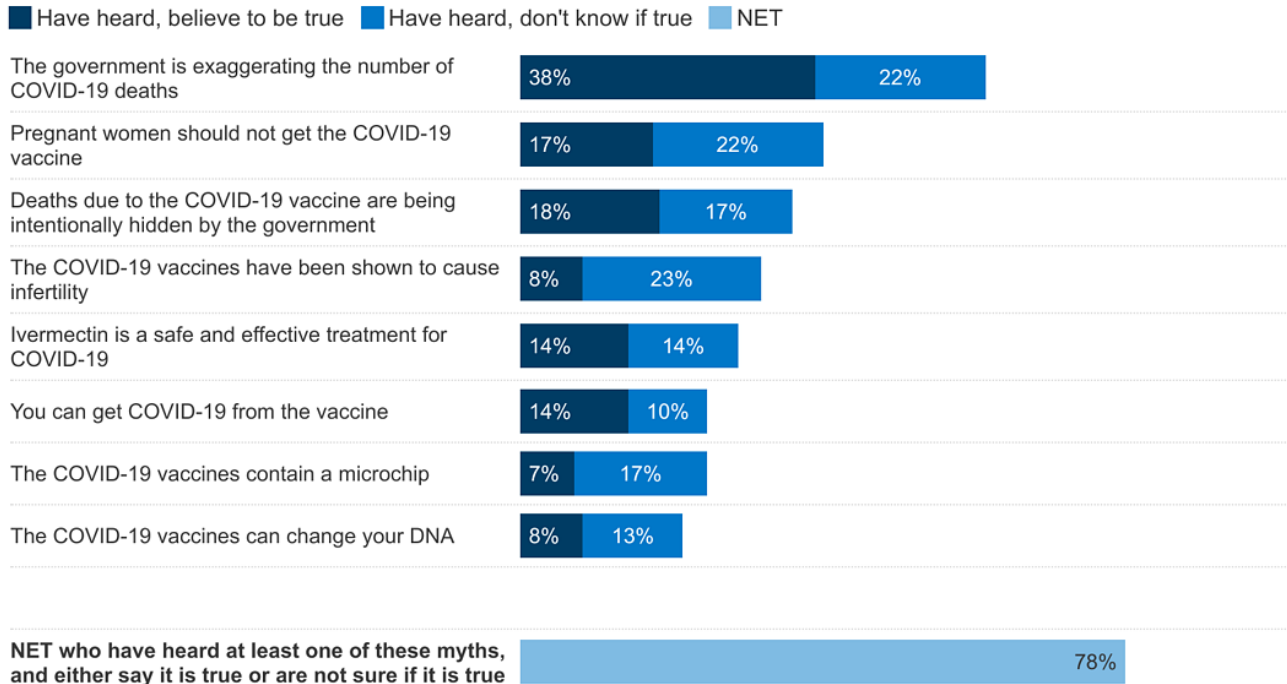
Suarez-Lledo, V., & Alvarez-Galvez, J. (2021). Prevalence of health misinformation on social media: Systematic review. *Journal of medical Internet research*, 23(1), e17187.



# People believe it

## Nearly Eight In Ten Believe Or Are Unsure About At Least One Common Falsehood About COVID-19 Or The Vaccine

Have you heard anyone say or have you read anywhere that...? IF YES: To the best of your knowledge is that true or false, or do you not know whether it is true or false?



NOTE: See topline for full question wording.  
SOURCE: KFF COVID-19 Vaccine Monitor (October 14-24, 2021)

KFF COVID-19  
Vaccine Monitor



# Why misinformation spreads on social media



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My search:  
February 18, 2023

# Information overload

covid-19 vaccine availability for 2 year olds ideal gap fourth booster



All

Shopping

News

Images

Books

More

Tools

About 48,200,000 results (1.05 seconds)



# Information voids and overload

covid-19

[Español](#) | [Other Languages](#)



Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™



Vaccine

Pfizer-BioNTech



## Find COVID-19 Vaccines

Powered by [VaccineFinder](#)

**New: Updated COVID-19 Vaccines for Children and Adults**

Select the “newly authorized” location near you. If you need a booster, see your health care provider for [booster recommendations](#).

**5-digit Zip Code**

Zip Code

COVID-19

AGE GROUP

6 MONTHS–4 YEARS

1st Dose  
**Pfizer-BioNTech**  
PRIMARY SERIES

2nd Dose  
**Pfizer-BioNTech**  
PRIMARY SERIES

3–8 weeks after 1st dose

**More details:** [Getting your 2nd dose](#)

3rd Dose  
**Pfizer-BioNTech**  
UPDATED PRIMARY SERIES  
At least 8 weeks after 2nd dose

Ad · Prescription

**COVID-19**  
See Emergencies

Ad · [https://www.cdc.gov/vaccines/imz-managers/immunization/updates/2022-08-04-01/index.html](#)  
**Moderna**

**Up to Date:** 2 weeks after 3rd dose; there is not a recommendation for an updated Pfizer-BioNTech booster for this age group

**More details:** [Staying up to date](#)



# Changing environment



covid-19 vaccine availability 2 year old ideal gap fourth booster



News

Shopping

Images

Books

Maps

Videos

Flights

Finance

About 13,300,000 results (0.54 seconds)

## Sponsored



cdc.gov

<https://www.cdc.gov>

### See Recommendations by Age - Official CDC Site for COVID

Stay up to date w/ **vaccination**. People 6 mos.+ should get an updated **vaccine**, if eligible.

Bivalent **COVID vaccines** help restore protection that has waned since previous **vaccination**. CDC

**Vaccine** Information. **Vaccines** Are Available. See **Vaccine** Eligibility.

[Am I Fully Vaccinated?](#) · [Updated Bivalent Boosters](#) · [FDA-Approved Vaccines](#)



Minnesota Department of Health

<https://www.health.state.mn.us> > vaccine > peds

### Pediatric COVID-19 Vaccination

The Pfizer **COVID-19 vaccine** for 5 through 11-year-olds is identified by an ... Bivalent **booster** doses are now **available** for children age 6 months and older.

<https://www.health.state.mn.us> > vaccine > basics

### About COVID-19 Vaccine - MN Dept. of Health

All Minnesotans 6 months and **older** should get an updated (bivalent) **booster vaccine**, when eligible. Find **Vaccine Locations** at clinics, hospitals, and pharmacies ...



Minnesota.gov

<https://mn.gov> > covid19 > vaccine > vaxforkids

### COVID-19 Vaccine for Children and Teens

Children age 6 months through 4 years can only get Moderna for their **booster**, but children age 5 years can get either Moderna or Pfizer for their **booster**.

Missing: **gap** | Must include: **gap**

<https://mn.gov> > covid19 > vaccine > boosters

### COVID-19 Vaccine Booster Shots

People age 12 years and **older** should get an updated (bivalent) **booster** shot at least 2 months after their primary series. The **booster** can be Pfizer or Moderna.

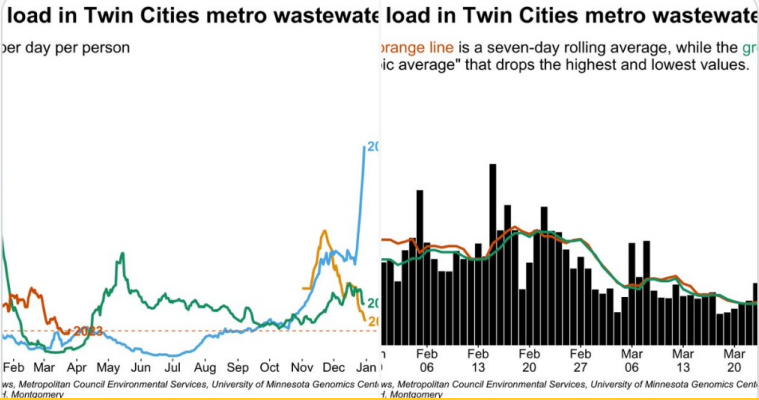


# Fewer gatekeepers & source cues



**David H. Montgomery** @dhmontgomery · 4h

I was a little busy last Friday, but the latest COVID data shows levels in Twin Cities wastewater generally trending down. A slight bump at the tail end, but looking at daily figures there's good reason to believe this is just noise & that the trend remains down.



1 2 36 4,044



**Chief Nerd** @TheChiefNerd · 58m

"Perhaps the most extraordinary thing about this state of affairs is that most Americans don't know it's happening. Every day, young people are dying from heart attacks, strokes, and seizures caused by COVID-19 vaccines. Most of their families and friends are led to believe..."

**EPOCH HEALTH**

### Analysis: COVID Vaccines Caused 300,000 Excess Deaths in 2022 Alone

HEALTH VIEWPOINTS  
John Leake  
Dr. Peter A. McCullough, MD  
Apr 1 2023

23 537 1,007 53.8K

Show this thread

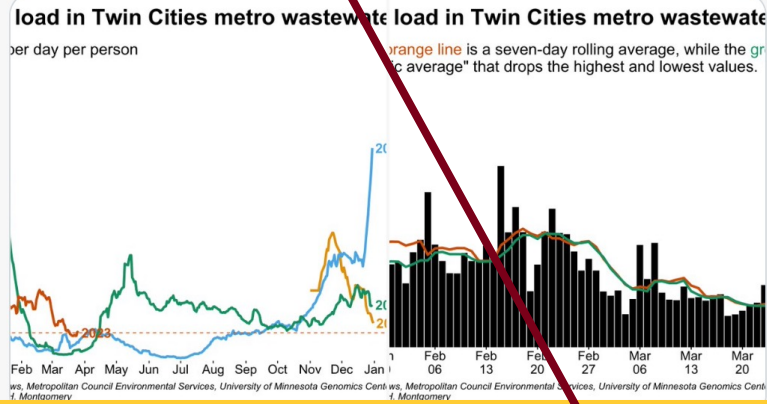


# Changing environment



**David H. Montgomery** @dhmontgomery · 4h

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1 2 36

FORBES > BUSINESS

BREAKING

## Twitter Launches \$8-A-Month Blue Check Days After Musk's Promise

**Brian Bushard** Forbes Staff  
I cover breaking news for Forbes

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Nov 5, 2022, 04:27pm EDT



**Chief Nerd** @TheChiefNerd · 58m

"Perhaps the most extraordinary thing about this state of affairs is that most Americans don't know it's happening. Every day, young people are dying from heart attacks, strokes, and seizures caused by COVID-19 vaccines. Most of their families and friends are led to believe...

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### Analysis: COVID Vaccines Caused 300,000 Excess Deaths in 2022 Alone

HEALTH VIEWPOINTS

John Leake  
Dr. Peter A. McCullough, MD  
Apr 1 2023



57 53.8K



# Virality of misinformation



Contents lists available at [ScienceDirect](#)

American Journal of Infection Control

journal homepage: [www.ajicjournal.org](http://www.ajicjournal.org)



Brief Report

## Zika virus pandemic—analysis of Facebook as a social media health information platform

Megha Sharma MD, FAAP <sup>a,\*</sup>, Kapil Yadav MD <sup>b</sup>, Nitika Yadav MD <sup>c</sup>,  
Keith C. Ferdinand MD, FACC, FAHA <sup>c</sup>

**Table 1**

Facebook (Facebook Inc, Menlo Park, CA) posts about the Zika virus pandemic with the most popular post characteristics

Variable	Useful information	Misleading/misguiding information
Number of posts (%)	162 (81)	21 (12)
Most popular post	WHO Live press briefing on Zika virus <sup>*</sup>	10 reasons why Zika virus fear is another fraudulent medical hoax and vaccine industry funding scam <sup>†</sup>
Total views	43,000	535,000 (178,000 + 357,000)
Total shares	964	15,300 + 4,300
Average shares for all posts	200	740

+, Added Sum of the views of the same video from two different sources.

<sup>\*</sup>World Health Organization (<https://www.youtube.com/watch?v=USgp2fNQwR4>).

<sup>†</sup>TheHealthRanger. (<https://www.youtube.com/watch?v=6Hzsvkw8Lko>).



# Virality of misinformation

## Science

Current Issue

First release papers

Archi

When we analyzed the diffusion dynamics of true and false rumors, we found that falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information [Kolmogorov-Smirnov (K-S) tests are

JE AND FALSE NEWS ONLINE

## The spread

It took the truth about six times as long as falsehood to reach 1500 people (Fig. 2F) and 20 times as long as falsehood to reach a cascade depth of 10 (Fig. 2E). As the truth never diffused

## online

[SOROUSH VOSOUGHI](#) , [DEB](#)

SCIENCE • 9 Mar 2018 • Vol 359, Issue 6380 • pp. 1146-1151 • [DOI: 10.1](#)

When we estimated a model of the likelihood of retweeting, we found that falsehoods were 70% more likely to be retweeted than the truth (Wald chi-square test,  $P \sim 0.0$ ), even when controlling for the account age, activity level, and number of followers and followees of the original tweeter, as well as whether the original tweeter was a verified user (Fig. 4B). Because user



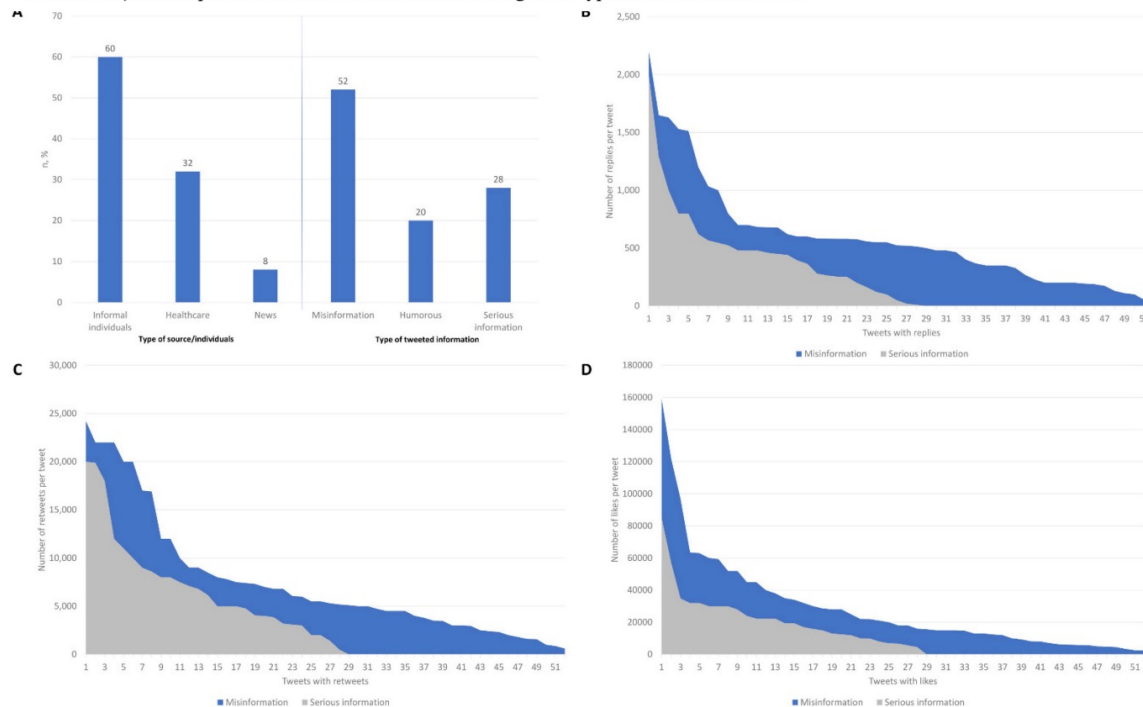
# Virality of misinformation

Letter to the Editor

## Monkeypox goes viral: measuring the misinformation outbreak on Twitter

Yeimer Ortiz-Martínez<sup>1,2,3</sup>, Jheinner Sarmiento<sup>2</sup>, D Katterine Bonilla-Aldana<sup>3,4,5,6,7</sup>, Alfonso J Rodríguez-Morales<sup>3,4,5,6,7,8</sup>

**Figure 1.** Analyses of the top 100 tweets on monkeypox. **A.** Type of source/individuals and tweeted information, **B.** Comparison of the number of replies, according to the type of tweeted information; **C.** Comparison of the number of retweets according to the type of tweeted information; **D.** Comparison of the number of likes according to the type of tweeted information.





# Polarization in health and science



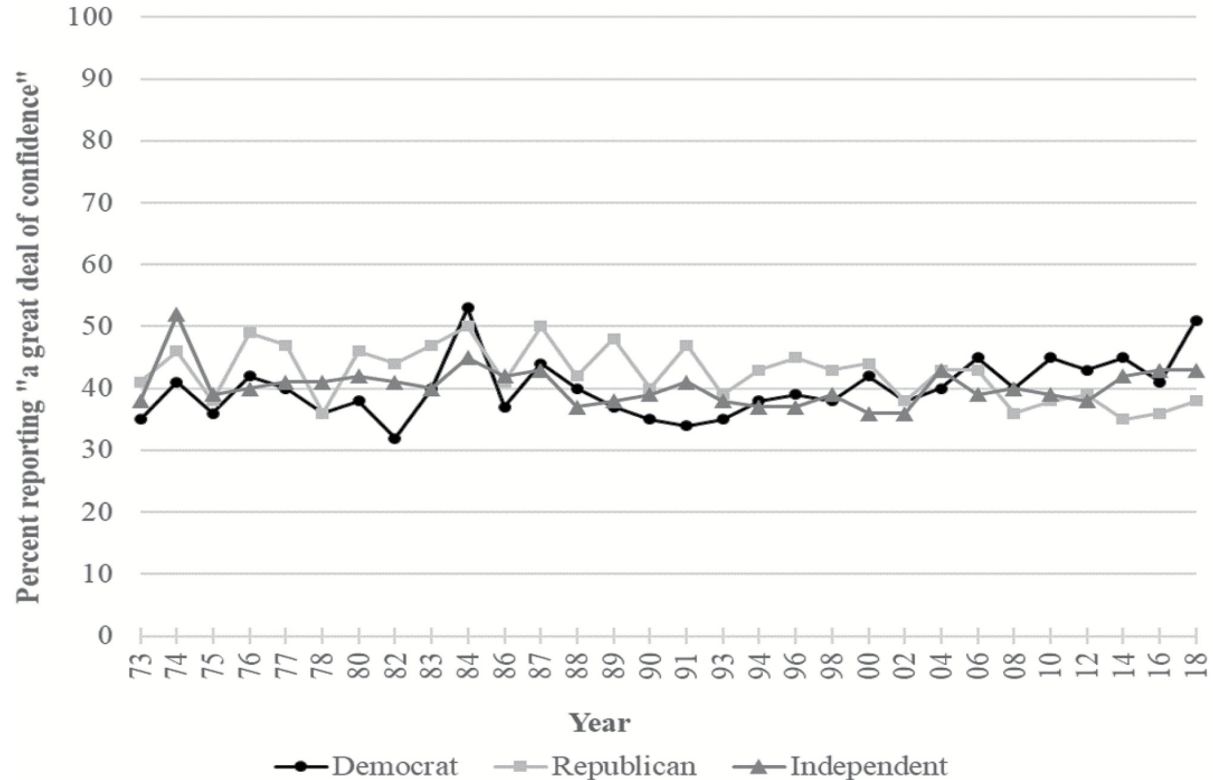
Volume 83, Issue 4  
Winter 2019

JOURNAL ARTICLE

## Trends—Americans' Trust in Science and Scientists



Nicole M Krause ✉, Dominique Brossard, Dietram A Scheufele, Michael A Xenos,  
Keith Franke



Public Opin Q, Volume 83, Issue 4, Winter 2019, Pages 817–836, <https://doi.org/10.1093/poq/ntz041>

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# Politicization and polarization in health



Pew Research Center

REPORT | FEBRUARY 15, 2022



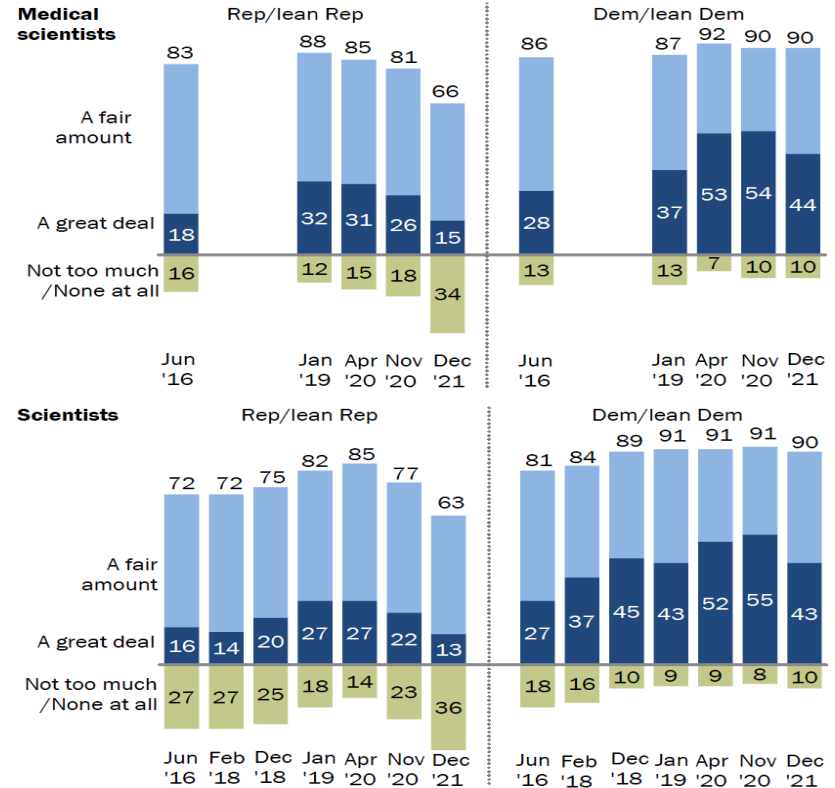
## Americans' Trust in Scientists, Other Groups Declines

*Republicans' confidence in medical scientists down sharply since early in the coronavirus outbreak*

BY BRIAN KENNEDY, ALEC TYSON AND CARY FUNK

### Democrats remain more confident than Republicans in medical scientists; ratings fall among both groups

% of U.S. adults who have \_\_\_ of confidence in the following groups to act in the best interests of the public



Note: Respondents who did not give an answer are not shown.  
 Source: Survey conducted Nov. 30–Dec. 12, 2021.  
 "Americans' Trust in Scientists, Other Groups Declines"

PEW RESEARCH CENTER

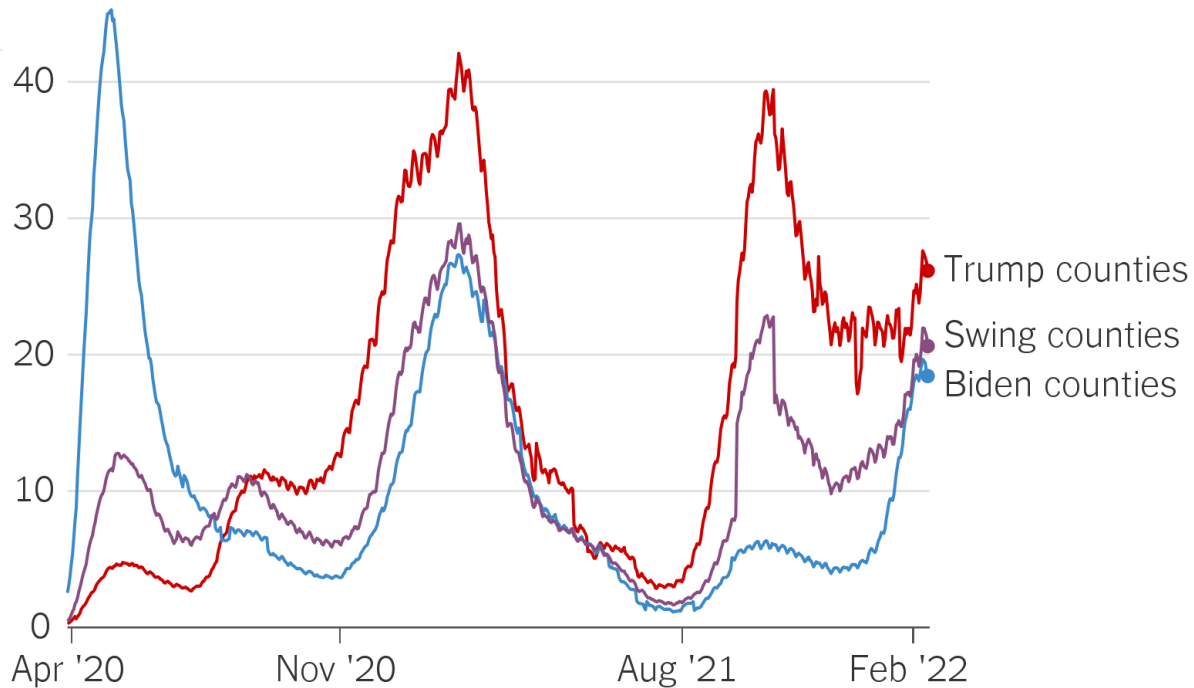


# Politicization in health

## *Red Covid, an Update*

The New York Times

The partisan Covid deaths per 100,000 people, previous 30 days



# Politicization in health

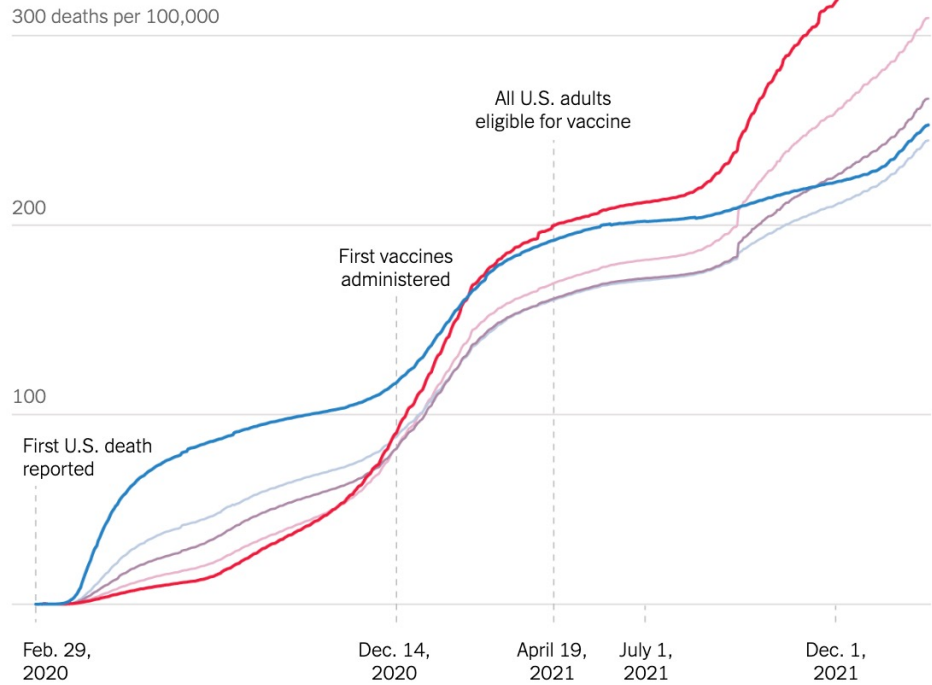
## Red Covi

The partisan ga

The New York Times

Cumulative U.S. deaths per capita

Counties' Trump vote share 30 45 55 70%



Note: Data as of Feb. 13, 2022. Sources: New York Times database; Edison Research By Ashley Wu



# The role of journalists



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# Journalistic norms

- Timeliness
  - Repeated sources
- Conflict
- Objectivity
  - Often “balanced”



# Conflict and balance

**The New York Times**

## ***These Health Care Workers Would Rather Get Fired Than Get Vaccinated***

Monday is the vaccination deadline for New York State health care workers. Thousands of refusers have failed to meet it.

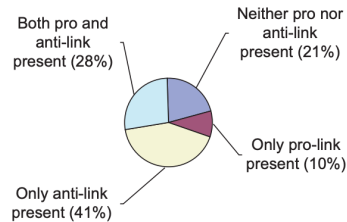
State vaccination  
the state's  
people, with  
[staff at skilled  
care facilities](#)  
25,000 or more

The dispute is dividing hospitals, where most workers are vaccinated and want their colleagues to be. The nurses' union supports the mandate — some 95 percent of members are already vaccinated — even as some members complain its rollout was too rushed. But unions representing support workers, including nurses' aides, orderlies, cafeteria workers and others, have opposed it. If many of those workers leave or are fired, their duties could fall to already taxed nurses.

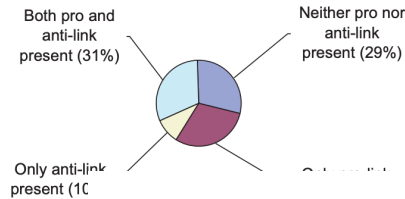


# False balance

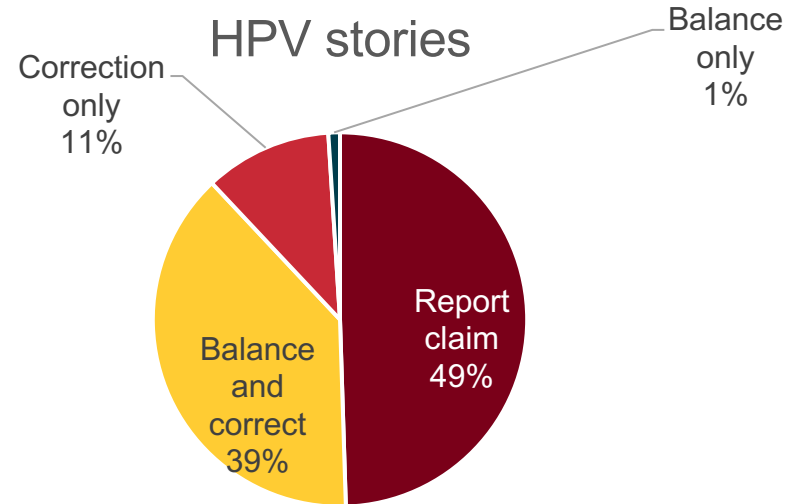
**Figure 4**  
Presentation of Autism-Vaccine Studies and Claims,  
U.S. Sample ( $n = 72$ )



**Figure 5**  
Presentation of Autism-Vaccine Studies and Claims,  
UK Sample ( $n = 207$ )



HEALTH COMMUNICATION  
2017, VOL. 32, NO. 2, 152–160  
<http://dx.doi.org/10.1080/10410236.2015.1110006>



 **Routledge**  
Taylor & Francis Group

## A Question

### The Autism-Vaccine Link in the British and American Media

Christopher E. Clar  
Cornell University

## False Balance in Public Health Reporting? Michele Bachmann, the HPV Vaccine, and “Mental Retardation”

Ryan J. Thomas<sup>a</sup>, Edson C. Tandoc, Jr.<sup>b</sup>, and Amanda Hinnant<sup>a</sup>

<sup>a</sup>School of Journalism, University of Missouri; <sup>b</sup>Wee Kim Wee School of Communication and Information, Nanyang Technological University





# Strategies to address misinformation



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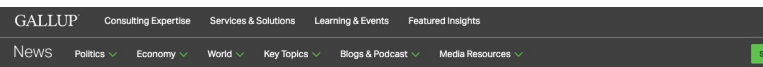
# Solutions for misinformation

1. Promoting
2. Prebunking
3. Debunking



# (1) Promoting: Fill Information Voids

- Promoting high quality information fills information voids
  - Credibility about **trust** and **expertise**



POLITICS DECEMBER 22, 2020

## U.S. Ethics Ratings Rise for Medical Workers and Teachers

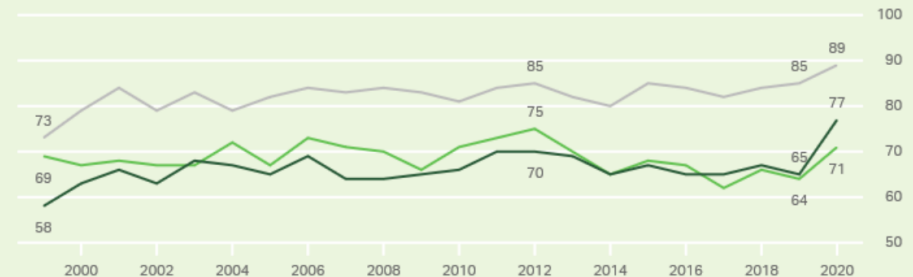
BY LYDIA SAAD



### Honesty and Ethical Ratings of Top-Rated Medical Professions, 1999-2020

% Very high/High honesty and ethical standards

■ Pharmacists ■ Medical doctors ■ Nurses

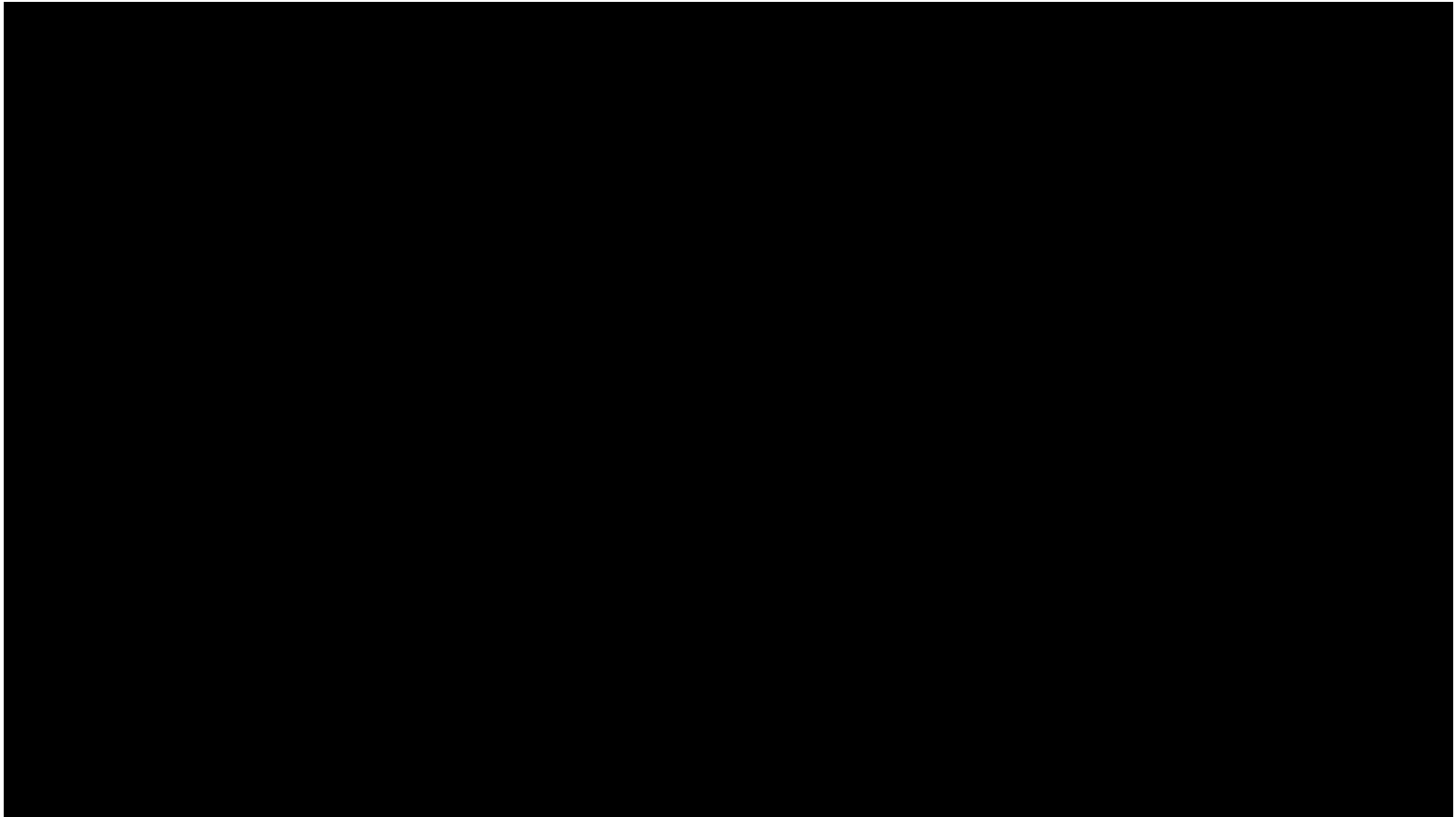


GALLUP

<https://news.gallup.com/poll/328136/ethics-ratings-rise-medical-workers-teachers.aspx>



# (1) Promoting Weight of Evidence



<https://www.youtube.com/watch?v=cjuGCJJUGsg&t=6s>

Source: Brewer, P. R., & McKnight, J. (2017).



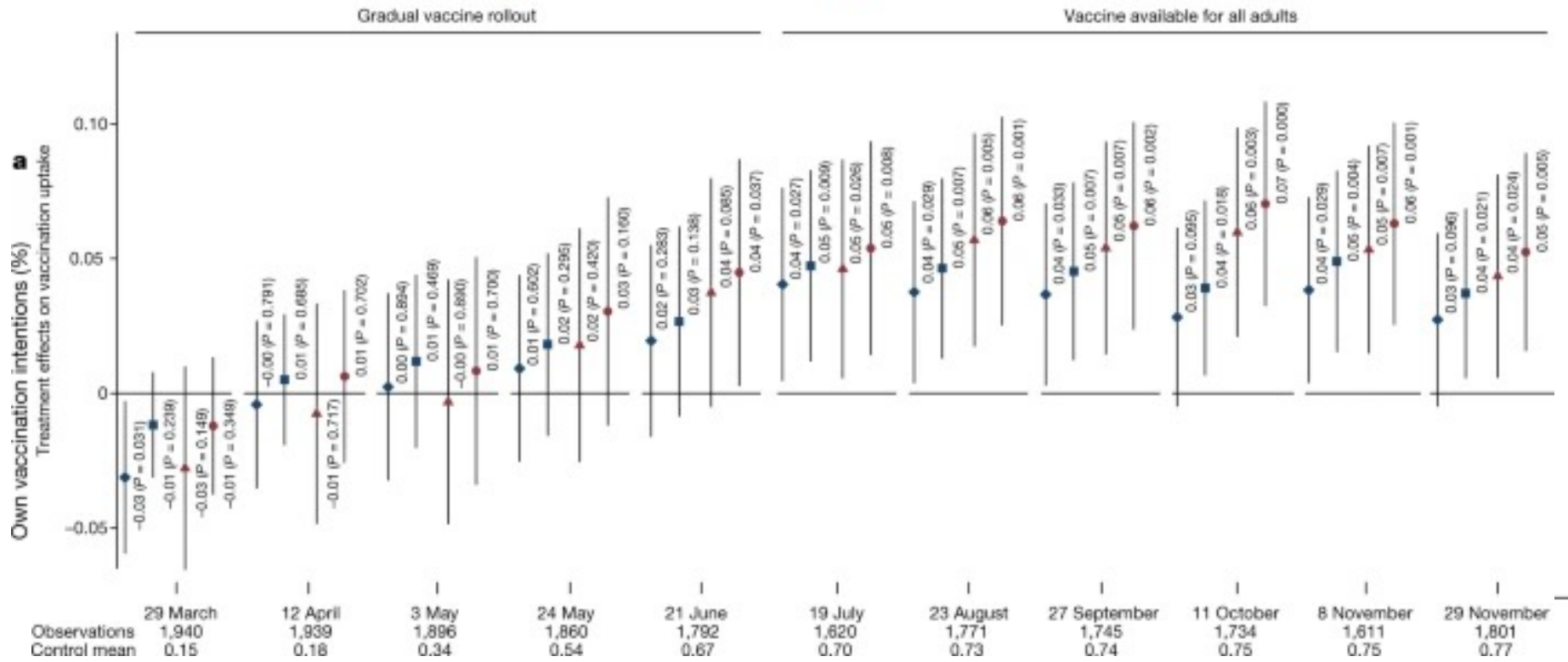
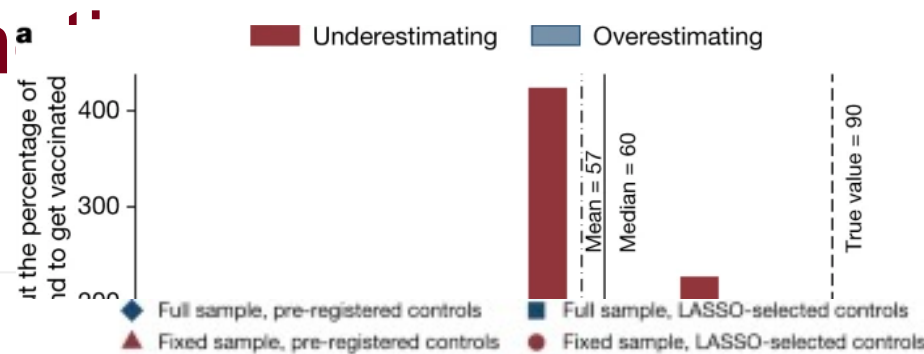
# (1) Promoting Weight of Evidence



Source: Brewer, P. R., & McKnight, J. (2017).



# (1) Prom nature

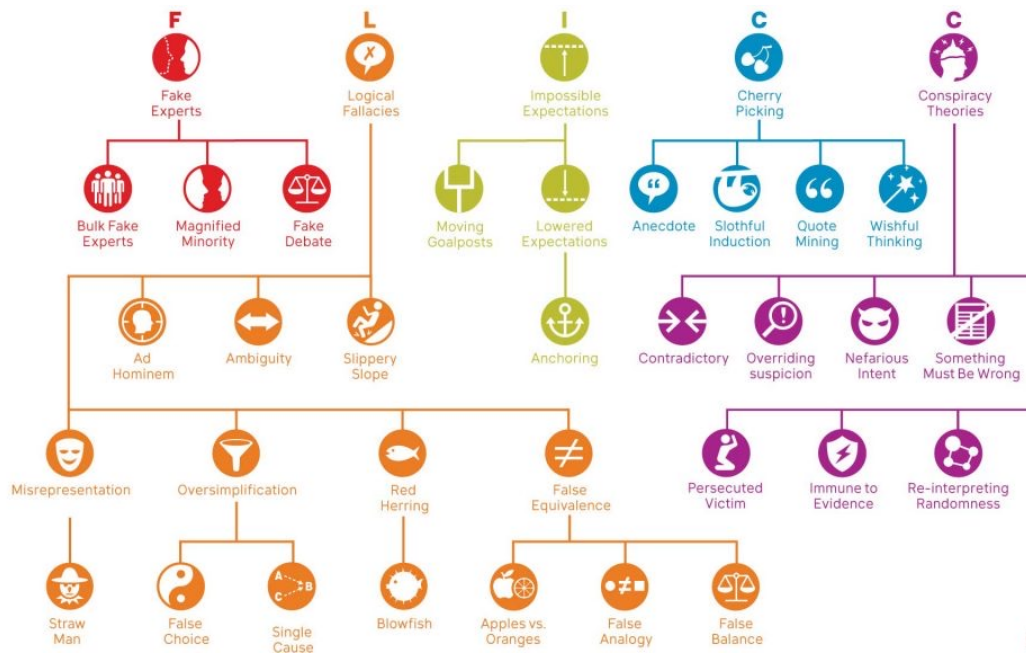


## (2) Prebunking

- **Prebunking** involves:
  - Warning about likely misinformation
  - Giving tools to recognize and resist
- Teaching people about:
  - Common misinformation strategies (rhetorical)
  - Facts on controversial topics (factual)
  - Common misinformation actors (source-based)
  - How media function (media literacy)



# (2a) Rhetorical prebunking



- Most disinformation campaigns use similar techniques
  - Fake experts
  - Logical fallacies
  - Impossible expectations
  - Cherry picking
  - Conspiracy theories

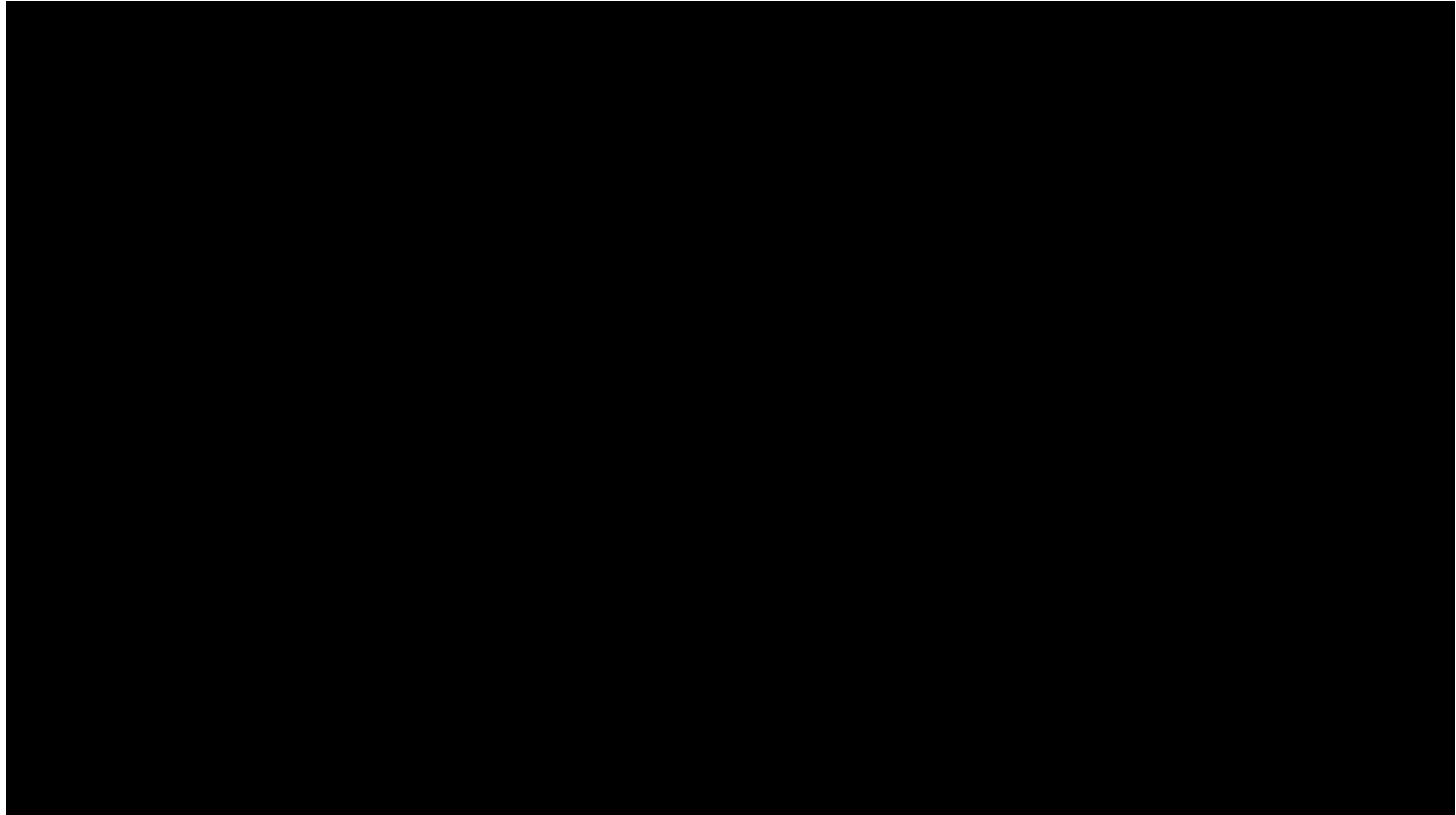
sk.s.to/flicc

<https://skepticalscience.com/history-FLICC-5-techniques-science-denial.html>





## (2a) Rhetorical prebunking



<https://www.youtube.com/watch?v=T-yK2tQdLDw>



## (2b) Factual prebunking



- Goal: Identify (likely) myths
- Topic-based misinformation often recycled

<https://firstdraftnews.org/articles/a-guide-to-prebunking-a-promising-way-to-inoculate-against-misinformation/>



## (2b) Factual prebunking



<https://www.youtube.com/watch?v=tEYQRnjbJBs>



## (2c) Source-based prebunking



- **65%** of anti-vaccine misinformation on social media from 12 accounts
- Largely for financial or political gain

<https://counterhate.com/research/the-disinformation-dozen/>



## (3) Debunking

- **Debunking (or correction):** responding to specific, concrete instances of misinformation
  - Rhetorical
  - Factual

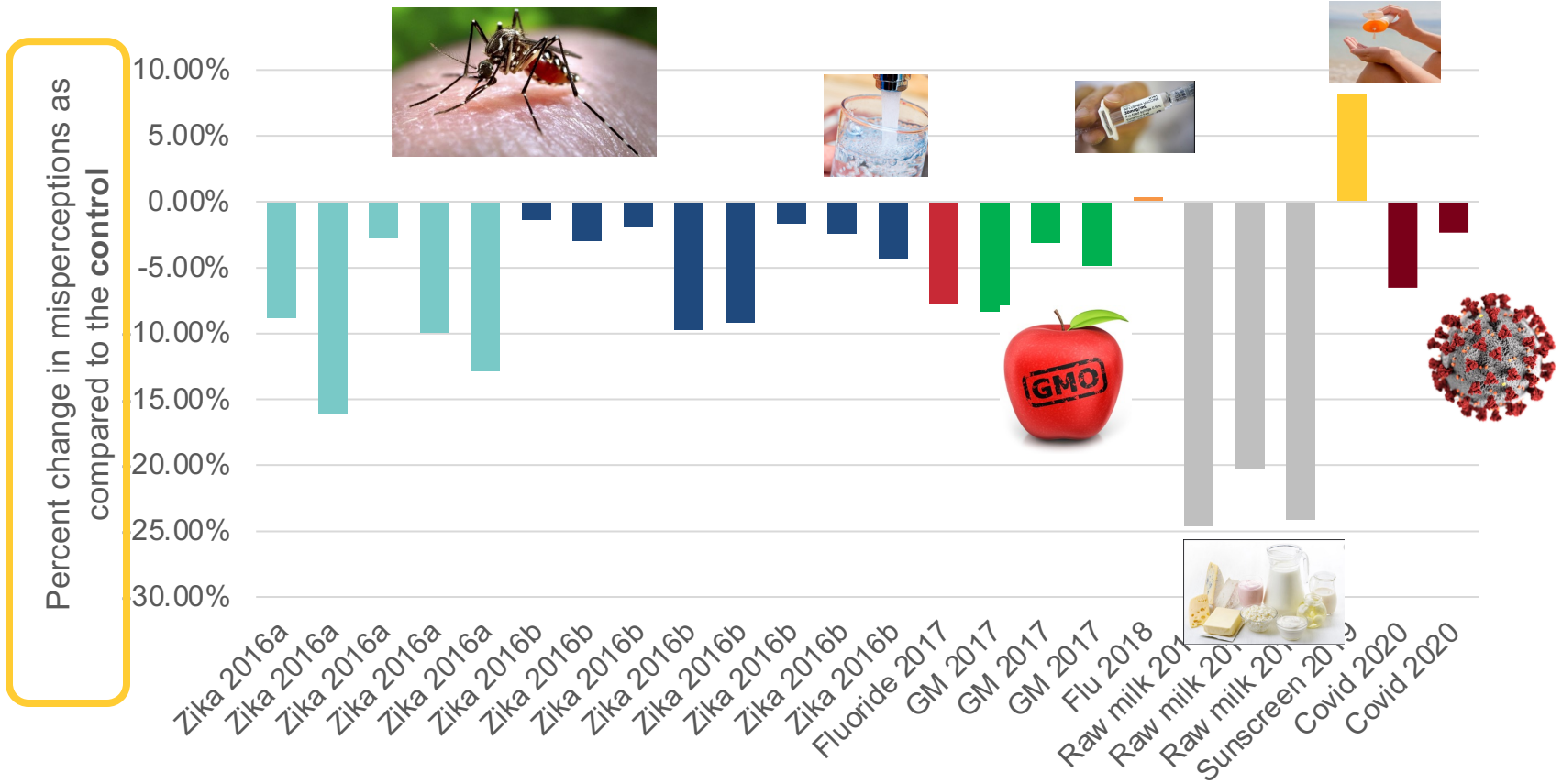


## (3) Observed correction

- **PUBLIC** correction
- When bystanders **witness** correction



# (3) Observed correction reduces misperceptions



## (3) REACT to misinformation

- **R**epeat corrections
- **E**mpathetic replies
- **A**lternative explanations
- **C**redible sources
- **T**imely response

Vraga, E. K., Ecker, U. K. H., Žeželj, I., Lazić, A., & Azlan, A. A. (forthcoming). To Debunk or Not Debunk? Correcting (Mis)information. In T. Purnat & B. Yau (Eds.) *Managing infodemics in the 21st century – Addressing new challenges in the information ecosystem*. Springer Nature.





# Swiss Cheese



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# Working together

ACTORS INVOLVED IN MISINFORMATION MITIGATION.



PLATFORMS



POLICYMAKERS



PRACTITIONERS



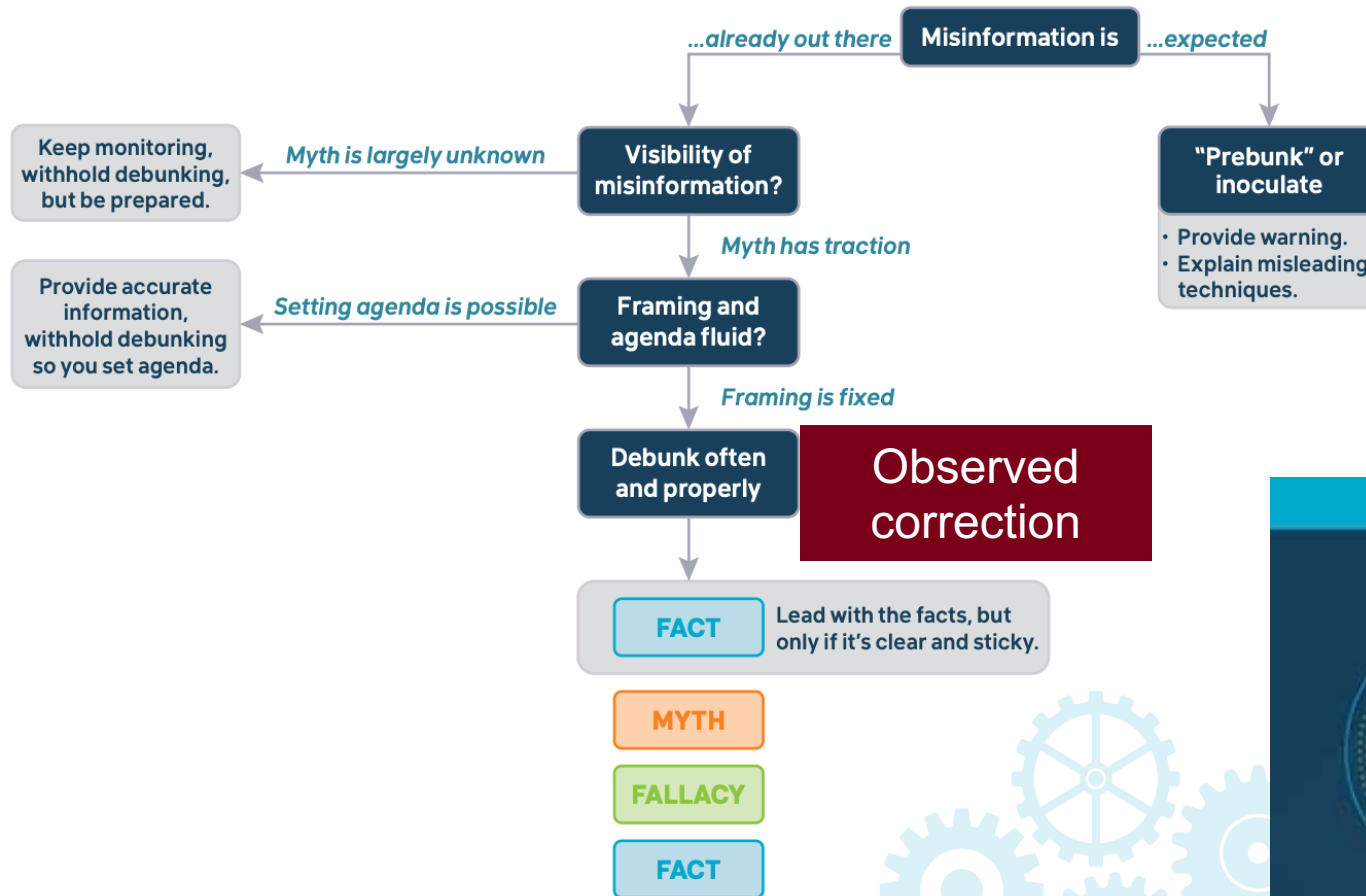
PUBLISHERS



PEOPLE

# Deciding which strategy

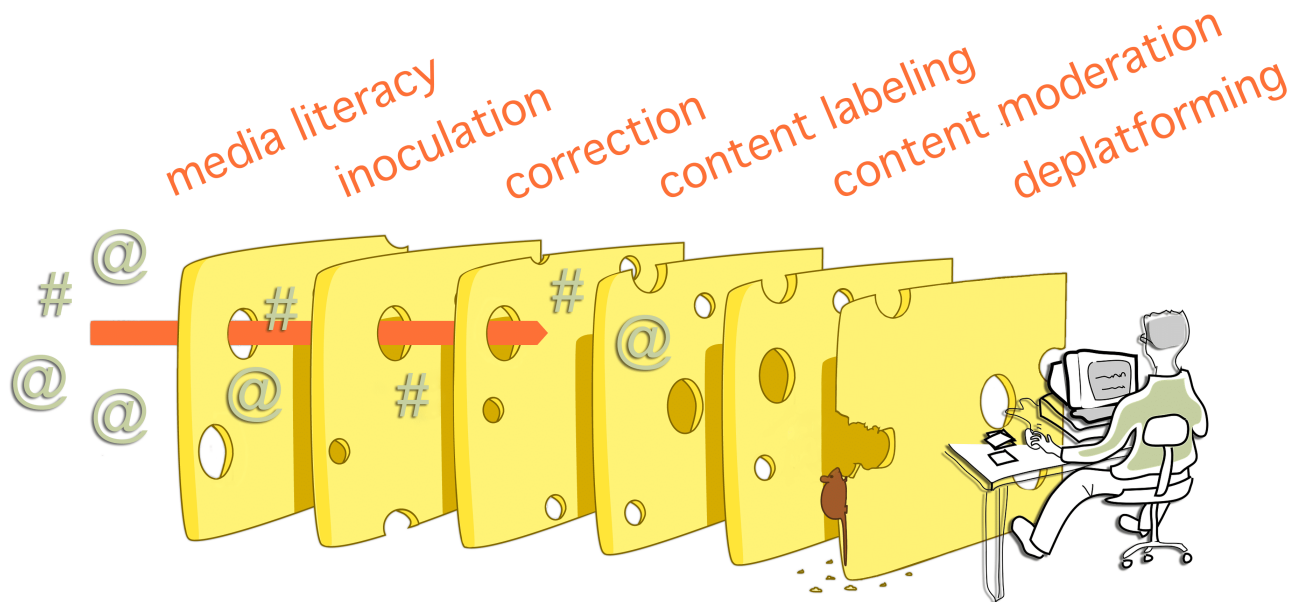
Sharing high quality information



Lewandowsky et al. (2020). The Debunking Handbook 2020. Available at <https://sks.to/db2020>. DOI:10.17910/b7.1182

# The “Swiss cheese” model for misinformation

The Swiss Cheese Model of Mitigating Online Misinformation



Bode & Vraga (2021): <https://thebulletin.org/premium/2021-05/the-layered-swiss-cheese-model-for-mitigating-online-misinformation/>

# Resources

- [Debunking handbook](#)
- [Skeptical science website](#)
- [Journalists' handbook on scientific consensus](#)
- [COVID-19 vaccine confidence handbook](#)
- [CDC manual on health communication](#)



Thank you!

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