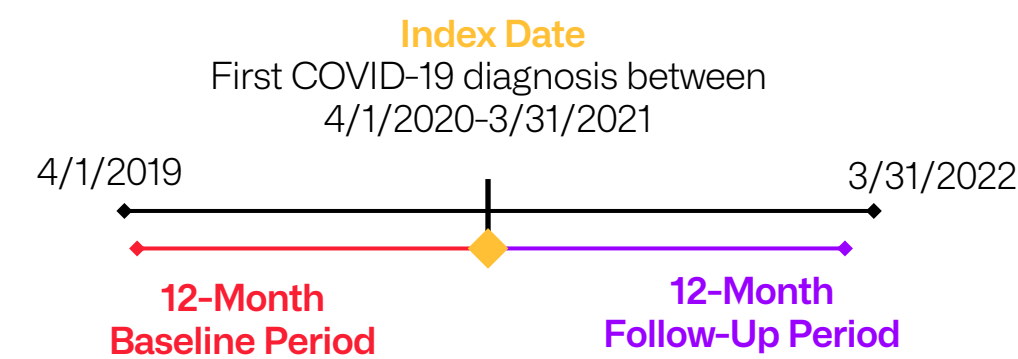


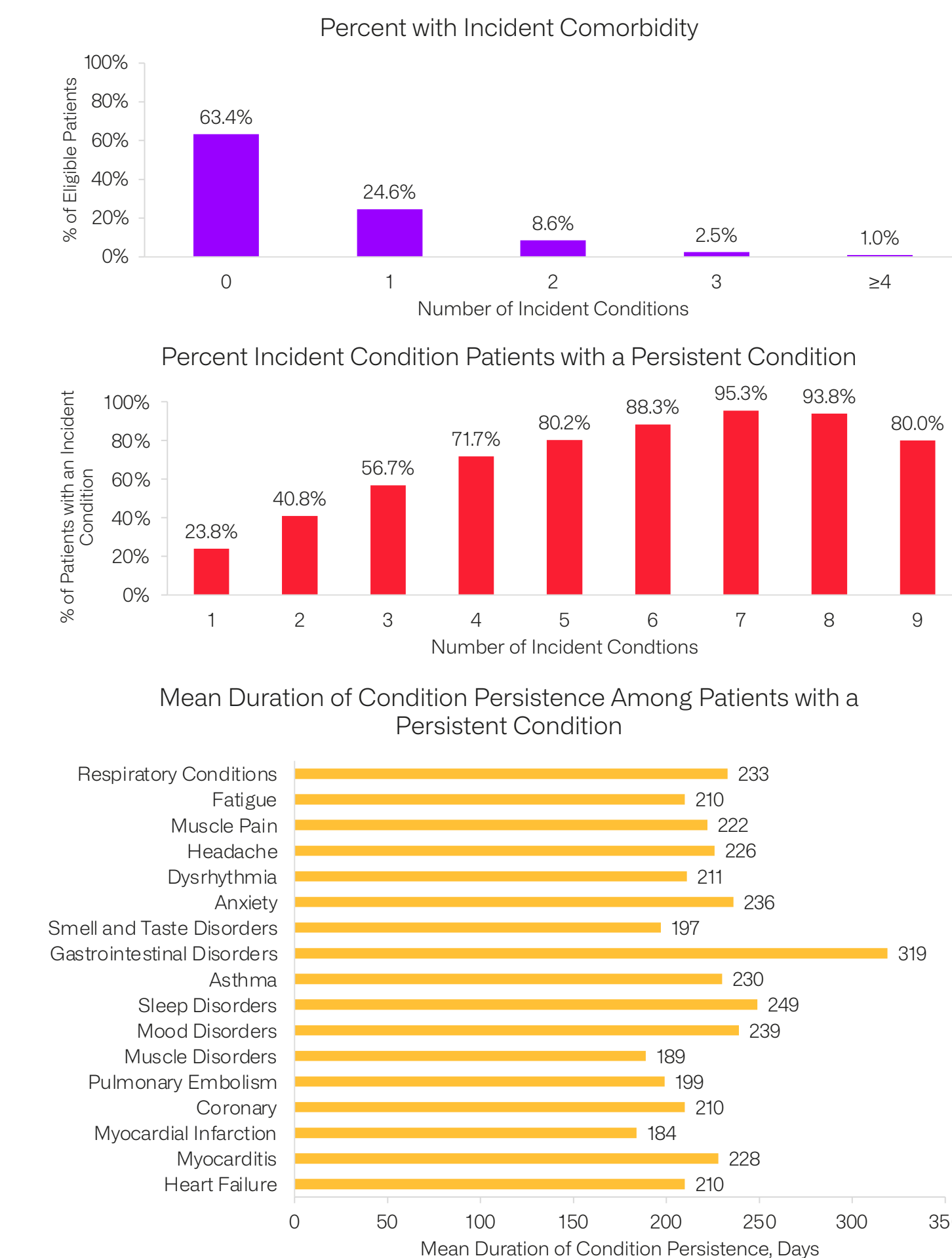
Study Summary

Study Question: What are the incidence and chronicity of various conditions associated with long-COVID syndrome within a US population?

Study Design:



Study Results:



Conclusion: Of the patients who developed ≥1 incident condition following COVID infection, 11.5% had a condition that persisted for >2 months. Improved understanding of the prevalence and duration of long-term COVID-19 related conditions is needed to inform management of patients as we reach the endemic stage of disease.

Background

- Since its emergence in the fall of 2019 COVID-19 has had a profound impact across the globe.
- Initial phases of the pandemic were focused on limiting transmission and caring for patients during the acute phases of infection.
- The long-term impacts of disease started to become apparent in late spring to summer of 2020 with the first reports of what is now known as long-COVID.¹⁻²
 - The Centers for Disease Control (CDC) and the National Institutes for Health and Care Excellence (NICE) both define long-COVID as the persistence of symptoms for at least 4 weeks following initial infection.³
- The prevalence and impact of long-COVID still remain unclear in part due to differences in reporting; long-COVID as been reported to affect approximately 13% of patients with higher rates reported in hospitalized populations.^{1-2,4}

Objective

- To investigate the incidence and persistence of conditions associated with long-COVID syndrome following initial COVID-19 infection within a US population.

Methods

Data Sources

- Merative™ MarketScan® Commercial and Medicare Database from April 1, 2019 through March 31, 2022
 - The MarketScan administrative claims databases contain the complete healthcare experience (inpatient, outpatient, and outpatient pharmacy) for individuals with employer sponsored commercial or Medicare insurance

Study Design

- Patients newly diagnosed with COVID-19, defined as ≥1 non-diagnostic claim for COVID-19 (ICD-10: U07.1), between April 1, 2020 and March 31, 2021 were selected in the MarketScan Commercial and Medicare Database.
- The first COVID-19 diagnosis served as the index date and patients were required to have continuous eligibility for ≥12-months pre- and post-index.
 - To ensure the index date represented the first COVID-19 diagnosis, individuals with a diagnosis of COVID-19 in the pre-period were excluded.

Outcomes and Analyses

- The incidence of 17 different conditions associated with COVID-19 were investigated in over the 12-month post-period among the subsets of the population with no diagnoses for the specific condition in the pre-period.
 - Patients were classified as having an incident condition if they evidenced a non-diagnostic claim for the condition in the 60 days following index.
 - Among individuals with an incident condition, the proportion of patients with persistent conditions, defined as a second claim for the same condition at least 61 days following the index date, was assessed along with the chronicity of the condition, defined as the time from index to the last claim for the condition of interest during the study period within subsets of patients with incident and persistent conditions.

Results

Study Sample and Rates of Screening

- A total of 503,742 patients qualified for the analyses; all patients qualified for ≥4 incident samples and most patients (62.8%) qualified for 16 or 17 incident samples. Patient counts for each incident sample are presented in Table 1.
 - Mean±SD age of patients was 39.5 ±16.5 years, with 11% aged <18 and 2.2% aged ≥65; 53.5% were female.
 - Most patients (57.9%) lived in the South region and the most common types of insurance were EPO/PPO (50.0%) and CDHP/HDHP (28.4%).

Results, Cont.

Condition Incidence and Persistence

- The most common incident conditions in the first 60 days were respiratory conditions, fatigue, muscle pain, headache, and dysthymia (Figure 1A).
 - The mean±SD number of incident conditions per patient was 0.53±0.85, with 24.6% of patients with 1 condition, 8.6% with 2 conditions, and 3.5% with ≥3 conditions (Top Summary Figure).
- Some of the least common conditions evidenced the greatest rates of persistence, with the greatest rates of persistence (second claim after 60 days) observed for pulmonary embolism, mood disorders, anxiety, sleep disorders, and myocarditis (Figure 1B).
 - The rate of persistent conditions increased with the number of incident conditions, primarily between 1 and 4 incident conditions (Middle Summary Figure).
- Among patients with a persistent condition, GI conditions had the longest duration of persistence followed by sleep disorders, mood disorders, and anxiety (Bottom Summary Figure).

Table 1. Patients Eligible for Incident Condition Samples

Condition	Incident Samples (N)	Proportion of Total Sample (%)
Anxiety	431,980	85.8%
Asthma	469,944	93.3%
Coronary	498,507	99.0%
Dysrhythmia	459,152	91.1%
Fatigue	458,005	90.9%
Gastrointestinal (GI) Disorders	439,978	87.3%
Headache	447,079	88.8%
Heart Failure (HF)	502,612	99.8%
Mood Disorders	454,391	90.2%
Muscle Disorders	476,834	94.7%
Muscle Pain	378,631	75.2%
Myocardial Infarction (MI)	502,363	99.7%
Myocarditis	501,162	99.5%
Pulmonary Embolism (PE)	502,389	99.7%
Respiratory Disorders	381,248	75.7%
Sleep Disorders	453,170	90.0%
Smell and Taste Disorders	498,850	99.0%

Figure 1. Proportion of Patients with Incident and Persistent Conditions



Limitations

- Results of this study may not generalize to patients with other (not commercial or private Medicare) types of insurance or the uninsured.
- Administrative claims data provide access to a large study sample; however, claims will not capture mild symptoms that did not require intervention from a healthcare provider.
 - Similarly, as claims are collected for billing purposes, misclassification or coding errors may be present.
- Symptom persistence was assessed via the presence of diagnosis codes on claims and may reflect follow-up for prior conditions, especially for acute conditions like MI, as opposed to active symptomology.

References

1. Crook H. *BMJ*. 2021;372:n1648; 2. Alwan NA. *Science*. 2021;373:491-493. 3. Venkatesan P. *Lancet*. 2021;9:129; 4. Sudre CH. *Nature Medicine*. 2021;27:626.

Conclusions

- COVID-related conditions were common with just over one-third (36.7%) of patients experiencing ≥1 incident symptom; among those, 11.5% had ≥1 persistent condition.
- The mean duration of condition persistence ranged from 189 to 319 days for patients with persistent conditions.
- Given the global infection rates of COVID-19, the development and persistence of COVID-related conditions could place a notable burden on the healthcare system.
 - Additional research into risk-factors of long-COVID syndrome is needed to help manage initial infection and avoid long-term health consequences.

Disclosure

This study was funded by Merative.