

# COVID Update

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Jon Jui mD

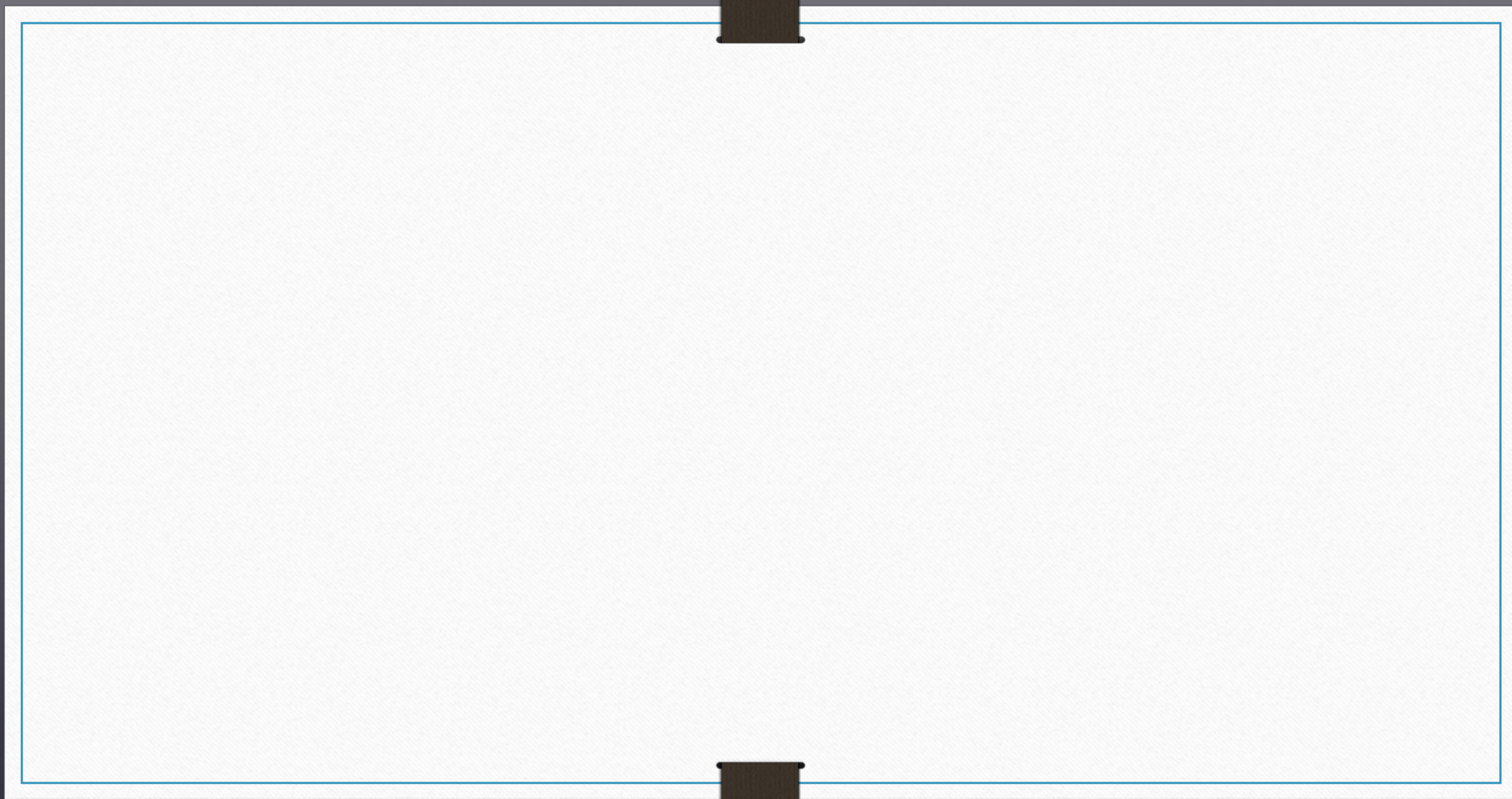
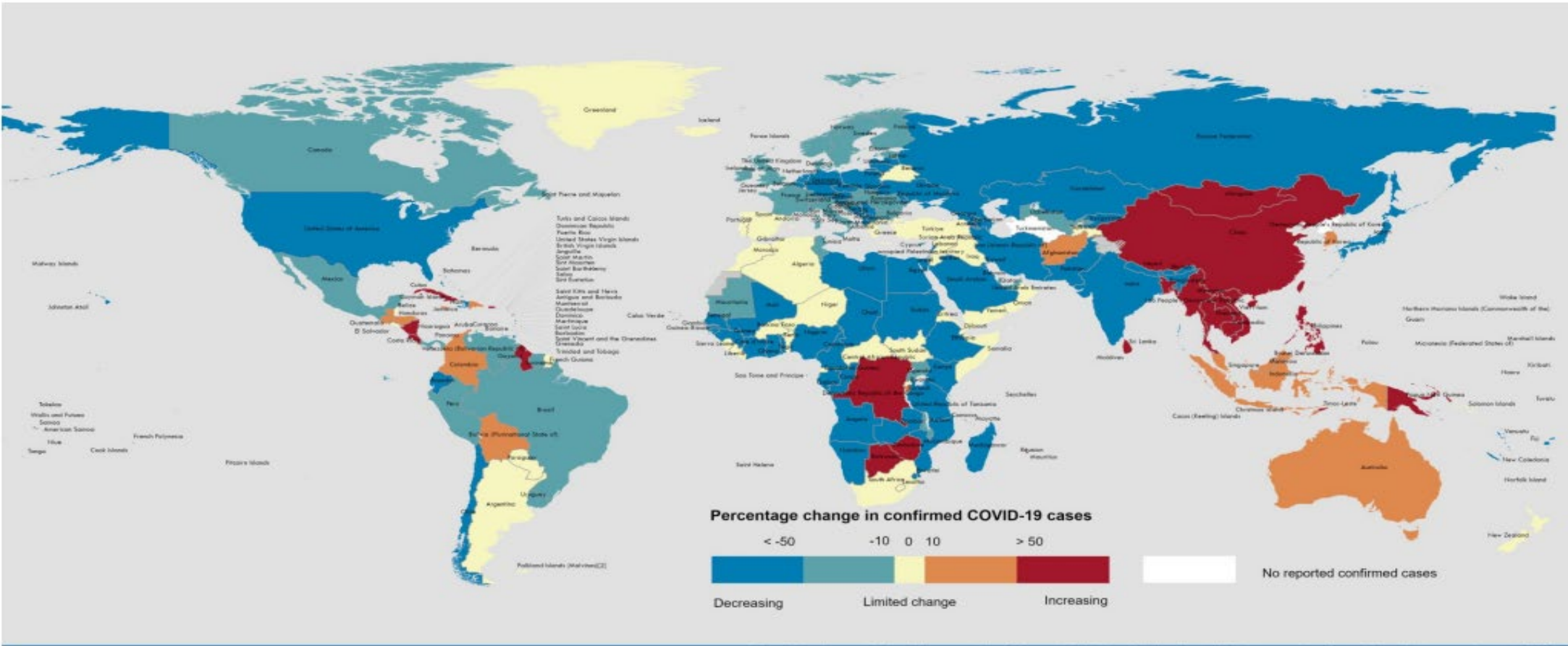


Figure 2. Percentage change in confirmed COVID-19 cases over the last 28 days relative to the previous 28 days, as of 28 May 2023\*\*



Data Source: World Health Organization  
Map Production: WHO Health Emergencies Programme

Not applicable

0 2,500 5,000 km  
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The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. [1] All references to Kosovo in this document should be understood to be in the context of the United Nations Security Council resolution 1244 (1999). Number of cases of Serbia and Kosovo (UNSCR 1244, 1999) have been aggregated for visualization purposes. [2] A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas). Data for Bonaire, Sint Eustatius and Saba have been disaggregated and displayed at the subnational level.

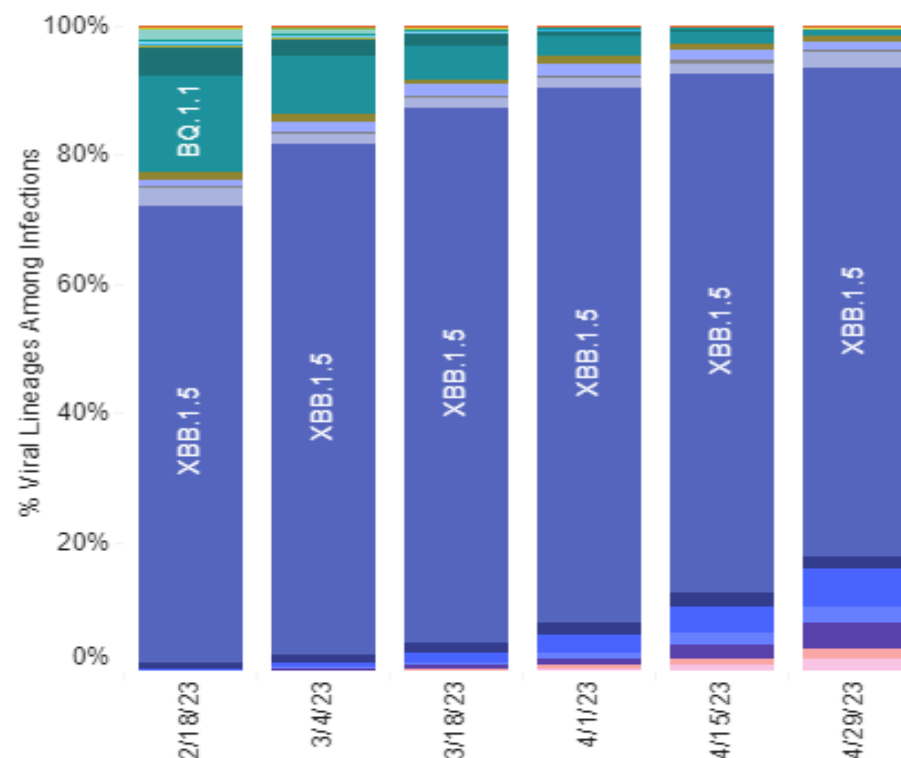
\*\*See [Annex 1: Data, table, and figure notes](#)

## Weighted and Nowcast Estimates in United States for 2-Week Periods in 2/5/2023 – 5/27/2023



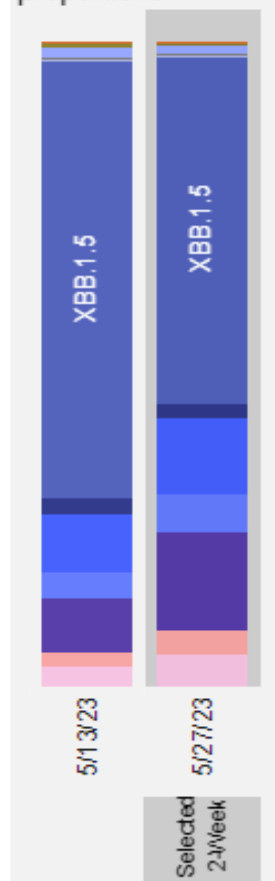
Hover over (or tap in mobile) any lineage of interest to see the amount of uncertainty in that lineage's estimate.

**Weighted Estimates:** Variant proportions based on reported genomic sequencing results



Collection date, two-week period ending

**Nowcast:**  
Model-based  
projected estimates  
of variant  
proportions



## Nowcast Estimates in United States for 5/14/2023 – 5/27/2023

USA

WHO label	Lineage #	US Class	%Total	95%PI	
Omicron	XBB.1.5	VOC	53.8%	50.2-57.4%	
	XBB.1.16	VOC	15.1%	12.1-18.7%	
	XBB.1.9.1	VOC	11.8%	10.3-13.5%	
	XBB.1.9.2	VOC	6.1%	4.7-7.9%	
	XBB.2.3	VOC	4.9%	3.3-7.1%	
	XBB.1.16.1	VOC	3.8%	2.8-5.3%	
	XBB.1.5.1	VOC	2.2%	1.7-2.8%	
	FD.2	VOC	1.5%	0.6-3.5%	
	XBB	VOC	0.4%	0.3-0.7%	
	CH.1.1	VOC	0.2%	0.1-0.3%	
	BQ.1.1	VOC	0.1%	0.1-0.2%	
	BQ.1	VOC	0.0%	0.0-0.1%	
	BA.2	VOC	0.0%	0.0-0.0%	
	BA.5	VOC	0.0%	0.0-0.0%	
	BN.1	VOC	0.0%	0.0-0.0%	
	BA.5.2.6	VOC	0.0%	0.0-0.0%	
Other	Other*		0.0%	0.0-0.0%	



# CDC Estimates of SARS-CoV-2

- Estimates of SARS-CoV-2 Seroprevalence and Incidence of Primary SARS-CoV-2 Infections Among Blood Donors, by COVID-19 Vaccination Status — United States, April 2021–September 2022

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- Estimated **96.4%** of persons aged  $\geq 16$  years in a longitudinal blood donor cohort had SARS-CoV-2 antibodies from previous infection or vaccination,
  - 22.6% from infection alone
  - 26.1% from vaccination alone;
  - 47.7% had hybrid immunity.
- Hybrid immunity prevalence was lowest among adults aged  $\geq 65$  years.



# Cats can catch COVID



- Cats can become infected with COVID-19 through contact with other infected animals or contaminated pens and should be considered part of the household dynamics of the virus
- Of the eight cats exposed to the contaminated pens, only one got infected, but three of four animals exposed to another infected animal became infected.
- The cats displayed mild symptoms, including nasal discharge.

Microbiology Spectrum Efficient Direct and Limited Environmental Transmission of SARS-CoV-2 Lineage B.1.22 in Domestic Cats <https://doi.org/10.1128/spectrum.02553-22>

# COVID Effective Reproductive Number $R_0$

	R	Range	Median	IQR
Measles	12-18			
Omicron	3.4	0.88-9.4	2.8	2.03-3.85
Omicron Variant	9.5	5.5-24	10	7.25-11.88

J Travel Med. 2022 Apr; 29(3)  
Lancet Infect Dis. 2017 Dec;17(12).

# Do Not Dispose of your Masks!

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**Mask      vs      Respirator**





# Scientific Guidance with novel Infectious Disease

Oct 5, 2020

May 7, 2021

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CORONAVIRUS

## CDC reverses again, now says Covid-19 is 'sometimes' airborne

The agency once again says that the coronavirus can be airborne, but that it is not the main method of transmission.



The New York Times

See more from our live coverage: [Covid-19 Updates](#)



## The virus is an airborne threat, the C.D.C. acknowledges.

The new focus underscores the need for the federal Occupational Safety and Health Administration to issue standards for employers to address potential hazards in the workplace, multiple experts say.

# Updated Recommendations for COVID-19 Vaccine Use

[Print](#)



Updated Recommendations for COVID-19 Vaccine Use  
Center for Preparedness and Response



## Updated Recommendations for COVID-19 Vaccine Use

Clinician Outreach and Communication Activity (COCA) Call



Thursday, May 11, 2023

# Transitioning from the **monovalent** to the **bivalent** era for individuals aged 6 years and older without immunocompromise



## Doses previously recommended:

### Moderna and Pfizer-BioNTech:

- 2 **monovalent** primary series doses +
- 1 **bivalent** booster dose

### Novavax (ages 12 and older):

- 2 **monovalent** primary series doses +
- 1 **bivalent** mRNA booster dose

### Janssen (ages 18 and older):

- 1 **monovalent** primary series doses +
- 1 **bivalent** mRNA booster dose

## Doses now recommended:

### Moderna:

- At least 1 **bivalent** dose

### Pfizer-BioNTech:

- At least 1 **bivalent** dose

### People aged 65 years and older:

- Option to receive 1 additional bivalent mRNA dose at least 4 months after the first dose of a bivalent mRNA vaccine



# Efficacy of COVID Bivalent Boosters

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- Appear to work well against the BQ, XBB, and other emerging variants
- Offered 30% to more than 50% better protection against the prevailing variants than the initial two-dose vaccine course tailored to the original strain, depending on patients' ages (resistance fell with age)

<https://www.cdc.gov/mmwr/volumes/71/wr/pdfs/mm7148e1-H.pdf>



## Transitioning from the **monovalent** to the **bivalent** era for people *with moderate to severe immunocompromise* aged 6 months and older



### Doses previously recommended:

- **monovalent** primary series doses +
- **1 bivalent** booster dose and
- **additional bivalent doses**

### Doses now recommended:

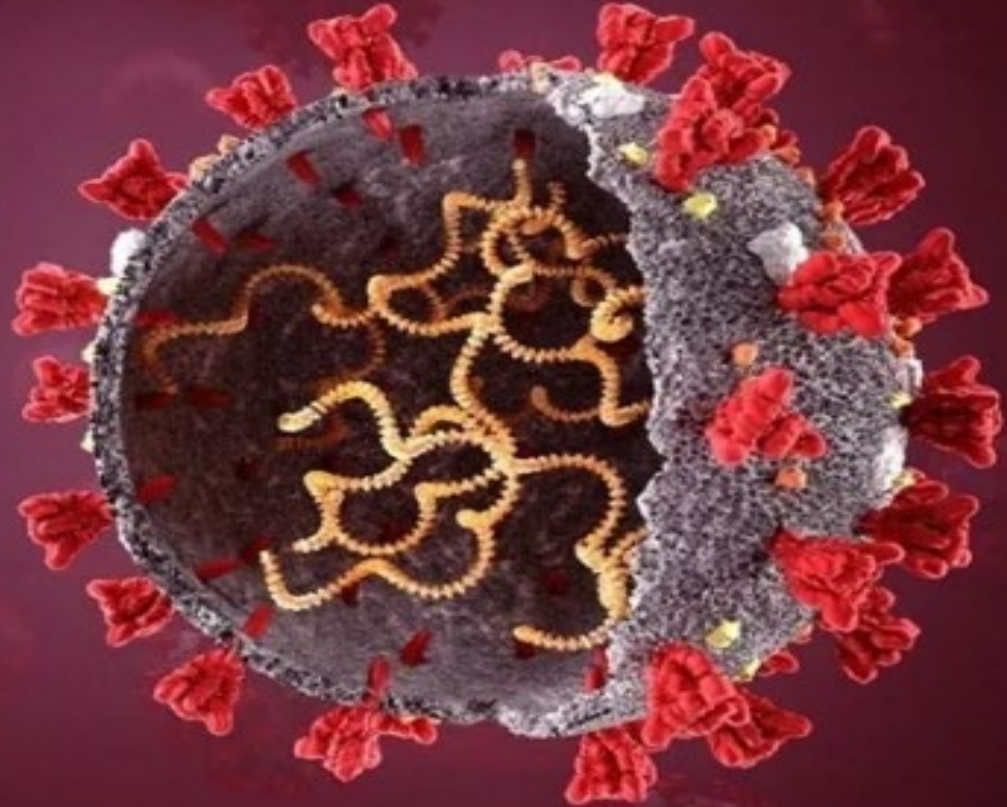
**Customized** by COVID-19 vaccination history such that immunocompromised people receive:

- **At least 3 vaccine doses in total** *including*
- **At least 1 bivalent** dose
  - Plus an optional additional bivalent dose
  - Plus additional bivalent doses as needed

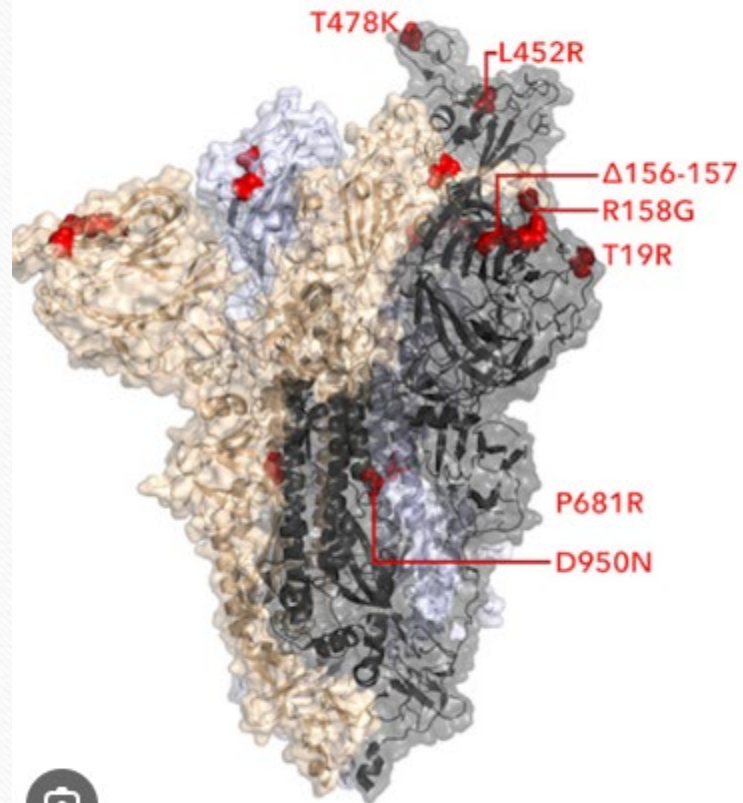
# DELTACRON

SARS-COV-2 VARIANT

combines  
delta and omicron

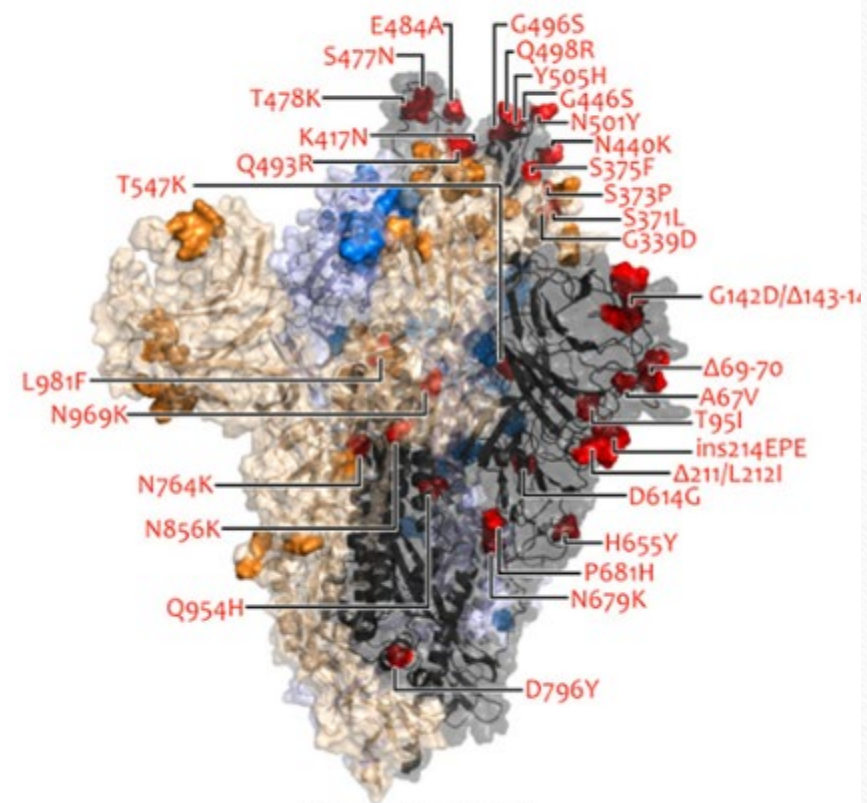


(A) Delta



(B.1.617.2)

(B) Omicron



(B.1.1.529)



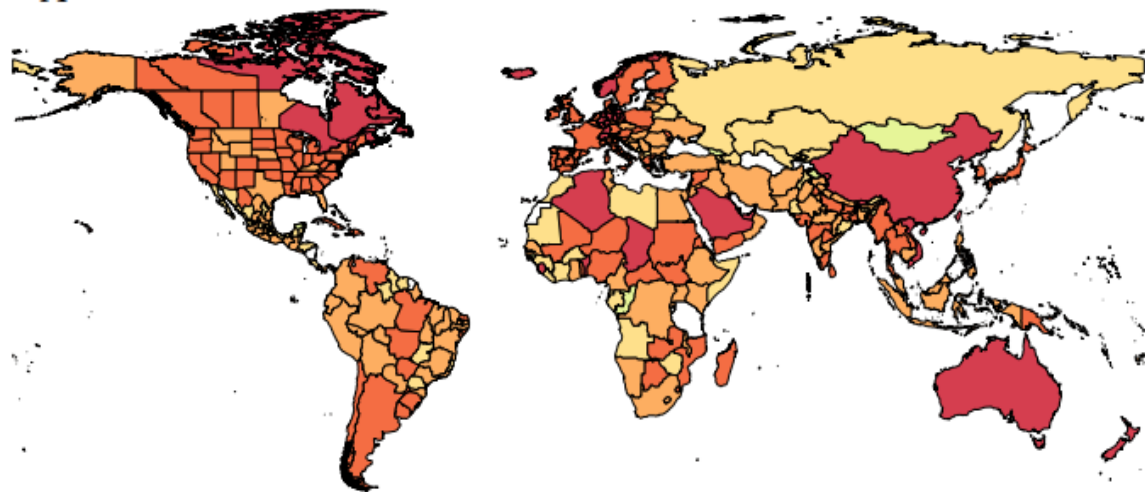
# Forecast University of Washington

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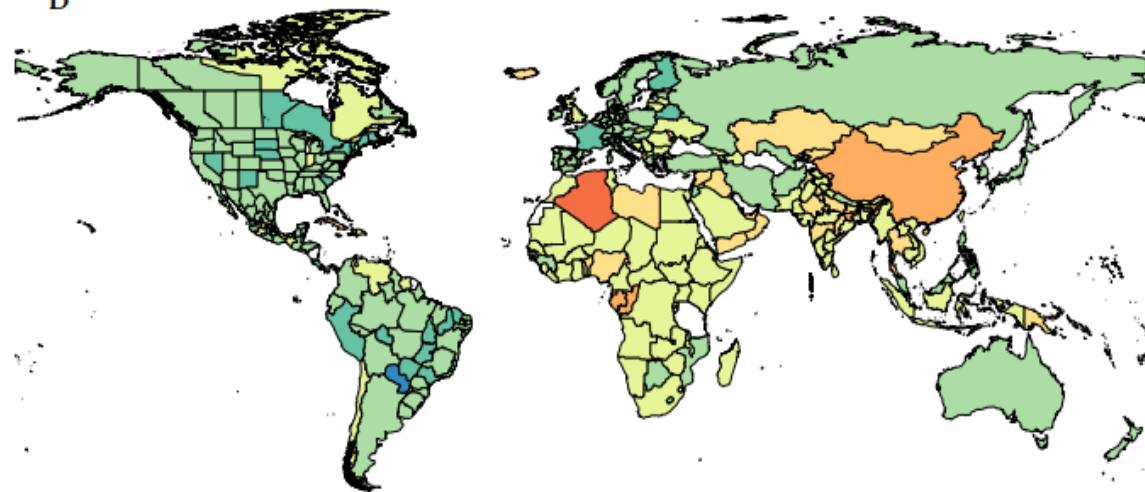
Before Omicron

A



After Omicron

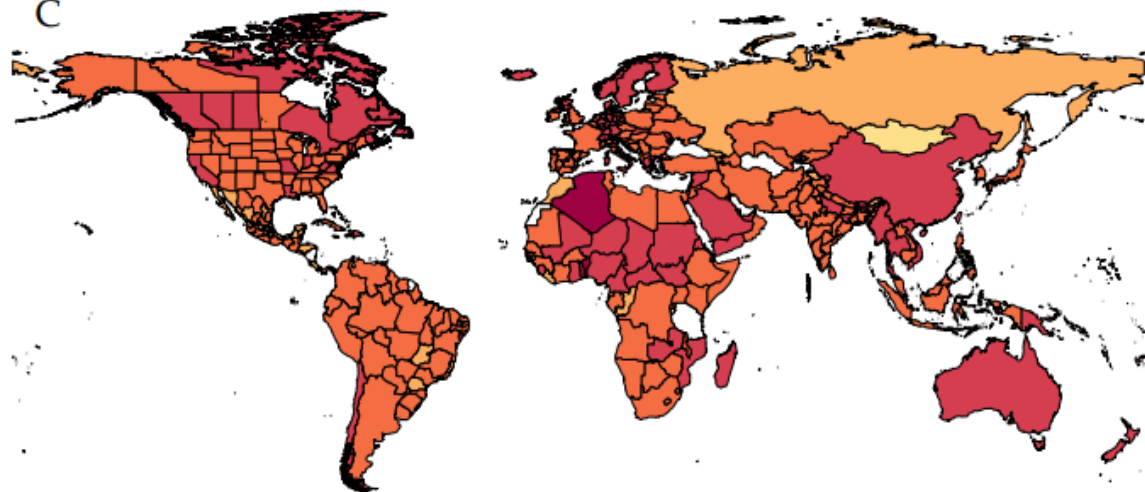
B



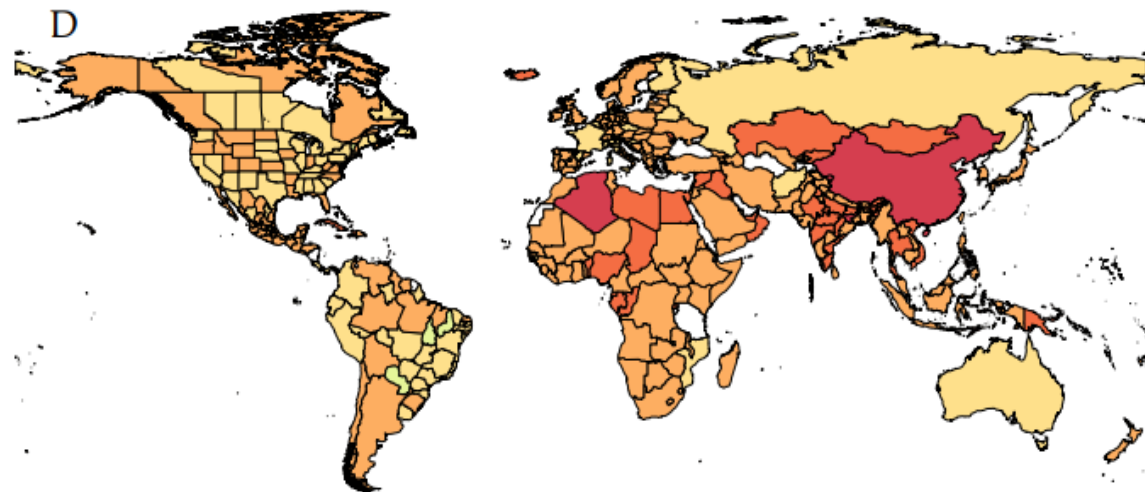
Fraction susceptible to new variant with Delta-like characteristics



C



D



Fraction susceptible to new variant with Omicron-like characteristics



# My Prediction

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- **Micro spikes Clusters**
  - No variant
  - Omicron like
  - Delta Like
  - Delta Breakthrough
  - Deltacron
- **Disclaimer: This is like weather forecasting**



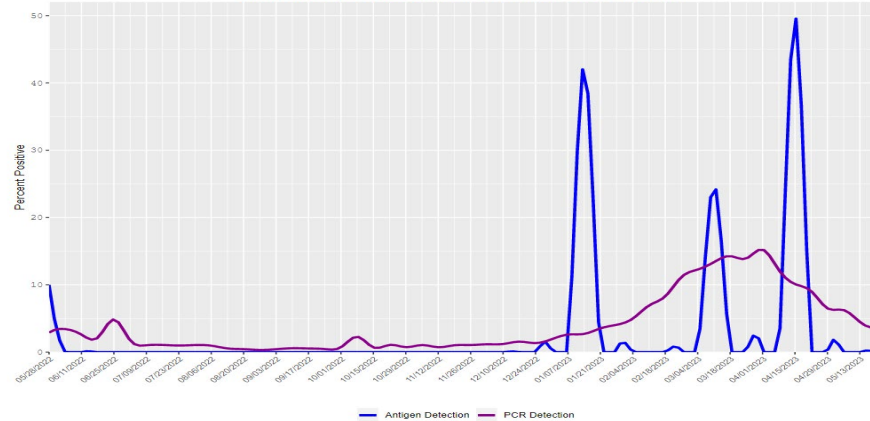
# Previously known Respiratory Pathogens

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# Human Metapneumovirus Infection

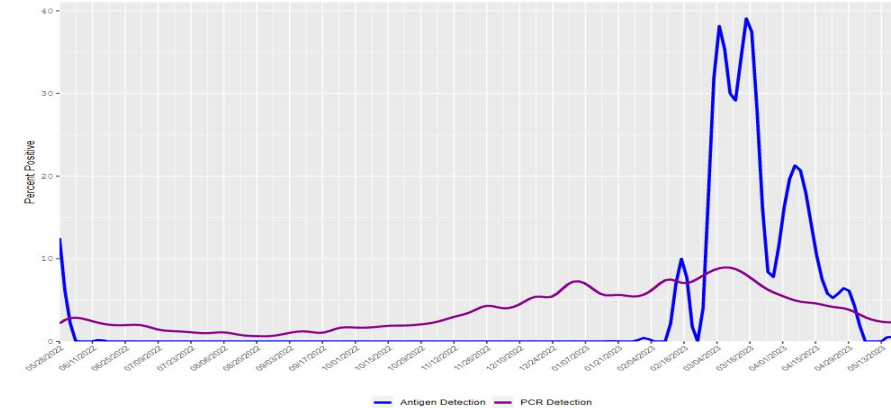
Northeastern United States Census Region

Human Metapneumovirus (hMPV) data for Census Region 2



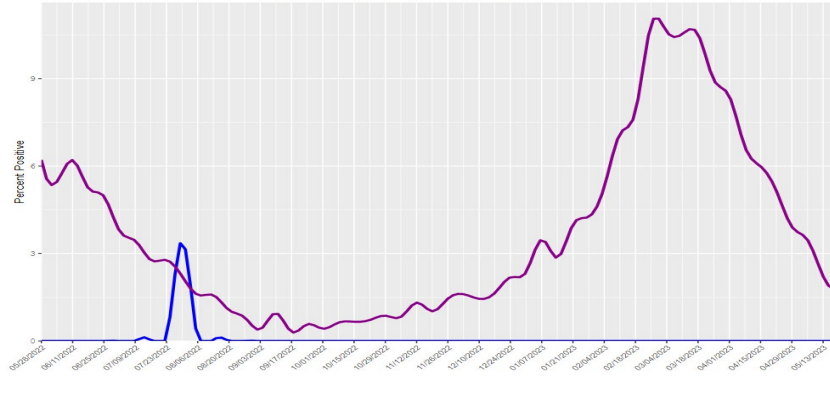
Midwestern United States Census Region

Human Metapneumovirus (hMPV) data for Census Region 3



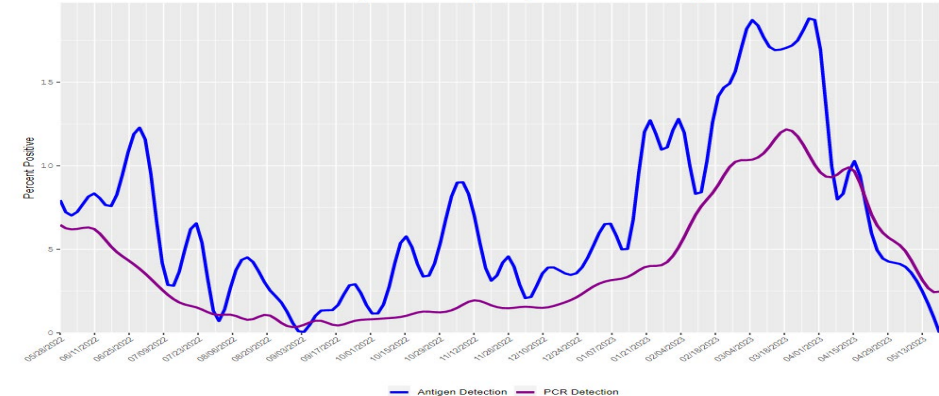
Southern United States Census Region

Human Metapneumovirus (hMPV) data for Census Region 1



Western United States Census Region

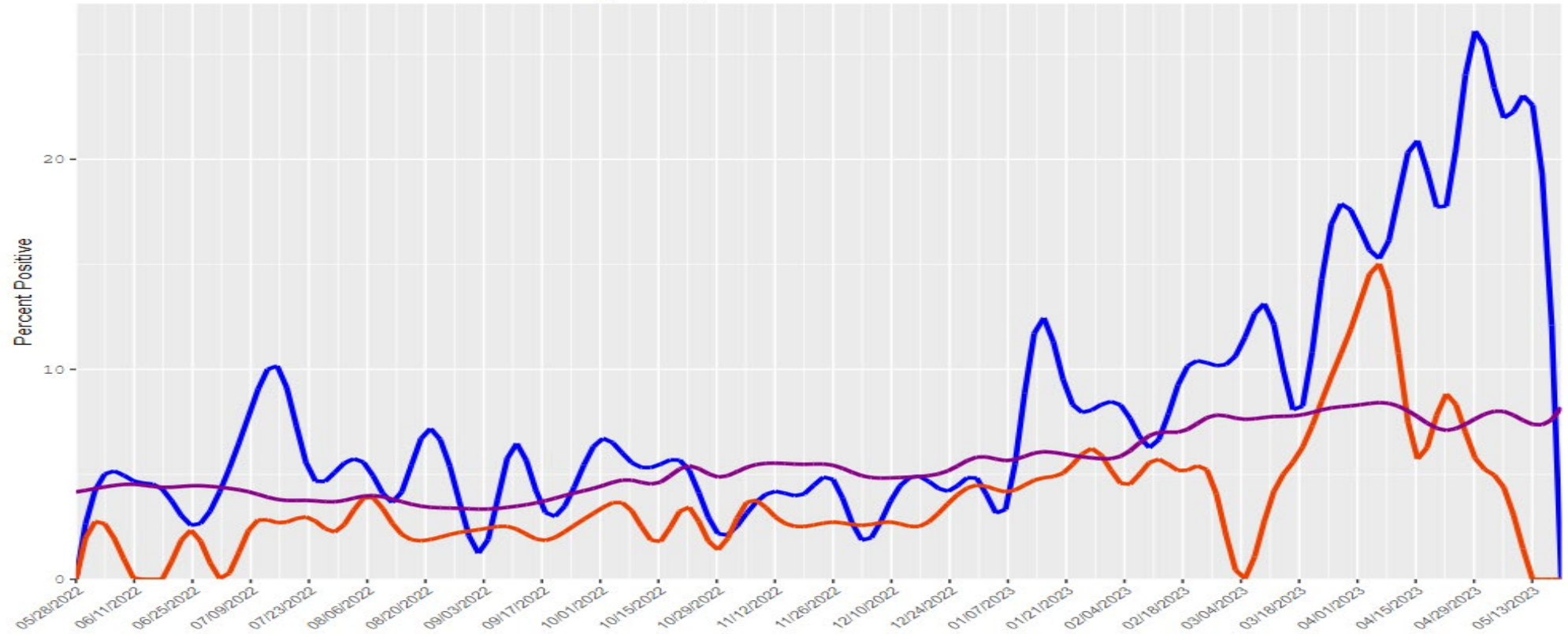
Human Metapneumovirus (hMPV) data for Census Region 4





# Adenovirus

Respiratory Adenovirus Data for the US





Мрор

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## Emergency Preparedness and Response

Resources for Emergency Health Professionals > Health Alert Network (HAN) > HAN Archive > 2023

### Health Alert Network (HAN)

HAN Jurisdictions

HAN Message Types

Sign Up for HAN Updates

HAN Archive

2023

HAN00490

HAN00489

HAN00488

## Potential Risk for New Mpox Cases

[Print](#)



Distributed via the CDC Health Alert Network  
May 15, 2023, 9:00 AM ET  
CDCHAN-00490

### Summary

In the United States, cases of mpox (formerly monkeypox) have declined since peaking in August 2022, but the outbreak is not over. The Centers for Disease Control and Prevention (CDC) continues to receive reports of cases that reflect ongoing community transmission in the United States and internationally. This week, CDC and local partners are investigating a



WATCH LIVE

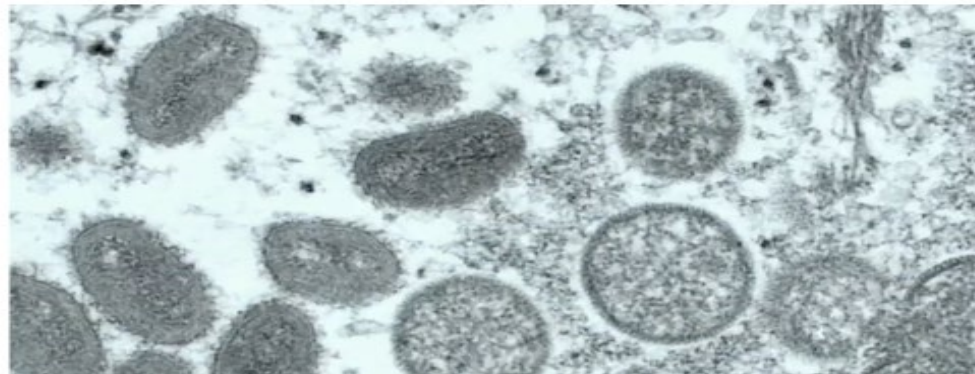
MPX

## Mpox, formerly Monkeypox, cases on rise in Chicago; vaccines recommended, health experts say



By Karen Jordan

Tuesday, May 9, 2023 4:56PM



## Rise of mpox cases in Chicago raises concern about possible summer spread

Diagnosed cases have been “increasing slightly” in eight countries the past three weeks, some in vaccinated people, the World Health Organization said.



### Bloomberg

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### Business

## Chicago Mpox Cases Spark Fears Of a Summer Resurgence

- Chicago has seen at least 14 new cases since mid-April
- More than half of cases are in vaccinated people, CDC says

By Madison Muller

May 10, 2023 at 6:11 PM PDT

Share this article



Gift this article

US health officials are investigating a cluster of new mpox cases in Chicago, more than half of which are in people who were previously vaccinated against the virus.



- As of 3/1/2023, the US has had 30,225 cases and 38 deaths (56,006 more cases worldwide)
- Most cases have been in gay, bisexual, & other men who have sex with men
- Mpox is **not** a sexually transmitted disease.
  - It spreads through close contact, so it does often spread during contact with sexual partners





# What are the symptoms of Mpox?

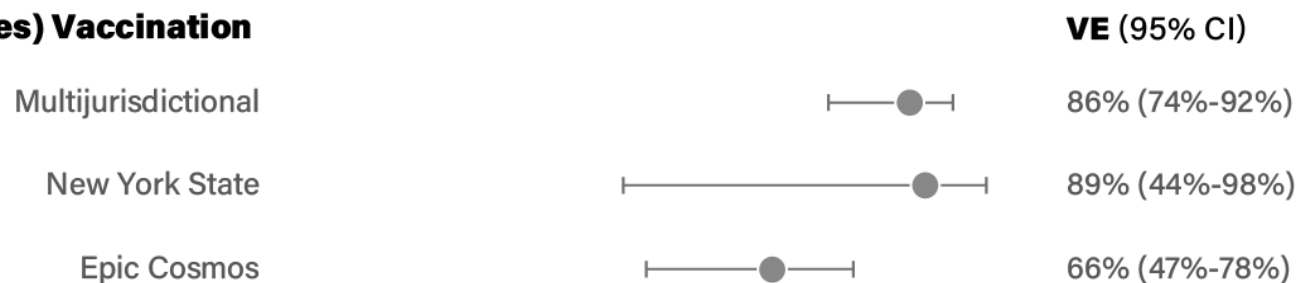
According to the CDC, this is how Mpox “presents”:

- Contact with an infected person occurs
- 3-17 day incubation period without any symptoms
- **Rash** starts on “hands, feet, chest, face, or mouth or near the genitals, including penis, testicles, labia, and vagina, and anus”
- Flu-like symptoms can occur: fever, chills, swollen lymph nodes, exhaustion, muscle aches, backache, headache, respiratory symptoms
- Some have flu-like symptoms before rash
- Some get a rash first then flu-like symptoms
- Some only get a rash

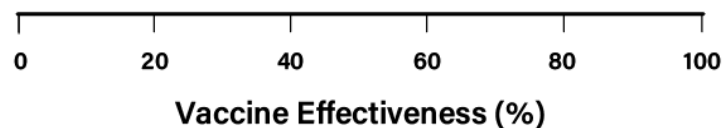
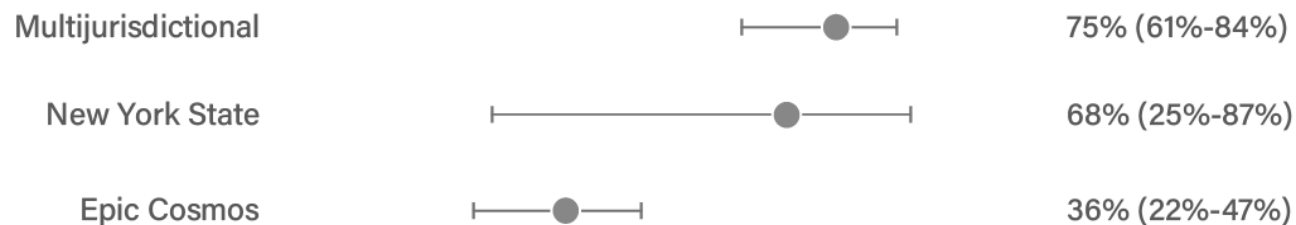


## Adjusted vaccine effectiveness (VE) of JYNNEOS vaccine against mpox by study and number of doses

### Full (2 Doses) Vaccination



### Partial (1 Dose) Vaccination



<https://www.cdc.gov/poxvirus/mpox/cases-data/JYNNEOS-vaccine-effectiveness.html>

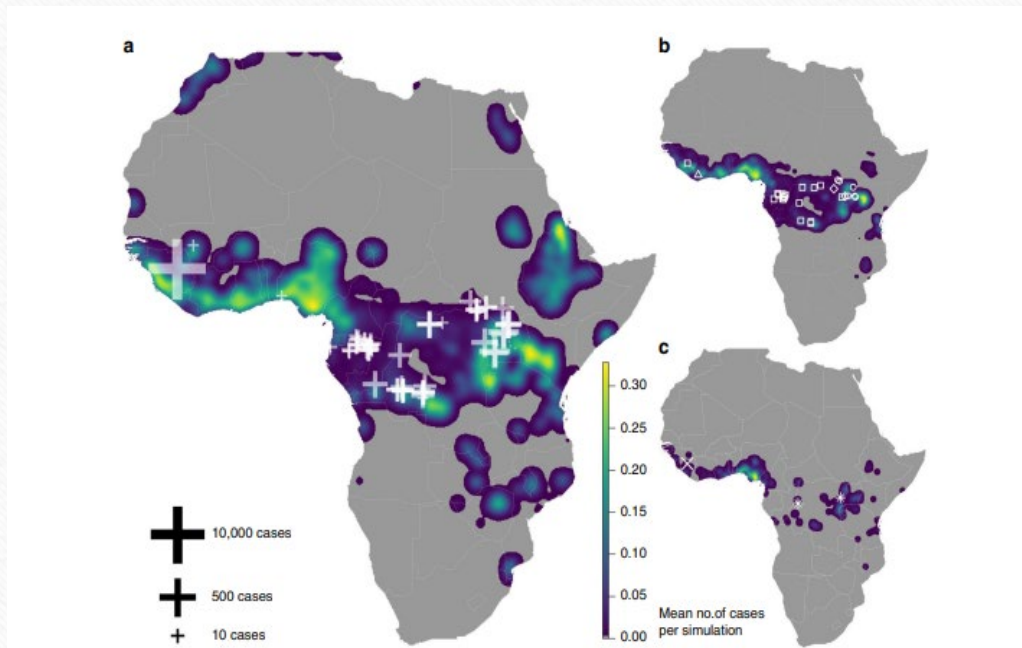
# Hemorrhagic Fever (Ebola / Marburg)

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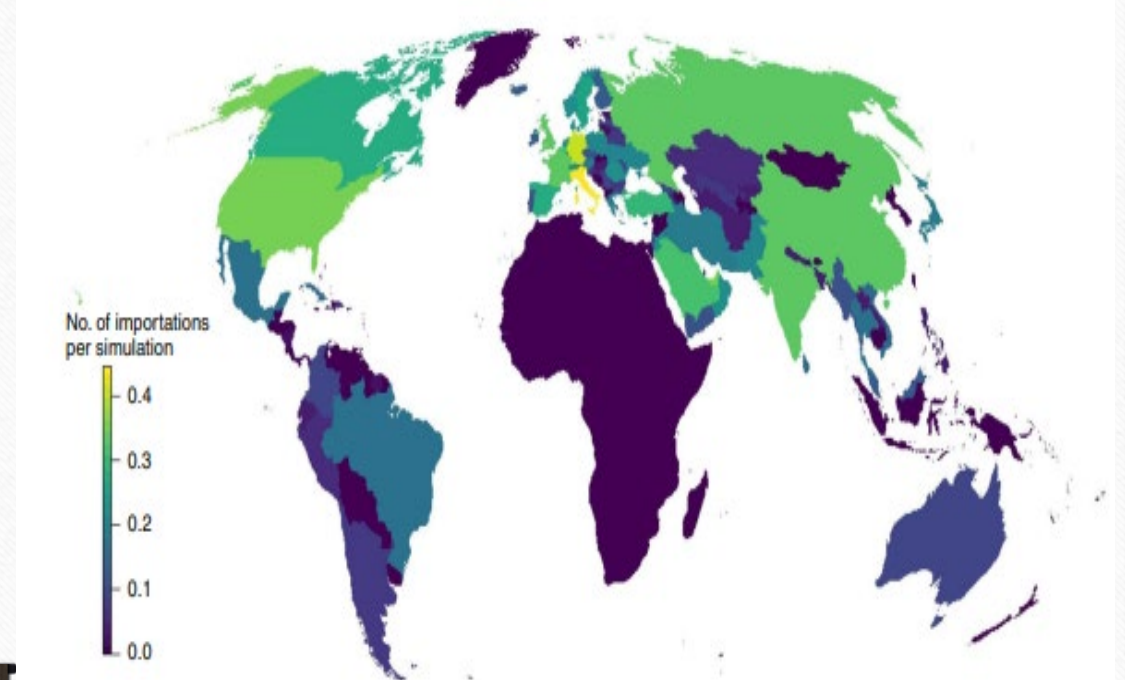
# Computer Simulations of Ebola Outbreaks

NATURE COMMUNICATIONS | (2019)10:4531

## Future Ebola Outbreak Locations



## Risk for Importation of Ebola







- Marburg virus disease - Equatorial Guinea and the United Republic of Tanzania
- In Equatorial Guinea, from 13 February to 1 May 2023:
  - 17 laboratory-confirmed MVD cases and 23 probable cases have been reported.
  - The last confirmed case was reported on 20 April.
  - Among the laboratory-confirmed cases, there are 12 deaths (Case Fatality Ratio (CFR) 75%).

# Influenza

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Why are scientists  
worried about bird flu?

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### Dangerous steps

For the H5N1 avian influenza virus to spark a human pandemic, its genome must acquire mutations that alter several of its proteins.

#### Hemagglutinin

Mutations can improve this protein's ability to bind to the species-specific carbohydrates on mammalian cells. Other mutations can stabilize it so the virus can be transmitted in aerosols.

#### Neuraminidase

#### Ion channel

#### Nucleoprotein

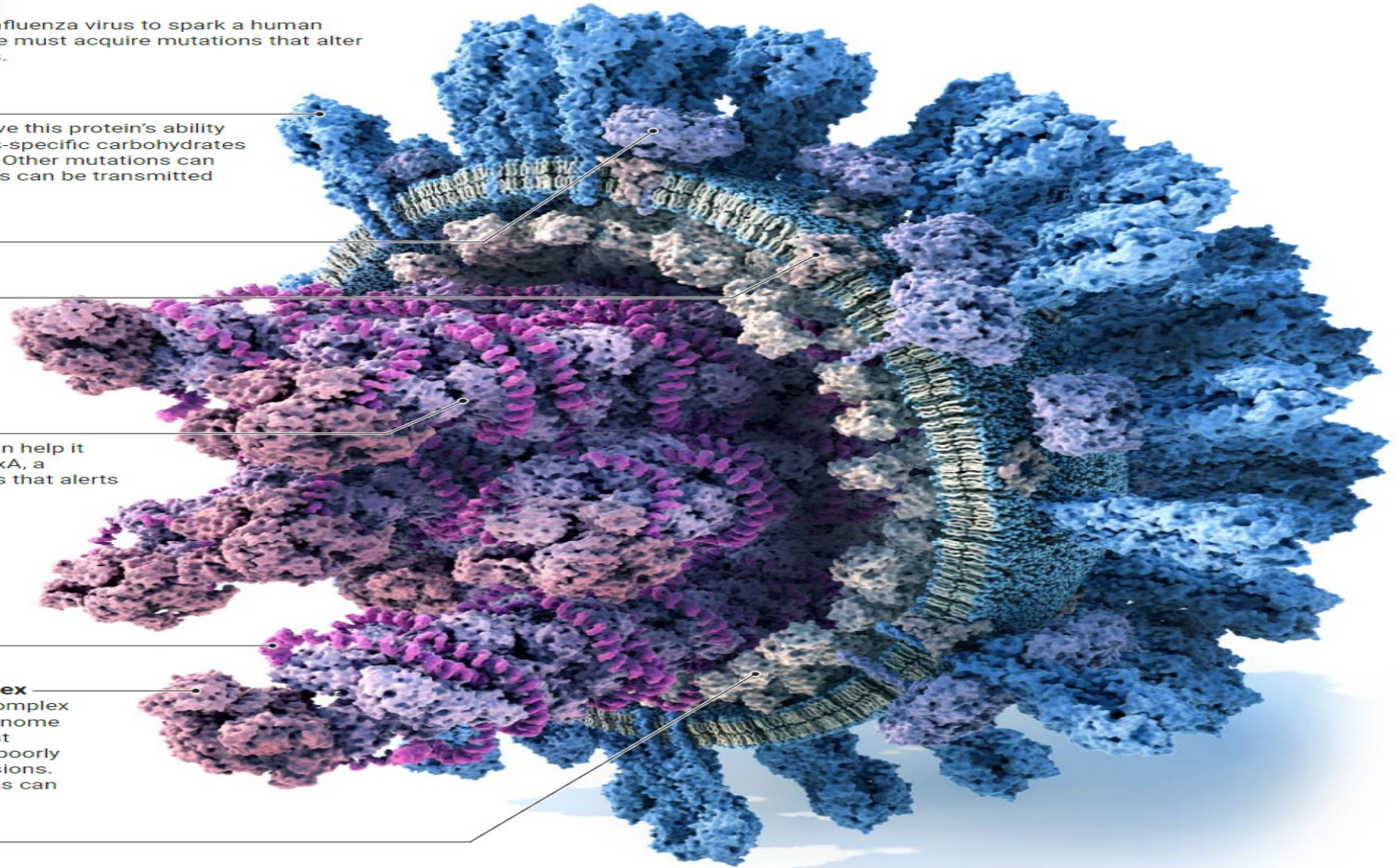
A change in shape can help it avoid detection by MxA, a sensor in human cells that alerts the immune system.

#### RNA

#### Polymerase complex

The enzyme in this complex replicates the viral genome with the help of a host protein, and it works poorly with mammalian versions. Polymerase mutations can improve the match.

#### Matrix protein







**Circumpolar Flyway**  
- Focal AMBI Areas

**Americas Flyway**  
- Focal AMBI Areas

**African-Eurasian Flyway**  
- Focal AMBI Areas

**East Asian Australasian Flyway**  
- Focal AMBI Areas

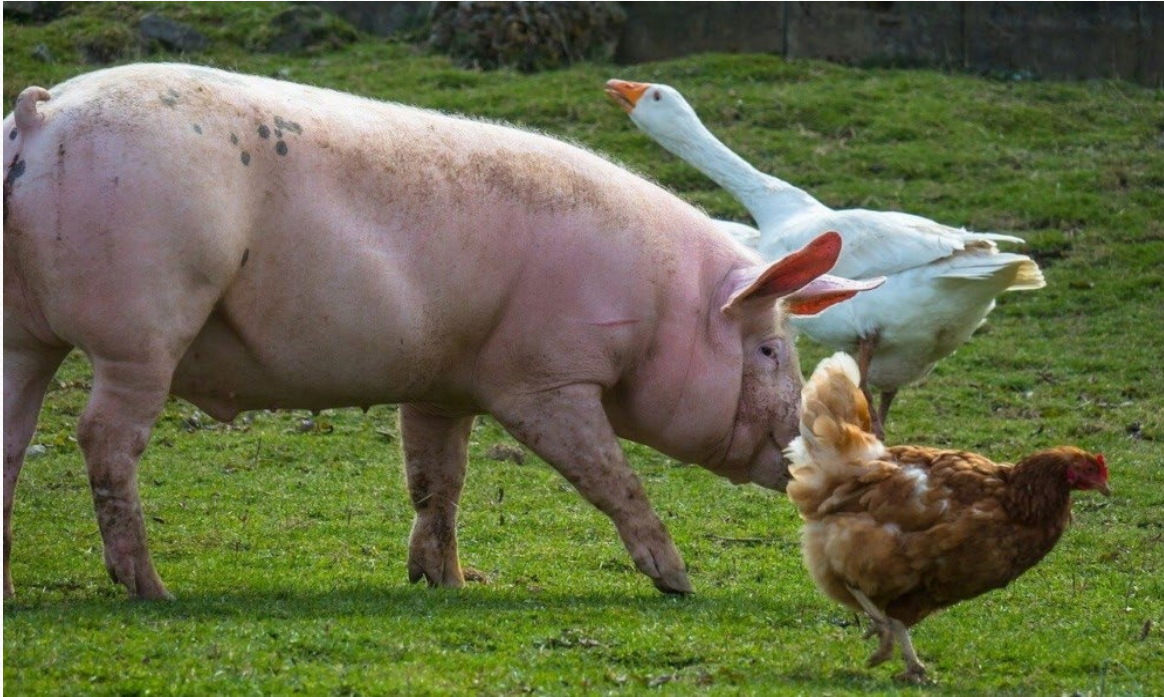
**Priority Conservation Issues**

Wildlife Harvest, Climate Change, Habitat Loss/Degradation

CAFF, ARCTIC COUNCIL



# How influenza Spreads and Mutates





**The End**

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