

2024: The Year in Infection Prevention and Control

HICSIG and ACIPC Collaboration Session

**Marion Kainer
Western Health**

ACIPC, Melbourne, 18th November 2024



Disclosures

- **No disclosures**
- **Pictures for illustration only– does not imply endorsement for particular brand/manufacturer**



Outline

- **Outbreak investigation resource: CORHA**
- **Current Pandemic: COVID-19**
- **Future Pandemic Potential:**
 - **H5N1 influenza**
 - **Mpox**





Council for **Outbreak **R**esponse:
Healthcare-Associated Infections
Antimicrobial-Resistant Pathogens**



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What is CORHA?

A collaboration of member organizations working to improve HAI/AR outbreak detection, investigation, control and prevention.

- **CORHA operates at the intersection of public health and healthcare**
- **CORHA is not a federal advisory committee**
- **CORHA's member organizations:**



Updated CORHA Website

- Compiles outbreak investigation resources (high-level and pathogen-specific), outbreak news, and CORHA blog
- Subscribe to CORHA listserv for resource updates

www.corha.org



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The screenshot shows the CORHA website homepage. At the top, there is a navigation bar with the CORHA logo and links for Principles & Practices, Investigation Resources, News, About, and Contact. The main heading is "Detect, Investigate, & Control Healthcare Outbreaks". Below this, a sub-heading states: "The Council for Outbreak Response: Healthcare-Associated Infections (HAIs) and Antimicrobial-Resistant Pathogens (AR) offers a curated collection of resources to help improve your outbreak response activities, wherever healthcare is delivered." A dropdown menu labeled "Select your outbreak" is visible. Three featured items are listed: "TRAINING COURSE Healthcare Outbreak Response Training" (introducing key concepts for investigation), "NEW RESOURCE Principles & Practices Chapters" (comprehensive reference on HAI/AR topics), and "NEW SPOTLIGHT ARTICLE Importance of Data Sharing and Reporting" (a conversation with CORHA's Policy Workgroup Co-Chairs). A "RECEIVE UPDATES FROM CORHA" section includes an email input field and a "SUBSCRIBE" button. The "Meet CORHA" section provides a brief overview of the organization's mission and a link to "MORE ABOUT CORHA". A video player for "Introduction to CORHA" is also featured, with a "Watch on YouTube" button.

Investigation Resources

- Resources by disease, pathogen, or pathogen type (e.g., *B. cepacia*, EKC, environmental fungi)
 - Suggested thresholds for facility investigation, reporting to public health, and defining an outbreak for COVID-19, influenza, *C. auris*, CRE, NTM



The screenshot shows the CORHA website page for Burkholderia cepacia. The page has a dark blue header with the CORHA logo and navigation links for Principles & Practices, Investigation Resources, News, About, and Contact. The main content area features a large circular image of a pink-stained bacterial culture. Below the image, the title "Burkholderia cepacia" is displayed, followed by a subtitle: "Also called *B. cepacia*, *Burkholderia cepacia* complex, or *Bcc*". A table provides publication and update dates: PUBLISHED September 24, 2024 and LAST UPDATED May 24, 2024. The "About Bcc" section describes the Burkholderia cepacia complex (Bcc) as a group of Gram-negative, rod-shaped bacteria found in soil and water. It details transmission routes (person-to-person, contaminated surfaces, environmental exposure) and lists various healthcare products that can be contaminated, such as saline flushes, mouthwash, oral liquid docusate, skin cleanser, ultrasound gel, nasal spray, nebulizers, antiseptics, disinfectant solutions, balloon pumps, and temperature probes. A key point advises maintaining a low threshold for reporting a Bcc outbreak or product concern. A "Read more" link is provided at the bottom of the section. The footer includes the text "Resources, Guides, Reports, & Toolkits" and the Western Health logo.

CORHA Principles & Practices Investigation Resources News About Contact

Investigation Resources > All Pathogens & Diseases > Burkholderia cepacia

Burkholderia cepacia

Also called *B. cepacia*, *Burkholderia cepacia* complex, or *Bcc*

PUBLISHED	LAST UPDATED
September 24, 2024	May 24, 2024

About Bcc

The Burkholderia cepacia complex (Bcc) is a group of closely related Gram negative, rod-shaped bacteria that can be found in soil and water.

Bcc can be spread by person-to-person contact, contact with contaminated surfaces, and environmental exposure. Outbreaks have been linked to intrinsic and extrinsic contamination of various products used in healthcare settings. These products usually have an aqueous component or are exposed to tap water. Contaminated medical products which have led to outbreaks in healthcare facilities include saline flushes, mouthwash, oral liquid docusate, skin cleanser, ultrasound gel, nasal spray, nebulizers, antiseptics, disinfectant solutions, balloon pumps, and temperature probes.

Key Point: Maintain a low threshold (e.g., single case or small cluster) for reporting a Bcc outbreak or product concern.

[+ Read more](#)

Resources, Guides, Reports, & Toolkits

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Investigation Resources

- **Setting (e.g., dialysis) and mechanism-specific resources (e.g., medical product investigations, drug diversion)**

The image shows two side-by-side screenshots of web pages. The left page is titled 'Dialysis Safety' and features a blue header with a 'MENU' dropdown. Below the header, there is a breadcrumb trail: 'Bloodstream Infection Prevention in Dialysis Setting > Training: Infection Prevention in Dialysis Settings > Dialysis Sur'. The main content area is titled 'Dialysis Wall Boxes and Drains' and includes a 'WHAT TO KNOW' section with the text: 'There are several infection prevention and control issues unique to wall boxes. Wall boxes need to be cleaned, disinfected, and properly maintained to decrease risk of patient infections.' Below this is an 'ON THIS PAGE' section with a link to 'Overview' and a sub-heading: 'Issues and suggested strategies for wall box maintenance and interventions for infection prevention:'. The right page is titled 'CORHA' and has a dark blue header with a search icon. The main content area is titled 'Drug Diversion' and includes the text: 'Drug diversion occurs when prescription medicines are obtained or used illegally. Healthcare providers who steal controlled substances such as opioids for their own use put patients at risk. This can result in several types of patient harm, including infections and outbreaks (e.g., involving hepatitis C virus or bacterial pathogens) if a provider has tampered with an injectable medication.' Below this is a section titled 'Resources, Guides, Reports, & Toolkits'.

Investigation Resources

- **Tools and other resources including**
 - HAI outbreak standardized variables list, and REDCap database
 - Framework for healthcare-associated infection outbreak notification



The Council for Outbreak Response: Healthcare-Associated Infections and Antimicrobial-Resistant Pathogens

Framework for Healthcare-Associated Infection Outbreak Notification

V4: August 2022

Contents

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CORHA-developed products are consensus driven and approved by voting representatives on the Council through a majority vote.

Disclaimer: The positions and views expressed in this framework do not necessarily represent official positions of CORHA member organizations.

Introduction

This document provides guidance for notification¹ in the context of a suspected healthcare-associated infection (HAI) outbreak. It is based on public health best practices and grounded in the bioethical principles of autonomy and beneficence. A suspected outbreak can be signaled by a cluster of cases (infection or colonization²), detection of an unusual pathogen or resistance mechanism, or even a serious infection control breach.³ For the purpose of this document, all such instances will be referred to as “outbreak.”

Investigation partners (e.g., the healthcare setting and public health authorities) should consider the communication needs of all affected target populations, as



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Principles and Practices for Healthcare Outbreak Response



Second Edition



The Council for Outbreak Response: Healthcare-Associated
Infections and Antimicrobial-Resistant Pathogens



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GUIDELINES FOR FOODBORNE DISEASE OUTBREAK RESPONSE



Principles and Practices

- **Comprehensive reference for public health, healthcare, and other stakeholders seeking to build, standardize, or improve upon HAI outbreak response practices.**



Principles and Practices: Chapters and Supplements

1. Overview

2. Fundamental Concepts

3. Planning & Preparation

4. Detection & Reporting

5. Investigation & Control

6. Laboratory Best Practices

7. Multifacility & Multijurisdictional Outbreaks

8. Notification & Communication

Supplement A – Medical Product Investigations

Supplement B – Infection Control Breach Investigations



Healthcare Outbreak Response Training

Self-paced interactive e-learning based on the CORHA Principles and Practices for Healthcare Outbreak Response

- **Hosted on CDC TRAIN**
- **Linked under Tools & Other Resources on CORHA website**

Designed for public health professionals in state, territorial, and local HAI/AR Programs.

Content overview:

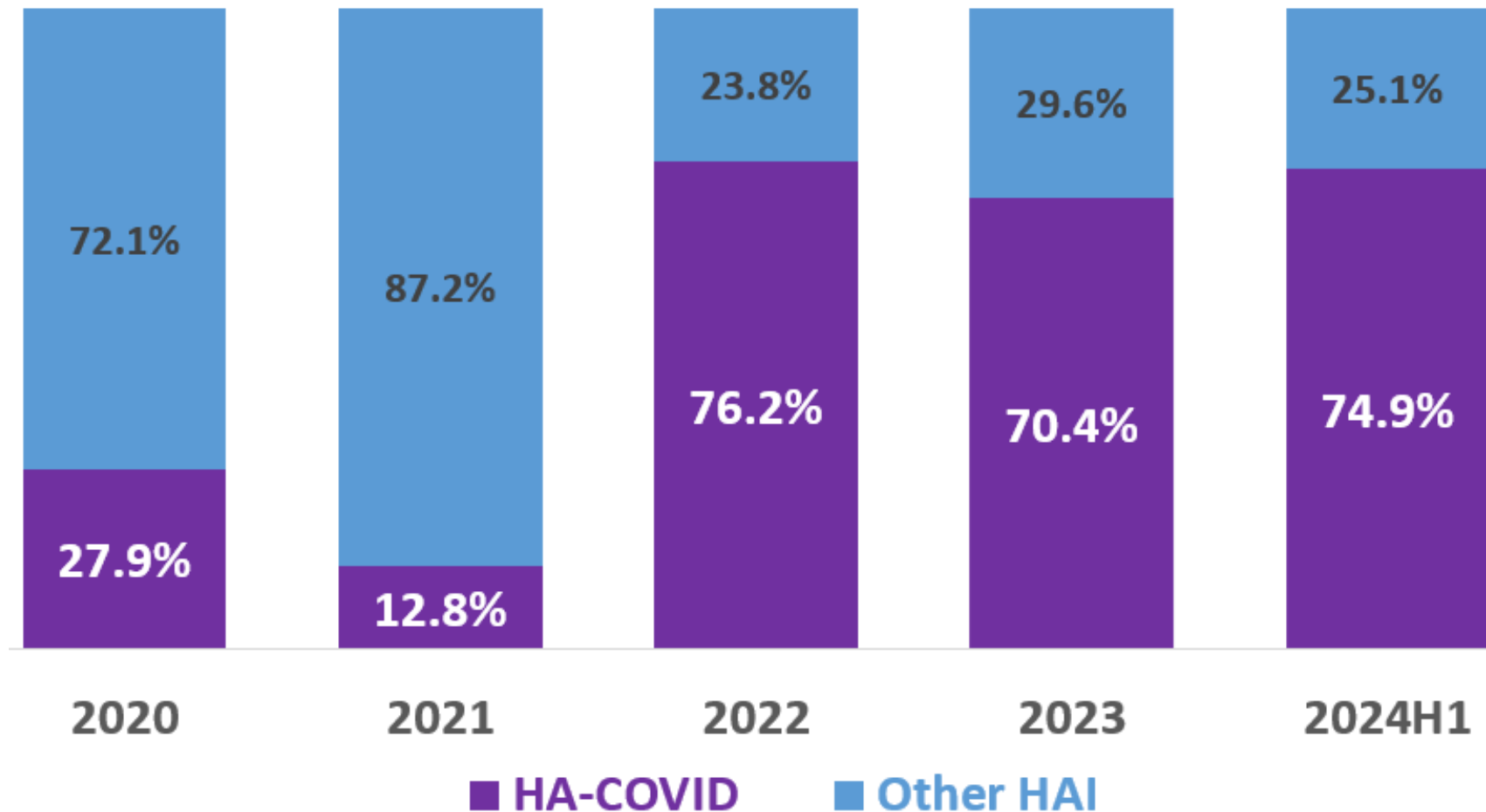
1. **Introduction to Healthcare Outbreak Response**
2. **Outbreak Detection and Reporting**
3. **Initiating an Outbreak Response**
4. **Case Finding and Data Collection**
5. **Data Analysis and Hypothesis Development**
6. **Conducting Site Visits**
7. **Closeout**



Current Pandemic: COVID-19



Since 2022, HA-COVID accounts for 3/4 of all HAI



Other HAI:

- HA-CDI
- HA-SAB
- SSI:
 - COLO
 - HYST
 - CSEC
 - HPRO
 - KPRO
- CLABSI-ICU

Kainer MA, Canning M, Relative burden of healthcare associated COVID infections compared to other reportable healthcare-associated infections (HAI) assuming ongoing continuous surveillance. Poster 67, ACIPC, Nov 2024



ELSEVIER

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin



Admission screening testing of patients and staff N95 respirators are cost-effective in reducing COVID-19 hospital-acquired infections

F. McAndrew^{a,*}, R.G. Abeyesuriya^{a,b}, R. Sacks-Davis^{a,b}, M. Sammann^c,
D.M. Lister^c, D. West^c, S.S. Majumdar^{a,b}, N. Scott^{a,b}

^a *Burnet Institute, Melbourne, Victoria, Australia*

^b *Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Victoria, Australia*

^c *Victorian Government Department of Health, Victoria, Australia*

Presented today, 18 Nov 2024 Session
“Staff Health and Challenges”



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Table 1: 90-day mortality rates among those with or without COVID-19 hospital acquired infections.

	Mortality rate (90 day)
Mortality rates (hospital-acquired COVID-19 infections)	18.9%
Mortality rates (no COVID-19 infections)	12.3%

54% more likely to die if acquired HA-COVID-19

Appendix A. Supplementary data

The following is the Supplementary data to this article:

 [Download: Download Word document \(2MB\)](#)

<https://www.sciencedirect.com/science/article/pii/S0195670124002366#appsec1>

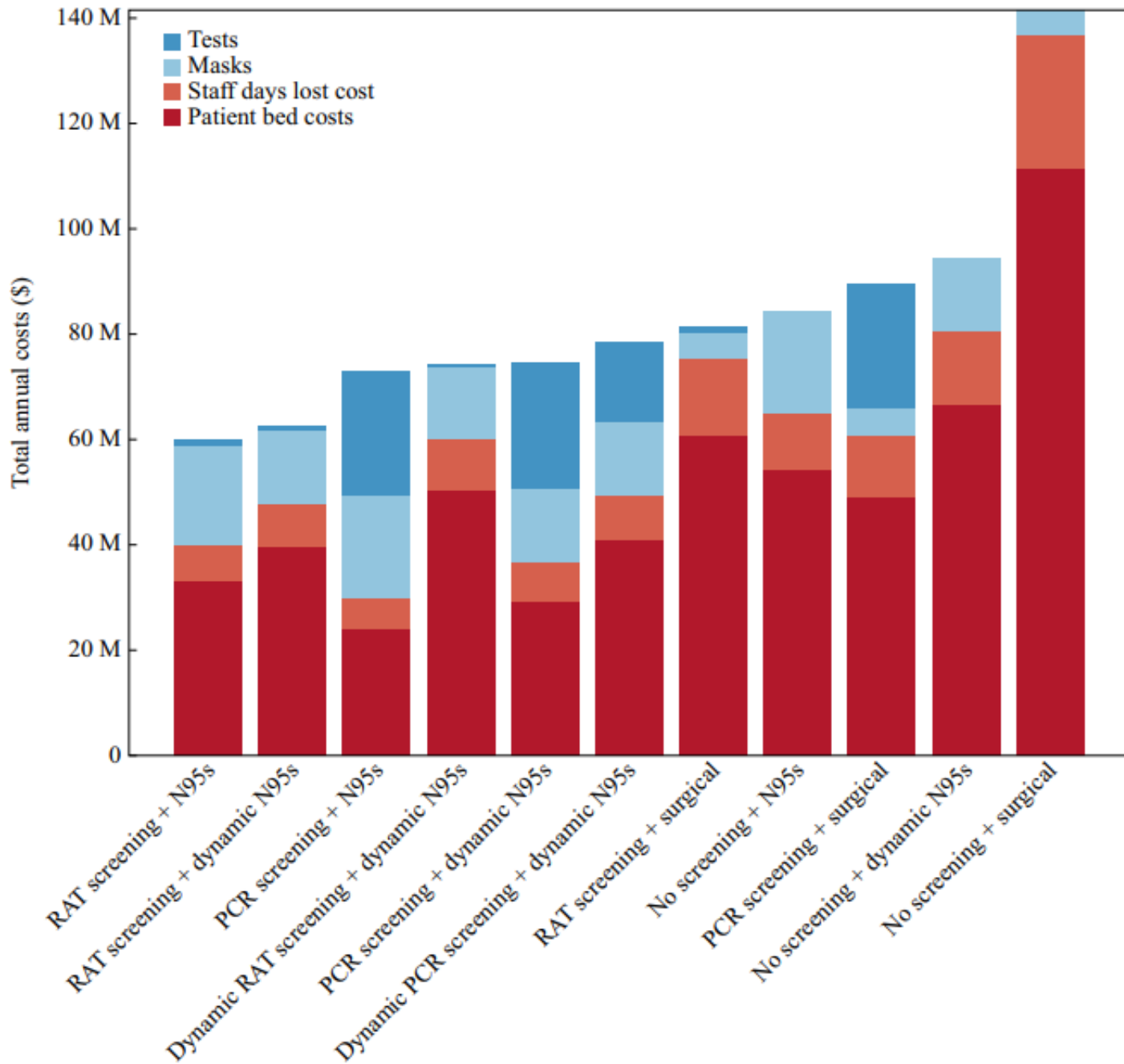


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Matching

- **Each case had multiple controls identified from historical VAED data**
- **Controls based on:**
 - **Victorian public hospital data**
 - **No COVID diagnosis**
 - **LOS of at least as long as the case's LOS prior to HA-COVID diagnosis**
 - **Same DRG.**





Staff use of N95 masks in hospitals could prevent

854 to 1,543 deaths

and save

\$54.7 to \$78.4 Million

**per year Statewide in Victoria
(depending on testing strategy)**





ELSEVIER

Available online at www.sciencedirect.com

Journal of Hospital Infection

journal homepage: www.elsevier.com/locate/jhin



Admission screening testing of patients and staff N95 respirators are ~~cost-effective~~ **COST-SAVING** in reducing COVID-19 hospital-acquired infections

F. McAndrew^{a,*}, R.G. Abey Suriya^{a,b}, R. Sacks-Davis^{a,b}, M. Sammann^c,
D.M. Lister^c, D. West^c, S.S. Majumdar^{a,b}, N. Scott^{a,b}

^a Burnet Institute, Melbourne, Victoria, Australia

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^c Victorian Government Department of Health, Victoria, Australia

Presented today, 18 Nov 2024 Session
“Staff Health and Challenges”



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SamuelHurtadoBE
@SamuelHurtadoBE



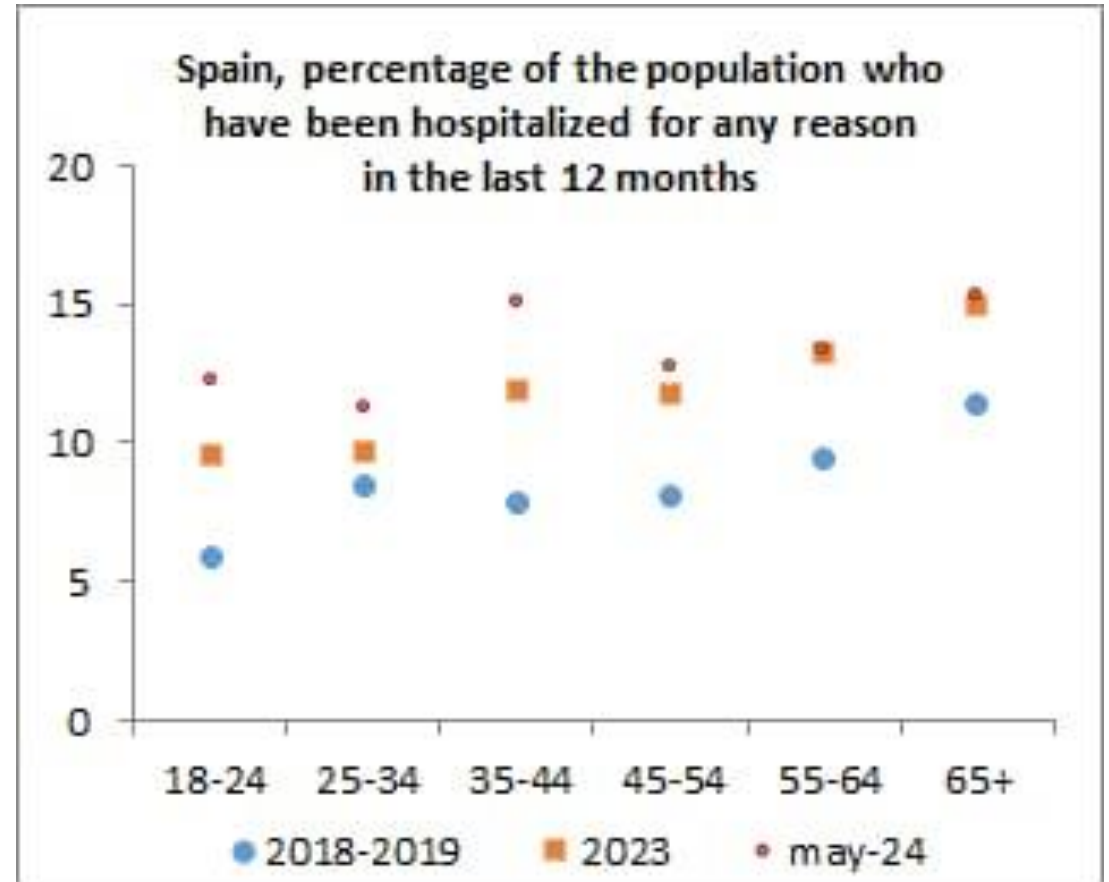
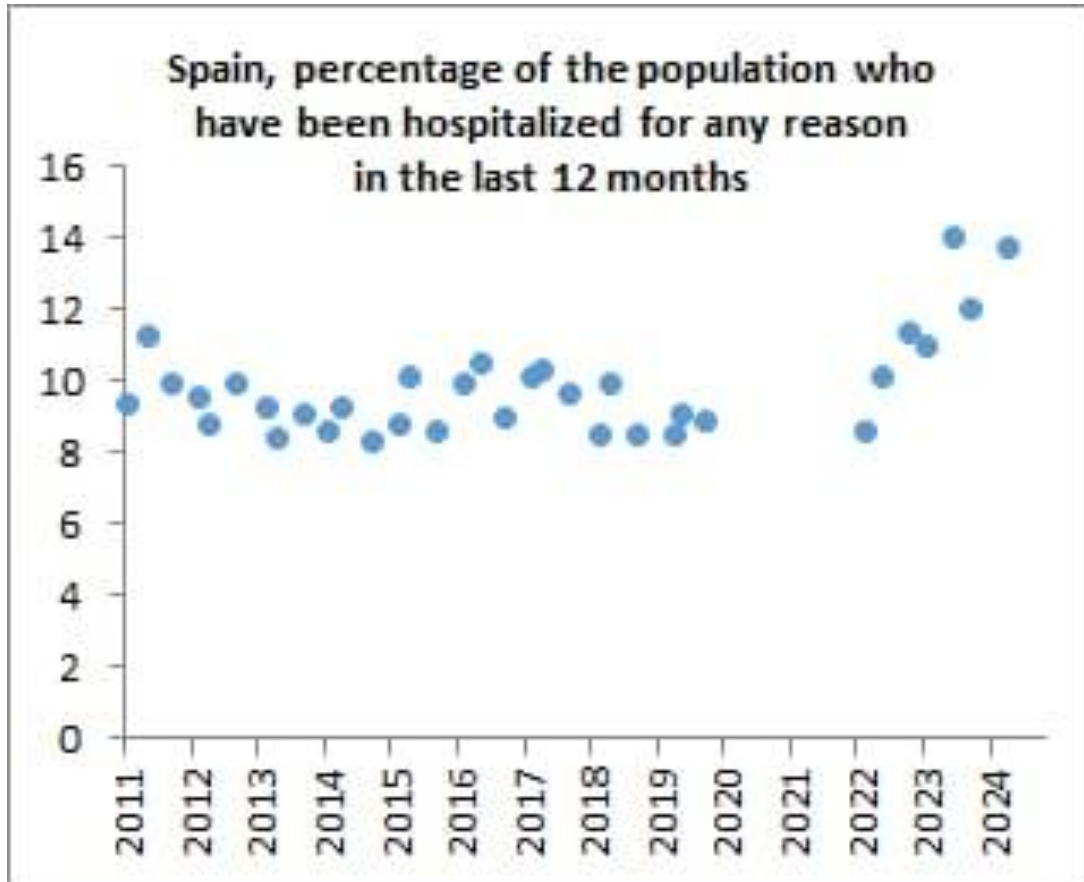
New data from the official Spanish health survey. The share of the population that has a chronic illness now stands 9.8 standard deviations above its prepandemic average. Hospitalizations, 5.9 standard deviations above its average. All age groups doing badly.

pic.twitter.com/nGsWe9q6lh

5/7/2024, 19:44

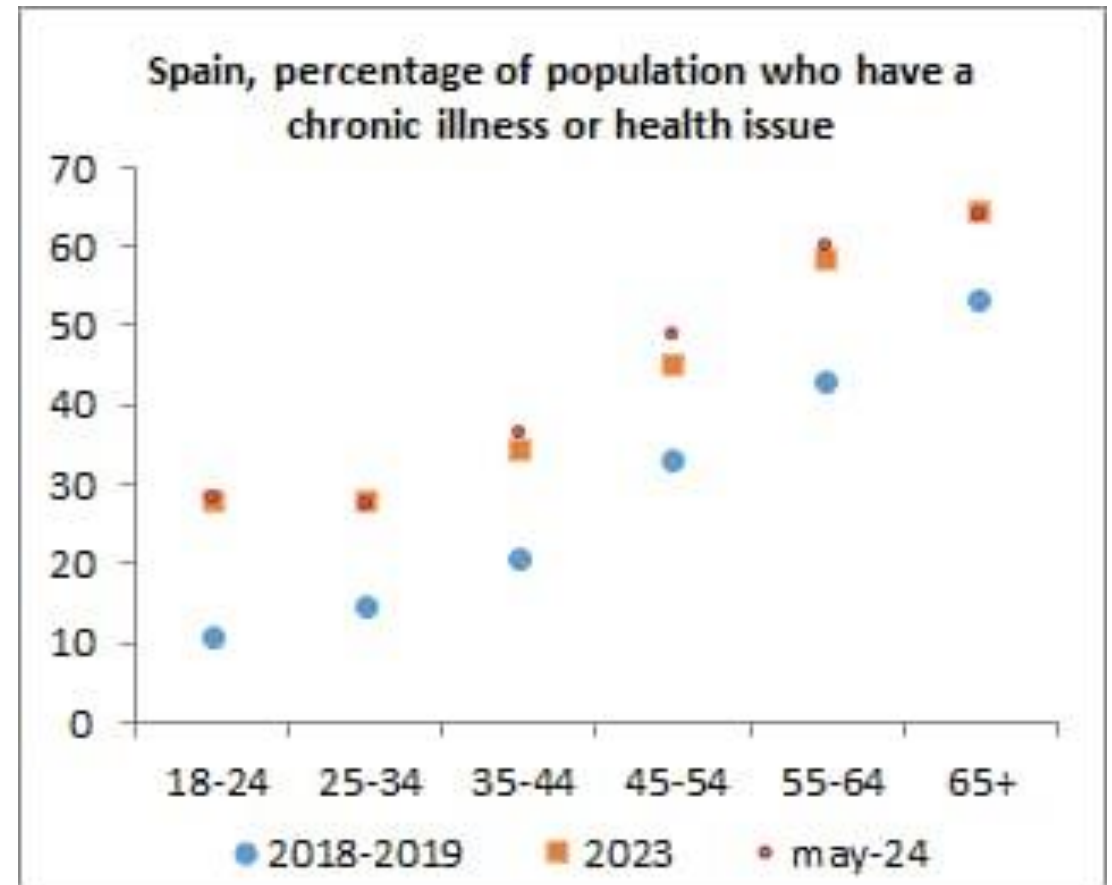
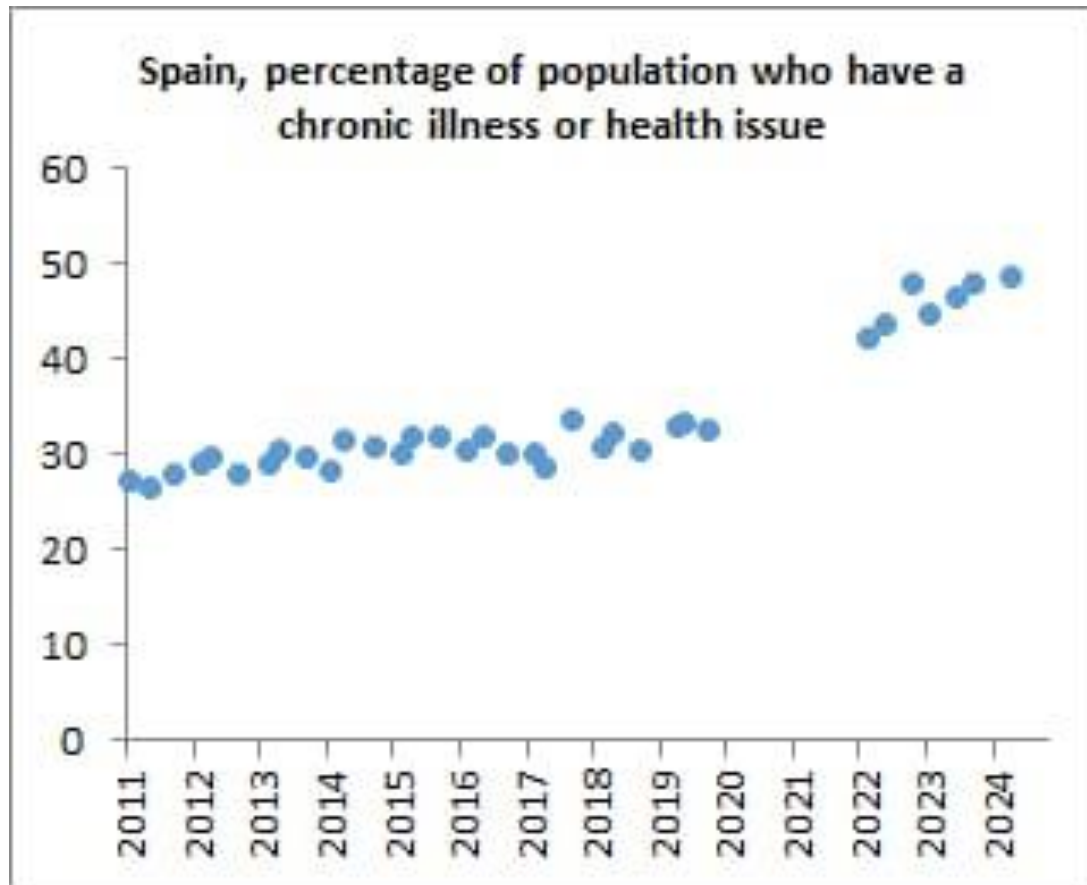


% Hospitalized in Last 12 Months (Spain)



@SamuelHurtadoBE

% With Chronic Illness/Health Issue (Spain)



@SamuelHurtadoBE



“You can start thinking about getting COVID as almost as an accelerant to aging. Several of your organs could be ageing 3-4 years faster.”

Dr Ziyad Al-Aly

https://journals.lww.com/jasn/fulltext/2021/11000/kidney_outcomes_in_long_covid.19.aspx



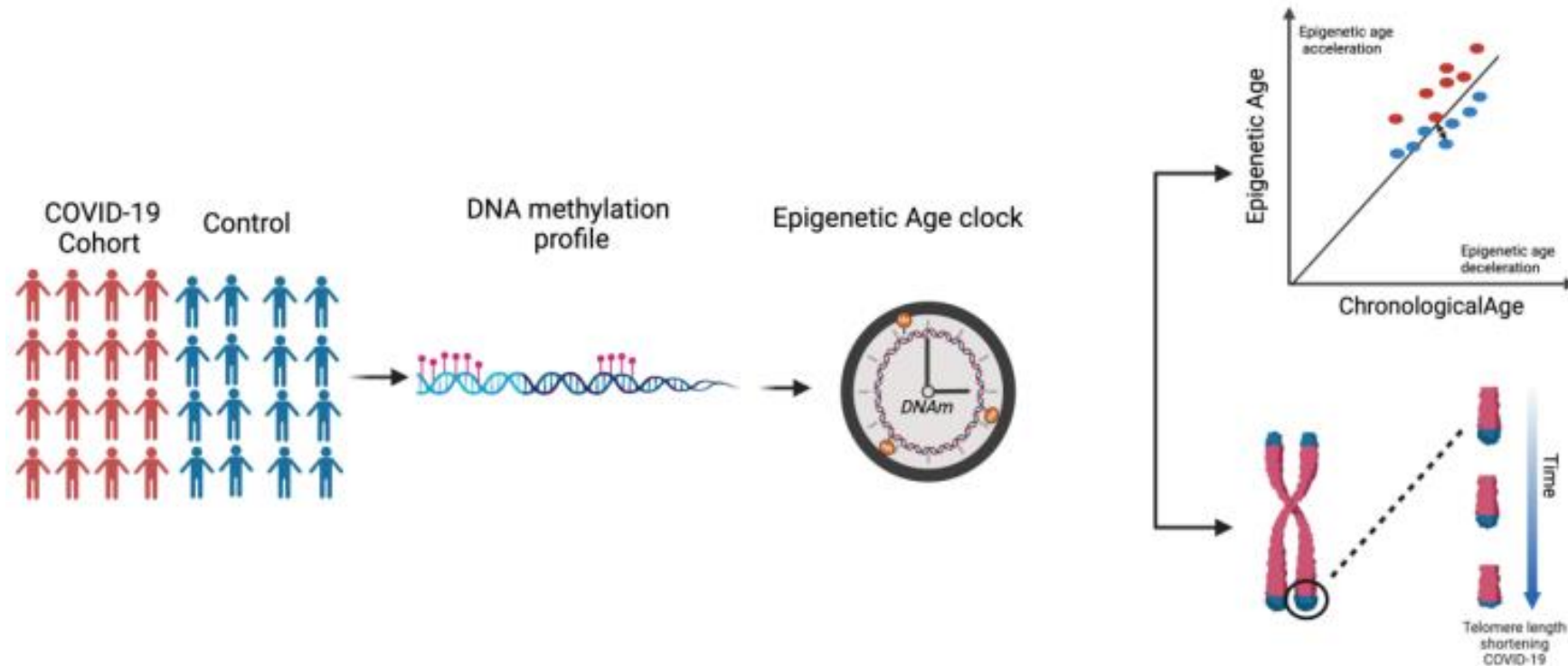
The impact of COVID-19 on “biological aging”

Fathima Humaira Amanullah¹, Tanvir Alam², Nady El Hajj^{1,2}
and Yosra Bejaoui^{1*}

TYPE Mini Review

PUBLISHED 10 June 2024

DOI 10.3389/fimmu.2024.1399676



<https://www.frontiersin.org/journals/immunology/articles/10.3389/fimmu.2024.1399676/full>



The public health and economic burden of long COVID in Australia, 2022–24: a modelling study

Valentina Costantino¹ , Quentin Grafton², Tom Kompas³, Long Chu², Damian Honeyman¹, Adriana Notaras¹, C Raina MacIntyre¹

“Our model indicated that 172 530–872 799 people would have long COVID symptoms at the end of 2024. The number of working hours lost would be highest for people aged 30–49 years, leading to an estimated mean **economic loss of up to \$9.6 billion (2020–21 value), or **one-quarter of GDP growth during 2022.**”**

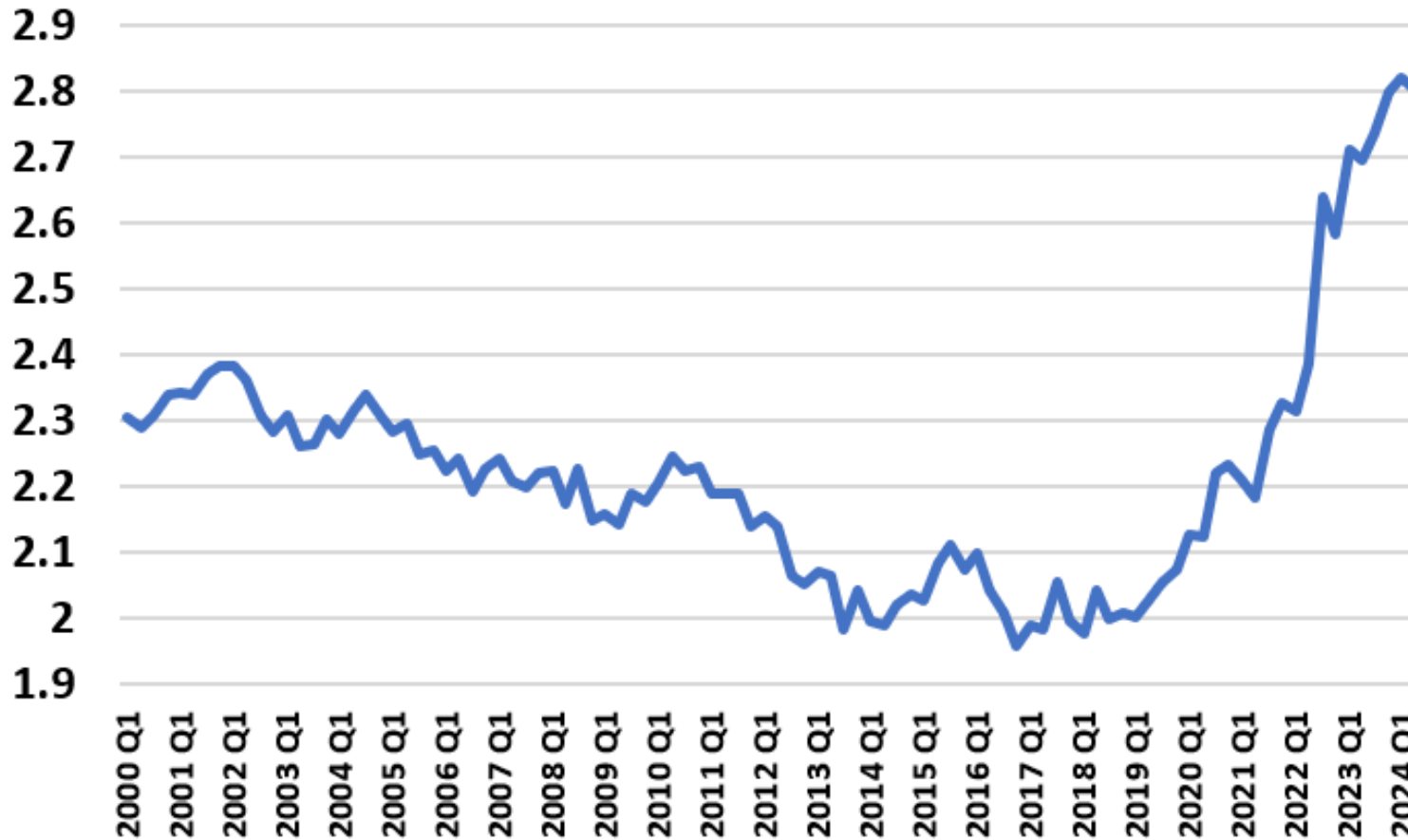
4 Projected mean loss in labour supply attributable to long COVID in 2022, by age group

Age group (years)	Work hours lost		
	Total, in millions of hours (95% CI)	Per employed person, in hours (95% CI)	Proportion of total
Total (10–69)	102.4 (50.4–162.2)	8.0 (3.9–12.6)	
10–19	0.7 (0.3–1.1)	1.0 (0.5–1.6)	0.7%
20–29	20.9 (9.0–34.5)	7.9 (3.4–13.1)	20.4%
30–39	27.5 (16.0–41.0)	9.0 (5.3–13.5)	26.9%
40–49	24.5 (12.1–38.7)	9.0 (4.5–14.3)	23.9%
50–59	17.7 (8.4–28.4)	7.4 (3.5–11.9)	17.3%
60–69	11.1 (4.6–18.6)	7.8 (3.2–13.1)	10.9%

CI = confidence interval. ◆



Economic Inactivity due to Long Term Illness 16-64 year olds (U.K.)



**Increased by 700,000
since 2020**

<https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/economicinactivity/timeseries/lf69/lms>

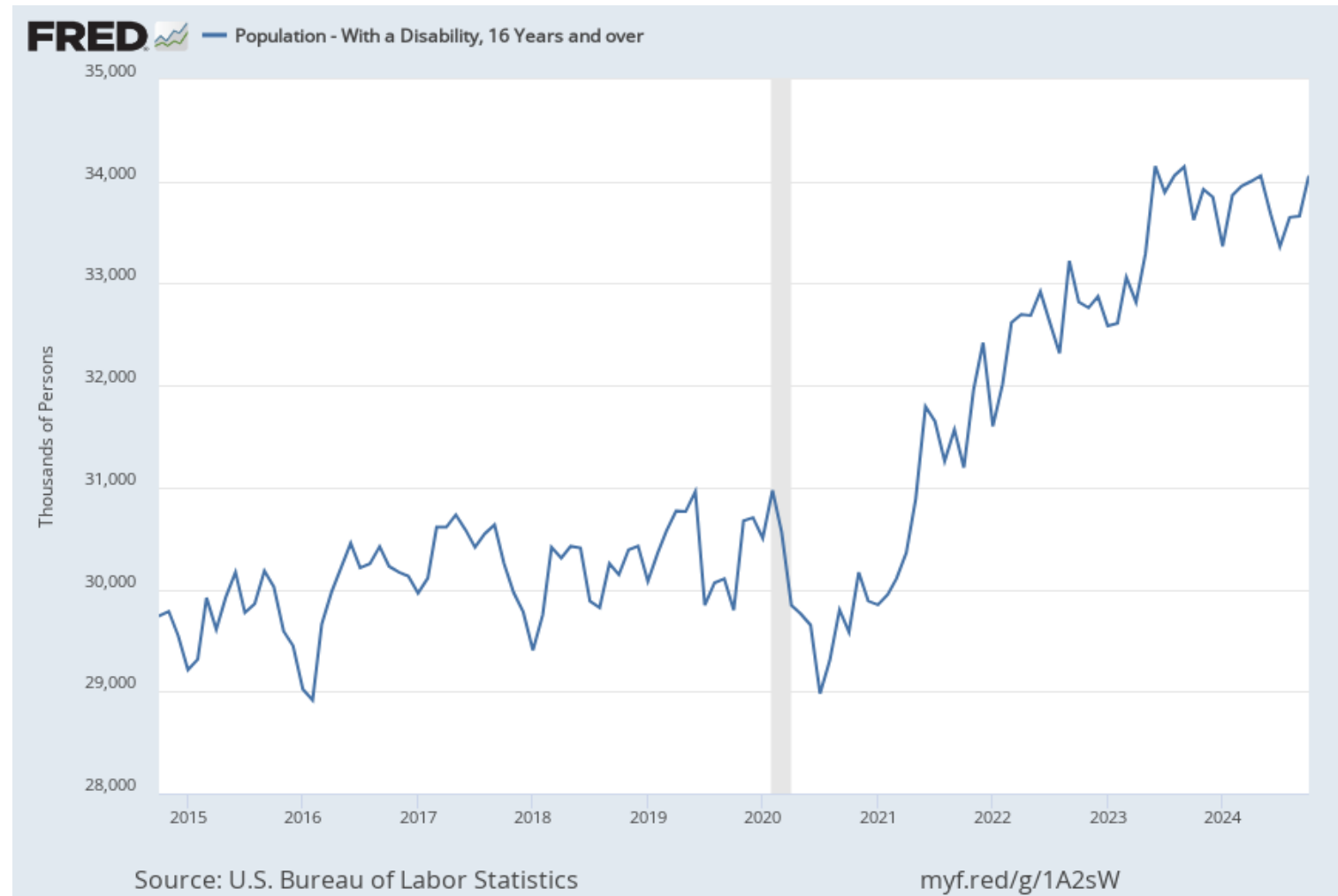


Population with Disability, 16-64 years, US

FEDERAL RESERVE BANK of ST. LOUIS



**Increase in 4 million
since 2020**



<https://fred.stlouisfed.org/series/LNU00074597>



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There Is Money in Prevention

By *Britta Domke*

Companies have been ignoring the enormous long Covid risk for too long. Now they're paying for it – literally. Implementing the Swiss cheese system could make them largely Covid-proof in no time. So what needs to be done?

What Long Covid Is Costing Us All

Economic, health care, and pension costs due to long/post-Covid syndrome in Germany

	Unit costs	Number of Units ¹	Total costs ¹
Production loss	124 euros per day	27.61 million days	3.42 billion euros
Loss of gross value	205 euros per day	27.61 million days	5.66 billion euros
Rehabilitation costs	3000 euros per stay	110,704 stays	322 million euros
Pension payments	109,024-169,344 euros per case	17,141 cases	2.07 billion euros

Costs in Germany from Long COVID

<https://www.manager-magazin.de/hbm/long-covid-and-the-economy-there-is-money-in-prevention-a-54022db9-428f-41d7-b71c-3f9befa58b0e>



FULL COMMITTEE HEARING

Addressing Long COVID: Advancing Research and Improving Patient Care



“The best way to prevent Long COVID is to prevent COVID in the first place. There is no Long COVID without COVID.”

Dr Ziyad Al-Aly

Date: Thursday, January 18th, 2024

Time: 10:00am

Location: SD-430

<https://www.youtube.com/watch?v=Nq5pCS3EkpM>



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Airborne Pathogen Tools



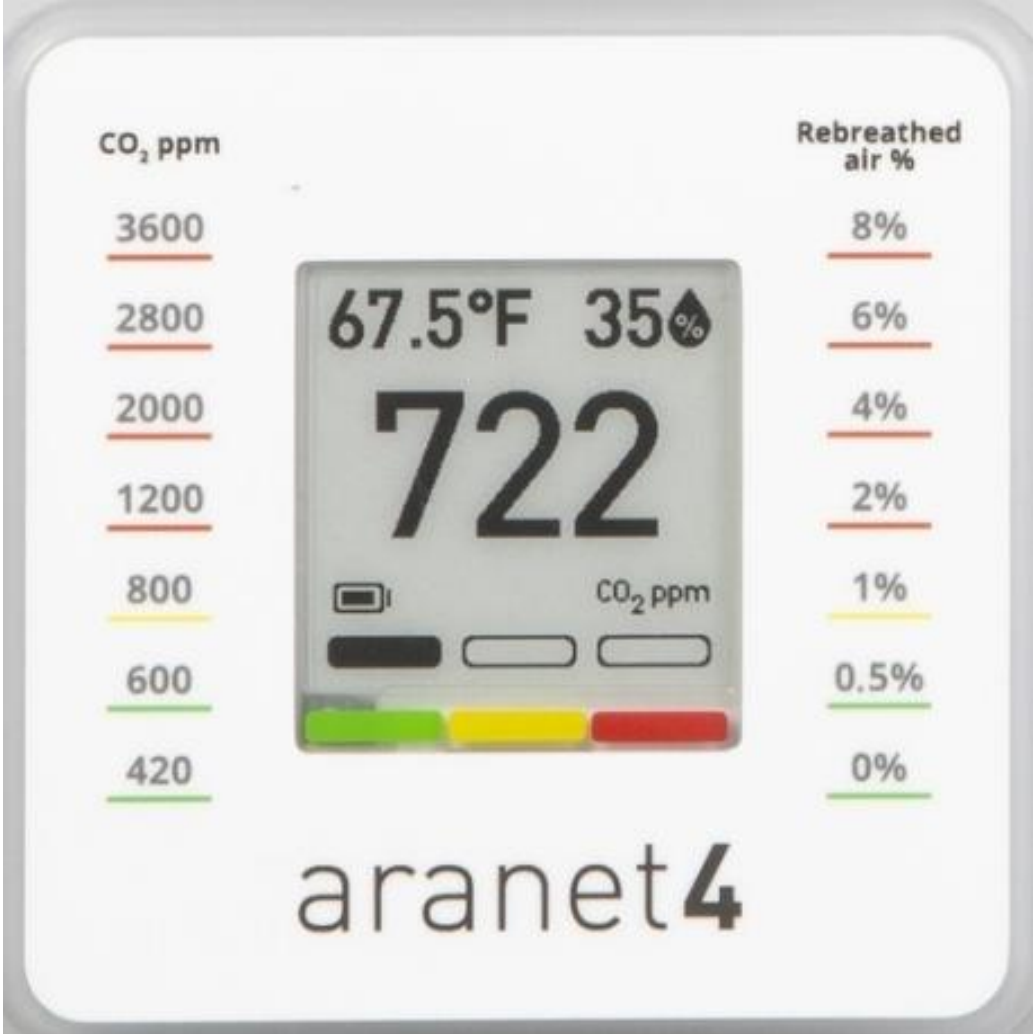
Indoor Air:

- Ventilation (fresh air/ dilution)
- Directionality of airflow
- Air cleaning- air purifiers/ portable HEPA
- Killing of pathogens: UVGI

Source Control and Protection:

- Masks/ Respirators





Relationship between Exhaled Aerosol and Carbon Dioxide Emission Across Respiratory Activities

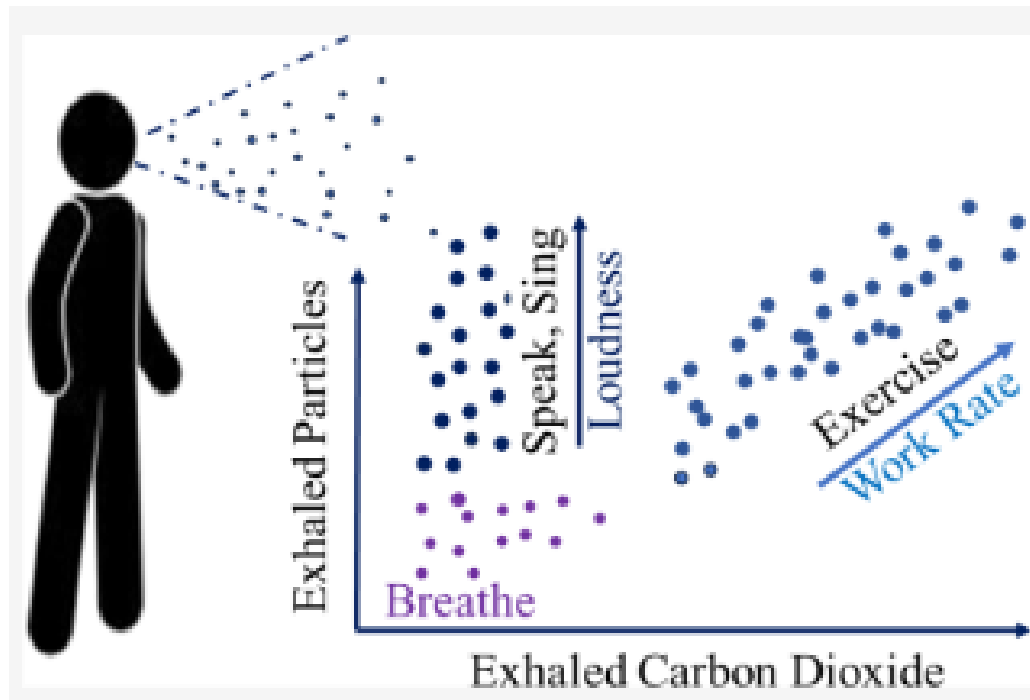
Benjamin Moseley,^{††} Justice Archer,^{††} Christopher M. Orton, Henry E. Symons, Natalie A. Watson, Brian Saccente-Kennedy, Keir E. J. Philip, James H. Hull, Declan Costello, James D. Calder, Pallav L. Shah, Bryan R. Bzdek,* and Jonathan P. Reid*



Cite This: *Environ. Sci. Technol.* 2024, 58, 15120–15126

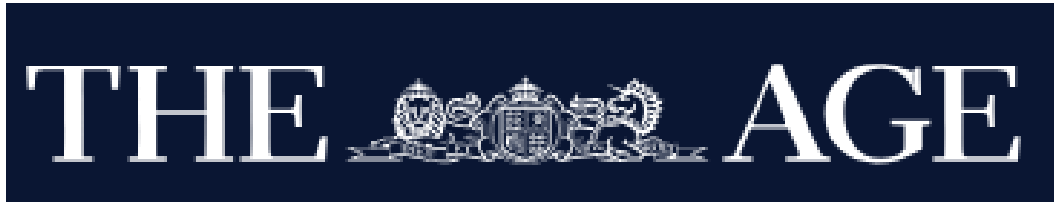


Read Online



- **CO₂ and aerosol correlate well in silence**
- **CO₂ is NOT a good marker if loud vocalization**





'Shouting and kicking': Hospitals reveal new source of COVID spread

Aisha Dow and Liam Mannix

September 11, 2020 – 11.30pm



<https://www.theage.com.au/national/victoria/shouting-and-kicking-hospitals-reveal-new-source-of-covid-spread-20200911-p55ut0.html>



Ambient carbon dioxide concentration correlates with SARS-CoV-2 aerostability and infection risk

Received: 2 August 2023

Accepted: 11 April 2024

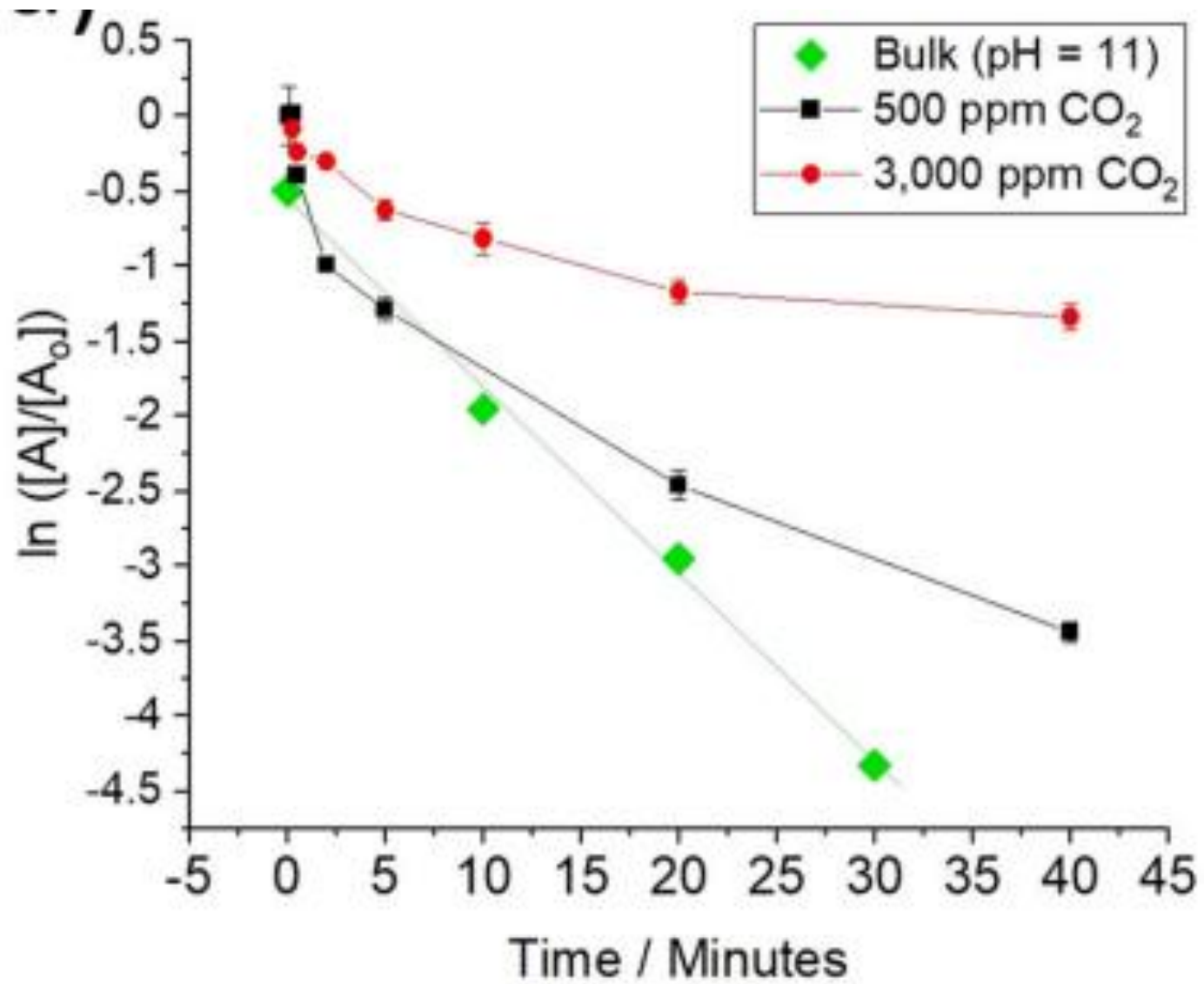
Published online: 25 April 2024

Check for updates

Allen Haddrell ¹ , Henry Oswin ¹, Mara Otero-Fernandez ¹,
Joshua F. Robinson ², Tristan Cogan³, Robert Alexander ⁴,
Jamie F. S. Mann ³, Darryl Hill ⁴, Adam Finn ^{4,5}, Andrew D. Davidson ⁴ &
Jonathan P. Reid ¹

<https://www.nature.com/articles/s41467-024-47777-5>





<https://www.nature.com/articles/s41467-024-47777-5>



Clinical Microbiology
Reviews

Conduct of Scientific Research | Review



Masks and respirators for prevention of respiratory infections: a state of the science review

Trisha Greenhalgh,¹ C. Raina MacIntyre,² Michael G. Baker,³ Shovon Bhattacharjee,^{2,4} Abrar A. Chughtai,⁵ David Fisman,⁶ Mohana Kunasekaran,² Amanda Kvalsvig,³ Deborah Lupton,⁷ Matt Oliver,⁸ Essa Tawfiq,² Mark Ungrin,⁹ Joe Vipond¹⁰

<https://journals.asm.org/doi/pdf/10.1128/cmr.00124-23>



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**Note: Does not examine Masks/
Respirators as Source Control**



- **Narrative review and meta-analysis**
- **Summarizes a broad evidence base on the benefits—and also the practicalities, disbenefits, harms and personal, sociocultural and environmental impacts—of masks and masking.**
- **Synthesis of evidence from > 100 published reviews and selected primary studies**
- **Re-analysis of contested meta-analyses of key clinical trials**
- **7 Key findings**

Key Findings

- 1) Strong and consistent evidence for **airborne transmission** of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and other respiratory pathogens.
- 2) Masks are, **if correctly and consistently worn**, effective in reducing transmission of respiratory diseases and show **a dose-response effect**.
- 3) **Respirators are significantly more effective than medical or cloth masks.**
- 4) Mask mandates are, overall, effective in reducing community transmission of respiratory pathogens.



Key Findings (Cont'd)

5) Masks are important sociocultural symbols

- **non-adherence to masking is sometimes linked to political and ideological beliefs and to widely circulated mis- or disinformation.**

6) Masks are not generally harmful to the general population

- **masking may be relatively contraindicated in individuals with certain medical conditions, who may require exemption.**
- **certain groups (notably deaf people) are disadvantaged when others are masked.**

7) Risks to the environment from single-use masks and respirators.



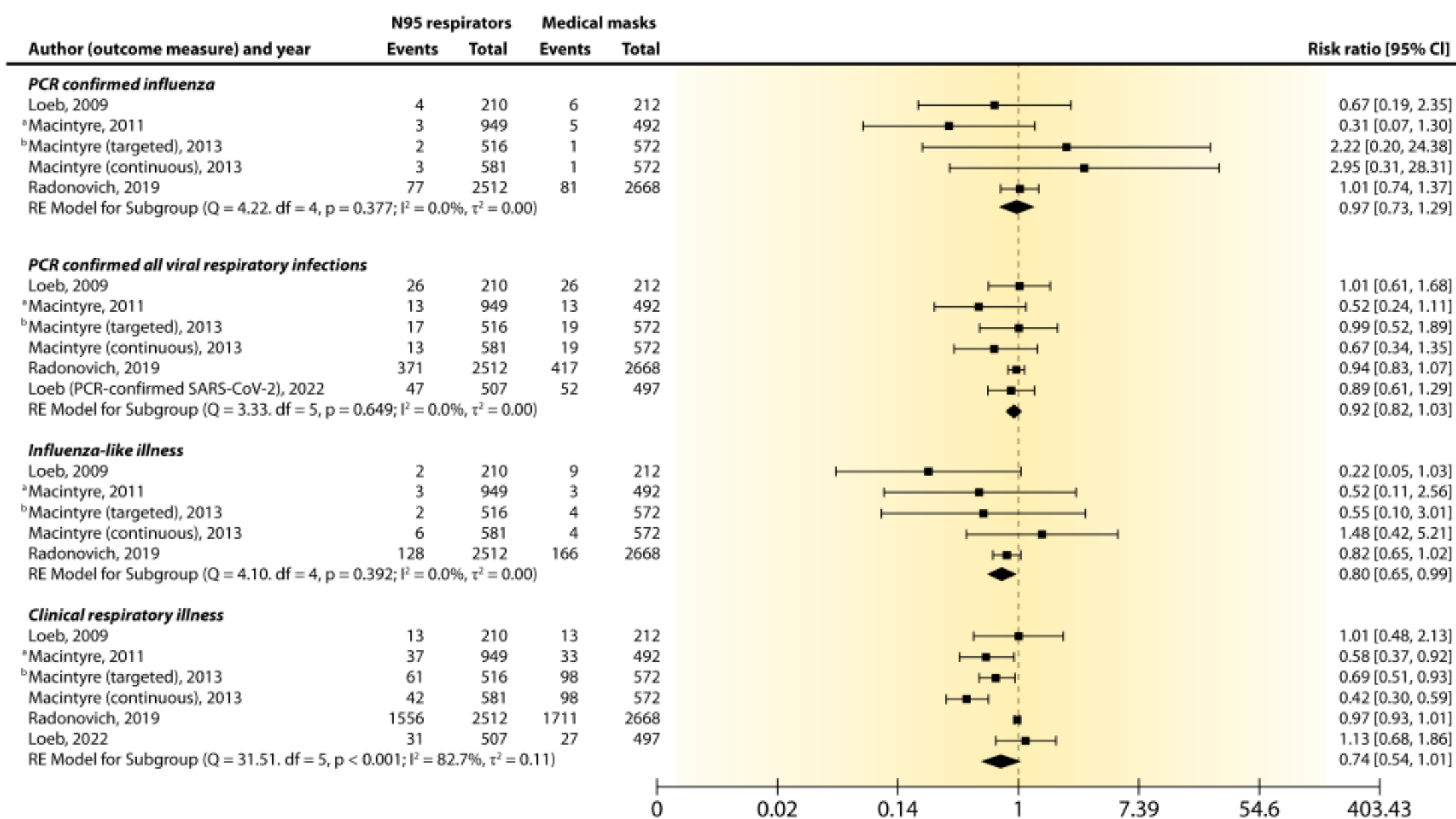


FIG 5 Forest plot of trials in health-care workers: any use of N95 vs medical masks. For references, see Table 4. a. MacIntyre 2011 combined values for fit-tested and not-fit tested arms = All N95 arm. b. MacIntyre 2013 (targeted N95 arm) vs control arm was continuous use of medical masks.

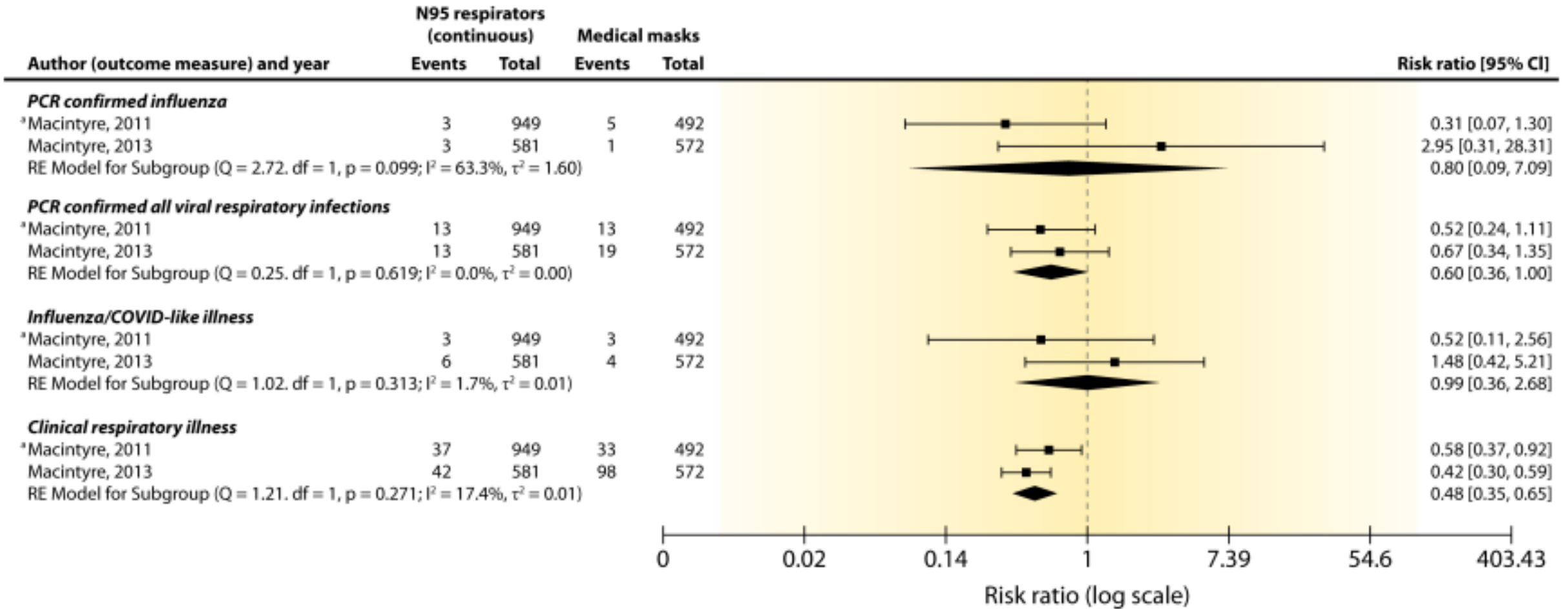


FIG 6 Forest plot of trials in health-care workers: continuous use of N95 vs medical masks. For references, see Table 4. a. MacIntyre 2011 combined values for fit-tested and not-fit tested arms = All N95 arm.

BOX 2: SOME SUGGESTIONS FOR A NEW GENERATION OF RESEARCH ON MASKS AND RESPIRATORS

1. Interdisciplinary and multi-method designs which go beyond “do masks work?” and ask nuanced, multi-faceted questions such as “what kind of masks should be introduced in respiratory epidemics and pandemics, at what stage, for whom, how and with what support?”
2. Studies of how to address the mismatch between the strong and consistent evidence base on the effectiveness of masks and respirators and the lack of acceptance of this evidence by influential scientists, clinicians and policymakers.
3. Studies to improve the quality of communication when [some people are] wearing face coverings.
4. Studies to optimize acceptability, fit and comfort of masks and respirators and minimize side effects such as skin reactions and headache. We recommend a wider range of mask materials, designs and styles, including consideration of specific need groups.
5. Studies of new materials and combinations of materials for masks and respirators, with a view to optimizing filtration efficacy, breathability, fit and environmental sustainability.
6. Studies of how to address the widespread, sinister and growing phenomenon of anti-mask misinformation and disinformation on social and mainstream media.

<https://journals.asm.org/doi/pdf/10.1128/cmr.00124-23>

**We need
better masks
and
respirators**



Relative efficacy of masks and respirators as source control for viral aerosol shedding from people infected with SARS-CoV-2: a controlled human exhaled breath aerosol experimental study

Jiayu Lai,^a Kristen K. Coleman,^a S.-H. Sheldon Tai,^a Jennifer German,^a Filbert Hong,^a Barbara Albert,^a Yi Esparza,^a Dewansh Rastogi,^b Aditya Srikakulapu,^a Petri Kalliomäki,^a Maria Schanz,^a Alycia A. Smith,^a Isabel Sierra Maldonado,^a Molly Oertel,^a Naja Fadul,^a T. Louie Gold,^a Kathleen McPhaul,^a Tianzhou Ma,^c Benjamin J. Cowling,^d and Donald K. Milton^{a,*}



98%



74%

“These results suggest that N95 respirators could be the standard of care in nursing homes and healthcare settings when respiratory viral infections are prevalent in the community and healthcare-associated transmission risk is elevated.”

<https://www.thelancet.com/action/showPdf?pii=S2352-3964%2824%2900192-0>

eBioMedicine
2024;104: 105157

Published Online 30 May
2024

<https://doi.org/10.1016/j.ebiom.2024.105157>

Potential for Human Pandemic: H5N1 Influenza

“The current H5N1 is not your grandma’s H5N1”

Richard Webby, St Jude’s Children Research Hospital, 15 Nov 2024



Isolation of Avian Influenza A(H5N1) Viruses from Humans -- Hong Kong, May-December 1997

Boy dies from flu virus never seen in humans

HONG KONG — A 3-year-old boy died after contracting an influenza strain that has never before been seen in humans, Hong Kong said Wednesday.

Laboratories in Hong Kong, the United States, Britain and Netherlands identified a specimen collected from the boy's trachea as carrying a virus called "influenza A of H4N1 strain," previously found mainly in birds.



18 human infections
6 deaths



<https://www.cbc.ca/newsinteractives/features/h5n1-bird-flu-timeline/first-detections>

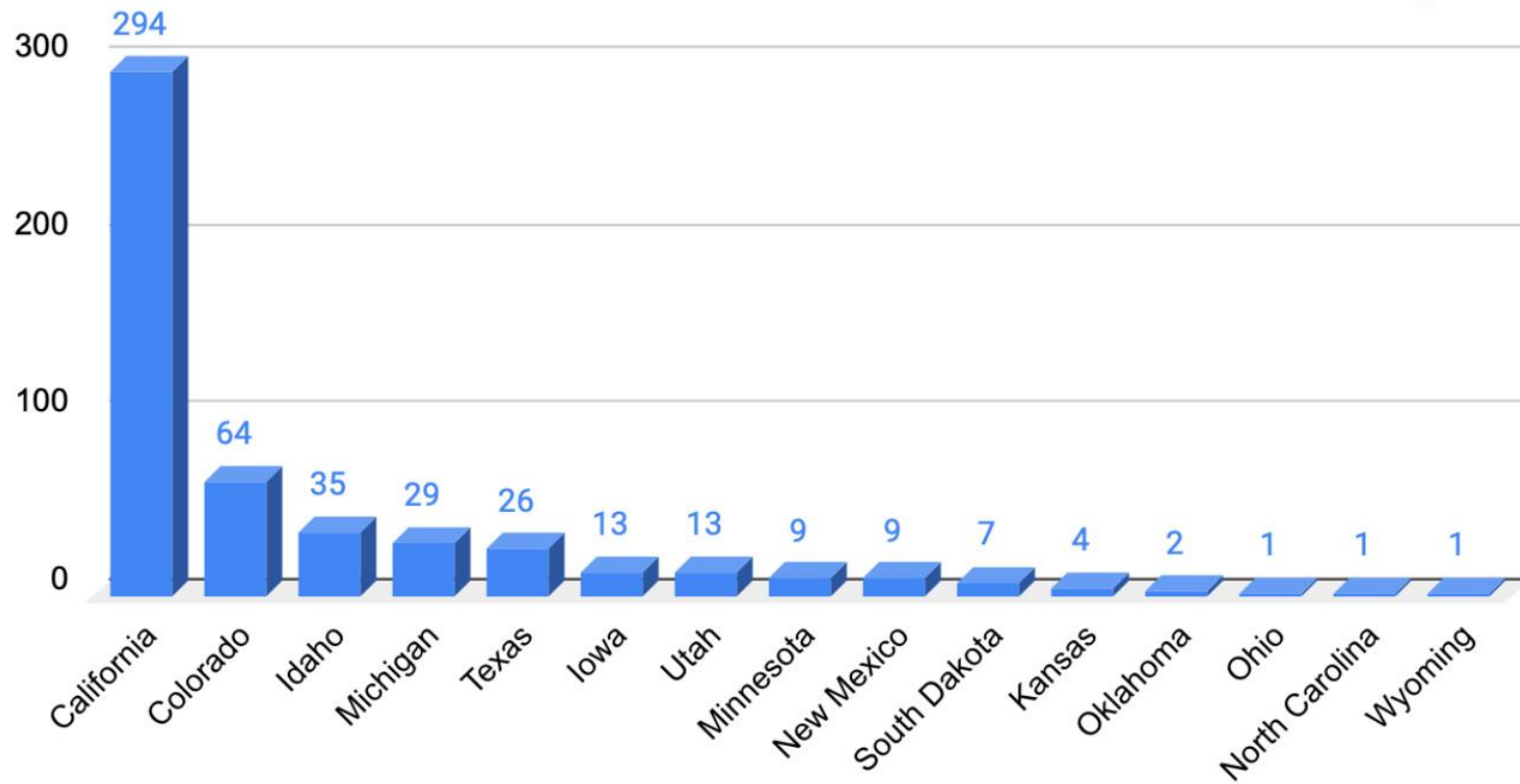
<https://www.cdc.gov/mmwr/preview/mmwrhtml/00050459.htm>



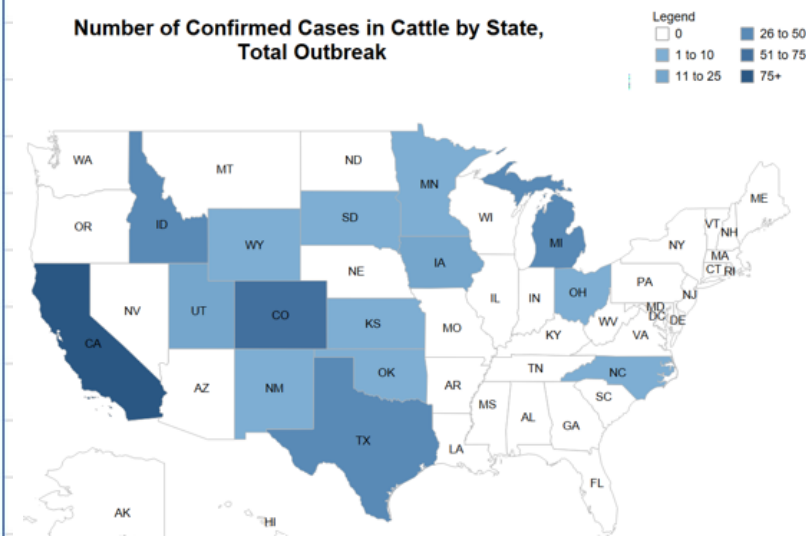
Western Health

H5N1-infected dairy herds as confirmed by USDA

cumulative national tally: 508



Number of Confirmed Cases in Cattle by State, Total Outbreak



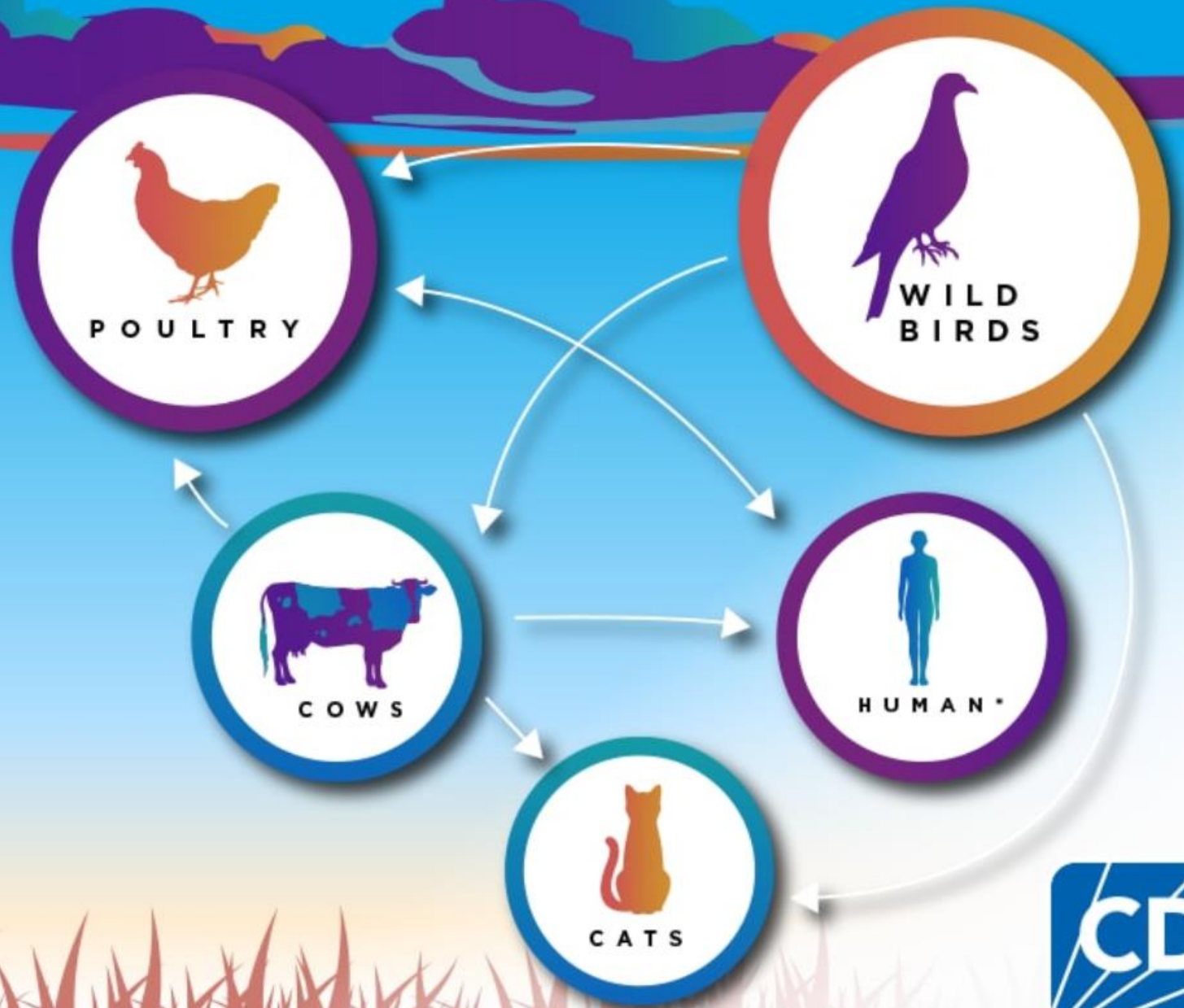
@helenbranswell.bsky.social

as of 16. Nov 24

<https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock>

H5N1 Bird Flu

How is it Spreading?



**No human-to-human spread of H5N1 has been detected during the current outbreak in dairy cows.*



Confirmed Human H5N1 Cases by Exposure, US, 2024*

	Cattle	Poultry	Unknown	State Total
California	26	0	0	26
Colorado	1	9	0	10
Michigan	2	0	0	2
Missouri	0	0	1	1
Oregon	0	1	0	1
Texas	1	0	0	1
Washington	0	11	0	11
Source Total	30	21	1	52

*as of 16. Nov 24

<https://www.cdc.gov/bird-flu/situation-summary/index.html>



Western Health

Serologic Evidence of Recent Infection with Highly Pathogenic Avian Influenza A(H5) Virus Among Dairy Workers — Michigan and Colorado, June–August 2024

Alexandra M. Mellis¹; Joseph Coyle²; Kristen E. Marshall^{3,4}; Aaron M. Frutos^{1,5}; Jordan Singleton^{5,6}; Cara Drehoff^{3,5}; Angiezel Merced-Morales¹; H. Pamela Pagano¹; Rachel O. Alade^{5,7}; Elizabeth B. White¹; Emma K. Noble¹; Crystal Holiday¹; Feng Liu¹; Stacie Jefferson¹; Zhu-Nan Li¹; F. Liani Gross¹; Sonja J. Olsen¹; Vivien G. Dugan¹; Carrie Reed¹; Sascha Ellington¹; Sophia Montoya³; Allison Kohnen³; Ginger Stringer³; Nisha Alden³; Peter Blank²; Derick Chia²; Natasha Bagdasarian²; Rachel Herlihy³; Sarah Lyon-Callo²; Min Z. Levine¹

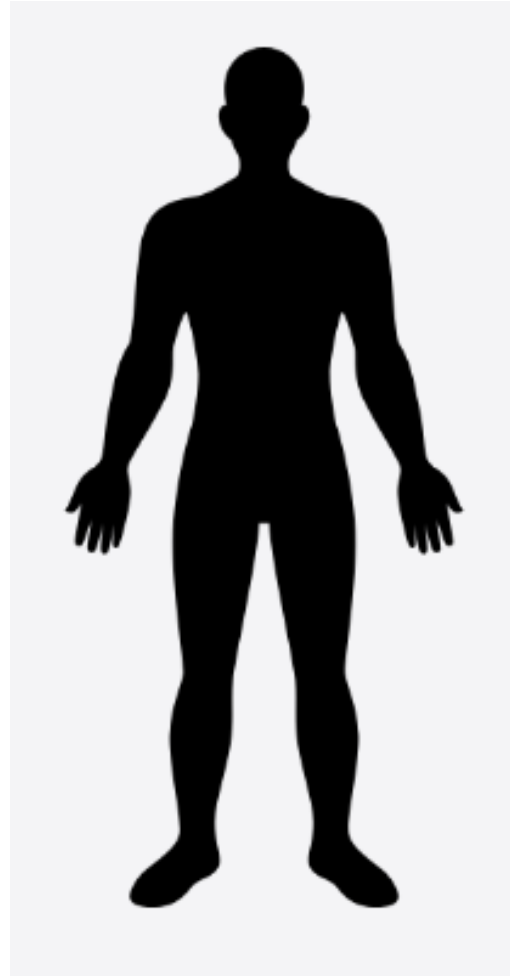
7% recent infection among exposed dairy workers

50% had no symptoms



Viral Reassortment: Mixing Vessel

Human influenza

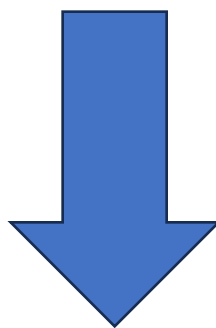


H5N1 influenza



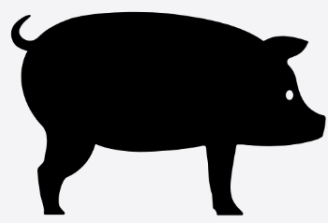
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CDC Expands Guidance to Better Protect Farm Workers and Livestock Owners to Lower the Risk of Becoming infected with Bird Flu

<https://www.cdc.gov/bird-flu/spotlights/protect-farm-workers-bird-flu.html>



“... positive cases of H5N1 in a backyard farming operation in Oregon that has a mix of poultry and livestock, including swine. The Oregon Department of Agriculture announced on Friday, Oct. 25, that poultry on this farm represented the first H5N1 detection in Crook County, Oregon. On Tuesday, Oct. 29, the USDA National Veterinary Services Laboratories also confirmed one of the farm’s five pigs to be infected with H5N1, marking the first detection of H5N1 in swine in the United States.”

<https://www.aphis.usda.gov/news/agency-announcements/federal-state-veterinary-agencies-share-update-hpai-detections-oregon>

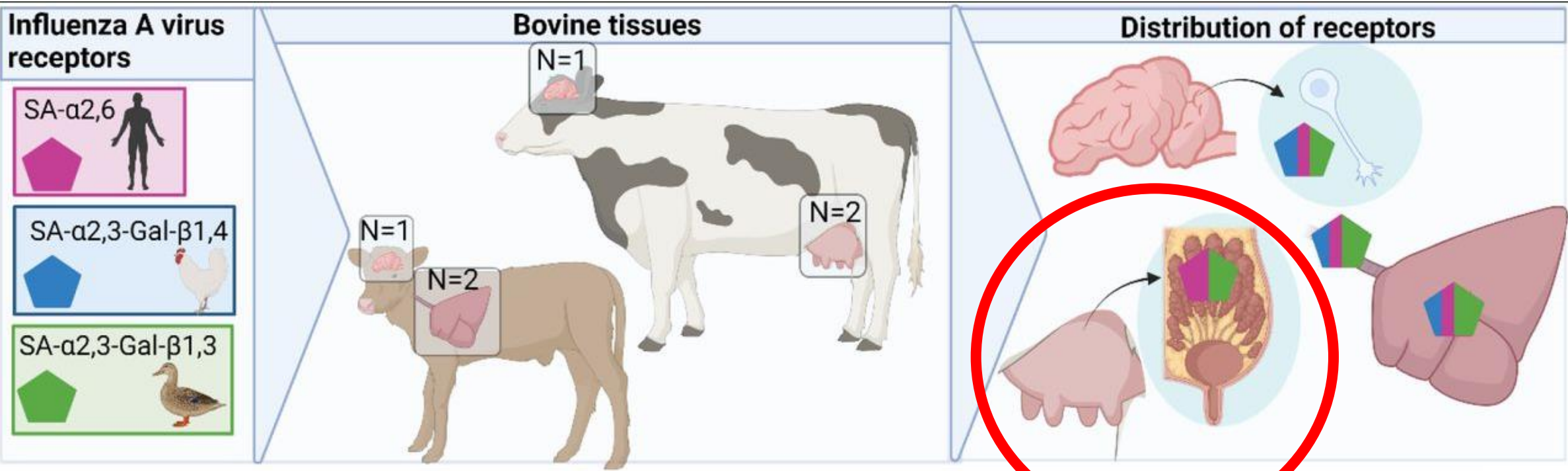


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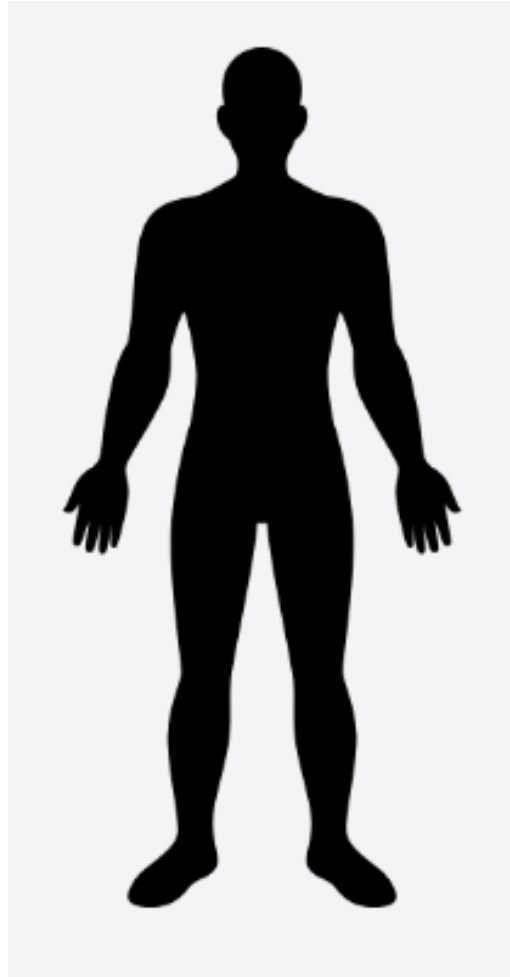
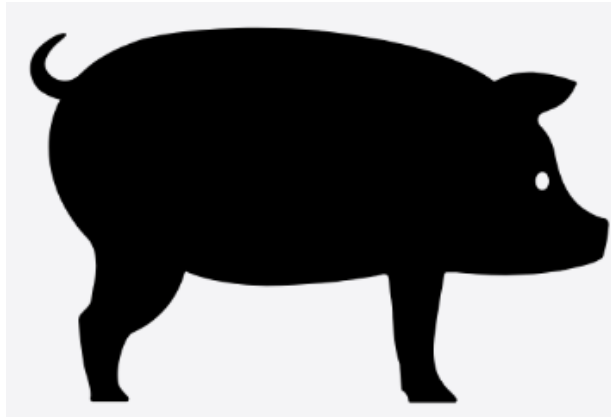
The avian and human influenza A virus receptors sialic acid (SA)- α 2,3 and SA- α 2,6 are widely expressed in the bovine mammary gland

Charlotte Kristensen, Henrik E. Jensen, Ramona Trebbien, Richard J. Webby, Lars E. Larsen
doi: <https://doi.org/10.1101/2024.05.03.592326>

The co-expression of both human and avian receptors in the mammary glands indicate susceptibility for viruses of both swine/human and avian origin.



Mixing Vessel



Post



Hensley Lab

@scottehensley.bsky.social

+ Follow

The preliminary sequence from the H5N1 human case in British Columbia has been posted and it is not good news. The virus potentially has a quasispecies at HA residue 226 (H3 numbering). This is bad news because we know that mutations at residue 226 can increase binding to human receptors. 1/

November 17, 2024 at 2:19 AM Everybody can reply

698 reposts 148 quotes 1.5K likes

147

846

1.5K



Hensley Lab @scottehensley.bsky.social · 19h

For example, take a look at this paper that we recently published together with [@jbloombiolab.bsky.social](#) . Jesse's lab led the study and found that single mutations at residue 226 dramatically changed H5 receptor binding preference from a2-3 (bird receptor) to a2-6 (human receptor) binding. 2/

Pandemic Influenza Vaccines: Responding to the H5 Outbreak & Preparing for The Future

November 15, 2024 • 8:30 am - 12:00 pm EST • Virtual

8:30 a.m. – Setting the Scene (*Current State of US and Global Pandemic Influenza Threats; H5 Epidemiology, Virology, Other Pandemic Influenza Threats*)

9:20 a.m. – H5 and Other Pandemic Vaccines: Current State (Approved and Investigational Vaccines: safety, efficacy, data gaps; US and global regulatory pathways, scientific and policy gaps and opportunities)

10:35 a.m. Moving Forward (*Use of H5 Vaccines in Response to the Current Outbreak: Options, monitoring and communications*)

11:20 a.m. Senior Leader Closing Panel

<https://oneill.law.georgetown.edu/events/pandemic-influenza-vaccines-responding-to-the-h5-outbreak-preparing-for-the-future/>

Potential for Pandemic: Mpox

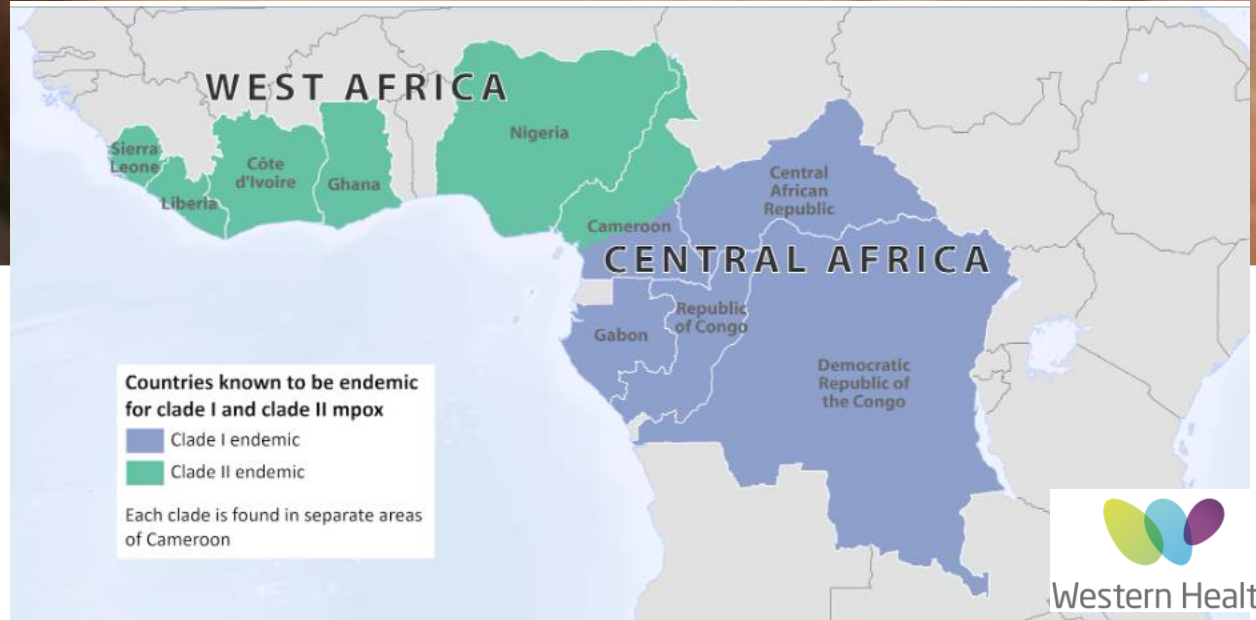




Mpox

https://www.who.int/health-topics/mpox#tab=tab_2

<https://www.cdc.gov/mpox/about/index.html>



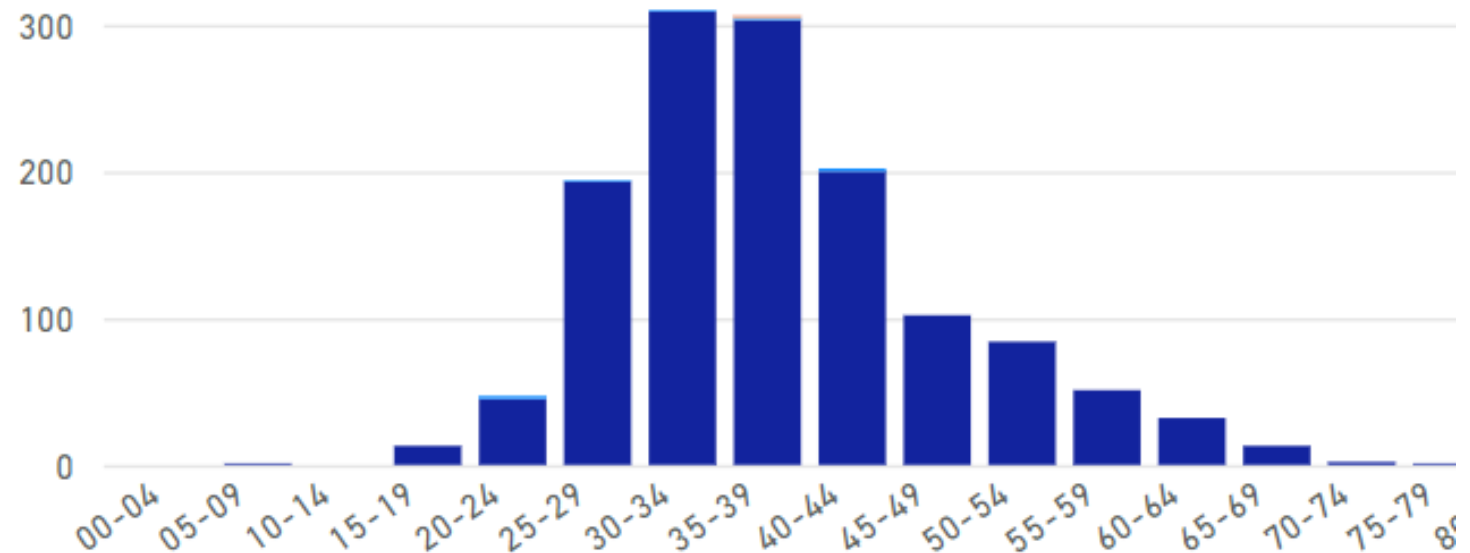
Mpox in Australia (Clade IIb)

State	2022	2023	2024
ACT	3	1	15
NSW	56	12	645
NT	0	0	4
QLD	6	2	109
SA	2	0	8
TAS	0	0	1
VIC	70	8	399
WA	7	3	7
Total	144	26	1,188

Primarily Gay, Bisexual and MSM

7 Females, some heterosexual transmission reported

At risk persons should get vaccinated (2 doses)



Mpox Clade I

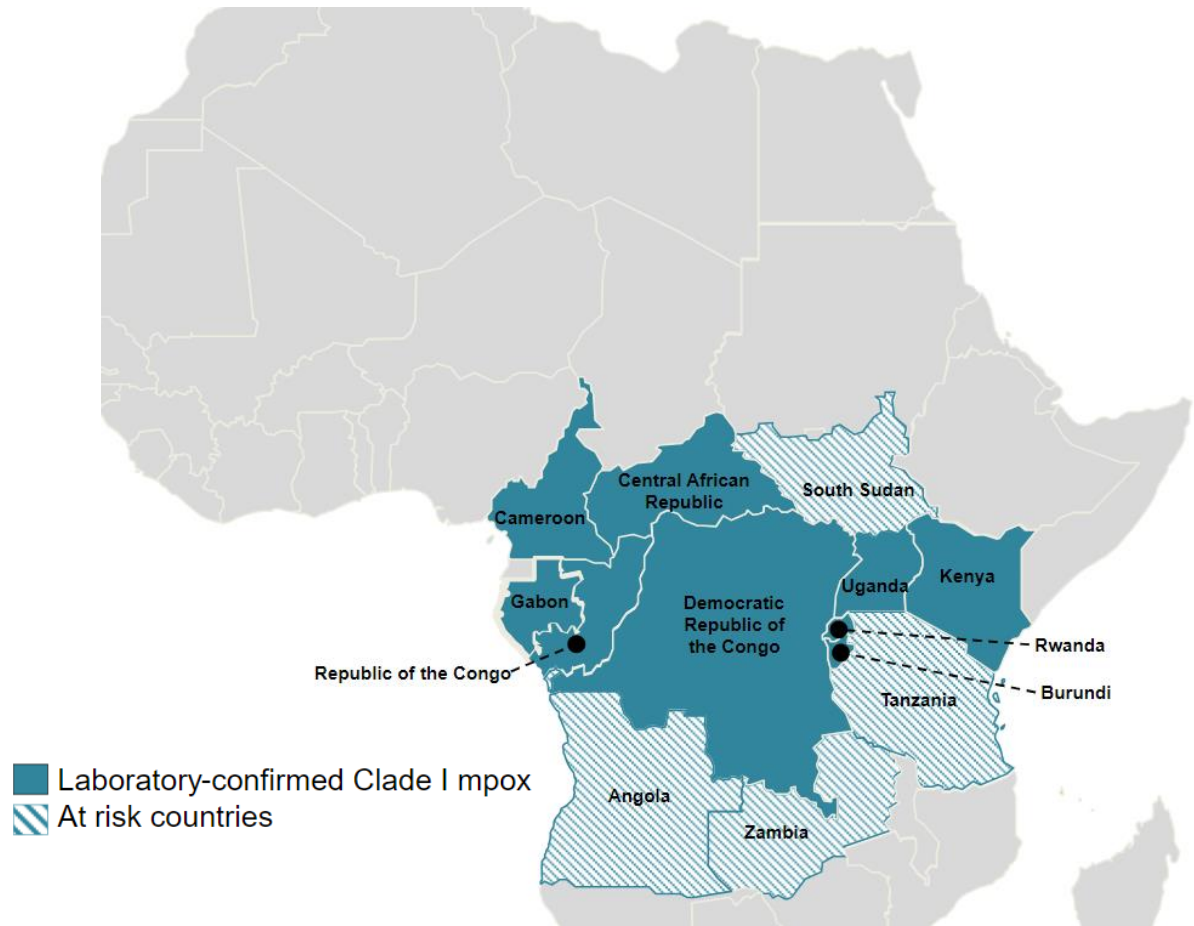


Figure 1. African Region countries reporting laboratory confirmed clade I mpox or where there may be a risk of clade I mpox exposure

<https://www.gov.uk/guidance/operational-mpox-monkeypox-hcid-case-definition>

- More severe, higher mortality
- Different epidemiology– lots of children
 - transmission modes not well characterized
- Acquiring mutations that make it more transmissible
- Efficacy of tecovirimat??

- Travel associated Clade 1, some spread to household contacts



Thursday, August 15, 2024

The antiviral tecovirimat is safe but did not improve clade I mpox resolution in Democratic Republic of the Congo

NIH-cosponsored study examined tecovirimat in mpox-endemic country.

**Mpox outbreak—
tecovirimat resistance,
management
approaches, and
challenges in HIV-
endemic regions**

<https://www.thelancet.com/action/showPdf?pii=S1473-3099%2824%2900591-7>

<https://www.nih.gov/news-events/news-releases/antiviral-tecovirimat-safe-did-not-improve-clade-i-mpox-resolution-democratic-republic-congo>

BOX 1: FLAWED ASSUMPTIONS AND LOGICAL FALLACIES ABOUT AIRBORNE TRANSMISSION

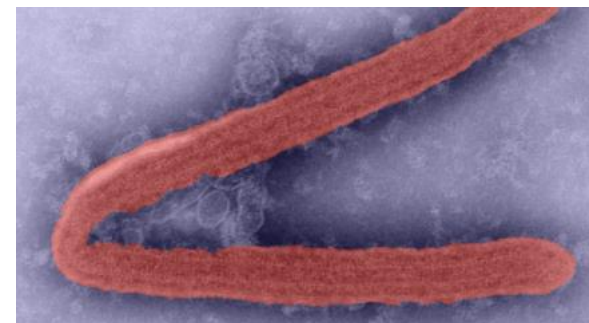
The following incorrect assumptions have led to flawed conceptual models and ineffective policies (see text for details and references):

1. Absence of direct evidence in favor of airborne transmission can be taken as evidence refuting airborne transmission.
2. Because contact and droplet transmission can occur only during close contact, all close-contact transmission must be contact and droplet.
3. Because large droplets are smaller than the lumen of the smallest bronchioles, they can reach the key target cell for SARS-CoV-2 in the alveoli.
4. Particles above 5 μm in diameter are droplets and not aerosols.
5. Aerosols are produced in significant numbers from infectious patients only when aerosol-generating medical procedures (AGMPs) are done.
6. Only respiratory diseases with a high R_0 (such as measles) are airborne.

Let's not make the same mistake with H5N1 influenza and Mpox

Assume airborne transmission until we have lots more information

Marburg Virus: Rwanda



As of 11.Nov 2024

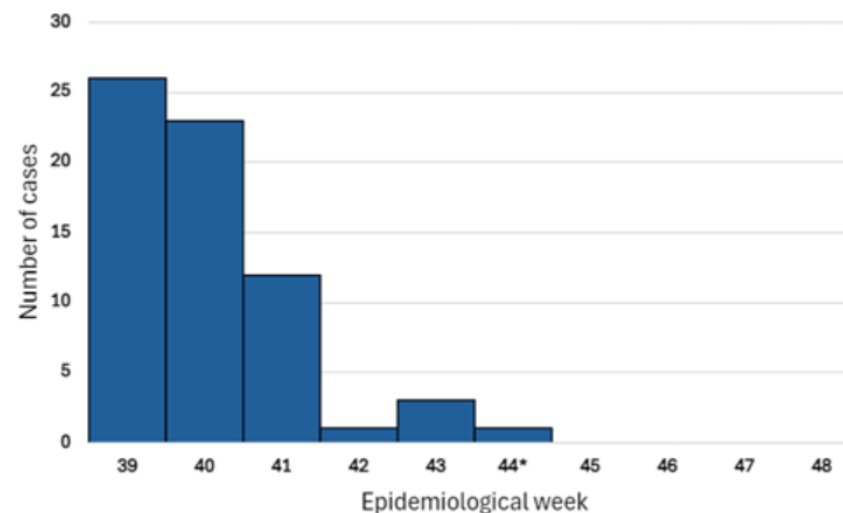
Confirmed Cases	Active Cases	Death Cases	Recovered Cases	Cases Fatality Rate
66	0	15	51	22.7 %

Vaccines
Delivered

1,710
(+81)

Cases per known
transmission chains:
100%

Figure 1. MVD cases by week of reporting in Rwanda, as of 31 October 2024, (n=66)

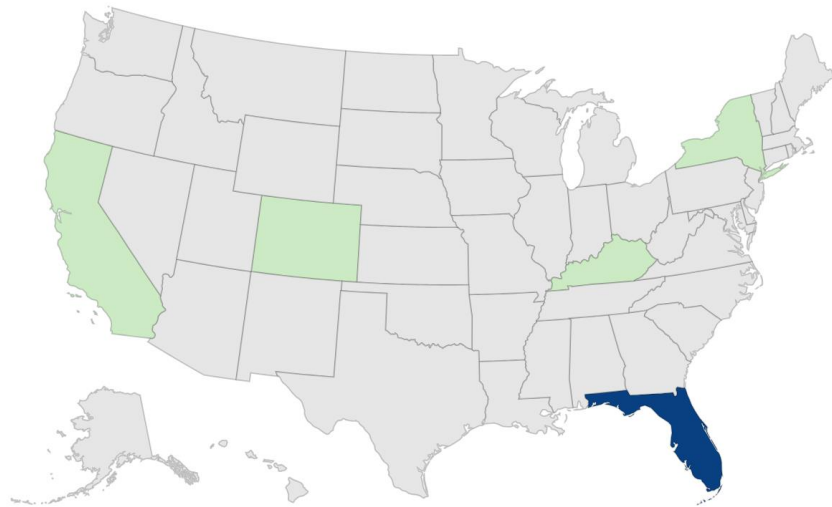


***14 days without a case,
8 days since last discharge of case***

<https://rbc.gov.rw/marburg/>

<https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON543>

Oropouche Virus



Legend

○ No reported cases ● 1 to 5 ● 6 to 10 ● 11 to 20 ● >20

- Spread primarily by bite of infected biting midges.
- Likely some mosquitoes can also spread the virus.
- Reported in parts of South America, Central America, and the Caribbean.
- Common symptoms include fever, severe headache, chills, muscle aches, and joint pains.
- No vaccines or treatments.
- Case reports of congenital abnormalities (similar to Zika virus)- magnitude of risk unclear

Data as of 6 Nov 2024

<https://www.cdc.gov/oropouche/data-maps/current-year-data.htm>

<https://www.cdc.gov/oropouche/about/index.html>



Western Health