



# ***Frontline Worker Safety in the Age of COVID-19***

***Health Watch USA<sup>sm</sup>***



***Webinar Sept. 14th, 2022 - Registration Now Open***

***<https://healthconference.org>***

## **Long Covid: a brief overview**

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# Disclosures

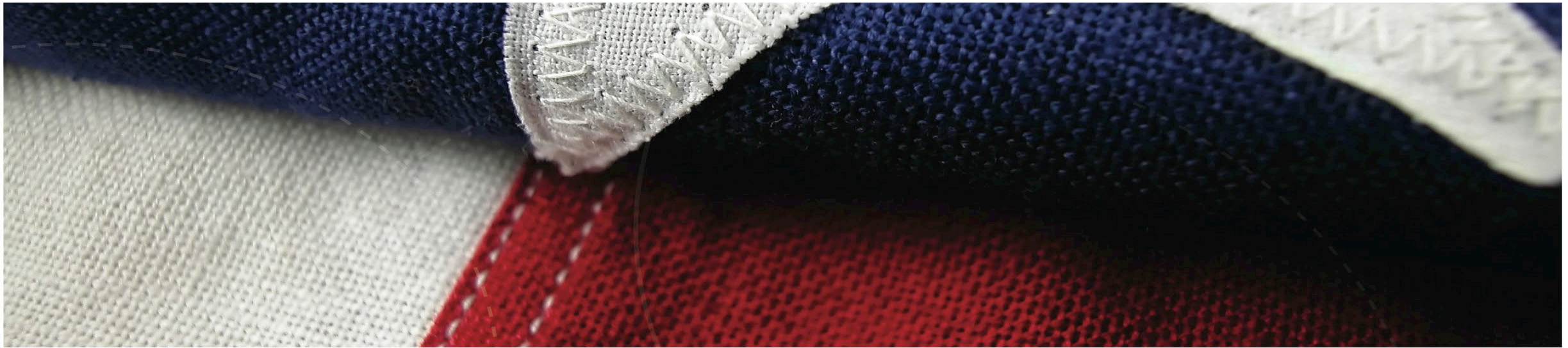
- Consulting: Gilead, Tonix
- The opinions expressed in this presentation do not represent the views of the US Department of Veterans Affairs or the US Government
- Funding: US Department of Veterans Affairs and American Society of Nephrology



# Outline

- What led us to study long Covid?
- Broad overview of Long Covid
- Long-term:
  - cardiovascular outcomes
  - kidney outcomes
  - diabetes
  - mental health outcomes
- Effect of vaccination on Long Covid
- Implications for health systems and communities
- Summary





How do we do our part in this pandemic?



# Non-recovery from Coronavirus infection

The New York Times

OPINION

## We Need to Talk About What Coronavirus Recoveries Look Like

They're a lot more complicated than most people realize.

April 13, 2020

By **Fiona Lowenstein**

Fiona Lowenstein is a writer, producer and yoga teacher.



**Fiona Lowenstein**  
@fi\_lowenstein

speaker, writer, producer 🗣️ @nytimes @voxdotcom @guardian @USAToday @TeenVogue @Eater @Elemental @Bustle @cjr ✨ founder + prez @itsbodypolitic they/she

📍 New York, NY 🌐 fionalowenstein.com 📅 Joined August 2012

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**Fiona Lowenstein** @fi\_lowenstein · Mar 17 ...

Last year on this day, I was being treated for Covid-19 in the hospital. Today, I'm in touch with thousands of patients who never recovered. My latest for @nytopinion with @ahandvanish looks at why #LongCovid needs to be our focus in year 2.



# Report: What Does COVID-19 Recovery Actually Look Like?

## An Analysis of the Prolonged COVID-19 Symptoms Survey by Patient-Led Research Team

Originally Released: May 11th, 2020. Generated from survey data organized by decentralized team of COVID-19 patients, exported on May 2, 2020 (640 Responses)



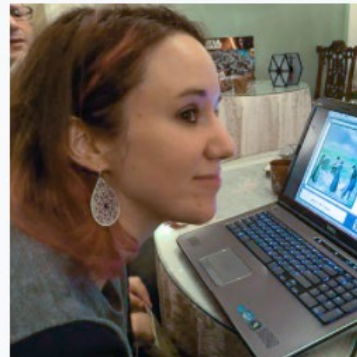
**Dr. Athena Akrami**

Day 1 on March 17th.



**Lisa McCorkell**

Day 1 on March 14th.



**Hannah Davis**

Day 1 on March 25th.



**Hannah Wei**

Day 1 on March 11th.



**Gina Assaf**

Day 1 on March 20th.

Patient-Led Research Collaborative  
[www.patientresearchcovid19.com](http://www.patientresearchcovid19.com)



Defining  
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# Early reports from patient-led groups

- Weakness
- Fatigue
- Brain fog
- Muscle pain
- Other manifestations



- Long Covid
- Long haulers



# What is Long Covid?



Accelerated Article Preview

# High-dimensional characterization of post-acute sequelae of COVID-19

Received: 18 January 2021

Accepted: 14 April 2021

Accelerated Article Preview Published  
online 22 April 2021

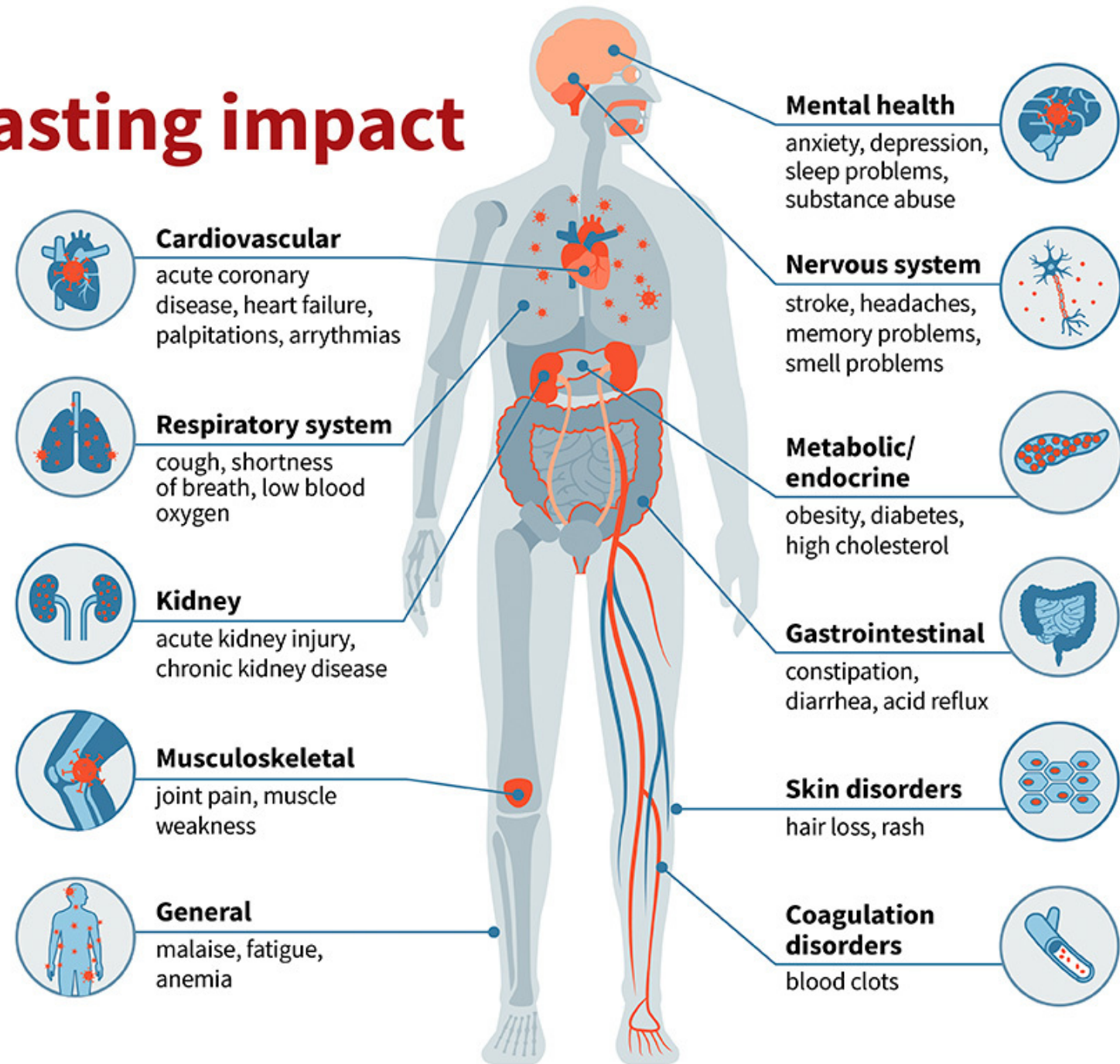
Cite this article as: Al-Aly, Z. et al.  
High-dimensional characterization of  
post-acute sequelae of COVID-19. *Nature*  
<https://doi.org/10.1038/s41586-021-03553-9>  
(2021).

Ziyad Al-Aly, Yan Xie & Benjamin Bowe

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# COVID-19: Lasting impact

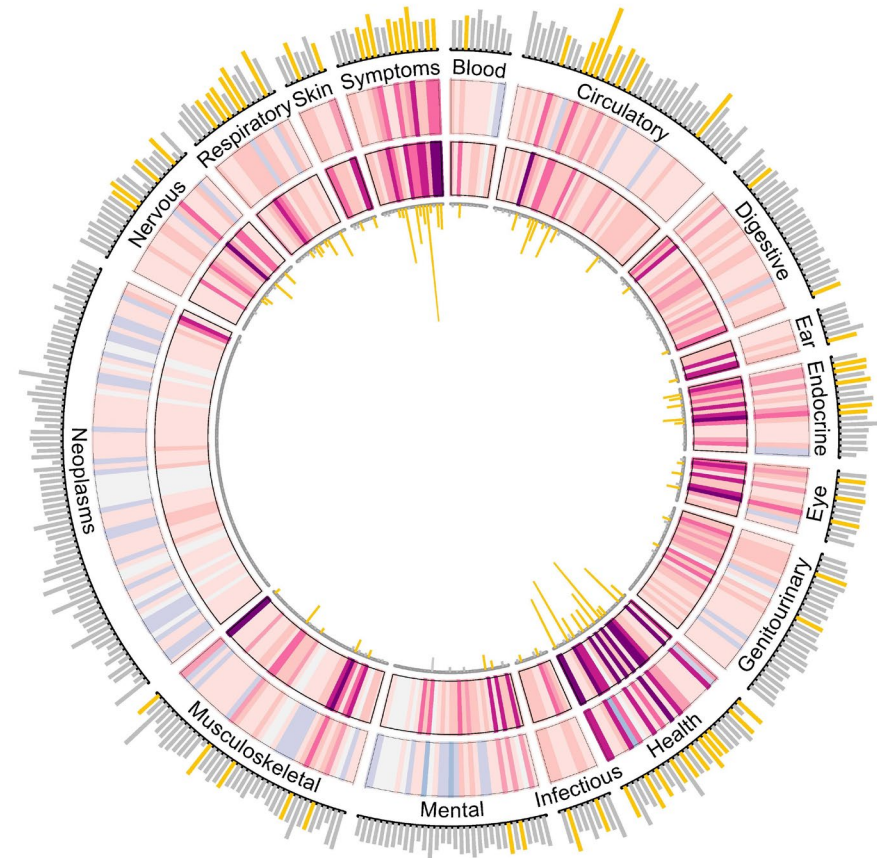


Al-Aly et al. Nature 2021



# Covid vs seasonal influenza

- Magnitude of risk is higher
- Breadth of organ involvement
- It is a different kind of post-viral syndrome

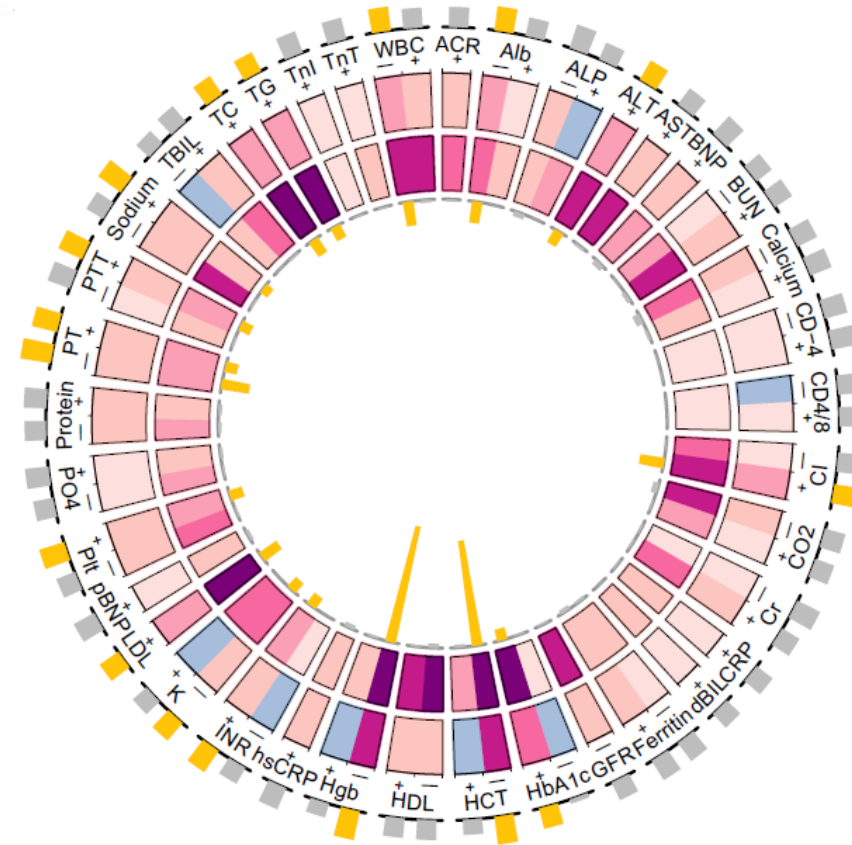


Al-Aly et al. Nature 2021



# Post-acute Sequelae

- The risk is evident among non-hospitalized
- The risk increases according to the severity of the acute infection



Al-Aly et al. Nature 2021







# Sequelae of concern

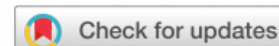
- Cardiovascular disorders
- Diabetes
- Kidney disease
- Neurologic and mental health disorders

Al-Aly et al. Nature 2021



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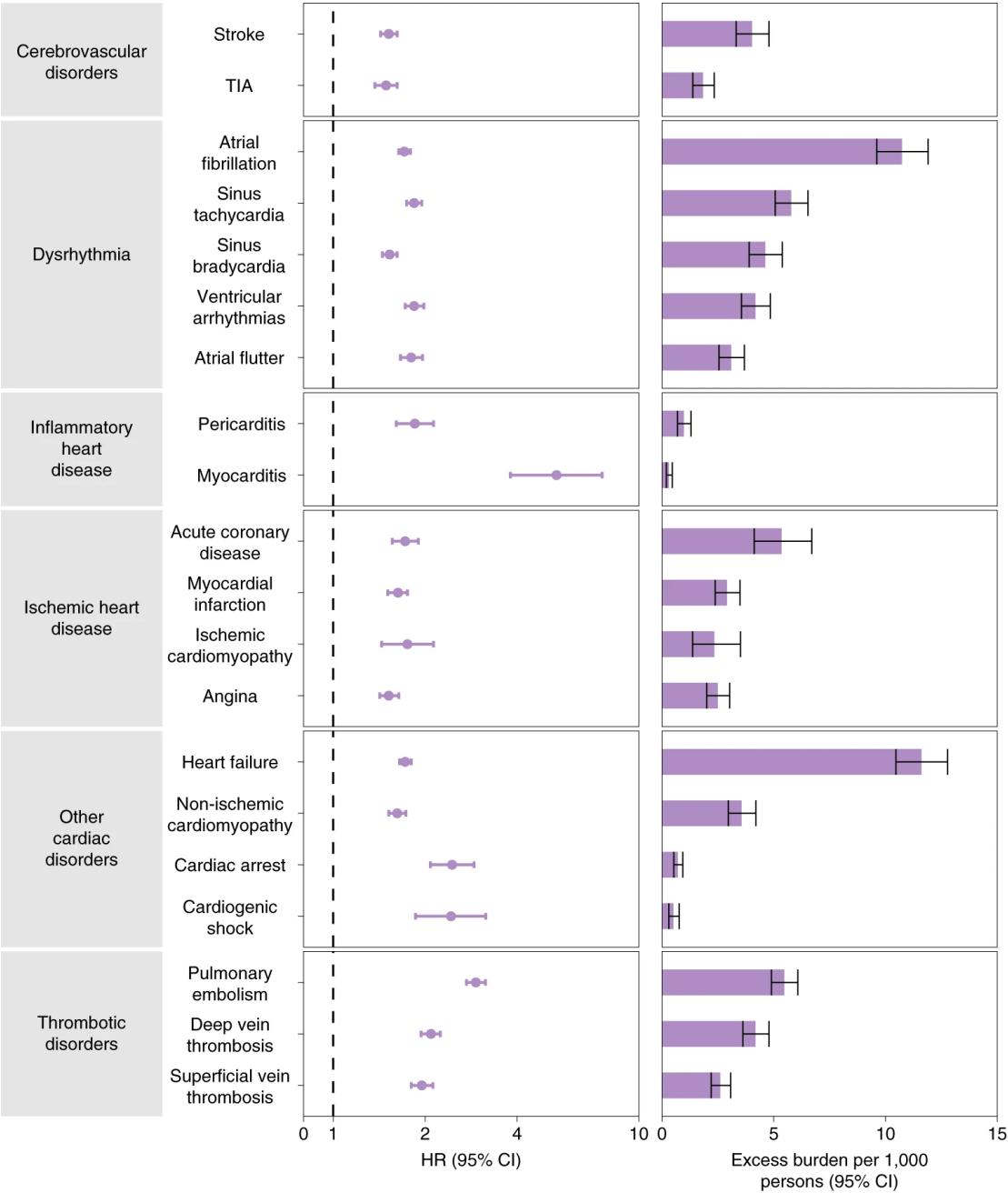
OPEN

# Long-term cardiovascular outcomes of COVID-19

Yan Xie <sup>1,2,3</sup>, Evan Xu <sup>1,4</sup>, Benjamin Bowe<sup>1,2</sup> and Ziyad Al-Aly <sup>1,2,5,6,7</sup> 

**The cardiovascular complications of acute coronavirus disease 2019 (COVID-19) are well described, but the post-acute cardiovascular manifestations of COVID-19 have not yet been comprehensively characterized. Here we used national healthcare databases from the US Department of Veterans Affairs to build a cohort of 153,760 individuals with COVID-19, as well as two sets of control cohorts with 5,637,647 (contemporary controls) and 5,859,411 (historical controls) individuals, to estimate risks and 1-year burdens of a set of pre-specified incident cardiovascular outcomes. We show that, beyond the first 30 d after infection, individuals with COVID-19 are at increased risk of incident cardiovascular disease spanning several categories, including cerebrovascular disorders, dysrhythmias, ischemic and non-ischemic heart disease, pericarditis, myocarditis, heart failure and thromboembolic disease. These risks and burdens were evident even among individuals who were not hospitalized during the acute phase of the infection and increased in a graded fashion according to the care setting during the acute phase (non-hospitalized, hospitalized and admitted to intensive care). Our results provide evidence that the risk and 1-year burden of cardiovascular disease in survivors of acute COVID-19 are substantial. Care pathways of those surviving the acute episode of COVID-19 should include attention to cardiovascular health and disease.**





Cerebrovascular disorders

Dysrhythmia

Inflammatory heart disease

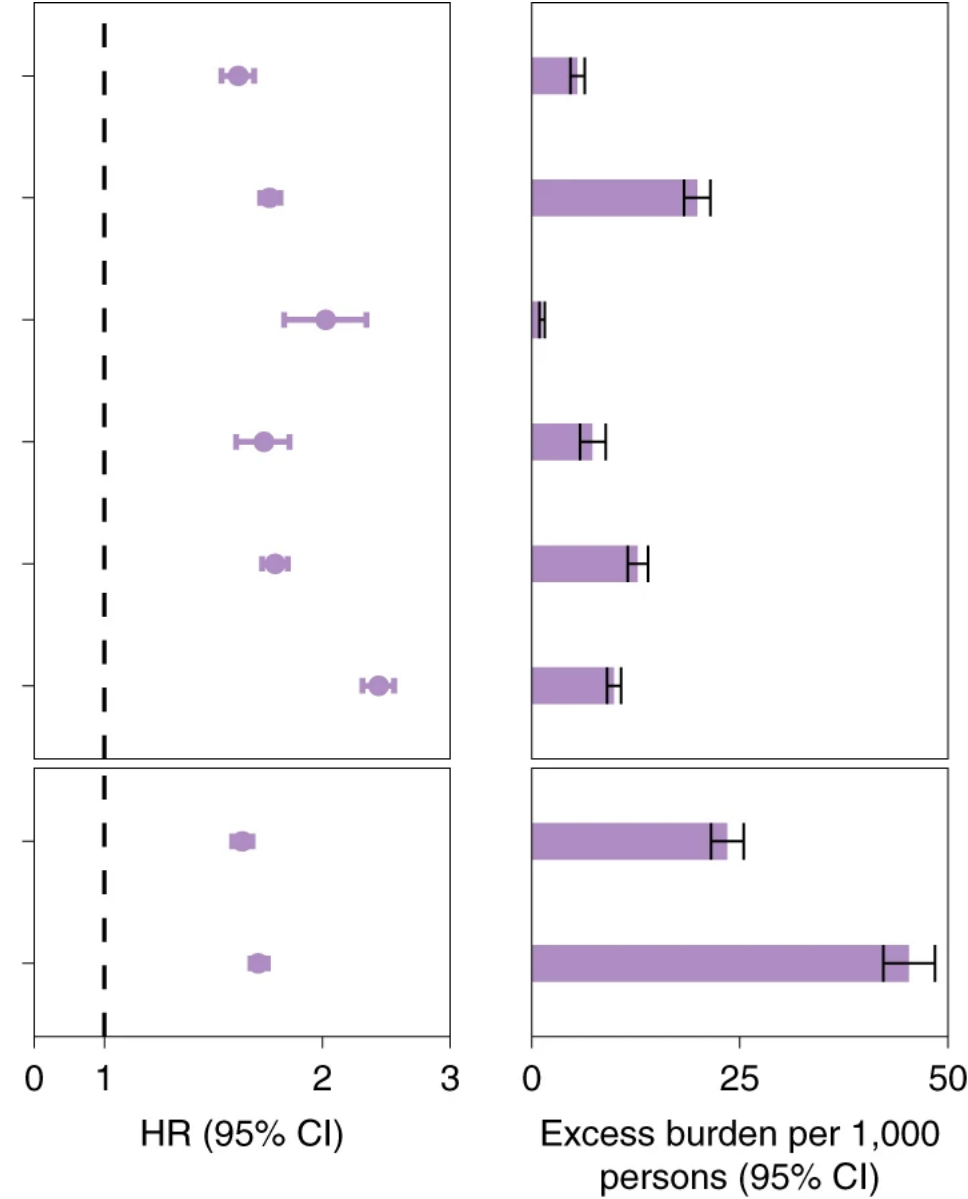
Ischemic heart disease

Other cardiac disorders

Thrombotic disorders

MACE

Any cardiovascular outcome

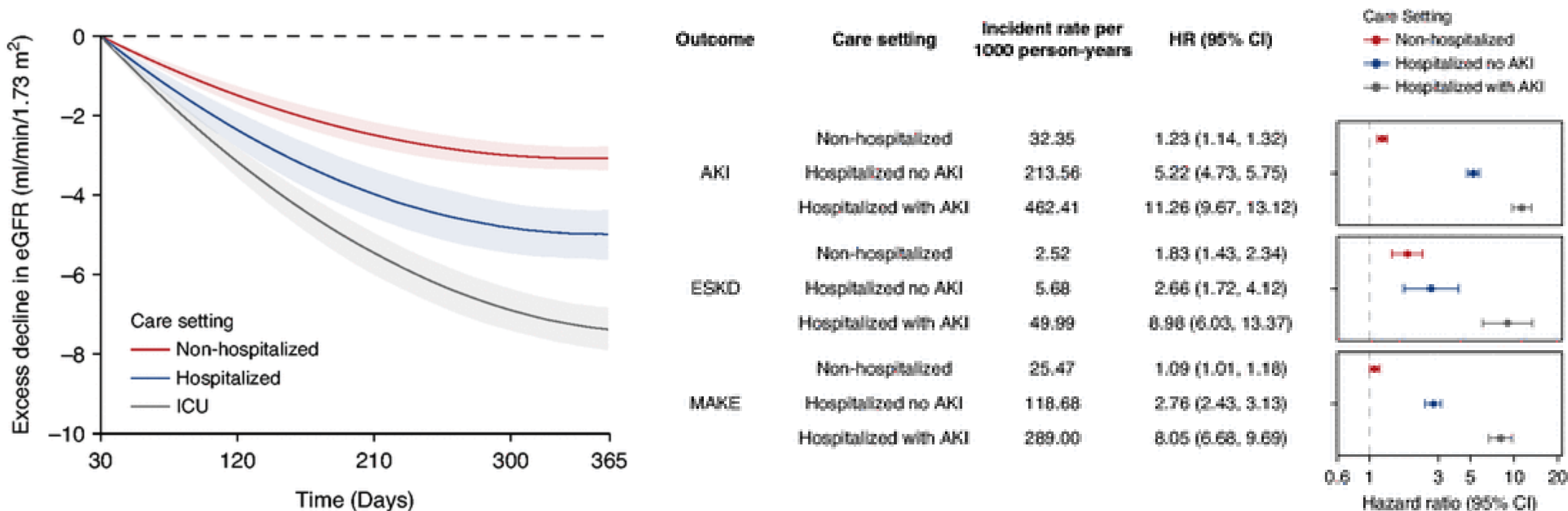




# Kidney Outcomes in Long COVID

Benjamin Bowe,<sup>1,2,3</sup> Yan Xie,<sup>1,2,3</sup> Evan Xu <sup>1,4</sup> and Ziyad Al-Aly <sup>1,3,5,6,7</sup>

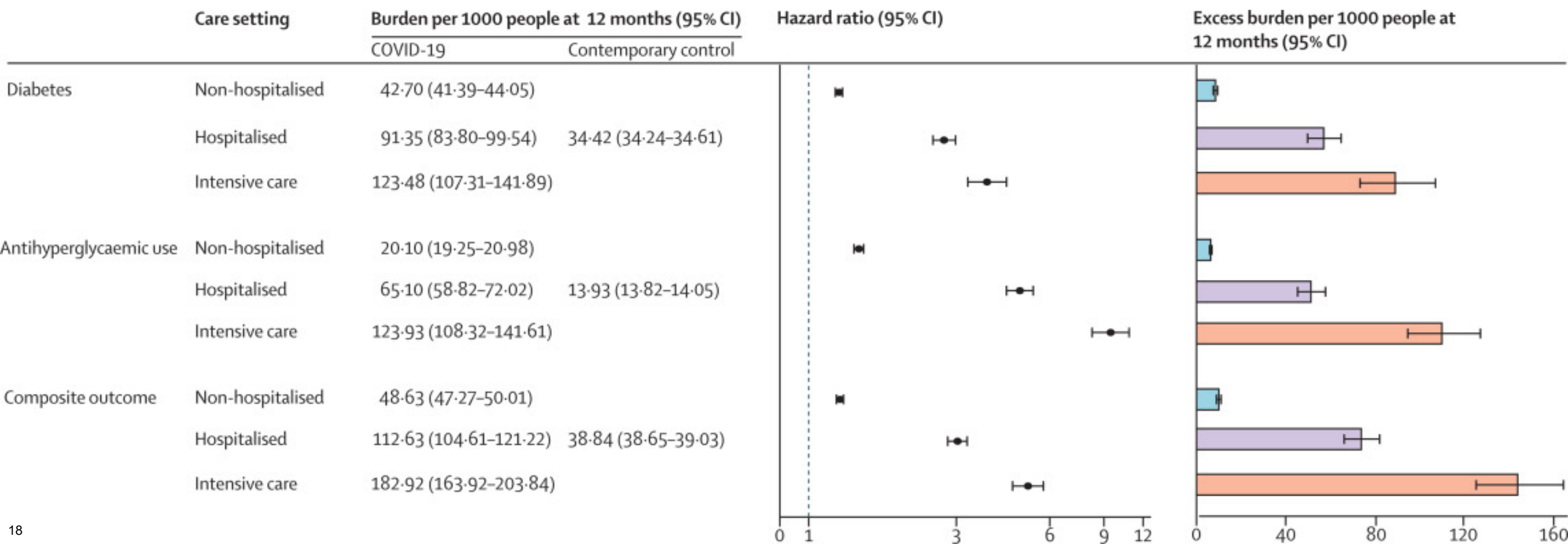
Due to the number of contributing authors, the affiliations are listed at the end of this article.





# Risks and burdens of incident diabetes in long COVID: a cohort study

Yan Xie, MPH • Ziyad Al-Aly, MD





## Research

### Risks of mental health outcomes in people with covid-19: cohort study

BMJ 2022 ; 376 doi: <https://doi.org/10.1136/bmj-2021-068993> (Published 16 February 2022)

Cite this as: BMJ 2022;376:e068993

#### Linked Editorial

Mental health after covid-19

#### Linked Opinion

Mental health in people with covid-19

Article

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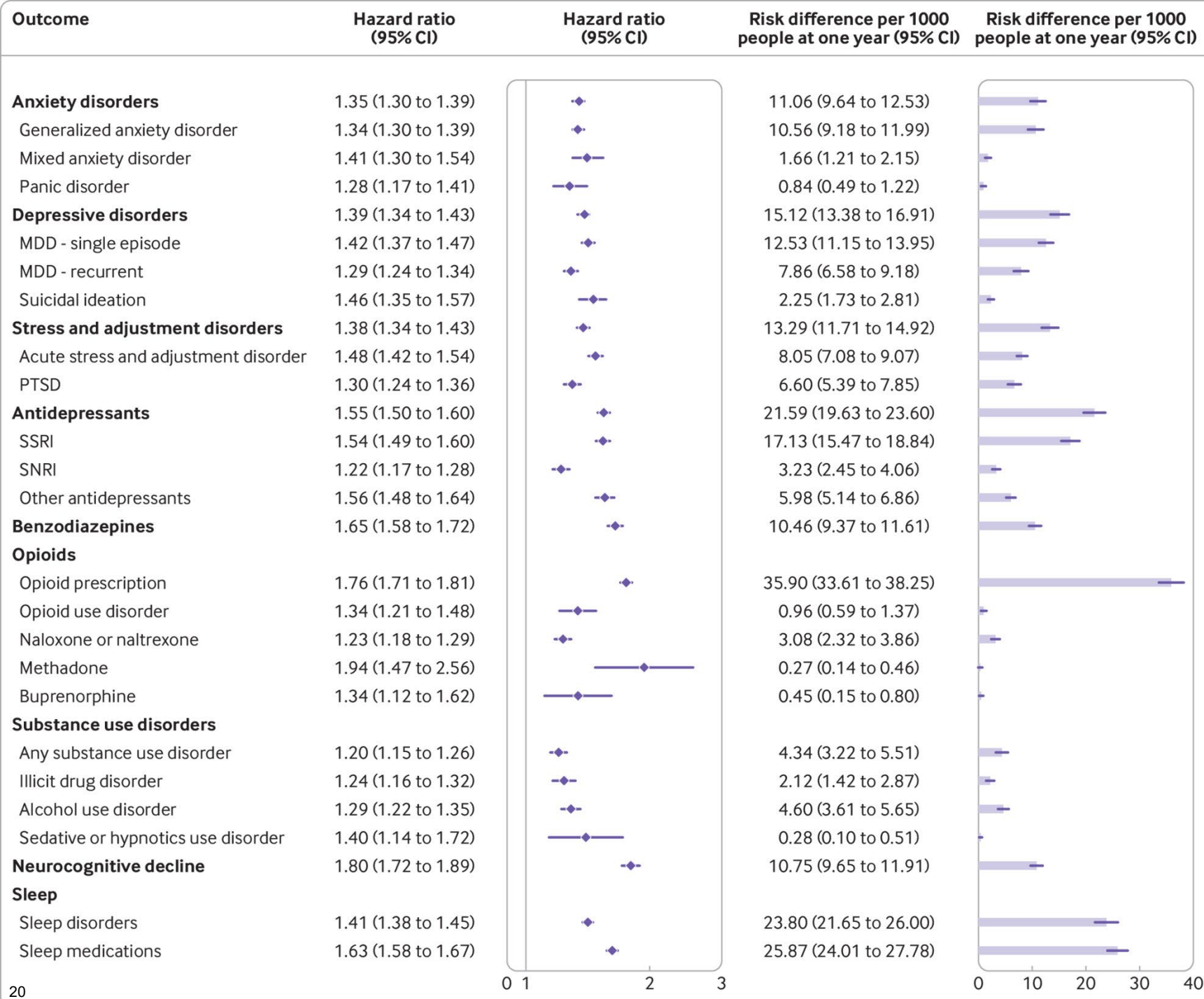
Yan Xie, clinical epidemiologist<sup>1 2 3</sup>, Evan Xu, medical student<sup>1</sup>, Ziyad Al-Aly , director<sup>1 3 4 5 6</sup>

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**Accepted** 8 January 2022





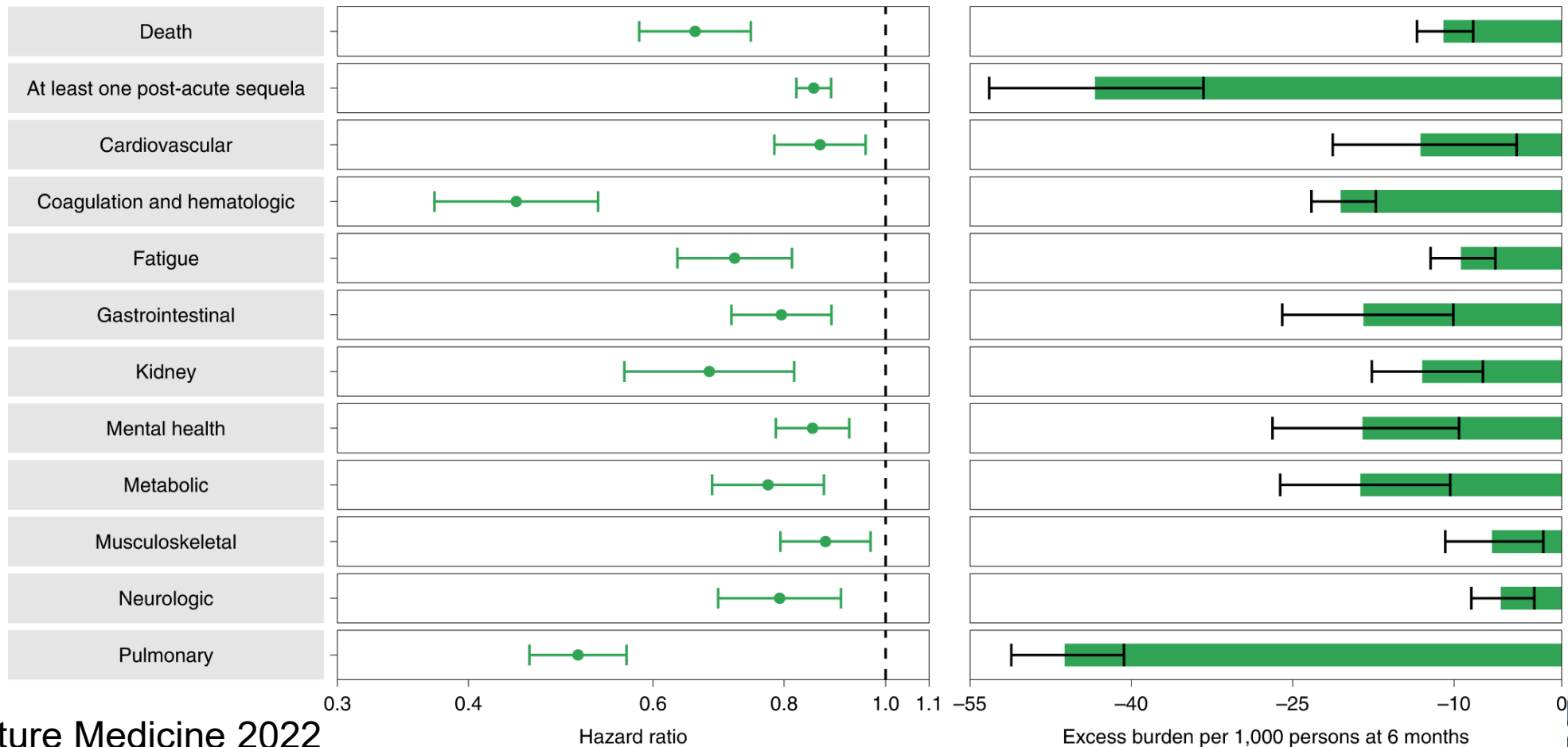
Xie et al. BMJ 2022



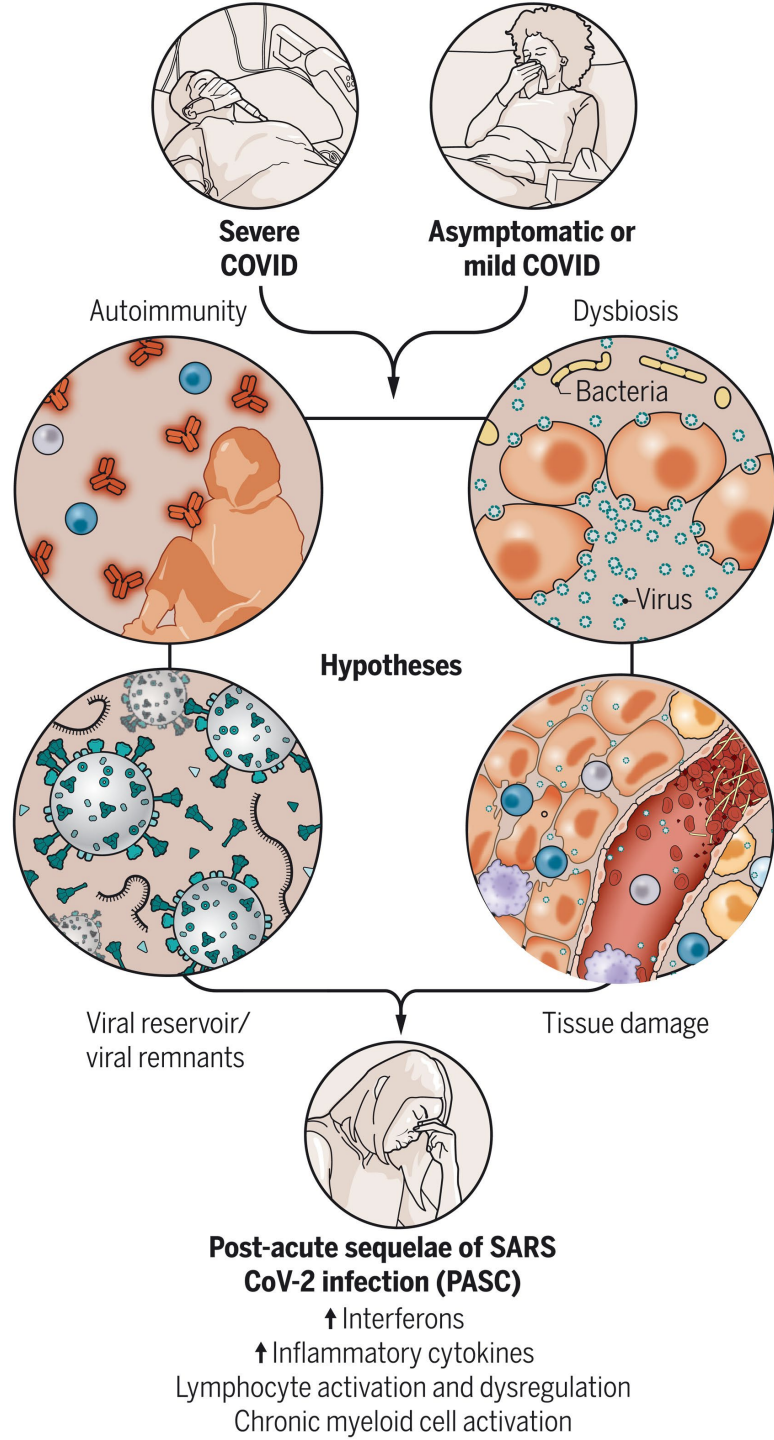


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# Long COVID after breakthrough SARS-CoV-2 infection

Ziyad Al-Aly<sup>1,2,3,4,5</sup>✉, Benjamin Bowe<sup>1,2</sup> and Yan Xie<sup>1,2,6</sup>





# Putative Mechanisms of Long Covid

Merad et al. Science 2022



# Long Covid – an umbrella term

- Overlap with
  - Post hospitalization
  - Post ICU
- Similarities and differences with:
  - Other post-viral illnesses
    - Post-flu (encephalitis lethargica (EL) or ‘sleepy sickness’, post-encephalitic parkinsonism)
    - Measles (subacute sclerosing panencephalitis)
    - EBV (multiple sclerosis)
    - Post-Ebola syndrome
    - Post-Polio syndrome
  - Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS)



# America's next big health crisis

The New York Times

OPINION

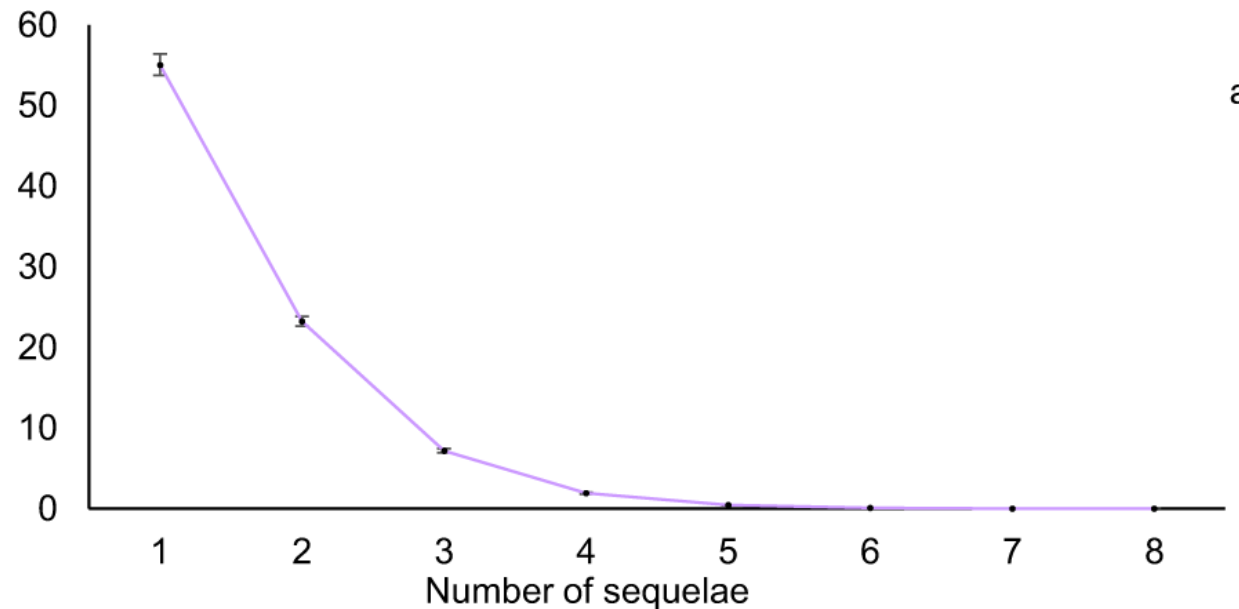
## Long Covid Is Not Rare. It's a Health Crisis.

Lingering symptoms from the coronavirus may turn out to be one of the largest mass disabling events in modern history.

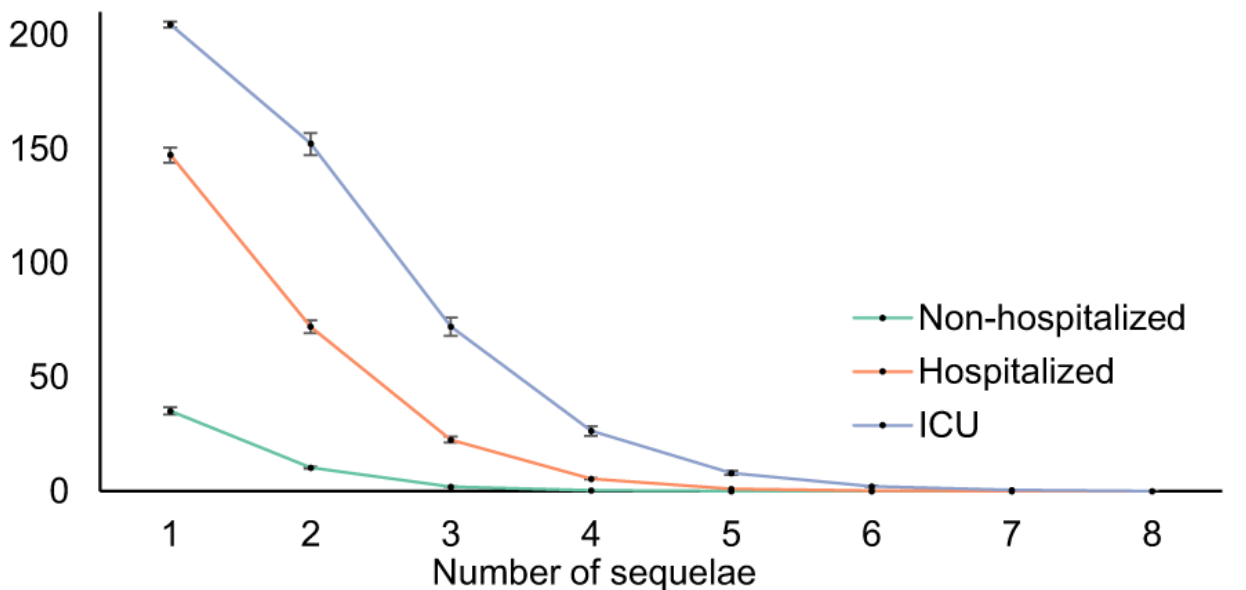
By Fiona Lowenstein and Hannah Davis

Fiona Lowenstein is a journalist and the founder of the health justice organization [Body Politic](#). Hannah Davis is an artist, researcher and founding member of Body Politic's research partner, the [Patient-Led Research Collaborative](#).

Burden per 1000 persons



Burden per 1000 persons





# Implications for health systems I

- Burden of long Covid is likely substantial (4-7% of people with COVID-19)
- Long Covid is a multifaceted disease that can affect nearly every organ system
  - Rise in burden of chronic diseases (cardiovascular disease, diabetes, kidney diseases, etc..)
    - Based on our work, the Institute of Health Metrics and Evaluation (IHME) estimates 200,000 and 40,000 additional cases of ischemic heart disease and stroke in the US



# Implications for health systems II

- It is imperative that governments and health systems prepare for people in need of post covid care
  - UK National Health Service
  - Several other health systems in the US
  - US VA Healthcare System



# Implications for communities

- Best way to prevent long covid is to prevent covid through vaccination
- Misinformation, disinformation and gaslighting
- The power of patient advocacy



# The long shadow of Covid

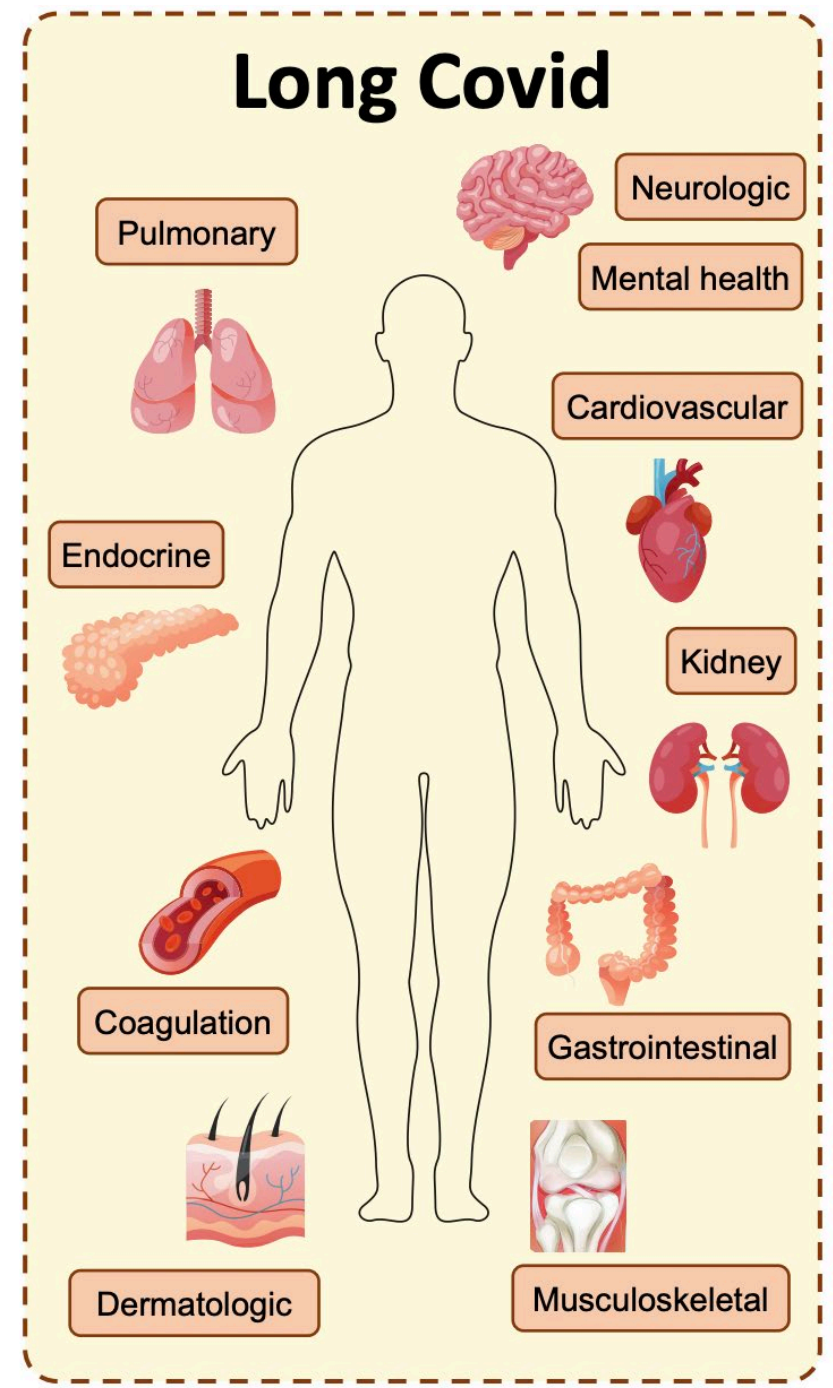
- The toll of hospitalization and death from acute covid is only the tip of the iceberg
- Long Covid
  - Disease and disability
  - Life expectancy
  - Development and educational attainment
  - Economic implications
  - Social implications





# Summary

- Long Covid is a multifaceted disease; it can affect nearly every organ system
- The burden of Long Covid around 4-7%
  - Some Long Covid manifestations are chronic conditions that last a lifetime
- Governments and health systems must adapt quickly and establish post-covid care strategies

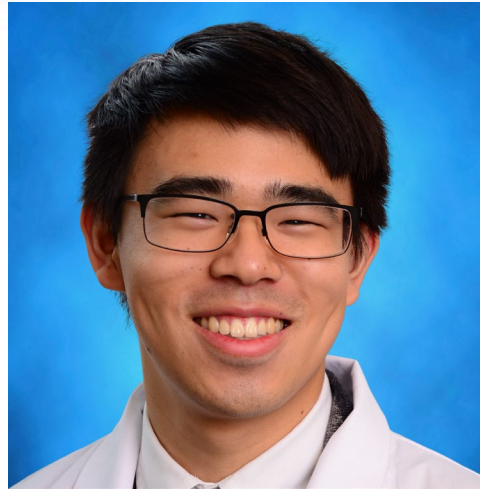




# Grateful!



**Yan Xie**  
Data Scientist



**Evan Xu**

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- US Department of Veterans Affairs
- American Society of Nephrology

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- Research and Development Service at VA Saint Louis Health Care System
- Public Affairs at Washington University in Saint Louis

**Long haulers who inspired and continue to inspire us!**

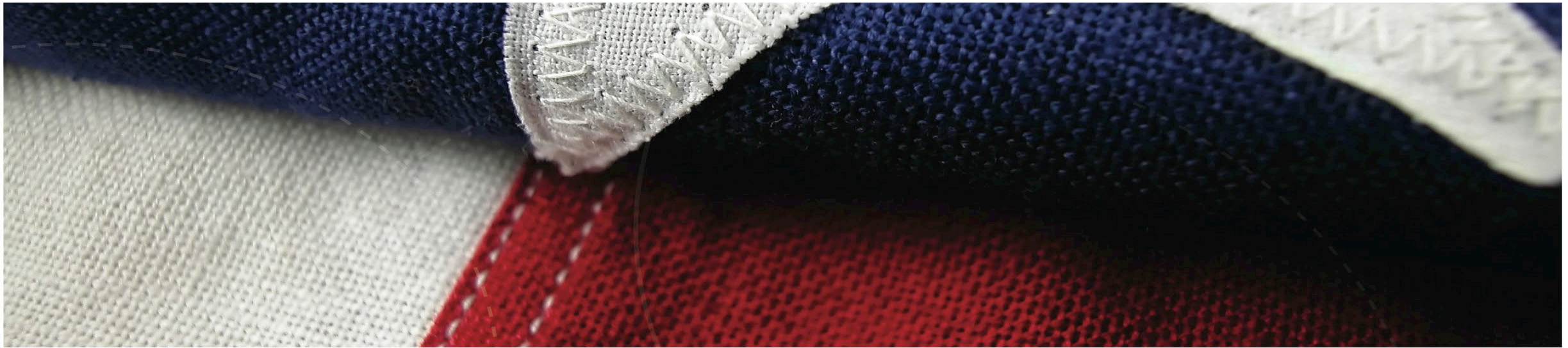


**Benjamin Bowe**  
Data Scientist

- **Other Team Members:**
  - Miao Cai
  - Andrew K. Gibson
  - Taeyoung Choi
  - John Ciconte
  - Uly Labilles







Thank you

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