

Long COVID

We've only just begun

One Year Later

- 30,737,000 confirmed cases
- 559,172 deaths
- 174.9 million vaccine doses administered as of 4/8/2021
- 33.7% population have received 1 dose
- Almost 20% have been fully vaccinated.
- Number of cases consistently rising since 3/20/2021

LIFE & ARTS | YOUR HEALTH

They Got Covid One Year Ago. They're Still Sick.

Scientists are putting new effort into understanding the troubling symptoms of long Covid. These patients are waiting



By *Sumathi Reddy*

The New York Times

Opinion

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

The Atlantic

Thousands of COVID-19 Long-haulers Are Still Sick - The Atlantic

The Atlantic › covid-19-coronavirus-longterm-symptoms-months



Jun 4, 2020 ... **COVID-19** Can Last for Several Months. The disease's "long-haulers" have endured relentless waves of debilitating symptoms—and disbelief ...

What is Post or Long COVID?

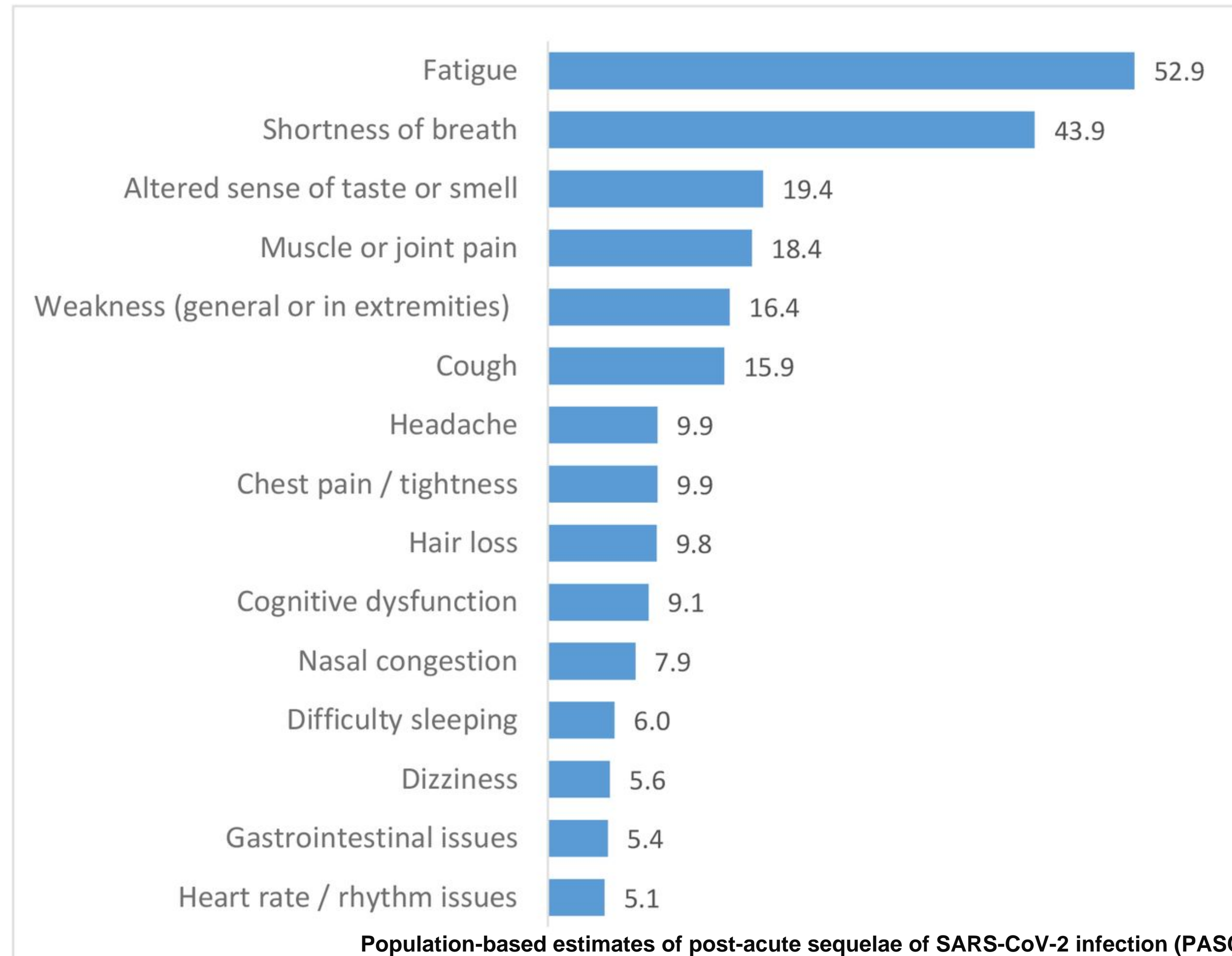
- **Long Covid** (Long-COVID-19, Long-term COVID-19 effects)
- **Post-Acute Sequelae of Covid (PASC)** (Post-Acute COVID-19, Persistent COVID-19 symptoms, Post COVID-19 manifestations,
- **COVID-19 Syndrome (PACS)** (Post COVID-19 Syndrome)
- “Long Hauler”

Population based estimated os post-acute sequelae of SARS-CoV-2 infection (PASC) prevalence and characteristics: A cross-sectional study

Michigan COVID-19 Recovery Surveillance Study

- Population based cross sectional survey of a probability sample of adults with confirmed COVID-19 in the Michigan Disease Surveillance System
- 2000/28,000 selected
- 629 completed survey
 - 79 excluded (ineligibility, asymptomatic, proxy reports, missing outcome data)
- 56% female, 68% Aged 45 and older
- Nonhispanic white (46.3%) Black (34.8%)
- Obese (53.4%), Hypertension (43%), diabetes (24.5%), asthma (17.1%) and cardiovascular disease (12.3%)
- Severe/very severe illness (39.5%/26.8%), moderate (20.4%), mild (13.3%)
- Hospitalized (32.4%), ICU (10%)

Prevalent symptoms among respondents with 60-Day COVID-19+ who had not recovered by the time they were surveyed (n=170)



+Defined as persistent symptoms at least 60 days post COVID-19 onset
^Respondents who answered 'no' to the question: "Have you recovered from COVID-19 to your usual state of health?"

Population-based estimates of post-acute sequelae of SARS-CoV-2 infection (PASC) prevalence and characteristics: A cross-sectional study

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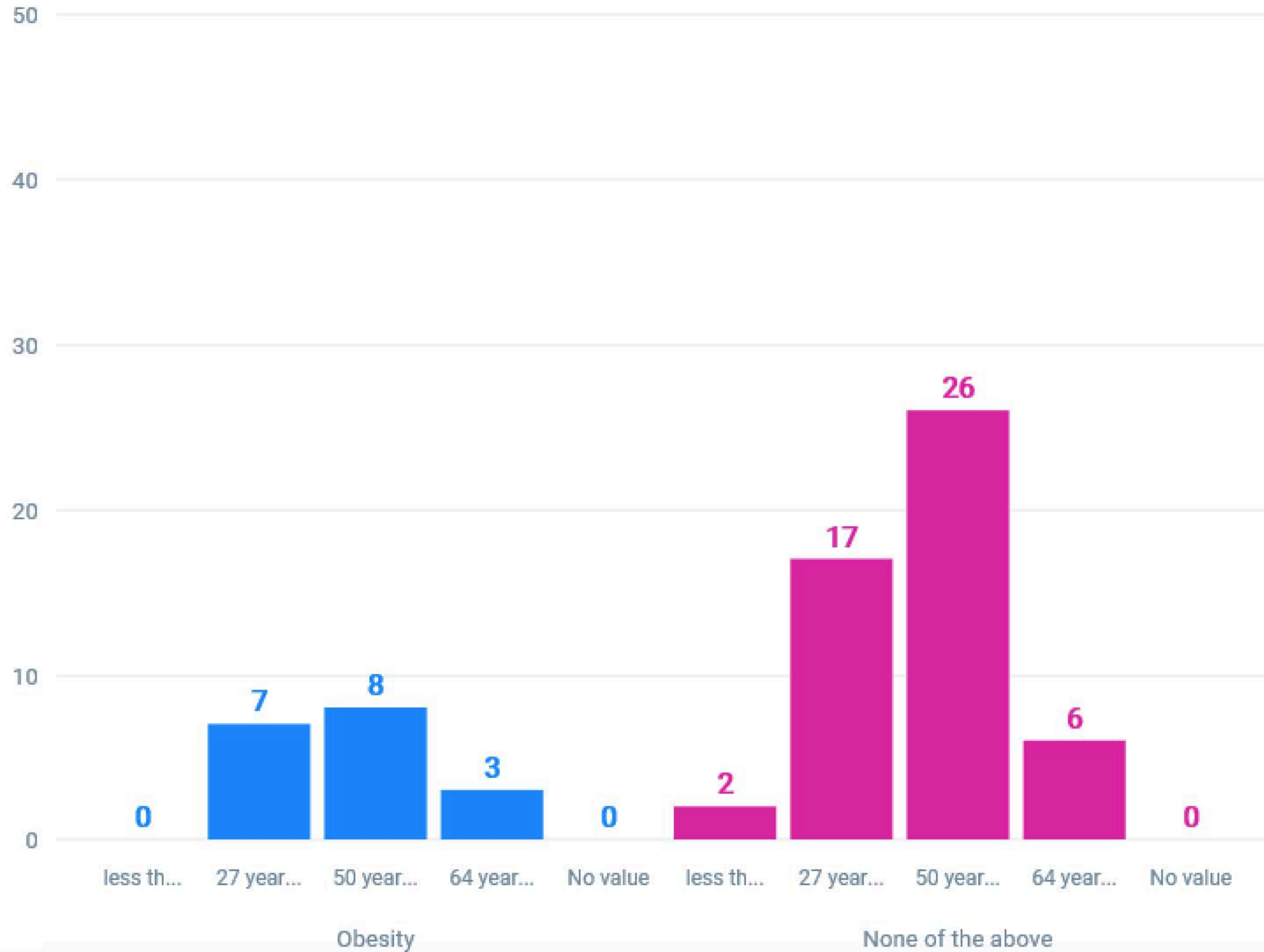
Jana L. Hirschtick, Andrea R. Titus, Elizabeth Slocum, Laura E. Power, Robert E. Hirschtick, Michael R. Elliott, Patricia McKane, Nancy L. Fleischer

doi: <https://doi.org/10.1101/2021.03.08.21252905>

Number of Patients by Diagnosis and Medic...



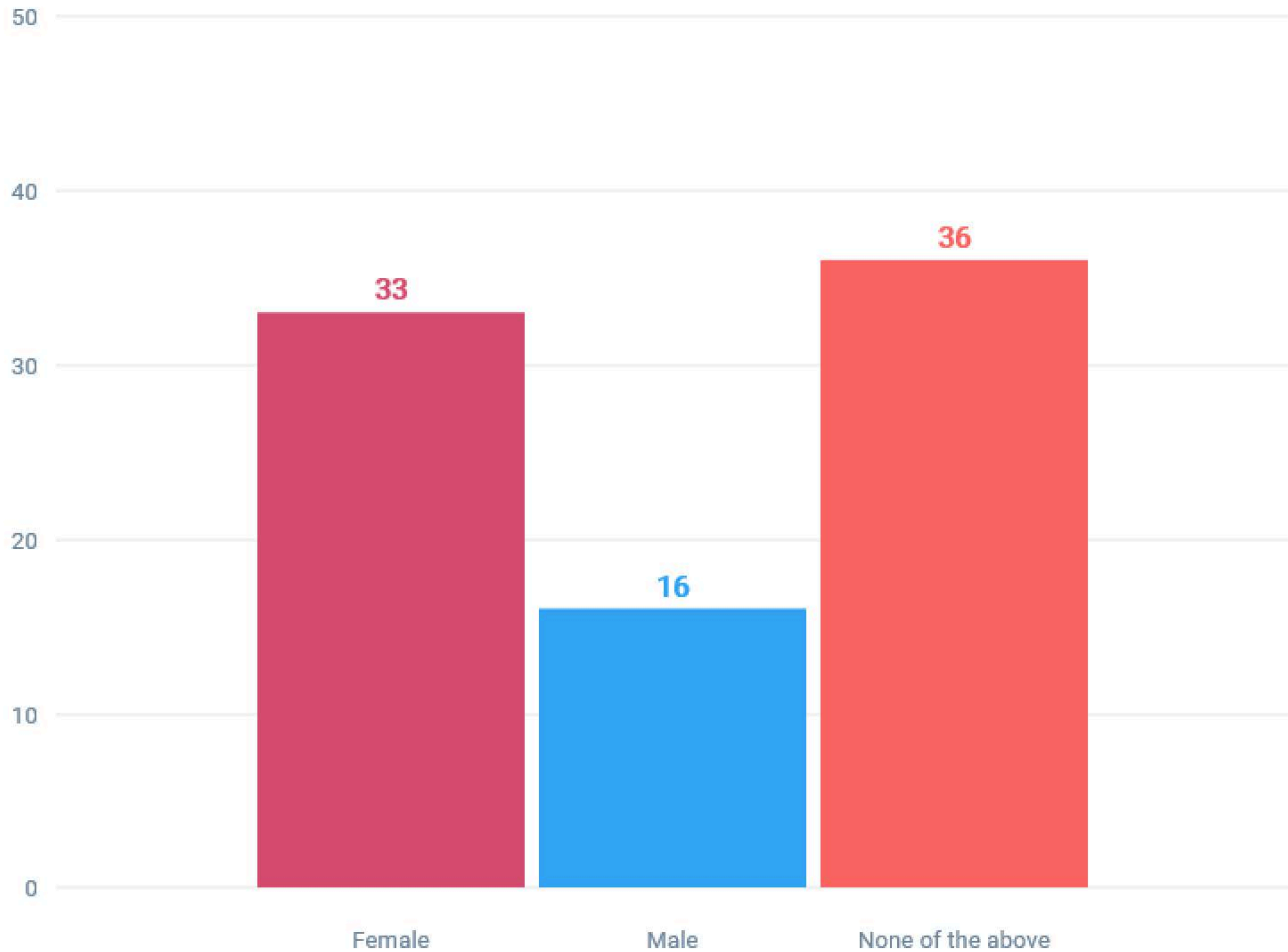
Last 2 months



Number of Patients by Gender Identity



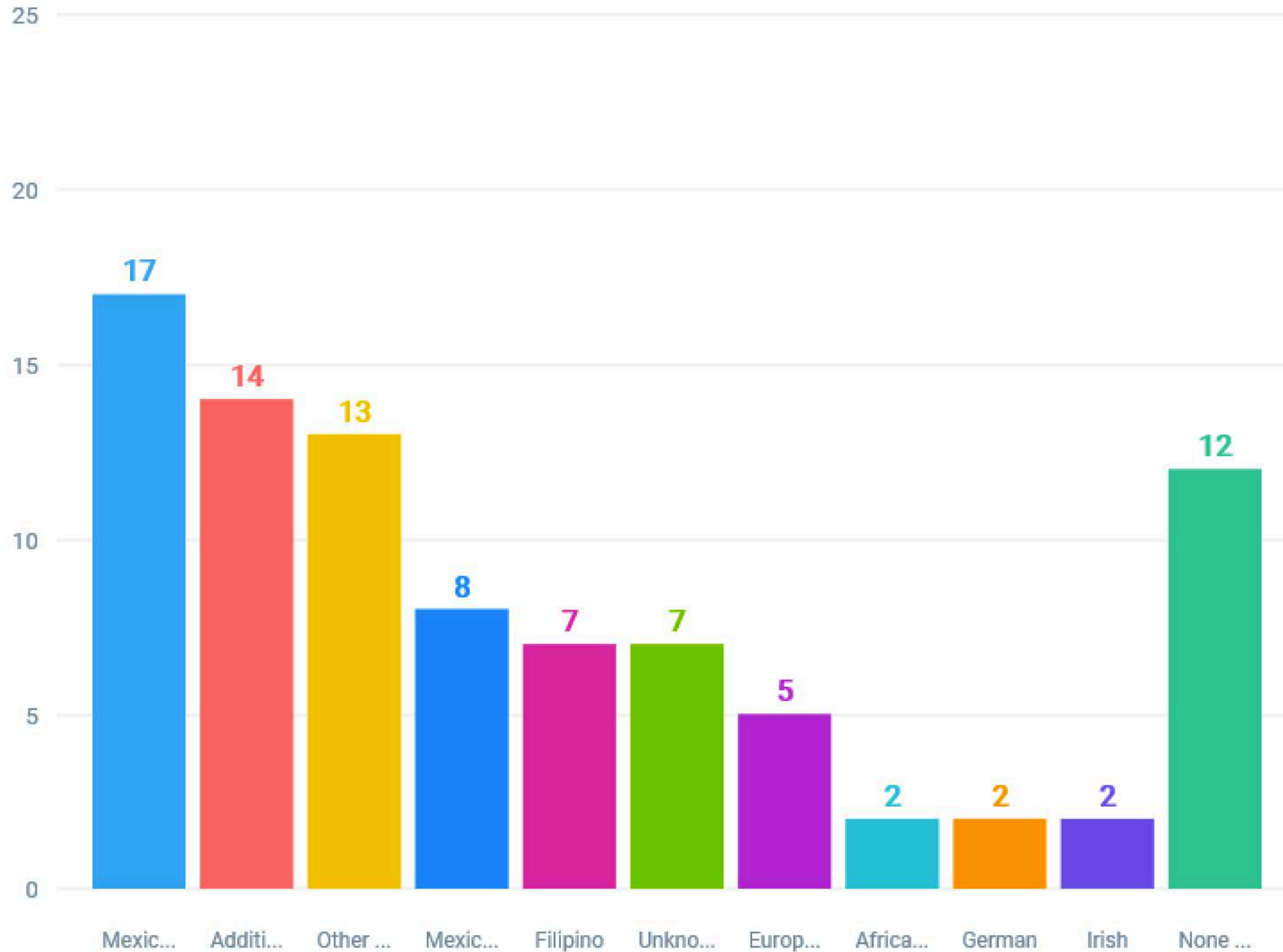
Last 6 months



Number of Patients by Ethnic Background



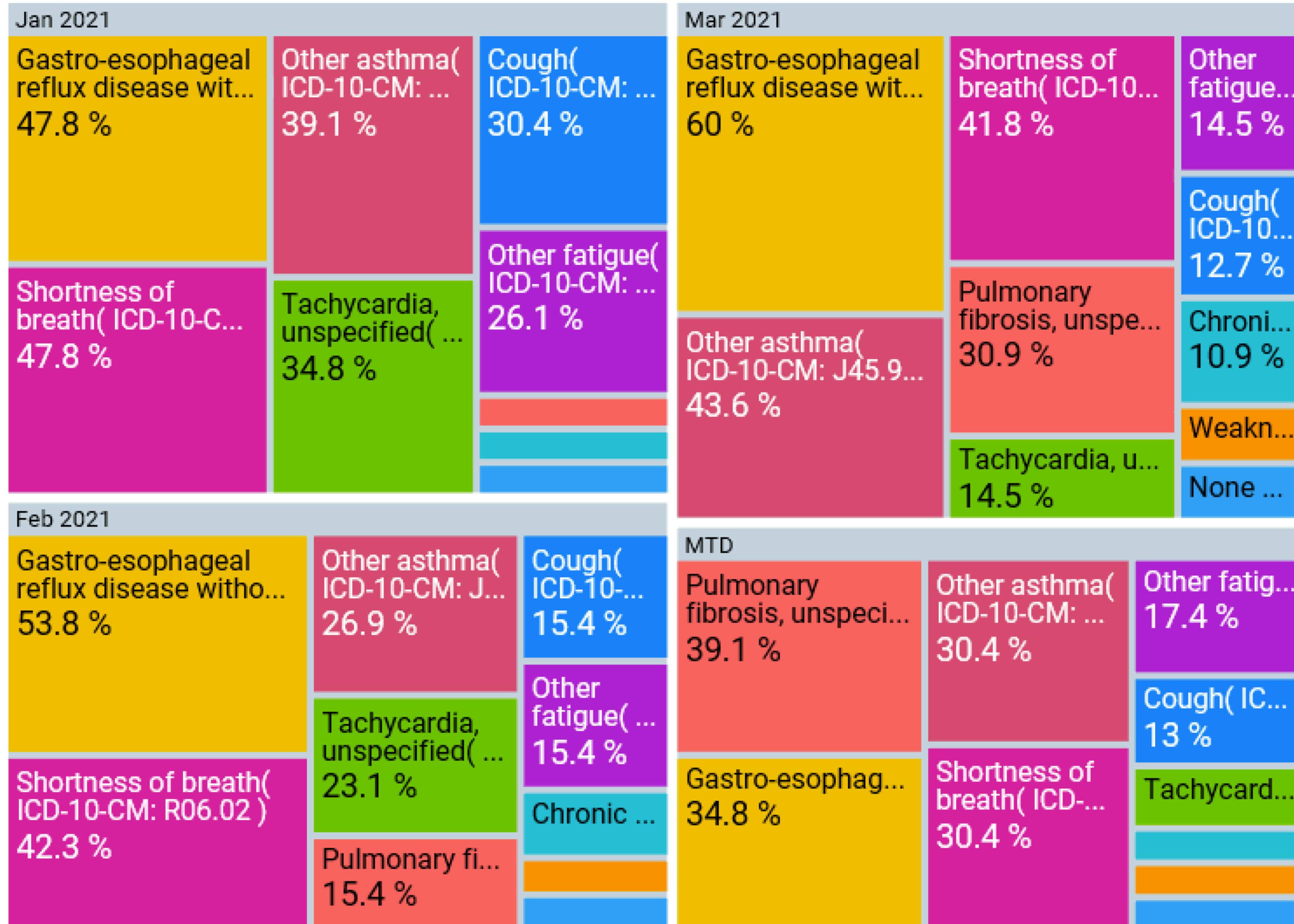
Last 6 months



Percentage of Population by Diagnosis



Last 6 months by month



Shortness of breath/chest tightness

- Reactive Airways
- Postinflammatory pulmonary fibrosis/organizing pneumonia
- Respiratory muscle weakness?

Challenges in defining Long covid: Striking differences across literature, Electronic Health Records, and patient-reported information

medrxiv.org posted March 26, 2021 <https://doi.org/10.1101/2021.03.20.21253896>

Post Acute Sequelae COVID-19

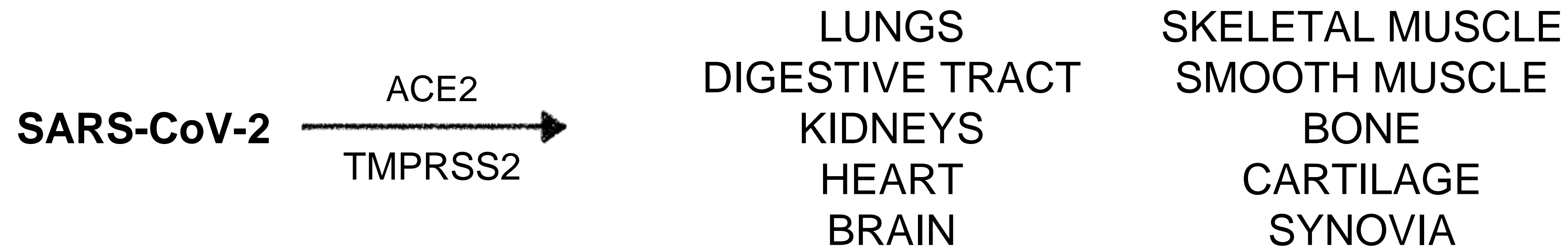
disabling fatigue, musculoskeletal pain, neurocognitive difficulties, and mood disturbance

with muscle weakness no longer associated at 60 days

difficulty concentrating emerging at 60 days, and confusion and bone or joint pain emerging at 90 days

55 symptoms of Long COVID. None of the most common symptoms were assessed by all 15 studies. They reported that the five most common symptoms evaluated in the literature were fatigue, headache, attention disorder, hair loss, and dyspnea

- Initial infection is a 2 step process
- Epithelial cells, endothelial cells, alveolar macrophages
- IHC highest ACE2 protein expression in Sinonasal cavity and Alveolar type II cells
- ACE2-expressing organs do not equally participate in COVID-19 pathophysiology, implying that other mechanisms are involved in orchestrating cellular infection resulting in tissue damage.



6 MONTH CONSEQUENCES OF COVID-19 IN PATIENTS DISCHARGED FROM HOSPITAL: A COHORT STUDY

- 1733/2469 discharged pts with COVID-19 enrolled
 - 736 excluded (declined, nursing or welfare home, unable to be contacted, osteoarticular disease, dementia or psychosis, living outside of Wuhan, death, readmitted, immobile before or after)
- Median age 57, 52% men
- Most common co-morbidities hypertension (29%), diabetes (12%) and cardiovascular disease 7%)
- 68% required O2 therapy, 7% required HFNC or NIV or IMV
- 4% admitted to ICU

Evaluating data from 3,762 respondents to 257 survey questions, this analysis documented 205 phenotypic features associated with Long COVID. The symptoms most frequently reported after 6 months were fatigue, post-exertional malaise, and cognitive dysfunction. Patients who reported symptoms lasting for longer than six months following acute infection experienced an average of 14 symptoms in month 7, and 86% of patients experienced relapses during the period assessed, with exercise, physical or mental activity, and stress reported as common triggers.

- At 6 months,
- 81% scale 3 (admitted, but not requiring supplemental O2) reported at least 1 symptom
- Muscle weakness or fatigue (63%)
- Sleep difficulties (26%)
- Anxiety/depression (23%)

Persistent symptoms

- 30 days (52.5%) vs. 60 days (35%)
- Predictors of symptoms at 30 days
 - Low income, age (35 - 44 vs 18-34), self reported severe/very severe vs. mild symptoms and hospitalization
- Fatigue (53%) and SOB (44%)
- Predictors of symptoms at 60 days
 - Diagnosed psychological disorder, very symptoms and hospitalization
- Mild symptoms (29%) vs. (24.5%)
- Non-hospitalized (43.7%) vs. (26.9%)
- 18-34 yr old (35%) vs (21%)

Post Infectious Sequelae

- Seen in other infectious diseases (Epstein-Barr Virus,¹⁷ Giardia lamblia, Coxiella burnetii, Borrelia burgdorferi (Lyme disease))
disabling fatigue, musculoskeletal pain, neurocognitive difficulties, and mood disturbance
- Other 2 human coronaviruses (SARS-CoV and MERS)
 - Lung health and capacity
 - Psychological health
 - Bone health
 - Lipid metabolism