# Expert Judgment and Epistemic Diversity

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# Introduction

# Sources of Epistemic Diversity

**Epistemic diversity in science**

– diversity of approaches, inquiries, hypotheses and theories in a given domain.

- An important catalyst of scientific progress
- Often manifested through scientific disagreements

But not all diversity is good.

# Bad epistemic diversity

- Manufactured dissent though industry bias (Biddle and Leuschner, 2015)
- Dissent triggered by the lack of expertise

# Two problems resulting from the lack of expertise

# Epistemic Trespassing

Many examples of experts making judgments—and assertions—outside the proper epistemic boundaries of their expertise:

**Examples:**

- Linus Pauling and vitamin C treatments (Ballantyne, 2019)
- Colin McGinn and disgust (Ballantyne, 2019)
- Neil deGrasse Tyson and philosophy (Ballantyne, 2019)
- Scott Atlas and masks (DiPaolo, 2021)

# Epistemic Problems with Trespassing

**Three general problems**

1. Generation of epistemic harms (Ballantyne, 2019).
2. Violation of social duties the trespasser has as an expert (DiPaolo, 2021).
3. General distrust and improper functioning of an epistemic ecosystem.

# Do your own research!

"Do your own research!" is an invocation often seen in online discussions (among other places). (Ballantyne et al., forthcoming; Levy, 2022)

- The invocation serves rhetorical roles
  - closing debate,
  - shifting the burden of proof,
  - increasing perceived epistemic authority
- The act of doing your own research seems intuitively good
  - Promotes the value of intellectual autonomy
  - Involves gathering more evidence before forming a judgment.

# Epistemic Problems of DYOR

The basic problem is that DYOR leads people into ignorance.

- Effective research requires developing competence—including competence to obtain and evaluate evidence.
  - I.e., it requires developing expertise.
- But obtaining expertise requires the right social circumstances and resources.
- Typical internet sleuths will often lack these resources.

# The lack of an adequate expert judgment

What kinds of reasons should undergird expert judgment?

# Expertise

**Expertise**

– involves possession of relevant knowledge/evidence and sufficient competence at evaluating relevant evidence/deploying relevant knowledge.

(For a detailed discussion, see Grundmann, forthcoming)

# Expert judgment

**Main focus in philosophical discussions**

The role of non-epistemic values

**Douglas, 2008**

- Epistemic support (warrant) for a claim should be based on evidence.
- Values play an indirect role: they help to weigh how strong the evidence is (for the acceptance/rejection of the policy-relevant claim).

# Expert judgment

**Main focus in philosophical discussions**

The role of non-epistemic values

**Douglas, 2008**

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Epistemic reasons: reduced to evidence

# In this talk

- I will argue that such a simplified evidentialist view of the relevant epistemic reasons for expert judgment can be misleading
- Two other kinds of epistemic reasons, so far overlooked in the literature on expertise:
  - Higher-order evidence
  - Inquisitive reasons

**The upshot:**

**To understand what goes wrong in cases of bad diversity, we first have to understand the sources of inadequate expert judgment, and therefore, these two types of social-epistemic reasons.**

# The Aerosol COVID-19 Controversy

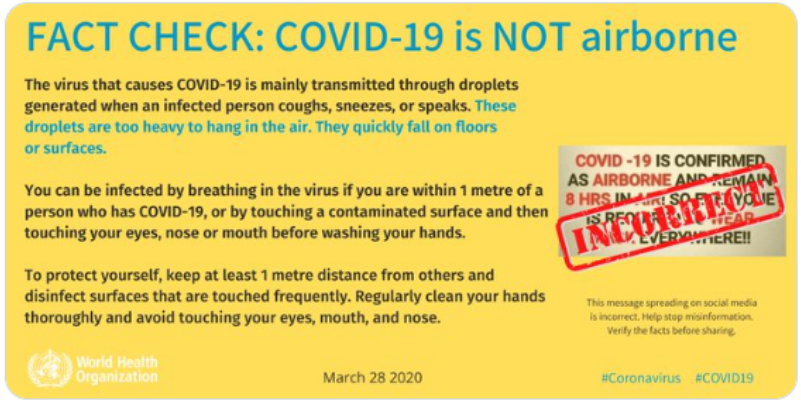
# March 28, 2020

**World Health Organization (WHO)** @WHO

FACT: #COVID19 is NOT airborne.

The #coronavirus is mainly transmitted through droplets generated when an infected person coughs, sneezes or speaks.

To protect yourself:
-keep 1m distance from others
-disinfect surfaces frequently
-wash/rub your 👐
-avoid touching your 👀👃👄




PAHO/WHO and 6 others

7:44 PM · Mar 28, 2020 · Twitter Web App

**39.4K** Retweets **4,334** Quote Tweets **44.1K** Likes Tip

NEWS FEATURE | 06 April 2022

# Why the WHO took two years to say COVID is airborne

**Early in the pandemic, the World Health Organization stated that SARS-CoV-2 was not transmitted through the air. That mistake and the prolonged process of correcting it sowed confusion and raises questions about what will happen in the next pandemic.**

Dyani Lewis

# Three methods of COVID-19 transmission

Early discussions in the pandemic: three methods of transmission:

1. Droplet: droplets are expelled from infected individuals and enter the systems of others
    - masks and social distancing
2. Fomite: non-infected persons come into direct contact with contaminated surfaces
    - wiping down potentially contaminated surfaces and avoiding close contact
3. Aerosol: infectious particles linger in the air and enter systems of others.
    - different kinds of masking, ensuring sufficient ventilation, etc.

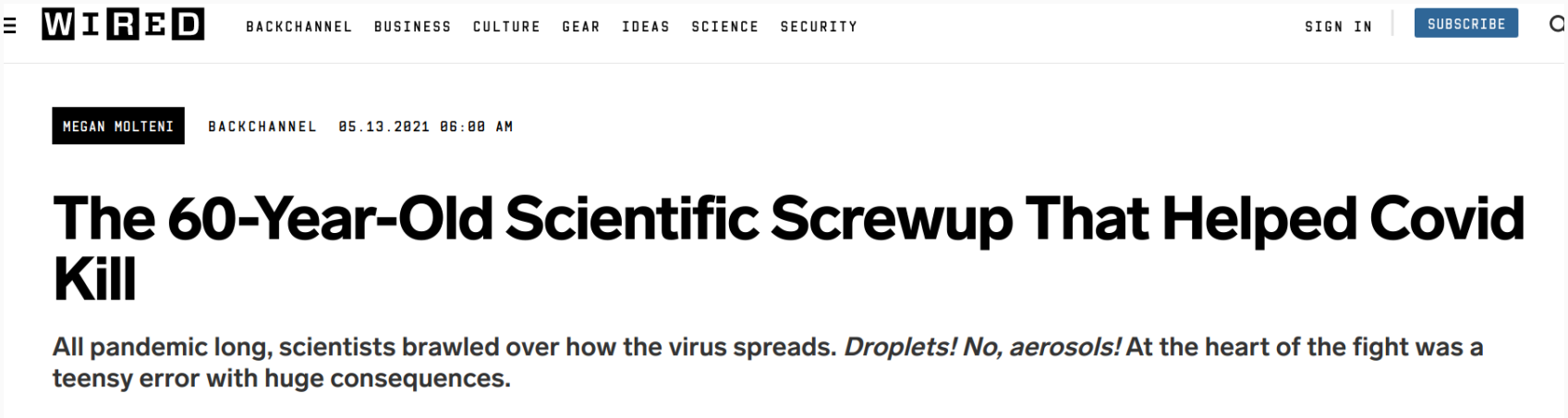
# WHO stance

## Aerosol transmission:

- A less significant focus of concern
- Because of difficulties with obtaining direct evidence by culturing the virus from (possibly contaminated) air particles.

## More general background:

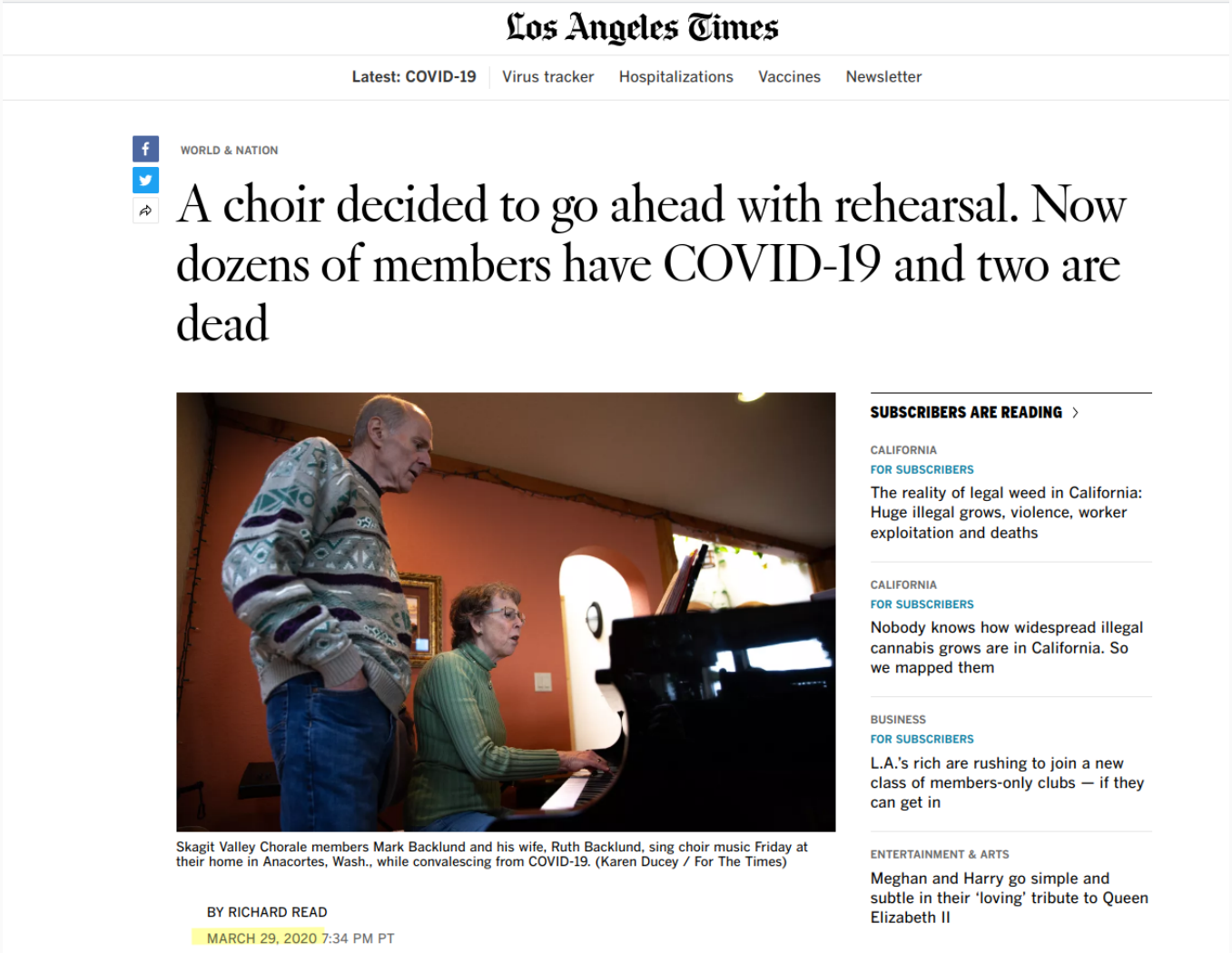
A decades long mistaken view on aerosols as necessarily smaller than five microns.






https://www.wired.com/story/the-teeny-tiny-scientific-screwup-that-helped-covid-kill/

# The impact



Los Angeles Times

Latest: COVID-19 | Virus tracker | Hospitalizations | Vaccines | Newsletter

WORLD & NATION

## A choir decided to go ahead with rehearsal. Now dozens of members have COVID-19 and two are dead

Skagit Valley Chorale members Mark Backlund and his wife, Ruth Backlund, sing choir music Friday at their home in Anacortes, Wash., while convalescing from COVID-19. (Karen Ducey / For The Times)

BY RICHARD READ

MARCH 29, 2020 7:34 PM PT

**SUBSCRIBERS ARE READING**

CALIFORNIA
FOR SUBSCRIBERS
The reality of legal weed in California: Huge illegal grows, violence, worker exploitation and deaths

CALIFORNIA
FOR SUBSCRIBERS
Nobody knows how widespread illegal cannabis grows are in California. So we mapped them

BUSINESS
FOR SUBSCRIBERS
L.A.'s rich are rushing to join a new class of members-only clubs — if they can get in

ENTERTAINMENT & ARTS
Meghan and Harry go simple and subtle in their 'loving' tribute to Queen Elizabeth II

https://www.latimes.com/world-nation/story/2020-03-29/coronavirus-choir-outbreak

# Problem:

The assessment made by the WHO:

- Primarily based on 'evidential reasons': reasons grounded in scientifically obtained evidence that supports or undermines a certain hypothesis.
  - Specifically: the focus is on first-order evidence.
- $E$ is evidence for $H$ iff the truth of $E$ raises the probability of the truth of $H$.
- Problem: there are relevant reasons other than (first-order) evidence.

# Overlooked Epistemic Reasons

# Overlooked Epistemic Reasons

## Higher-Order Evidence

# Higher-order evidence

- Higher-order Evidence (HOE): "evidence which bears on a believer's rational capacities, epistemic performance, or evidential situation." (Horowitz, 2022)

**Debated in the epistemology of peer disagreement**

Feldman, 2005, Kelly, 2010, Christensen, 2010, LasonenAarnio, 2014, Skipper and Steglich-Petersen, 2019, Whiting, 2020, Dorst, 2020, etc.

- HOE $\Longrightarrow$ (FOE $\Longrightarrow$ A) (higher-order support)
- HOE $\Longrightarrow$ (FOE $\not\Longrightarrow$ A) (higher-order defeat)

# Higher-order evidence

**For example: peer disagreement**

- I have good reasons to consider theory T the best account of a given domain of phenomena.
- A peer disagrees: we've exchanged our reasons and I still believe I am right and you are wrong.
- The fact that my peer disagrees indicates that I might be wrong after all

- FOE: evidence for T as the best theory in the given domain.
- HOE: not everyone agrees, hence I might be wrong. (Hence: I should lower my confidence in my view on T)

# April 2020

## Fact check: COVID-19 is not airborne

COVID-19 02 April 2020

The World Health Organization has moved to dispel the myth that COVID-19 is an airborne virus. This and many more myths about COVID-19 virus are spreading in South Africa and globally.

https://www.discovery.co.za/corporate/covid19-fact-check-covid-19-is-not-airborne

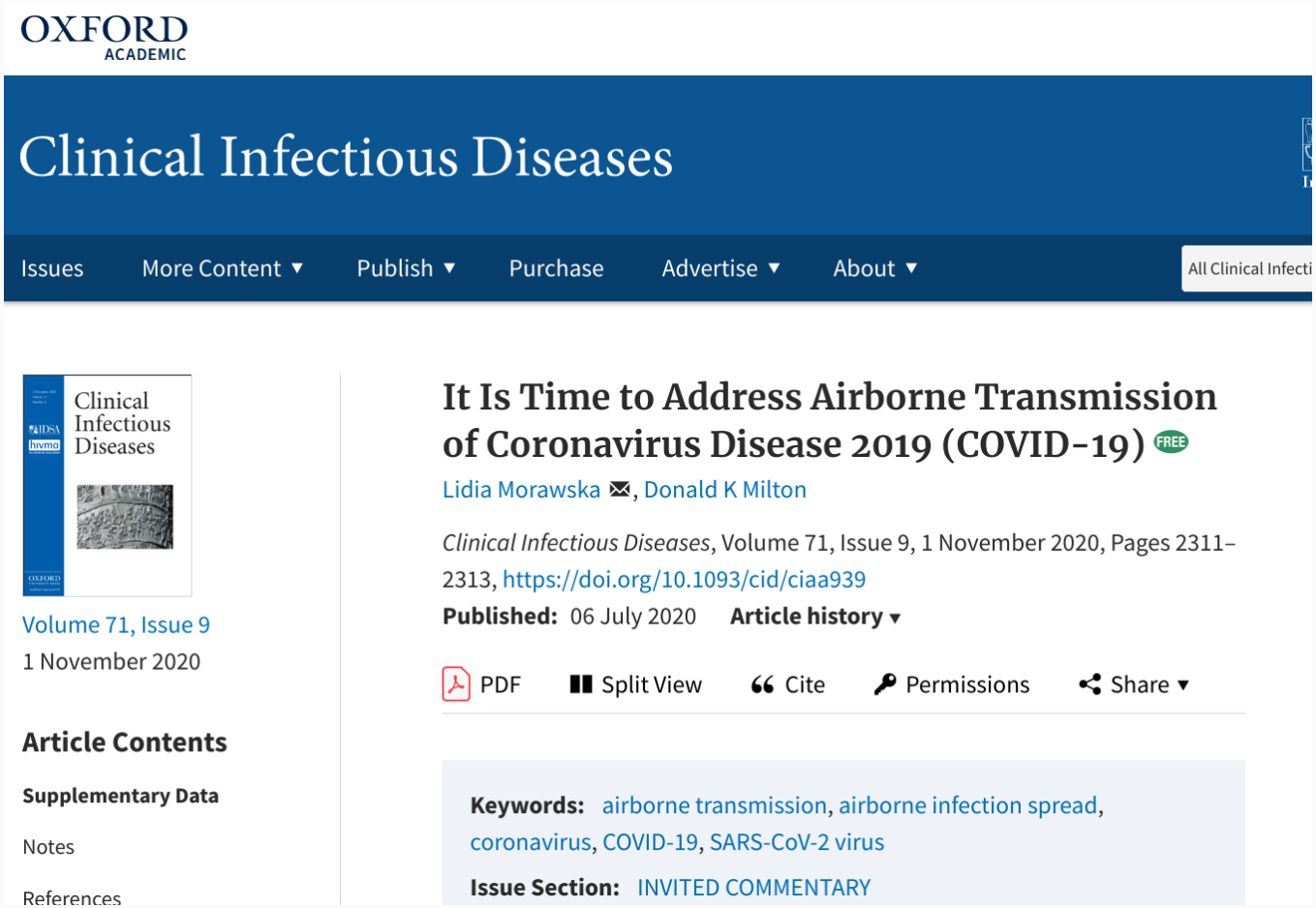
NEWS FEATURE · 08 JULY 2020 · UPDATE 23 JULY 2020

# Mounting evidence suggests coronavirus is airborne — but health advice has not caught up

Governments are starting to change policies amid concerns that tiny droplets can carry SARS-CoV-2. And after months of denying the importance of this, the World Health Organization is reconsidering its stance.

## July 2020, Morawska and Milton, 2020

239 “infectious-disease physicians, epidemiologists, engineers and aerosol scientists” published commentary indicating their conviction that aerosol transmission was a real threat and urging the WHO to explore it further.



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Clinical Infectious Diseases

Volume 71, Issue 9
1 November 2020

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Supplementary Data

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References

**It Is Time to Address Airborne Transmission of Coronavirus Disease 2019 (COVID-19)** FREE

Lidia Morawska, Donald K Milton

*Clinical Infectious Diseases*, Volume 71, Issue 9, 1 November 2020, Pages 2311–2313, https://doi.org/10.1093/cid/ciaa939

**Published:** 06 July 2020 **Article history** ▾

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**Keywords:** airborne transmission, airborne infection spread, coronavirus, COVID-19, SARS-CoV-2 virus

**Issue Section:** INVITED COMMENTARY

# WHO response

- These experts disagreed with the WHO
- WHO responded by acknowledging that aerosols couldn't be ruled out, especially in poorly ventilated places
- But it stuck to the up-to-6-feet (1.5 m) rule, advising people to wear masks indoors only if they couldn't keep that distance.

# WHO response

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- WHO responded by acknowledging that aerosols couldn't be ruled out, especially in poorly ventilated places
- But it stuck to the up-to-6-feet (1.5 m) rule, advising people to wear masks indoors only if they couldn't keep that distance.

**The published commentary, signed by scientists**

- not itself direct evidence for aerosol transmission
- however: it is evidence pertaining to the epistemic status of all the hypothesis of COVID-19 transmission, indicating that WHO could be wrong after all.

# WHO stance

- It took until 20 October 2020 for the WHO to acknowledge that aerosols transmit the virus
- Only in December 2021 the WHO used the term ‘airborne’ in its reports (Lewis, 2022)

# The commentary on aerosol transmission

**Friedman and Šešelja, 2023**

Desiderata for scientifically relevant HOE

- Relevant expertise
- Good acquisition
- Diversity
- Scope

- HOE based on on expert disagreement, which was scientifically relevant
- Failed to be taken into account by the WHO

# Overlooked Epistemic Reasons

## Inquisitive Reasons

# Inquisitive reasons

**Inquisitive Reasons (Fleisher, 2022)**

$R$ is an **inquisitive reason** to perform an act $\phi$ iff $R$ favors $\phi$-ing in virtue of the fact that $\phi$-ing is likely to promote successful inquiry (and to promote it in the right kind of way).

- I.e., reasons that concern promoting successful inquiry.
- Including reasons a hypothesis is worthy of pursuit
- Non-evidential epistemic reasons
  - Epistemic: because they promote successful inquiry
  - They might not increase the probability of the truth of $H$

# Inquisitive reasons

Two types of inquisitive reasons: promise and social

**Promise reasons:**

Features of a theory (or hypothesis) which favor pursuing it because this pursuit will promote successful inquiry.

For example: testability, heuristic analogies, etc.

**Social inquisitive reasons:**

Features of the social context of inquiry that favor pursuing a theory (or hypothesis) because doing so will promote successful collective inquiry.

For example: promoting division of labor and productive debate, avoiding premature consensus

# Why are inquisitive reasons important for expert judgment?

- Assessing whether a scientific claim should be accepted for the purposes of policy guidance requires:
  - sensitivity to the evidence in favor of that claim,
  - but also: sensitivity to the field of research that has produced the claim.
- Inquisitive reasons in favor of a rival theory are informative of potential defeaters of the dominant theory
- Inquisitive reasons in favor of the aerosol hypothesis were informative of the dominant view on the COVID-19 transmission

The WHO failed to take inquisitive reasons into account prior to July 2020

# The pursuitworthiness of the aerosol hypothesis

Inquisitive reasons early in the pandemic

**Analogy with the predecessor of COVID-19: SARS-CoV-1**

SARS-CoV-1 spreads in the air (Morawska and Cao, 2020)

**Analogy with other viral infections**

(Morawska and Cao, 2020)

- Norwalk-like virus between school children
- influenza A/H5N1 virus between ferrets
- the WHO review of evidence from 2009: viral infectious diseases can be transmitted by aerosols

# The pursuitworthiness of the aerosol hypothesis

## Heuristic resource: direction for further inquiry

- The virus was found in aerosols in laboratory conditions (Van Doremalen et al., 2020).
- Attempts at culturing non-lab samples had been unsuccessful.
- But other experimental designs were possible, and were suggested by scientists.

## Testability

Inquiring into the aerosol hypothesis was feasible given the variety of methods, providing this research line with a programmatic character.

But aren't HOE and inquisitive reasons already well-understood in scientific practice?

# Lack of understanding of inquis. reasons and HOE

Krisch, 2020

LIVESCIENCE

Space Health Planet Earth Animals Archaeolog

TRENDING 'Quantum supremacy' record Maya underground structure

Health > Viruses, Infections & Disease > Coronavirus

## Is the coronavirus airborne? Evidence is scant, infectious disease experts say

News By Joshua A. Krisch published July 8, 2020

A recent letter signed by 239 researchers claims that the novel coronavirus causing COVID-19 can spread through airborne microdroplets. Whether that matters is up for debate.

When you purchase through links on our site, we may earn an affiliate commission. Here's how it works.

But epidemiologists and infectious disease experts are wary of the limited evidence for airborne transmission, and concerned that recent media reports on this letter will do more harm than good. "It is a shame that they felt the need to publish," Paul Hunter, a professor at the University of East Anglia in the United Kingdom and a member of WHO's infection prevention committee, told Live Science. What's more, even if COVID-19 can spread via the airborne route, it's likely this happens only in limited circumstances and doesn't require additional precautions in most cases, experts said.

"Given the ample evidence that reducing droplet transmission works [to reduce COVID-19 spread], throwing other things into the mix only confuses people and undermines the World Health Organization at a critical time," Hunter said.

https://www.livescience.com/coronavirus-airborne-transmission-debate.html

Part of the confusion may stem from the fact that many of the signatories of the open letter are not infectious disease experts, but experts in fluid mechanics and the study of aerosols. And, while they understand how particles move through the air, their understanding of how those particles fuel disease spread, and the implications of this spread, may prove to have more academic significance than practical value in the midst of a global pandemic, according to Hunter. "Most of them are chemists, engineers, owners of ventilation companies," Hunter said. "They do not have a broad understanding of disease transmission mechanisms ... this issue is more nuanced than many of them realize."

Inquisitive reasons and HOE – not considered relevant.

# Discussion

Let's go back to

Epistemic Trespassing and "Do Your Own Research!"

# Benefits of our account

- Better analysis of the two expertise-related problems:
  1. Epistemic trespassing
  2. "Do Your Own Research!"

# Epistemic Trespassing Redux

A more careful formulation of our target:

**Epistemic Trespassing**

S epistemically trespasses if

1. S is an expert in field A, but not field B
2. S forms beliefs and makes assertions concerning questions in field B
3. S's assertions and beliefs in field B are taken as expert judgments concerning field B.

# HOE, InqRes, and Trespassing

Our account helps to explain how trespassing causes epistemic harms, even if a trespasser has a good understanding of first-order evidence.

- Trespassers may fail to possess the appropriate higher-order evidence and inquisitive reasons.
- They may also fail to have the appropriate competences for gathering and evaluating these reasons.

# HOE, InqRes, and Trespassing

Trespassers are particularly unlikely to possess reasons concerning the state of inquiry.

Trespassers will typically lack:

- knowledge of the social circumstances (e.g. disagreement and distribution of labor)
- knowledge of alternative theories and their associated heuristic resources.
- actual social network relations who might provide testimony about HoE and InqRes.

# Sharp Trespasser Cases

Consider a trespasser who does an excellent job of gathering and evaluating first-order evidence.

**Our account highlights what else can go wrong**

- The trespasser may fail to have (and be senesitive to) HOE and InqRes.
- This lack is a *pro tanto* negative feature of trespassing.

# Sharp Trespasser Cases

**Examples**

- An expert on wound management dismissing the aerosol hypothesis of COVID-19.
- A biophysicist and a perfume expert initiating research on a novel theory of smell

These are abstract versions of real cases.

# Sharp Trespasser Cases

- We can imagine these researchers as contributing in an extremely valuable way to the fields they enter.
- Despite the potential value of their work for *inquiry*, when they offer expert advice to laypeople, they trespass.
- The problem with the trespassing is that they give a misleading picture of the state of the field.
- Their lack of possession of (and sensitivity to) HoE and InqRes means that their expert testimony may be misleading – even if they are right about the first-order evidence.

# DYOR!

Recall the invocation to Do Your Own Research!

- Seems to promote worthwhile intellectual values (autonomy, evidence gathering)
- Commonplace in extant debates

# Overlooked Reasons and DYOR!

What our account highlights is that:

- Those who do their own research face difficulty in acquiring (social) HOE and InqRes.
- Absent expertise: it is hard to assess the state of inquiry

Suppose a layperson was to do their own research on the aerosol transmission of COVID-19 in July 2020...

# Why inquisitive reasons?

# Why not a simple probability assessment?

A possible criticism: When evaluating a scientific hypothesis, instead of inquisitive reasons, we can just check how probable the rival hypotheses are given the total evidence.

- Assessing if COVID-19 is airborne: how likely is the aerosol hypothesis?
- Why does the dimension of inquiry matter here?

**Consider two scenarios in March 2020:**

- Inquiry into the aerosol hypothesis is rather easy
- Inquiry into the aerosol hypothesis is very difficult

Is the expert-judgment in these two scenarios different?

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- Inquiry into the aerosol hypothesis is rather easy
- Inquiry into the aerosol hypothesis is very difficult

Is the expert-judgment in these two scenarios different?

**Yes!**

The prospects of forthcoming inquiry (expectation of new evidence) should be included in the assessment.

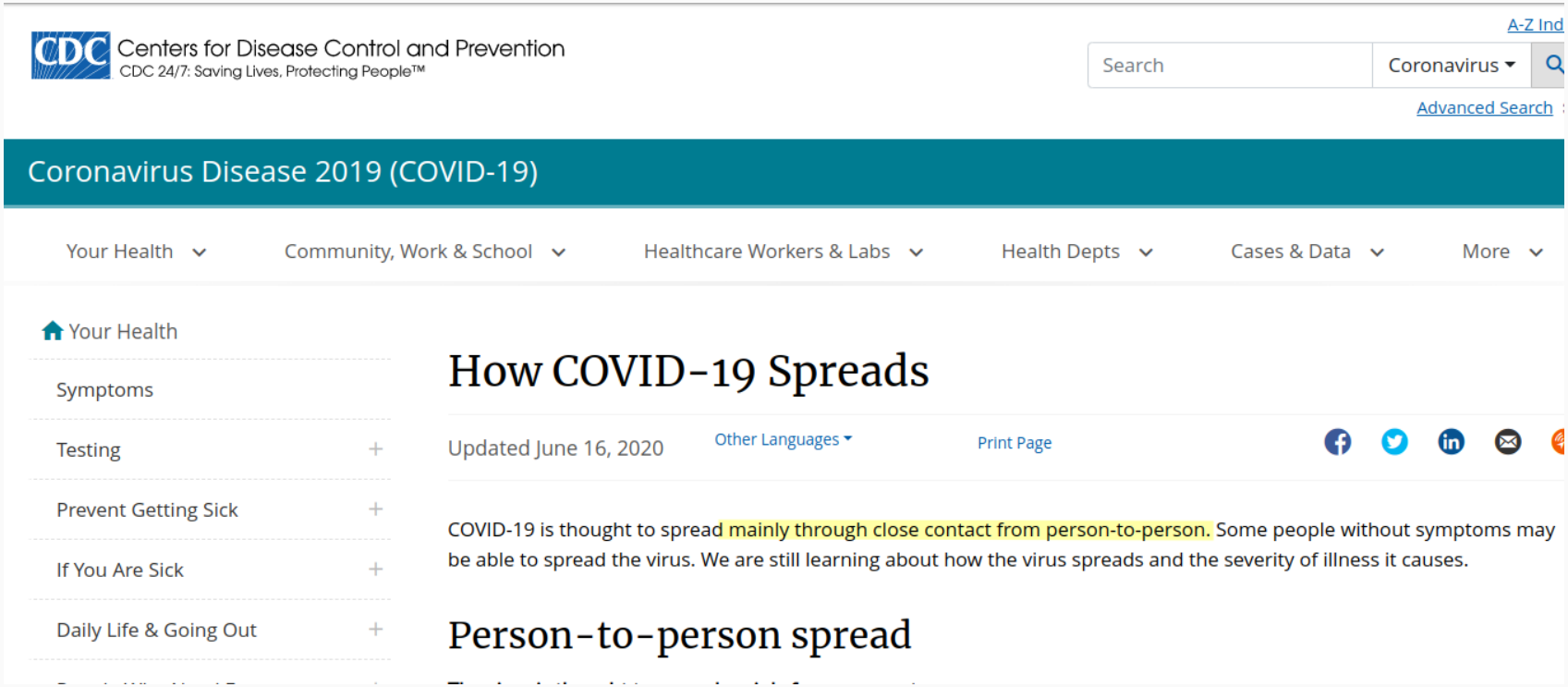
# Relevance of inquisitive reasons

Why inquisitive reasons matter for expert judgment:

- They indicate how and why the current uncertainty can be reduced
- Hence, they are relevant for evaluating how robust or resilient the current assessment is.
- This may have repercussions for the application of precautionary measures.

You focused only on the WHO, but what about other public health institutions?

# CDC changing recommendations




https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html

# CDC changing recommendations

## How COVID-19 Spreads

Updated Sept. 18, 2020 Languages Print

COVID-19 is thought to spread mainly through close contact from person to person, including between people who are physically near each other (within about 6 feet). People who are infected but do not show symptoms can spread the virus to others. We are still learning about how the virus spreads and the severity of illness it causes.

### COVID-19 most commonly spreads

- Between people who are in close contact with one another (within about 6 feet).
- Through respiratory **droplets or small particles, such as those in aerosols, produced when an infected person coughs, sneezes, sings, talks, or breathes**.
  - These **particles can be inhaled** into the nose, mouth, airways, and lungs and cause infection. **This is thought to be the main way the virus spreads.**
  - Droplets can also land on surfaces and objects and be transferred by touch. A person may get COVID-19 by **touching the surface or object that has the virus on it** and then touching their own mouth, nose, or eyes. Spread from touching surfaces is not thought to be the main way the virus spreads.
- It is possible that **COVID-19 may spread through the droplets and airborne particles that are formed when a person who has COVID-19 coughs, sneezes, sings, talks, or breathes.** There is growing evidence that droplets and airborne particles can remain suspended in the air and be breathed in by others, and travel distances beyond 6 feet (for example, during choir practice, in restaurants, or in fitness classes). In general, indoor environments without good ventilation increase this risk.

https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html

# CDC changing recommendations

## How COVID-19 Spreads

Updated Sept. 21, 2020 Languages Print

A draft version of proposed changes to these recommendations was posted in error to the agency's official website. CDC is currently updating its recommendations regarding airborne transmission of SARS-CoV-2 (the virus that causes COVID-19). Once this process has been completed, the update language will be posted.

COVID-19 is thought to spread mainly through close contact from person-to-person. Some people without symptoms may be able to spread the virus. We are still learning about how the virus spreads and the severity of illness it causes.

### Person-to-person spread

**The virus is thought to spread mainly from person-to-person.**

- Between people who are in close contact with one another (within about 6 feet).
- Through respiratory droplets produced when an infected person coughs, sneezes, or talks.
- These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.
- COVID-19 may be spread by people who are not showing symptoms.

`https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html`

# CDC changing recommendations

## How COVID-19 Spreads

Updated Oct. 5, 2020 Languages Print

COVID-19 is thought to spread mainly through close contact from person to person, including between people who are physically near each other (within about 6 feet). People who are infected but do not show symptoms can also spread the virus to others. We are still learning about how the virus spreads and the severity of illness it causes.

### COVID-19 spreads very easily from person to person

How easily a virus spreads from person to person can vary. The virus that causes COVID-19 appears to spread more efficiently than influenza but not as efficiently as measles, which is among the most contagious viruses known to affect people.

### COVID-19 most commonly spreads during close contact

- People who are physically near (within 6 feet) a person with COVID-19 or have direct contact with that person are at greatest risk of infection.
- When people with COVID-19 cough, sneeze, sing, talk, or breathe they produce **respiratory droplets**. These droplets can range in size from larger droplets (some of which are visible) to smaller droplets. Small droplets can also form particles when they dry very quickly in the airstream.

`https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html`

# CDC changing recommendations

## COVID-19 can sometimes be spread by airborne transmission

- Some infections can be spread by exposure to virus in small droplets and particles that can linger in the air for minutes to hours. These viruses may be able to infect people who are further than 6 feet away from the person who is infected or after that person has left the space.
- This kind of spread is referred to as **airborne transmission** and is an important way that infections like tuberculosis, measles, and chicken pox are spread.
- There is evidence that under certain conditions, people with COVID-19 seem to have infected others who were more than 6 feet away. These transmissions occurred within enclosed spaces that had inadequate ventilation. Sometimes the infected person was breathing heavily, for example while singing or exercising.
  - Under these circumstances, scientists believe that the amount of infectious smaller droplet and particles produced by the people with COVID-19 became concentrated enough to spread the virus to other people. The people who were infected were in the same space during the same time or shortly after the person with COVID-19 had left.
- Available data indicate that it is much more common for the virus that causes COVID-19 to spread through close contact with a person who has COVID-19 than through airborne transmission. [1]

`https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html`

# Conclusion

# In this talk we have argued

- Expert judgment should be based on a broader set of epistemic reasons
- A simplified evidentialist approach to expertise omits some of the relevant epistemic reasons, such as:
  - higher-order evidence
  - inquisitive reasons
- Each should inform expert recommendations depending on their relative strength

# Relevance of our account

- Deeper understanding of expertise and its social epistemic character
- Deeper understanding of problematic cases involving expertise (such as epistemic trespassing and calls to 'DYOR!')
- Deeper understanding of *bad diversity*.
- Beyond the discussion on expertise: epistemic reasons relevant for science journalism and fact-checking of scientific claims.

Thank you!

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