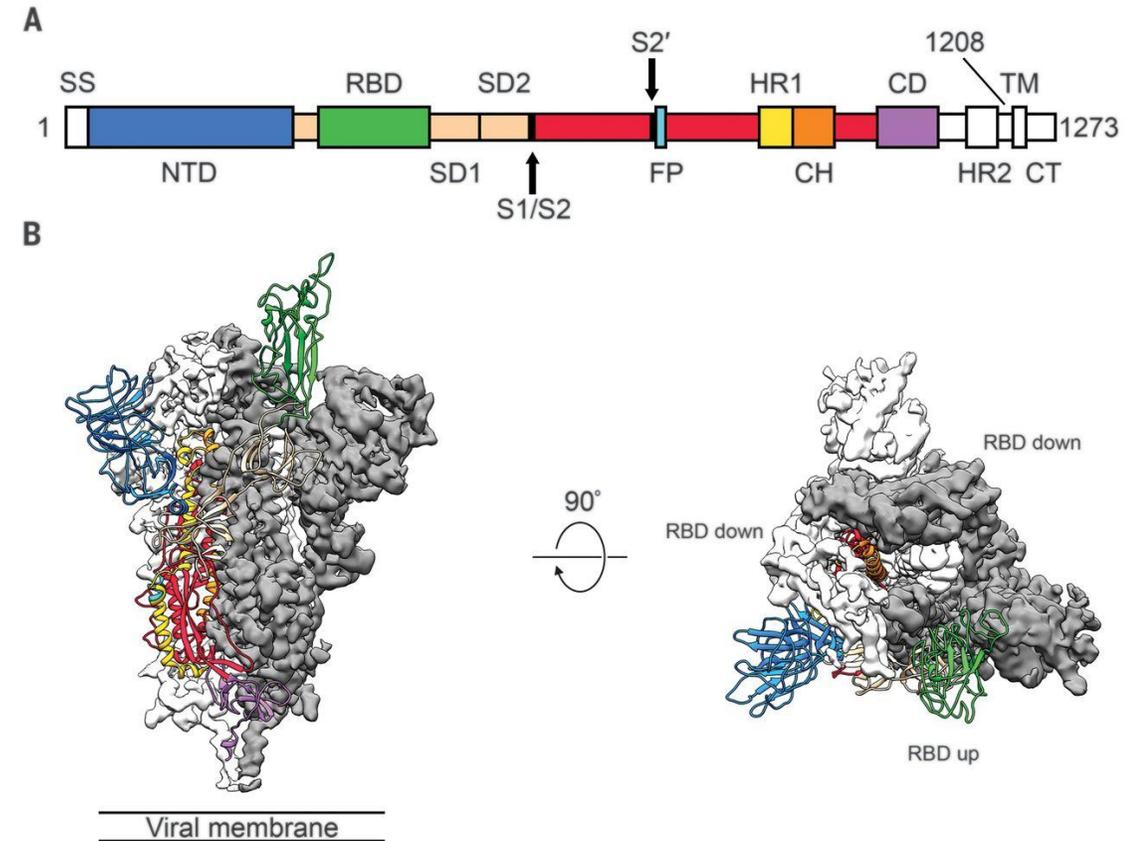


SARS-CoV-2 Variants

- Coronaviruses known for high mutation rate
- Subtle changes in shape of the **spike (S) protein's receptor-binding domain**, which attaches to the ACE2 receptor in airway cells
- Random mutations, some benefit the virus:
 - More effective binding to receptor
 - Higher viral loads in nose and airways
 - E.g. D614G variant identified in spring 2020
- Recently identified variants raise concern for **higher transmission, more severe disease, and/or ability to cause disease in those previously infected or vaccinated**



First Detected	Lineage	Key Features	In USA
UK	B.1.1.7 501Y.V1	<ul style="list-style-type: none"> • D614G, N501Y, 69/70del mutations • 50-74% more transmissible • Higher airway viral loads • More cases in children • Possibly higher mortality • Cases doubling every ~10 days 	
South Africa	B.1.351 501Y.V2	<ul style="list-style-type: none"> • D614G, N501Y, E484K mutations • Arose independently of B.1.1.7 • Unclear how much more transmissible • Decreased efficacy of existing vaccines, especially AstraZeneca 	
Brazil	P.1 501Y.V3	<ul style="list-style-type: none"> • D614G, N501Y, E484K, K417N/T • Unclear how much more transmissible • Able to evade antibodies from prior infection; large 2nd wave in Manaus 	



Effect on COVID-19 Pandemic and Response

- Need for **continued precautions** for individuals and communities
- **Window of opportunity** to prevent a “fourth wave” in spring
 - Personal protection, enhanced masking
 - May need more rigorous public safety measures
 - Stem the tide of new infections before new variants arise/spread
- **Policies** will need to reflect lessons learned from earlier waves
- **Vaccines** still effective to prevent vast majority of cases
 - Will likely retain effectiveness for preventing severe/critical disease
 - Development of updated vaccines and boosters in progress
- **Critical resources:** public health laboratories and genomic surveillance

References

- <https://www.cdc.gov/coronavirus/2019-ncov/transmission/variant-cases.html>
- <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/variant-surveillance/genomic-surveillance-dashboard.html>
- <https://www.gisaid.org/phylogenetics/global/nextstrain/>
- <https://www.bmj.com/content/372/bmj.n394>
- <https://www.nytimes.com/interactive/2021/health/coronavirus-variant-tracker.html>

Post Acute-CoVID Syndrome

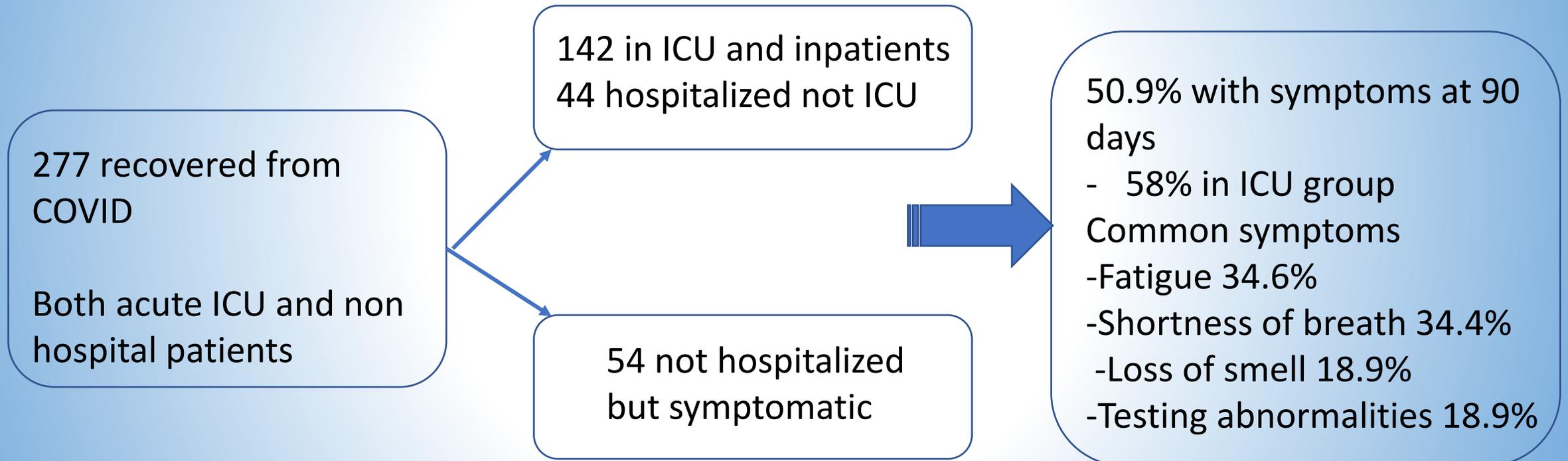
A Short Update

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What is this disease state called?

- Long haul CoVID
- Continued CoVID
- Post CoVID
- Post-CoVID syndrome
- Post-acute CoVID syndrome

How common is this and how sick are people?



Symptoms of post-acute CoVID syndrome

- Cardiovascular: Chest pain, shortness of breath (myocardial inflammation, ventricular dysfunction on testing)
- Respiratory: Chest pain, shortness of breath, decreased exercise tolerance (pulmonary function abnormalities)
- Dermatologic: rash, alopecia
- Constitutional: Fatigue, “brain fog”, “I am just not myself”
- Neurological: loss of smell and taste, sleep dysregulation, altered cognition, memory impairment
- Psychiatric: depression, anxiety, changes in mood

So what causes all these divergent symptoms?

- Prolonged ICU stay and complications thereof
 - Can explain many symptoms at 6 and 12 months post DC
- Microvascular disease with clot and patchy tissue hypoxemia
 - This is driving much of what we see with chest pain, shortness of breath, high heart rate, low oxygen levels, brain fog, fatigue, inability to exercise
 - Explains many of the abnormalities with tests
- Autoimmune process from excess inflammation
 - May explain the nervous system-driven effects: Depression, fatigue, sleep disorders, chronic fatigue overlap symptoms
- Direct infection of the virus
 - Smell and psychiatric issues

What can we do to such diverse disease?

- Improving living
 - Steady activity (yoga and meditation)
 - Mind exercises
 - Sleep hygiene
 - Nutrition
- If you have one predominant symptom, check it out
 - Might not be post acute COVID syndrome
- Anti-coagulation
- Anti-inflammatory agents
- Immune modulators

Any questions

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