

# Managing uncertainty: valuable lessons on post-acute infection

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BY KASHIF PIRZADA

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EMERGENCY PHYSICIAN

## **Masks4Canada**

Worked to promote pandemic precautions to reduce the burden of death and morbidity from the Covid-19 pandemic

## **Critical Drugs Coalition**

Worked to bring attention to critical drug shortages, and improve Canada's supply chain with respect to medications and vaccines.



@kashprime

# Phases of Covid Infection



## **Phase 1**

Early viral symptoms

## **Phase 2**

Inflammatory phase

## **Phase 3**

Hypercoagulable phase

## **Phase 4**

Multi-System Inflammatory Phase

## **Phase 5**

Post-Acute Sequelae phase (Long Covid)

# What is Long Covid?



## **Hard to Define**

Long Covid isn't fully understood, and there's no internationally-agreed definition - so estimates of how common it is, or what the main symptoms are, vary. Most describe it as disabling symptoms that persist after 6-12 weeks post infection

## **It is definitely real**

A set of common symptoms are appearing in many patients and are beginning to be recognized, including severe fatigue, trouble breathing, concentration and memory issues, cardiovascular issues

## **Vaccines reduce but do not eliminate the risk**

In one study of double vaccinated patients, 10% developed long-term symptoms

# Identification of Distinct Long COVID Clinical Phenotypes Through Cluster Analysis of Self-Reported Symptoms

Grace Kenny ✉, Kathleen McCann, Conor O'Brien, Stefano Savinelli, Willard Tinago, Obada Yousif, John S Lambert, Cathal O'Broin, Eoin R Feeney, Eoghan De Barra ... [Show more](#)

*Open Forum Infectious Diseases*, Volume 9, Issue 4, April 2022, ofac060, <https://doi.org/10.1093/ofid/ofac060>

**Published:** 07 March 2022 **Article history** ▼

## Cluster 1

Pain symptoms - joint pain, muscle aches, headaches, fatigue, poor concentration

## Cluster 2

Cardiovascular symptoms - chest pain, shortness of breath, palpitations along with fatigue, poor concentration

## Cluster 3

Combinations of 1 and 2 but milder course, fewer symptoms

<https://academic.oup.com/ofid/article/9/4/ofac060/6543845>



# WHAT IS THE CAUSE OF LONG COVID?

## Auto-Antibodies

The immune system attacks itself

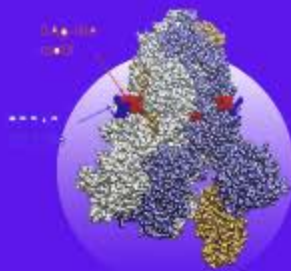
Your own immune system is induced by SARS2 to attack your own proteins, producing inflammation and damage



## Viral Reservoirs

The virus never leaves

Active virus can remain in some body tissues, which continues to drive inflammation and damage



## Immune System Over-activation

T-cells become a problem

SARS2 over-activates T-cells, and may even infect and stay persistent in various white blood cells.



# How common is Long Covid?

medRxiv

THE PREPRINT SERVER FOR HEALTH SCIENCES



BMJ Yale

## Risk of Long Covid in people infected with SARS-CoV-2 after two doses of a COVID-19 vaccine: community-based, matched cohort study

Daniel Ayoubkhani, Matthew L. Bosworth, Sasha King, Koen B. Pouwels, Myer Glickman, Vahé Nafilyan, Francesco Zaccardi, Kamlesh Khunti, Nisreen A. Alwan, A. Sarah Walker

doi: <https://doi.org/10.1101/2022.02.23.22271388>

**This article is a preprint and has not been peer-reviewed [what does this mean?]. It reports new medical research that has yet to be evaluated and so should not be used to guide clinical practice.**

**Results** The study sample comprised 3,090 double-vaccinated participants (mean age 49 years, 54% female, 92% white, median follow-up from infection 96 days) and matched control participants. Long Covid symptoms were reported by 294 double-vaccinated participants (prevalence 9.5%) compared with 452 unvaccinated participants (14.6%), corresponding to an aOR for Long Covid symptoms of 0.59 (95% CI: 0.50 to 0.69). There was no evidence of heterogeneity by adenovirus vector versus messenger ribonucleic acid vaccines ( $p=0.25$ ).

Studies on 3rd doses pending

**Tim Kaine** 46:54

And so that's why I've started to do it. And I'll tell you Andy the response of people, the first time I did it at a hearing couple months back with Fauci, Dr. Fauci, and Walensky, got a lot of outreach, introduced this bill, so a lot of people reaching out to me, including look, including colleagues here on the hill, who are having the same experience, but X don't want to talk about it yet. And there's that, hey, thanks for putting that bill in. Because this is real. And look, when COVID is completely in



# For covid long-haulers, a grueling fight for benefits

Patients with a puzzling syndrome that's hard to measure face denials by both insurers and government

BY CHRISTOPHER ROWLAND

Deepa Singh, 30, of Louisville, has been seriously ill for two years, racked with extreme fatigue, racing heartbeat and memory problems from long covid that she says prevent her from working. Adding to her distress, she says, has been a grueling — and so far unsuccessful — battle for disability payments.

Singh, who worked as a project manager for a Fortune 100 company, is among a cohort of long covid patients who have been denied disability benefits, either by private insurance companies, which operate benefit plans offered by employers, or by the Social Security Administration, which manages government disability benefits.

Tasked with sorting legitimate health claims from fraudulent or



JEFF SWENSEN FOR THE WASHINGTON POST

**Laurie Bedell, 42, of Pennsylvania, was recently denied disability. "I spend 95 percent of my time in this room ... exhausted," she said.**

**Isolated:** In Hong Kong, elders are facing a mental health crisis. **A9**

**Covid czar:** Biden names public health expert to key position. **A18**

marginal ones, these gatekeepers now face a novel challenge as the coronavirus pandemic drags on: a flood of claims citing a post-infection syndrome that is poorly understood by the medical community and difficult to measure.

Patients cite a long list of symptoms that defy verification through basic medical tests. They become exhausted at the merest exertion. They can't remember simple words. Their hearts feel like they are fluttering. Yet neurological exams, EKGs and chest X-rays come back clean.

Doctors said in interviews that they are treating long covid patients who are clearly too sick to work but have difficulty meeting the evidence threshold insurers demand: objective medical tests results showing an inability to

SEE VIRUS ON A17

## Long Covid Holds a Mirror Up to Medicine

By Algal A. Dames

LONG covid symptoms, such as fatigue, shortness of breath, cognitive difficulties, muscle pain, loss of taste and smell, and hair loss, can be debilitating and frustrating. There is uncertainty about when the mysterious long covid will finally be resolved.

In conventional medicine, doctors witness definitive markers of disease and often describe it as "objectively measurable." As a medical anthropologist who has studied the contemporary world, I've treated Lyme disease, for instance, and I've been struck by the similarities between long Covid and other so-called illnesses like chronic Lyme disease and myalgic encephalomyelitis, also frequently known as chronic fatigue syndrome.

Patients with long covid often describe their symptoms as "objectively measurable." As a medical anthropologist who has studied the contemporary world, I've treated Lyme disease, for instance, and I've been struck by the similarities between long Covid and other so-called illnesses like chronic Lyme disease and myalgic encephalomyelitis, also frequently known as chronic fatigue syndrome.

Long Covid has a bigger significance than what most doctors know. Long Covid has become a national test case for health care in the United States. It has brought attention to the limits of conventional medicine, and it has shown that the system is not always as objective as we think it is.

At the heart of conventional medicine is a foundational distinction between symptoms and signs. Symptoms like fatigue and joint pain are subjective markers of disease, while signs like fever and swollen lymph nodes are objective markers. Unlike symptoms, signs can be observed and measured by a physician, often with the aid of technologies such as blood tests and imaging.

When it comes to making a diagnosis, signs are the key. In the United States and Europe, when physicians find a patient with a fever, they often order a blood test to see if the patient has an infection. The French philosopher Michel Foucault observed that during the 19th century, medicine was based on a practice in which the physician asked, "What is the matter with you?" in a practice in which the physician asked, "What is the matter with you?"

The diagnostic imperative of signs over symptoms has become central to the way we think about medicine. It is the way we think about medicine.



Through patients' struggles with long covid, we can see the limits of conventional medicine. It has shown that the system is not always as objective as we think it is.

Confronted illnesses reveal the limits of conventional health care.

As the main way that conventional medicine diagnoses and treats disease, signs are the key. In the United States and Europe, when physicians find a patient with a fever, they often order a blood test to see if the patient has an infection.

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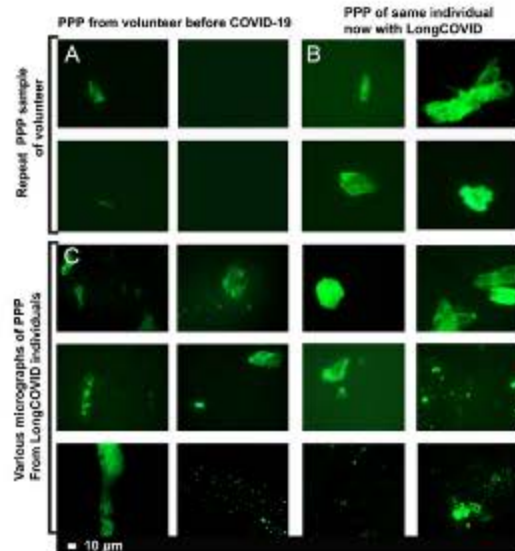
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Table 10

Average yearly medical costs for diagnosed vs. reference population.

<b>Year</b>	<b>General population</b>	<b>ME</b>	<b>Lupus</b>	<b>MS</b>
2016	\$ 8,500	\$ 30,600	\$ 22,600	\$ 23,220
2015	\$ 7,800	\$ 32,400	\$ 21,100	\$ 22,090
2014	\$ 7,500	\$ 31,300	\$ 20,100	\$ 21,050
2013	\$ 7,700	\$ 34,300	\$ 20,100	\$ 22,780
2012	\$ 7,300	\$ 25,700	\$ 16,900	\$ 19,160
Average	\$ 7,760	\$ 30,860	\$ 20,160	\$ 21,660

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6331450/>



	> 10.0 U/ml: positive	7.5
	< 10.7 U/ml: negative	(negative)
<i>anti-Muscarinic Cholinergic Receptor-4-Antibodies</i>	> 10.7 U/ml: positive	7.5
	<14.2 U/ml: negative	(negative)
<i>anti-Muscarinic Cholinergic Receptor-5-Antibodies</i>	> 14.2 U/ml: positive	7.1
	<12.0 U/ml: negative	(negative)
<i>Anti-FGF Receptor-3-Antibodies</i>	> 12.0 U/ml: positive	6.7
	<9.0 U/ml: negative	(negative)
<i>anti-TSHDS-IgM-Antibodies</i>	> 9.0 U/ml: positive	5.4
	<9.8 U/ml: negative	(negative)
<i>anti-ACE-2-Antibodies</i>	> 9.8 U/ml: positive	13.6
	<25.0 U/ml: negative	(positive)
<i>anti-MAS1-Antibodies</i>	> 25.0 U/ml: positive	39.6
		(positive)

It is strongly recommended that each laboratory should determine its own normal and abnormal values.

26.01.2022

Dr. Harald Heidecke



The best defense is a good offense.

— *Jack Dempsey* —

AZ QUOTES

**Table 1. Time to Infectious Dose for an Uninfected Person (Receiver)\***

		Receiver is wearing (% inward leakage)				
		Nothing	Typical cloth mask	Typical surgical mask	Non-fit-tested N95 FFR	Fit-tested N95 FFR
<b>Source is wearing (% outward leakage)</b>		100%	75%	50%	20%	10%
Nothing	100%	15 min	20 min	30 min	1.25 hr	2.5 hr
Typical cloth mask	75%	20 min	26 min	40 min	1.7 hr	3.3 hr
Typical surgical mask	50%	30 min	40 min	1 hr	2.5 hr	5 hr
Non-fit-tested N95 FFR**	20%	1.25 hr	1.7 hr	2.5 hr	6.25 hr	12.5 hr
Fit-tested N95 FFR	10%	2.5 hr	3.3 hr	5 hr	12.5 hr	25 hr

\*The data for % inward and outward leakage of cloth and surgical masks were derived from a study by Lindsley et al (2021). Data for non-fit-tested N95 FFRs come from a study by Brosseau (2010). Data for fit-tested N95 FFRs are derived from the OSHA-assigned protection factor of 10 for half-facepiece respirators. Also, note the following:

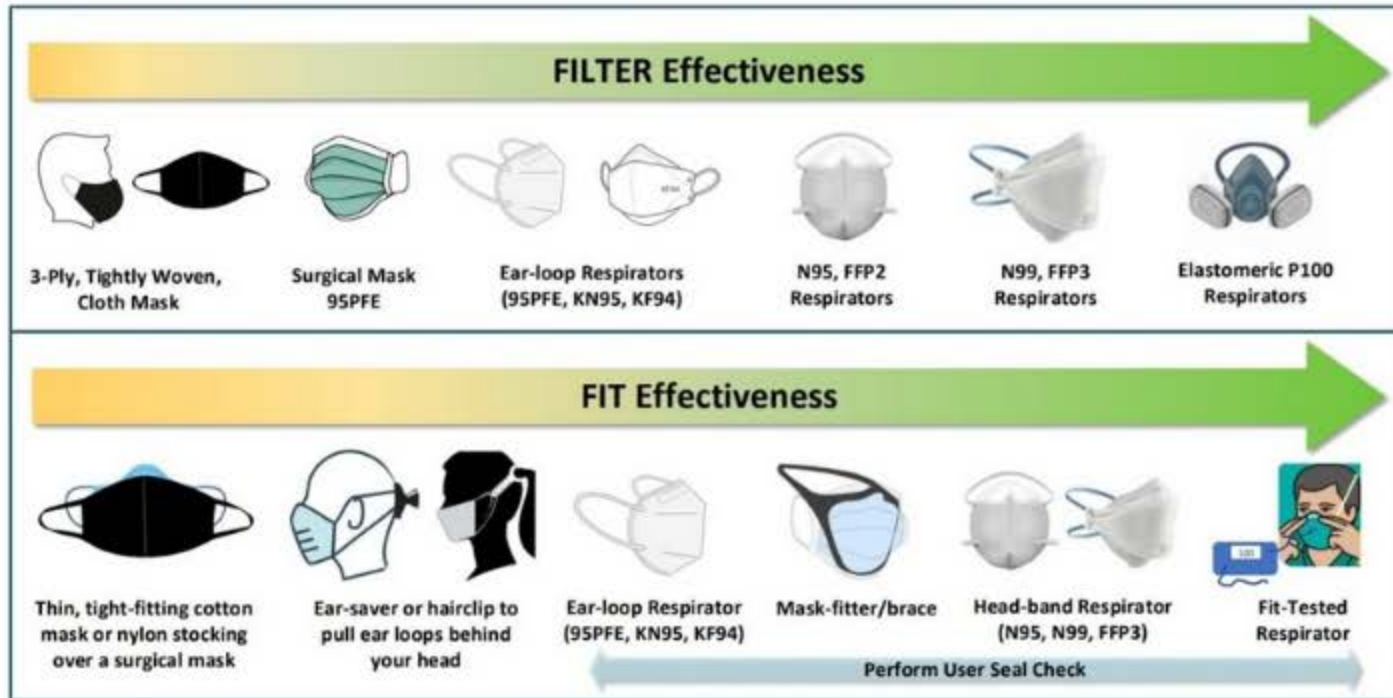
- These numbers are not bright lines between safe and unsafe, but rather are meant to illustrate the differences between cloth face coverings, surgical masks, and respirators.
- People should not rely on these exact times to protect themselves, but should limit the amount of time they spend in enclosed spaces with many potential sources.
- The baseline time of 15 minutes is not based on any science and could be shorter or longer, depending on the number of sources, size of the room, source's activities (eg, talking, singing), nature of ventilation, etc. The CDC says the 15 minutes could be spread out over the course of a day. Exposure (and dose) depend on the concentration of infectious particles in the air and the time spent inhaling those particles. This table illustrates only the impact of time.

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

# Masking



COVID is AIRBORNE, so Upgrade Your Mask  
**FILTER + FIT + FUNCTION**



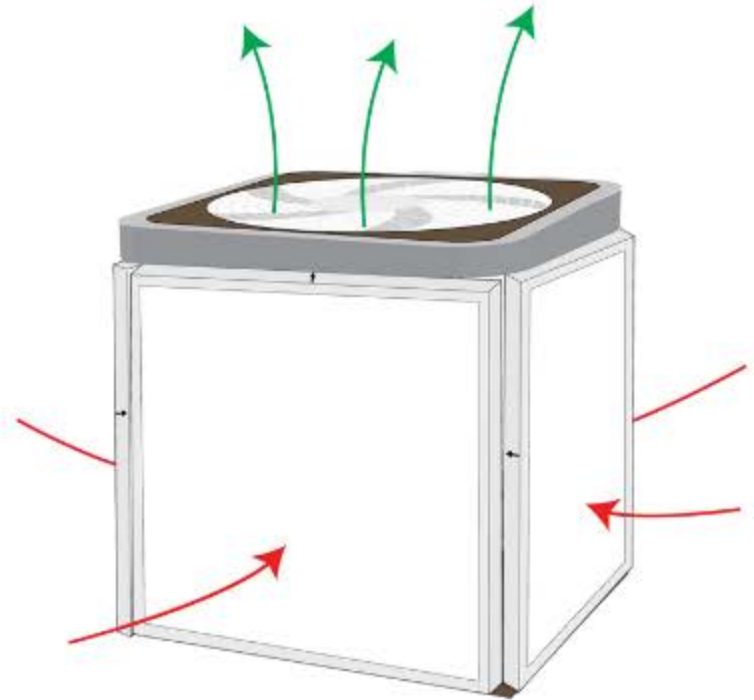
**FUNCTION:** Make sure your mask is breathable and comfortable.

# Fresh Air/Filtration

## Italian study shows ventilation can cut school COVID cases by 82%

(ANSA) – ANCONA, MARCH 22 – The use of Controlled Mechanical Ventilation (Vmc) in school classrooms, depending on the flow rate of cubic meters / hour of the machinery, reduces the risk of coronavirus transmission between 40% and 82% , 5% (the latter with machines that allow 4.67-6.66 air changes per hour). This is the result of the study conducted for the Marche Region in collaboration with the Hume Foundation, chaired by Luca Ricolfi. In 2021 the Region allocated about 9 million euros to install Vmc systems in

<700 ppm CO2  
or



# Rapid Testing

Make it a core part of your everyday personal and work routine

Identify asymptomatic cases, clusters of cases





# Smart Masking



**S**hops  
and



workplaces

Keep our common spaces safe with masks, for those most at risk



**T**ransit/Uber/  
Air travel



**M**edical  
settings



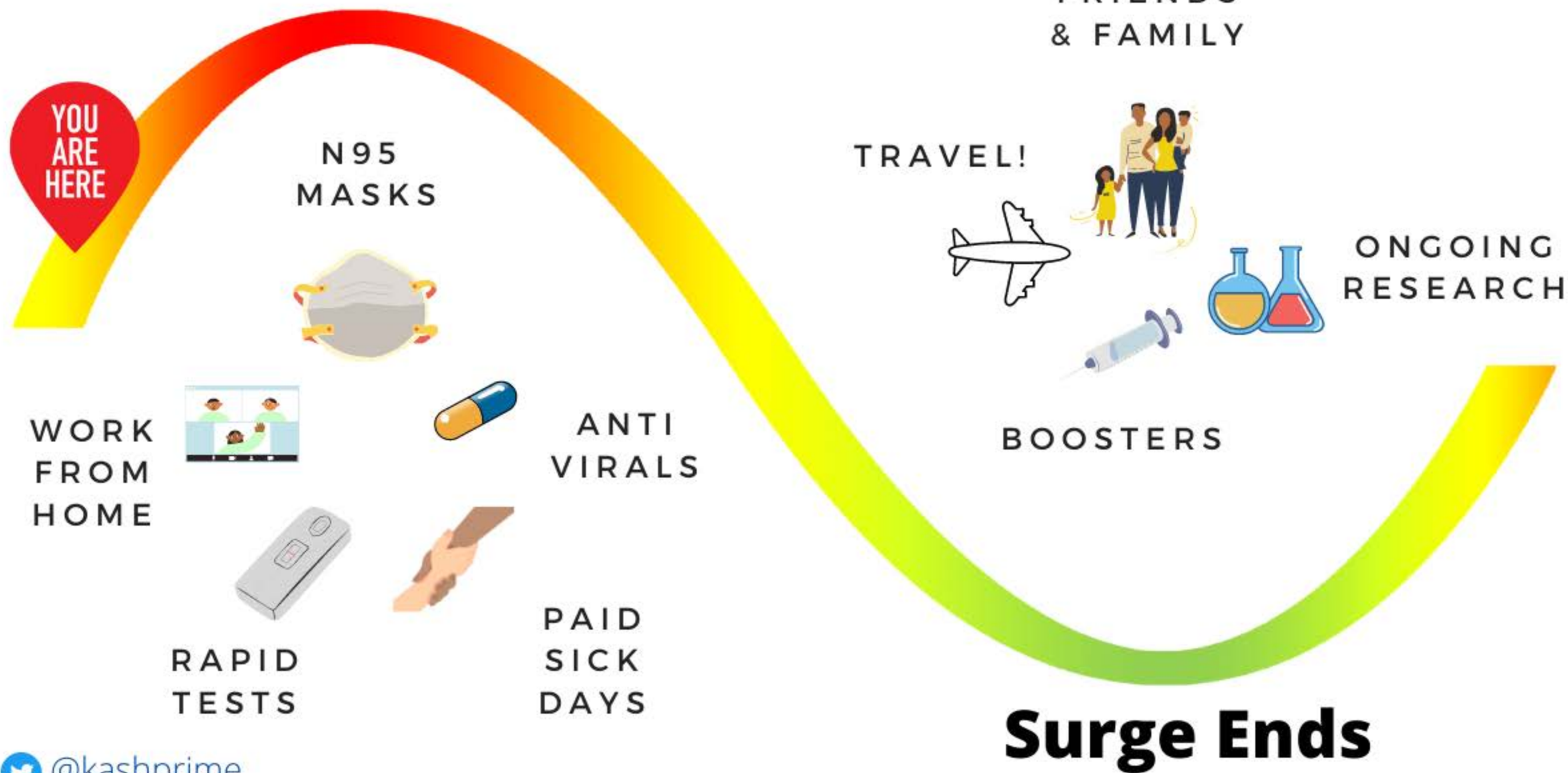
**A**cademic/  
schools



**R**eligious  
gatherings



# Covid Surges



THANK  
YOU

