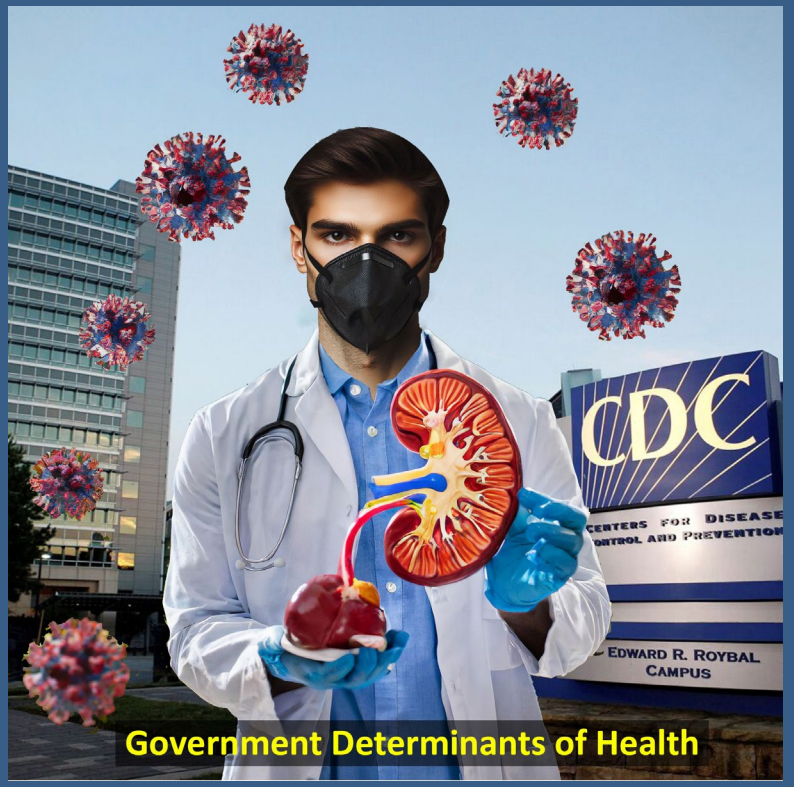
MITIGATING INFECTIOUS DISEASE RISKS DURING MEDICAL VISITS

Kevin T. Kavanagh, MD, MS
Health Watch USA℠
American Association of Kidney Patients - Sept. 26, 2024

Health Watch USA

TOPICS WE WILL COVER

- Risks of COVID-19
- Timing of Appointment
- Preparation For Visit
- Waiting Rooms
- Masking
- Ventilation
- Sanitizers & Wipes
- Vaccination



USA Health Watch

RISKS OF COVID-19

- SARS-CoV-2 is more lethal than the flu,
- It is much more infectious and
- 10 to 20% of the cases develop long COVID.
- COVID-19 affects every organ of the body.

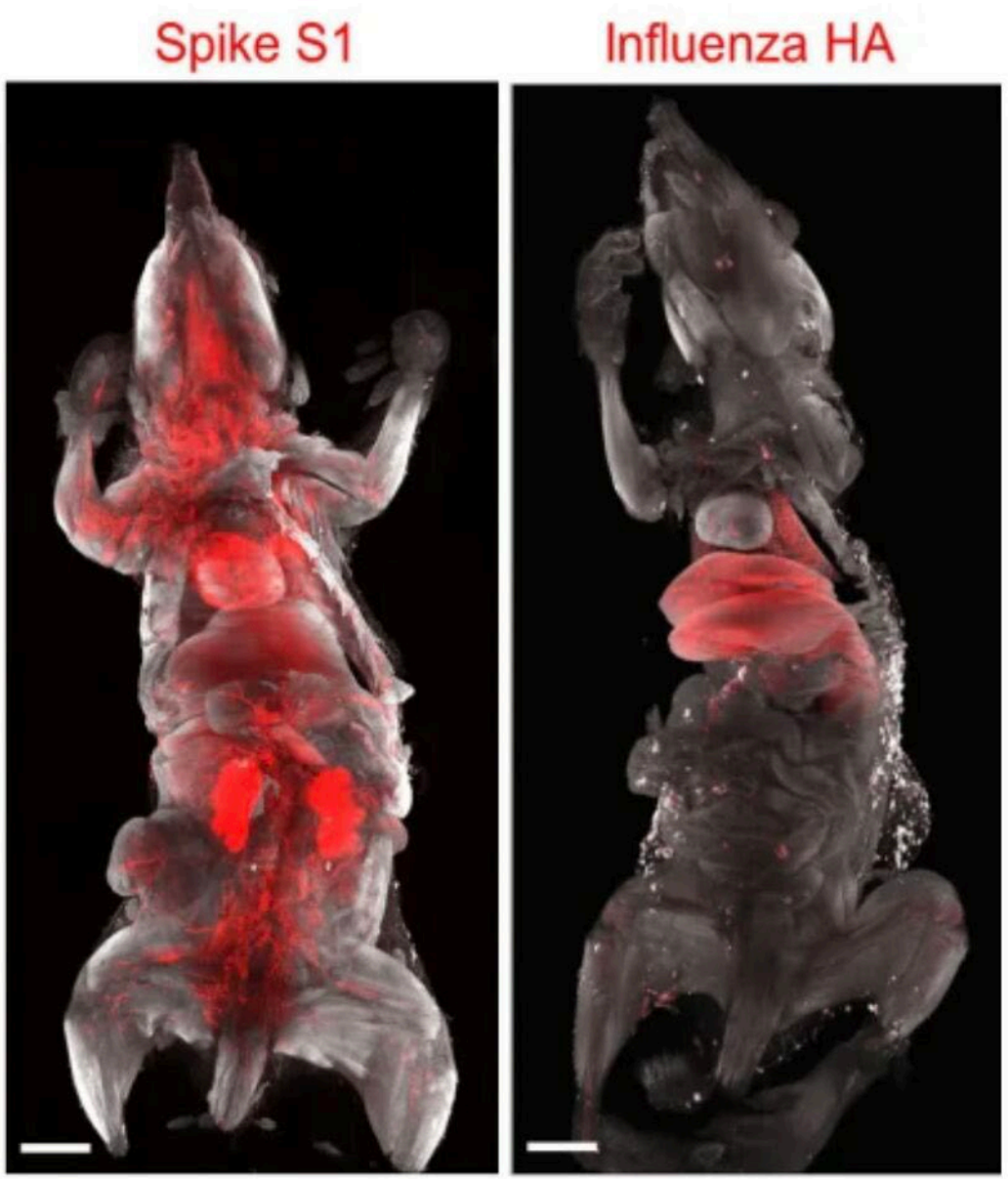


Figure 1: The left image shows that SARS-CoV-2 propagated to most organs, whereas the right image shows that influenza was mostly confined to the liver and lungs (Reproduced with permission from Figure 1A of Rong et al., 2023 [8]).

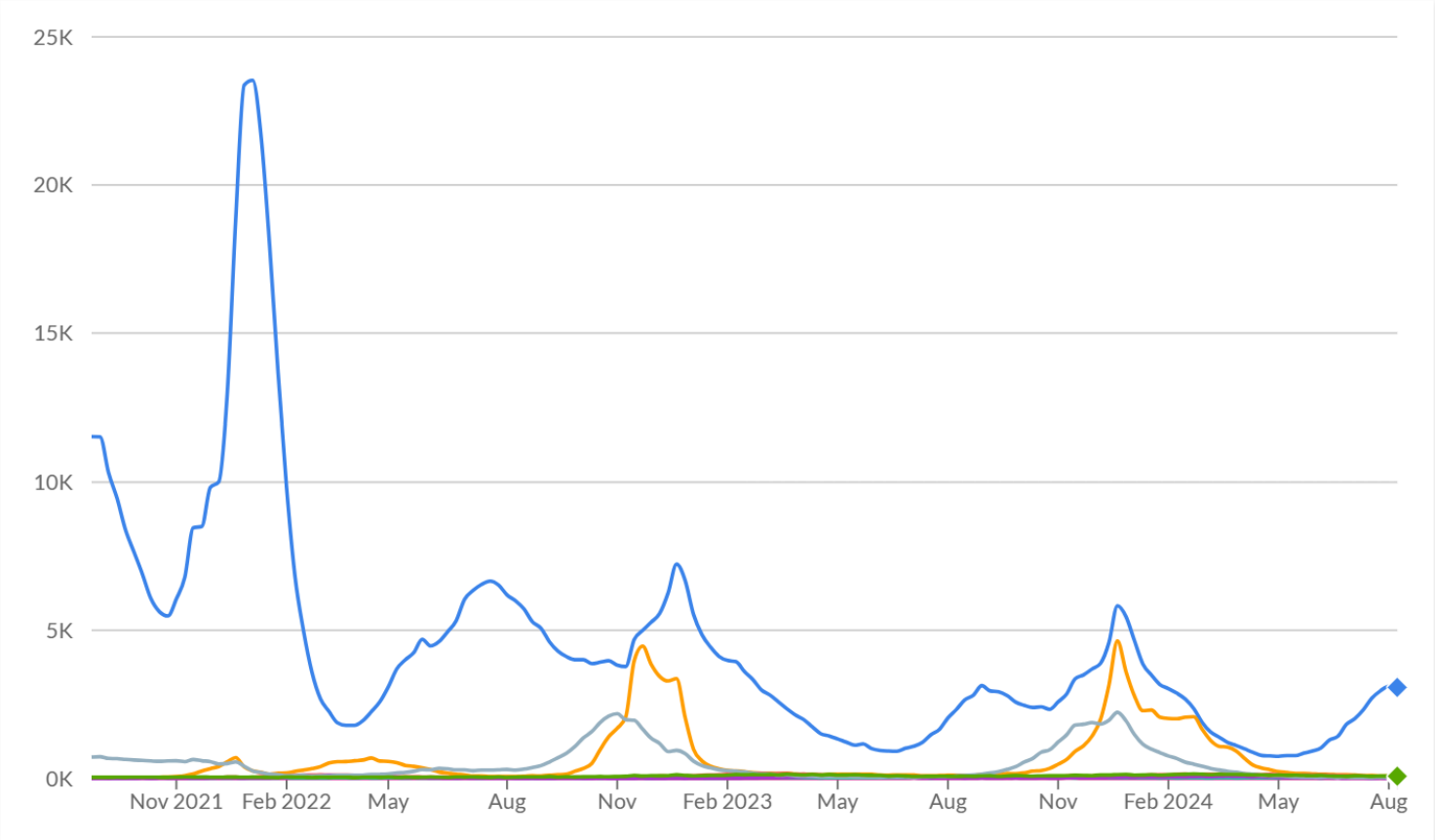
USA Health Watch

Communicable Disease Admissions

During Week Ending 8/17

3.07k COVID-19	3.06 Hand Foot and Mouth
80.8 Influenza	27.2 Mono
55.5 Norovirus	8.43 Rotavirus
28 RSV	75.1 Strep Throat

Weekly rates of admissions with a communicable disease diagnosis or positive lab per 100,000 encounters.



BEFORE YOUR APPOINTMENT

Sign on to the medical record portal.
Do all paperwork online before your appointment.
You do not want to be stuck in the waiting area filling out forms while wearing a surgical mask.

USA Health Watch

TIMING OF APPOINTMENT

Time of Day: First appointments in the morning are best.
-- Lower viral load in air,
-- Less time in waiting room and waiting for doctor in exam room.
-- In addition, there is time for the rooms to be cleaned and many of the residual virions should have died over the night.

Second best is first appointment in the Afternoon.
-- Less time in waiting room and waiting for doctor in exam room.

In a crowed waiting room, give the receptionist your cell phone number and ask if you can wait in the car and be called directly back to the exam room.

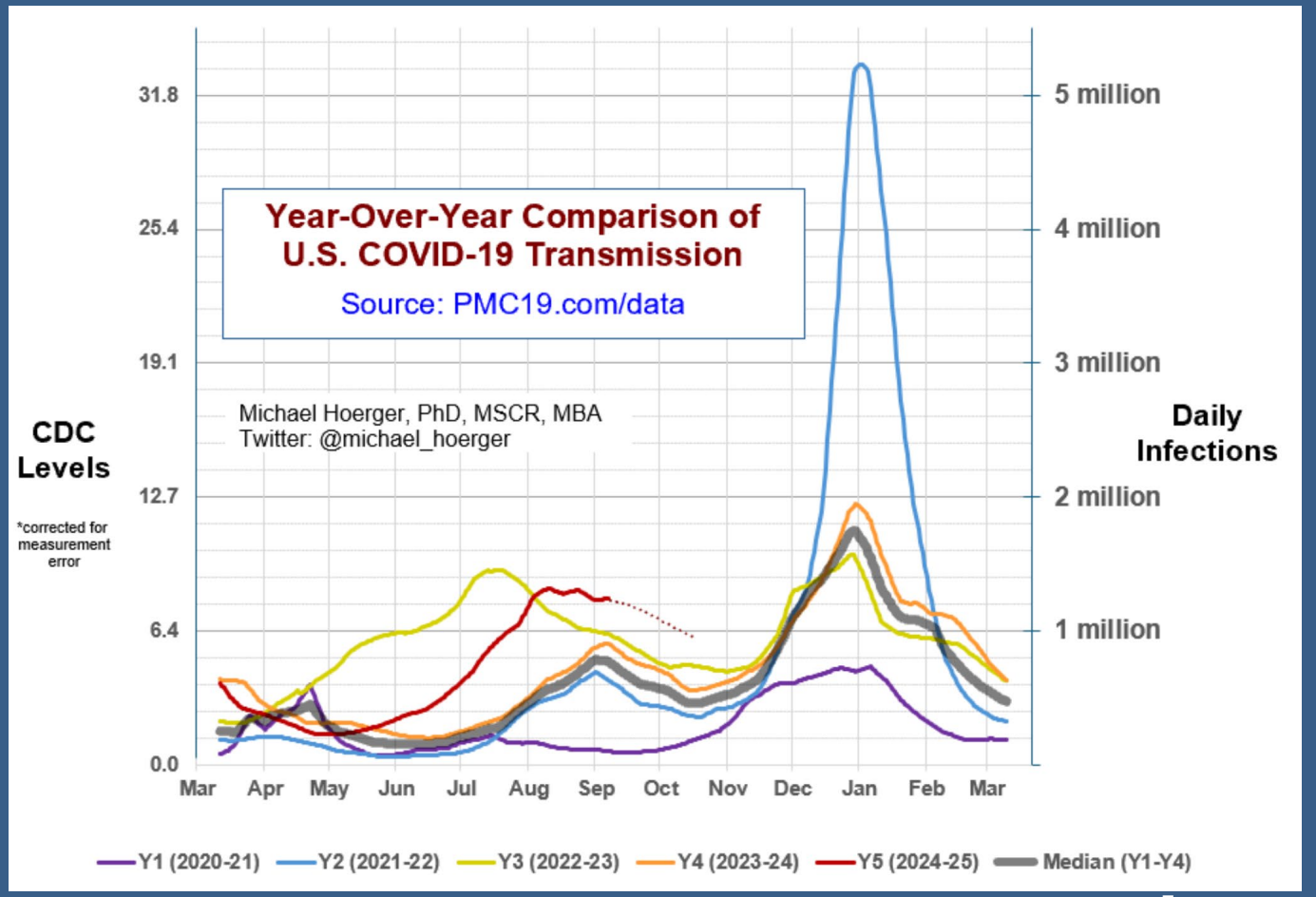
USA Health Watch

TIMING OF APPOINTMENT

For Semi-Elective Surgical Procedures (i.e. a routine colonoscopy), attempt to schedule in May or June, COVID rates are sometimes lower then.

Try to be the first case in the morning.

Data From Michael Hoerger, PhD, MSCR, MBA, the Pandemic Mitigation Collaborative: https://www.pmc19.com/



N95 MASKS WORK BEST TWO WAY MASKING

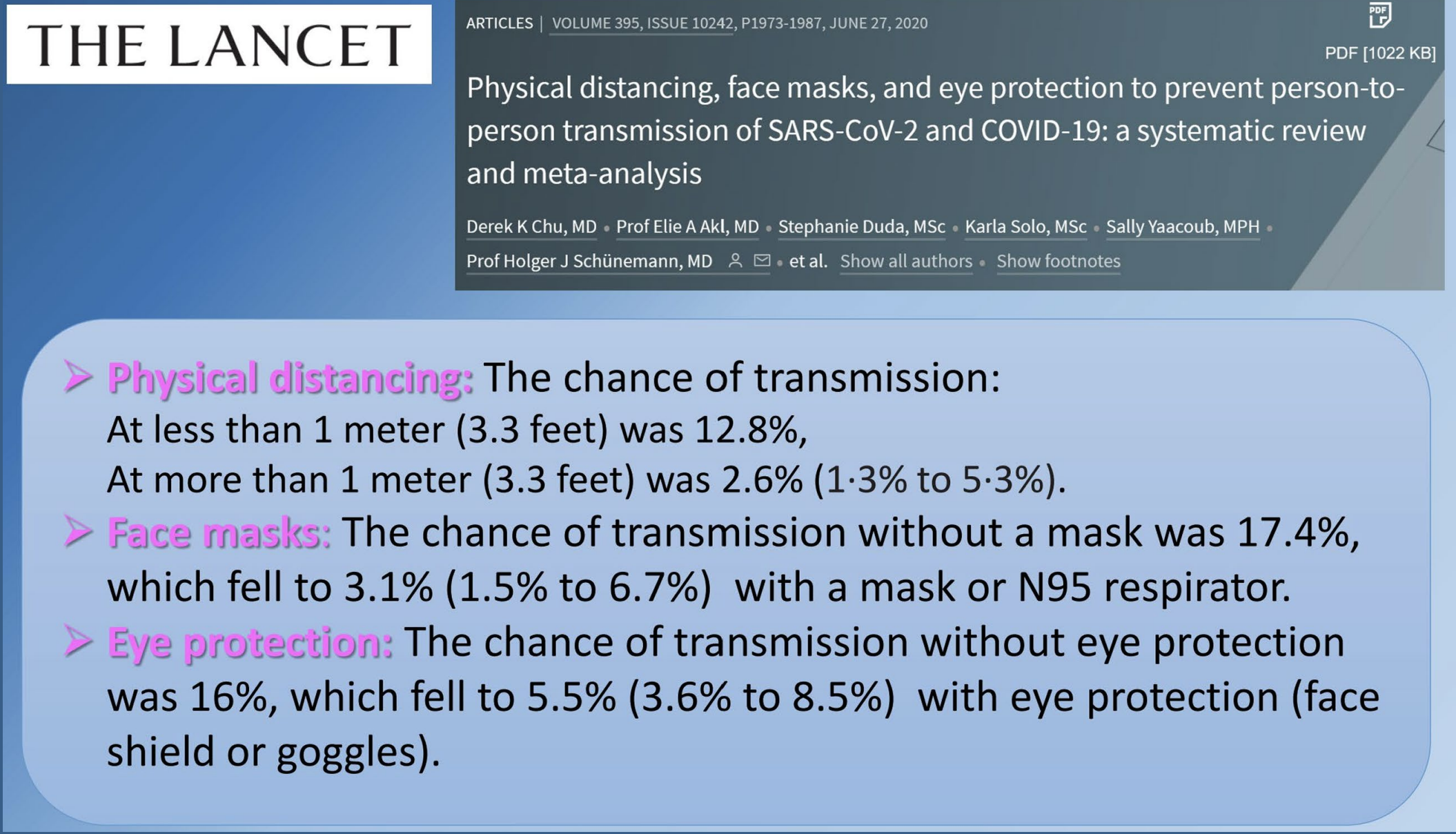
Time to infectious dose for an uninfected person (receiver)*

Source Is Wearing (% outward leakage)		Receiver Is Wearing (% inward leakage): Nothing	Typical cloth mask	Typical surgical mask	Non-fit-tested N95 FFR†	Fit-tested N95 FFR
		100%	75%	50%	20%	10%
Nothing	100%	15 min.	20 min.	30 min.	1.25 hours	2.5 hours
Typical cloth mask	75%	20 min.	26 min.	40 min.	1.7 hours	3.3 hours
Typical surgical mask	50%	30 min.	40 min.	1 hour	2.5 hours	5 hours
Non-fit-tested N95 FFR†	20%	1.25 hours	1.7 hours	2.5 hours	6.25 hours	12.5 hours
Fit-tested N95 FFR	10%	2.5 hours	3.3 hours	5 hours	12.5 hours	25 hours

†FFR = filtering facepiece respirator; N95 = not oil-proof, 95% efficient at NIOSH filter test conditions

Colton Foundation, the COVID Collaborative and The Rockefeller Foundation: Getting-to-and-Sustaining-the-Next-Normal-A-Roadmap-for-Living-with-Covid-Report-Final.pdf (rockefellerfoundation.org)

USA Health Watch



- **Physical distancing:** The chance of transmission:
  At less than 1 meter (3.3 feet) was 12.8%,
  At more than 1 meter (3.3 feet) was 2.6% (1·3% to 5·3%).
- **Face masks:** The chance of transmission without a mask was 17.4%, which fell to 3.1% (1.5% to 6.7%) with a mask or N95 respirator.
- **Eye protection:** The chance of transmission without eye protection was 16%, which fell to 5.5% (3.6% to 8.5%) with eye protection (face shield or goggles).

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31142-9/fulltext

MASKS WORK

DOSAGE AND DURATION OF USE IS IMPORTANT

Medical Settings: These studies often involve medical providers in healthcare facilities, where there is a high viral load in the environment and masks need to be used 8 hours a day for 30 to 60 days. Any lapse will result in an infection.

Community Settings: Where viral dosage is smaller and exposure intermittent, N95 masks offer better protection. – For example, the Bangladesh masking study from Stanford, Yale, & John Hopkins

Abaluck J, Kwong LH, Styczynski A, et al. Impact of community masking on COVID-19: A cluster-randomized trial in Bangladesh. Science. 2022 Jan 14;375(6577):eabi9069. doi: 10.1126/science.abi9069. Epub 2022 Jan 14. PMID: 34855513; PMCID: PMC9036942. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9036942/

USA Health Watch

N95 MASKS WORK
TWO WAY MASKING

USA Health Watch

International Journal of Environmental Research and Public Health

The Risk of Aircraft-Acquired SARS-CoV-2 Transmission during Commercial Flights: A Systematic Review

- Compared to short flights without masking, medium and long flights without masking were associated with 4.66-fold increase (95% CI: [1.01, 21.52]; $p < 0.0001$) and 25.93-fold increase in incidence rates (95% CI: [4.1, 164]; $p < 0.0001$), respectively;
- long flights with enforced masking had no transmission reported.
- A 1 hour increase in flight duration was associated with 1.53-fold (95% CI: [1.19, 1.66]; $p < 0.001$) increase in the incidence rate ratio (IRR) of cases.
- Masking should be considered for long flights.

Int. J. Environ. Res. Public Health **2024**, *21*(6), 654;
https://doi.org/10.3390/ijerph21060654

eBioMedicine
Part of THE LANCET Discovery Science

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

- A duckbill N95 reduced exhaled viral load by 98% (95% CI: 97%–99%),
- and significantly outperformed a KN95 ($p < 0.001$)
- as well as cloth and surgical masks.
- Cloth masks outperformed a surgical mask ($p = 0.027$) and the tested KN95 ($p = 0.014$).

https://europepmc.org/article/MED/38928901

USA Health Watch

N95 MASKS WORK
ONE WAY MASKING

USA Health Watch

Impact of community masking on COVID-19: A cluster-randomized trial in Bangladesh

Science

- Bangladesh masking study by Jason Abaluck and colleagues was actually a masking education study to encourage masking.
  This was a massive study with over 342 thousand participants. Both the control and experimental arms wore masks.
- There was only a 11.6 percentage difference in COVID-19 symptom reduction,
- but the masking compliance difference was also small, 28.8 percentage points, which made the positive results much more impactful.
- However, detractors often view this as a negative study despite the fact the subjects did not use N95 masks, and it had a design which made detection of mask effectiveness more difficult.
- If all subjects in one trial arm wore masks and in the other trial arm did not, the reduction in COVID-19 symptoms would be expected to be over 40%, and even higher if N95s were used.

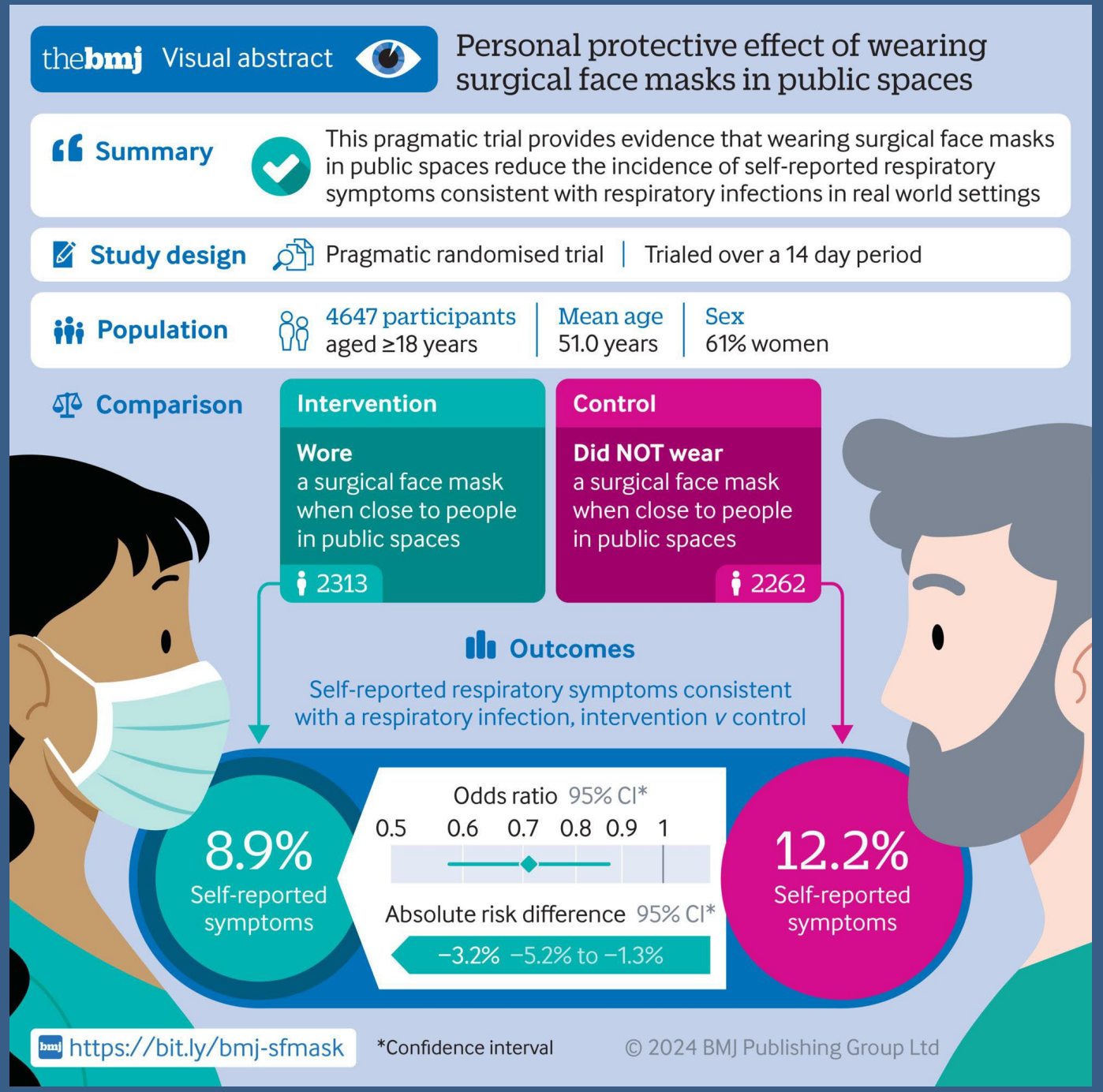
USA Health Watch

ONE WAY MASKING

New Trial -- One way masking provides a modest decrease in transmission.

Overall a 27% reduction in self reported symptoms.

https://www.bmj.com/content/386/bmj-2023-078918



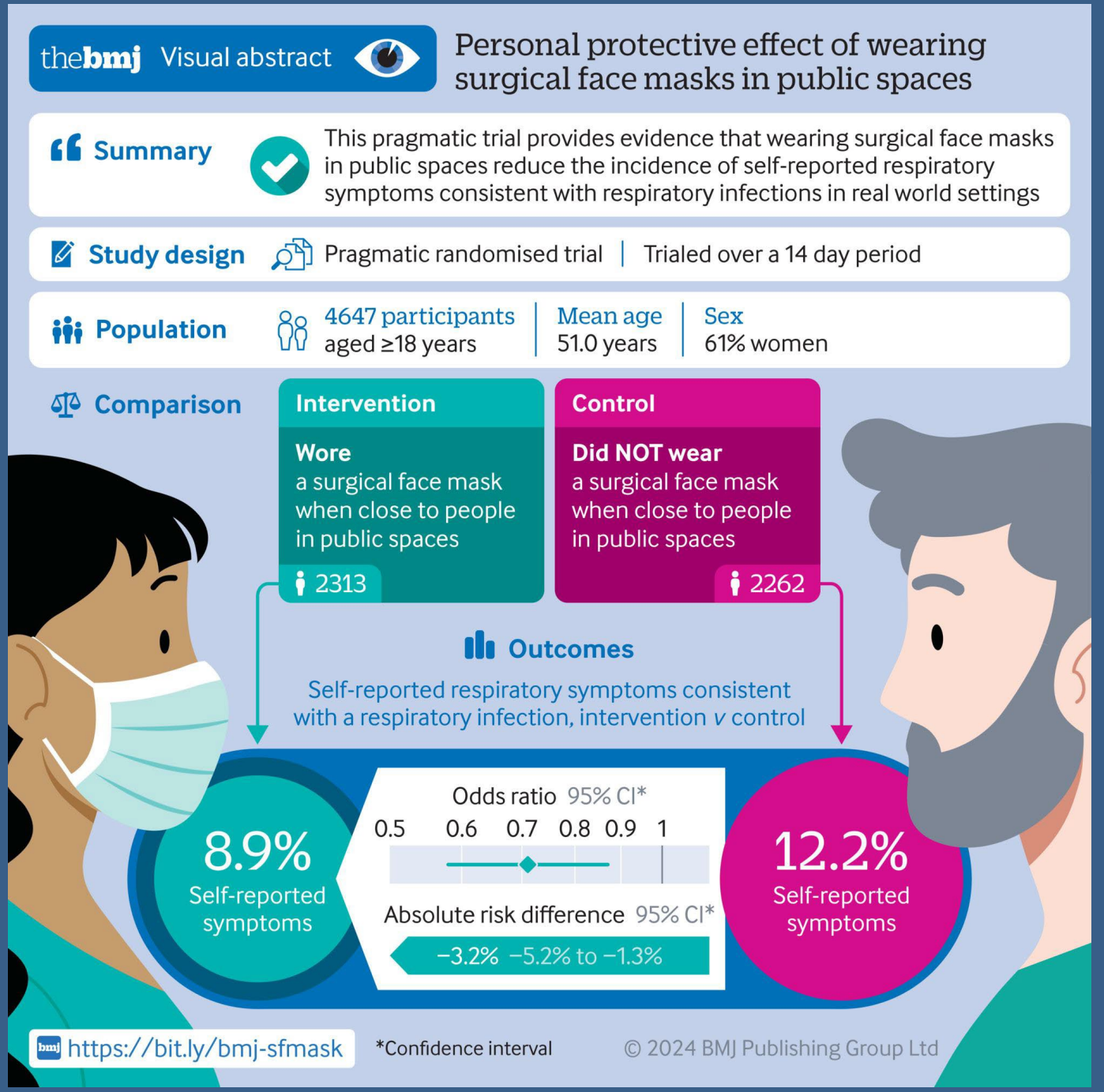
USA Health Watch

ONE WAY MASKING

A Possible confounder is that if one way masking is for example 50% effective and the group which masks become overly confident in their protection, they might frequent restaurants and bars more often.

If they did this twice as often it would eliminate the observed protective effect of masks.

https://www.bmj.com/content/386/bmj-2023-078918



USA Health Watch

RECOMMENDATION

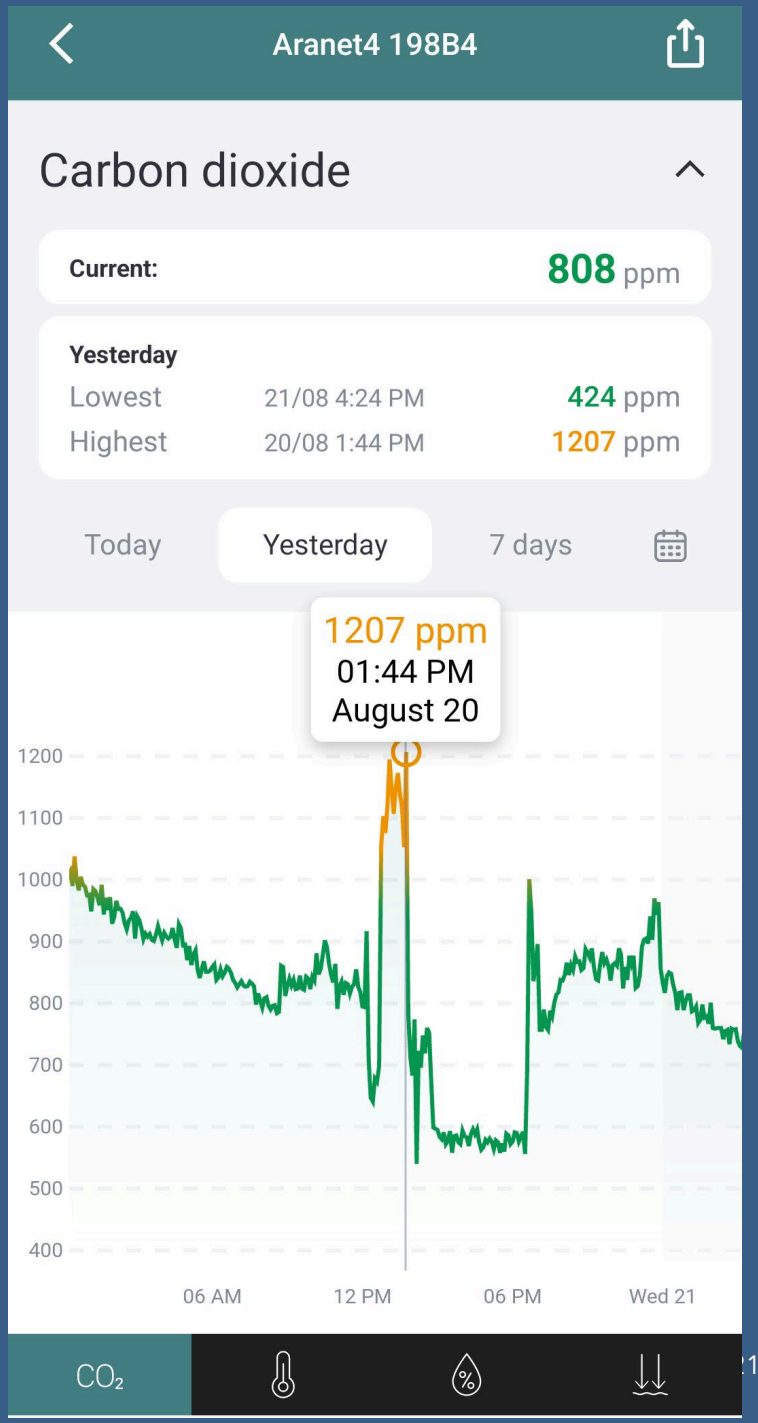
Call ahead and ask if the provider and staff will wear masks.

Wear an N95 Mask and bring several for the healthcare staff.

I order masks from https://uline.com

VENTILATION

PORTABLE CO2 MONITOR



USA Health Watch

CO2 IS A SURROGATE FOR VENTILATION AND SAFE AIR

- Outdoor Air – 425 ppm CO2 (up from 320 ppm in 1960)
  https://climate.nasa.gov/vital-signs/carbon-dioxide/
- High Quality Indoor Air – Less than 700 ppm.
- Prepandemic ASHRAE Standards - < 870 ppm.
- Cognitive performance (thinking) decreases
  15% at 945 ppm and 50% at 1400 ppm.
  https://ehp.niehs.nih.gov/doi/10.1289/ehp.1510037
- My Doctor's Office – 1200 ppm CO2

USA Health Watch

PORTABLE CO2 MONITOR

Crowded airport – Boston's Logan Airport had CO2 levels consistently below 600ppm.

Some HVAC systems have fluctuating ventilation depending upon occupancy and CO2 levels.

USA Health Watch

ASHRAE STANDARDS

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS

https://www.ashrae.org/about/news/2023/ashrae-approves-groundbreaking-standard-to-reduce-the-risk-of-disease-transmission-in-indoor-spaces

ASHRAE Standard 241, Control of Infectious Aerosols establishes minimum requirements to reduce the risk of disease transmission by exposure to infectious aerosols in new buildings, existing buildings, and major renovations. Infectious aerosols are tiny, exhaled particles that can carry disease-causing pathogens and are so small that they can remain in the air for long periods of time and be inhaled. Use of this standard would reduce exposure to SARS-COV-2 virus, which causes COVID-19, influenza viruses and other pathogens that cause major personal and economic damage every year. Standard 241 provides requirements for many aspects of air system design, installation, operation, and maintenance.

Centers for Disease Control and Prevention

EMERGING INFECTIOUS DISEASES®

Lu J, Gu J, Li K, et al. COVID-19 Outbreak Associated with Air Conditioning in Restaurant, Guangzhou, China, 2020. Emerging Infectious Diseases. 2020;26(7):1628-1631. doi:10.3201/eid2607.200764. https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article

Figure

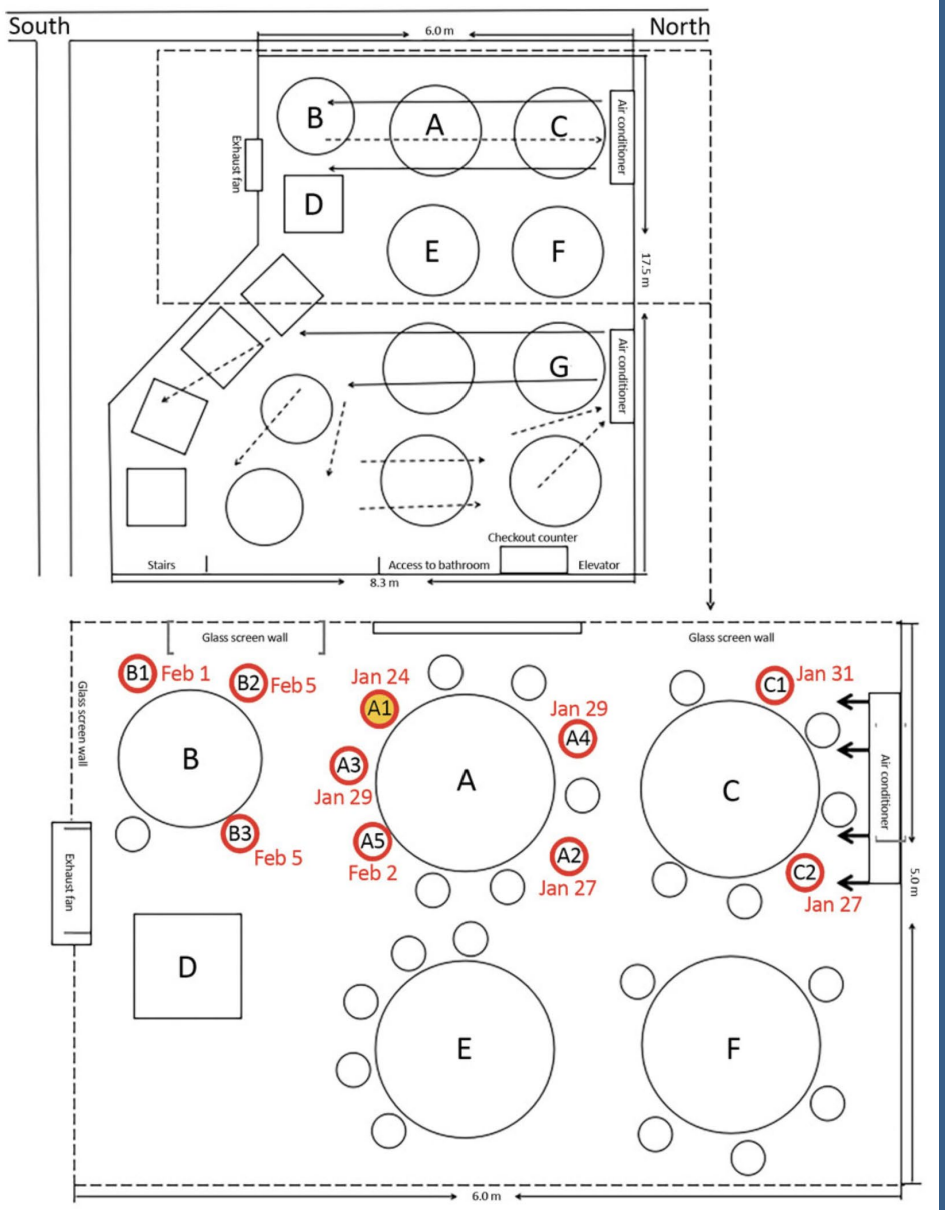


Figure. Sketch showing arrangement of restaurant tables and air conditioning airflow at site of outbreak of 2019 novel coronavirus disease, Guangzhou, China, 2020. Red circles indicate seating of future case-patients; yellow-filled red circle indicates index case-patient.

USA Health Watch

AJIC
American Journal of Infection Control
Published: April 05, 2024

Evidence from whole genome sequencing of aerosol transmission of SARS-CoV-2 almost 5 hours after hospital room turnover

- The half-life for survival of SARS-CoV-2 in aerosols is estimated at 1-3 hours.
- We studied hospital transmission of SARS-CoV-2 using whole genome sequencing.
- Airborne SARS-CoV-2 may transmit infection after more than 4 hours.

"Whole genome sequencing during an outbreak suggested in-room transmission of SARS-CoV-2 to two patients admitted nearly 2 and 5 hours, respectively, after discharge of an asymptomatic infected patient."

https://www.ajicjournal.org/article/S0196-6553(24)00162-7/abstract

USA Health Watch

HAND SANITIZER & WIPES

AIR CLEANERS – UV-C DISINFECTION

Continuously Sanitizing up to 99.9% of Pathogens.*

Fully automated, safe, and simple, Visium™ provides constant air and surface sanitization in your workplace.

USA Health Watch

VACCINATION

Smallpox Vaccination Mandate
George Washington & the Continental Army

1775: "Washington eventually made the bold decision to inoculate all American troops who had never been sickened with smallpox at a time when inoculation was a crude and often deadly process. His gamble paid off. The measure staved off smallpox long enough to win a years-long fight with the British. In the process, Washington pulled off the first massive, state-funded immunization campaign in American history."

The process was "Variolation" where a piece of pus laden material from an infected person was placed into a wound of the individual to be inoculated. The fatality rate was 5 to 10 percent. But far better than the 30% fatality of smallpox.

https://www.history.com/news/smallpox-george-washington-revolutionary-war

Smallpox Vaccination Mandate
George Washington & the Continental Army

There are two important overarching lessons.

1. First, vaccine mandates in certain circumstances can be necessary and they are not “anti-American”.
2. Second, a vaccine is not free of complications, but, you are less likely to develop these complications with the vaccine than with an infection.

The premise behind vaccination is to give an experience to the body of a mild infection, which avoids most of the complications but imparts immunity. Often boosters are needed.

Our World in Data | Browse by topic | Latest | Resources | About | Search for a topic, cha

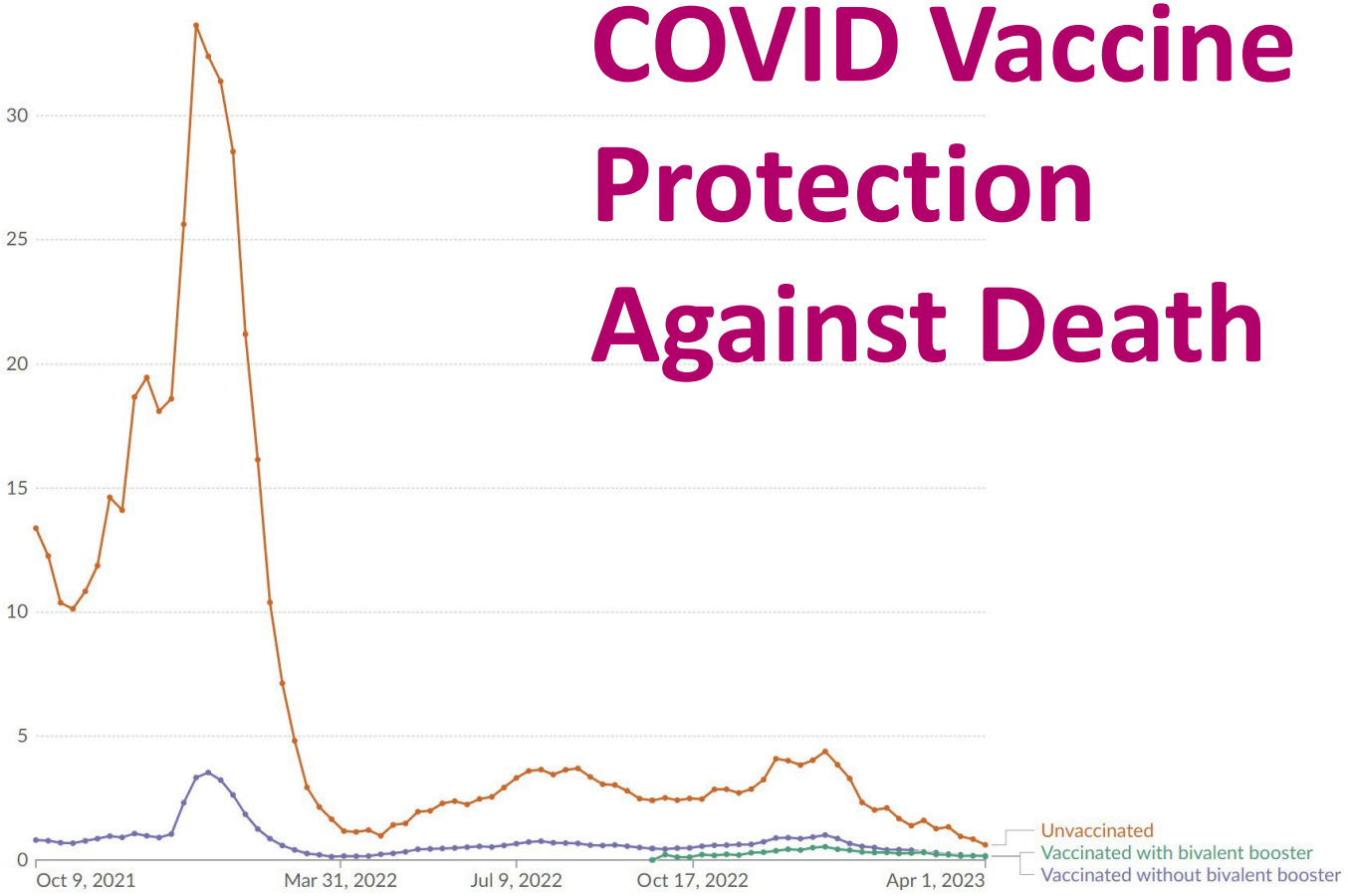
United States: COVID-19 weekly death rate by vaccination status, All ages

Death rates are calculated as the number of deaths in each group, divided by the total number of people in this group. This is given per 100,000 people.

Our World in Data

Table | Chart | Settings

COVID Vaccine Protection Against Death



Data source: Centers for Disease Control and Prevention, Vaccine Breakthrough/Surveillance and Analytics Team – Learn more about this data

Note: The mortality rate for the 'All ages' group is age-standardized to account for the different vaccination rates of older and younger people.

OurWorldInData.org/coronavirus | CC BY

USA Health Watch

Protection Against Long COVID

- A recent systematic review and meta-analysis by Alexandre Marra and colleagues deduced that for individuals who received 3 vaccine doses, there was a 69% efficacy against long COVID.
https://pubmed.ncbi.nlm.nih.gov/38028898/

- Lundberg-Morris and colleagues has reported a dose response relationship related to the number of vaccine doses received and the chances of not developing long COVID. There was a 21% reduction with receiving one vaccine dose, a 59% reduction receiving two doses and a 73% reduction after three doses.
https://pubmed.ncbi.nlm.nih.gov/37993131/

USA Health Watch

SARS-CoV-2 Immunizations

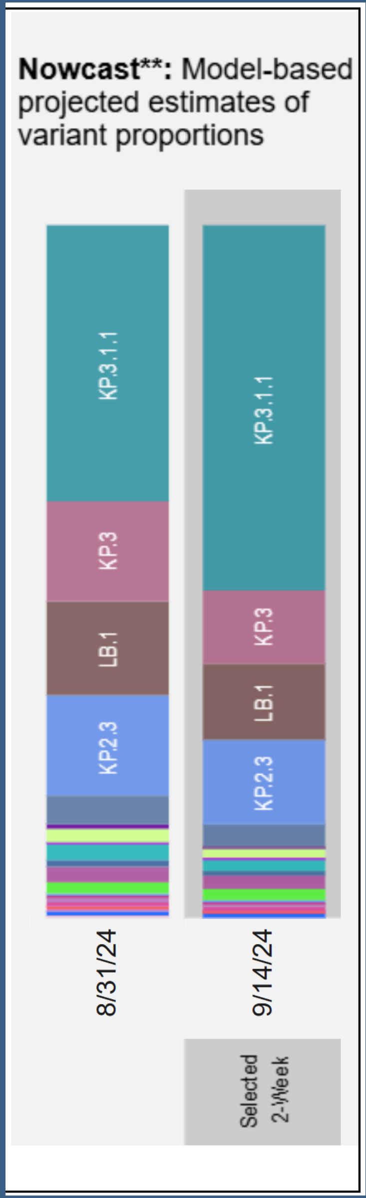
- Best to be immunized before transplantation. "maintain superior humoral response"
  https://pubmed.ncbi.nlm.nih.gov/34506644/
- Post-Transplant Vaccine effectiveness can be reduced and it is best to obtain antibody levels post vaccination. *"Third-dose vaccination increased the seroconversion rate from 57.3% to 71.8%. However, despite a marked rise of the antibody concentrations after the booster, 55.4% and 11.6% only formed neutralizing antibodies against the SARS-CoV-2 wild type and Omicron, respectively."*
  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9575732/
  https://pubmed.ncbi.nlm.nih.gov/34051026/
- Live attenuated vaccines may be dangerous in severely immunosuppressed or immunocompromised individuals.
  https://pubmed.ncbi.nlm.nih.gov/26291740/

USA Health Watch

Passive Immunity - - PEMGARDA

FDA EUA – March 2024:
https://www.fda.gov/media/177067/download

- who are not currently infected with SARS-CoV-2 and who have not had a known recent exposure to an individual infected with SARS-CoV-2 **and**:
- who have moderate-to-severe immune compromise due to a medical condition or receipt of immunosuppressive medications or treatments **and** are unlikely to mount an adequate immune response to COVID-19 vaccination.



➢ Pemgarda is a monoclonal antibody.

➢ Pemivibart (Pemgarda) neutralized both JN.1 and KP.2 in vitro with comparable activity, whereas its potency was decreased slightly against LB.1, KP.2.3, and KP.3 but substantially against KP.3.1.1.

➢ Critically, the 50% inhibitory concentration of pemivibart against KP.3.1.1 was ~6 µg/mL, or ~32.7 fold higher than that of JN.1.

Health Watch USA

Thank You

Notice

CDC offers separate, specific guidance for healthcare settings (COVID-19, flu, and general infection prevention and control). Federal civil rights laws may require reasonable modifications or reasonable accommodations in various circumstances. Nothing in this guidance is intended to detract from or supersede those laws.

Taking Steps for Cleaner Air for Respiratory Virus Prevention
https://www.cdc.gov/respiratory-viruses/prevention/air-quality.html

USA Health Watch