

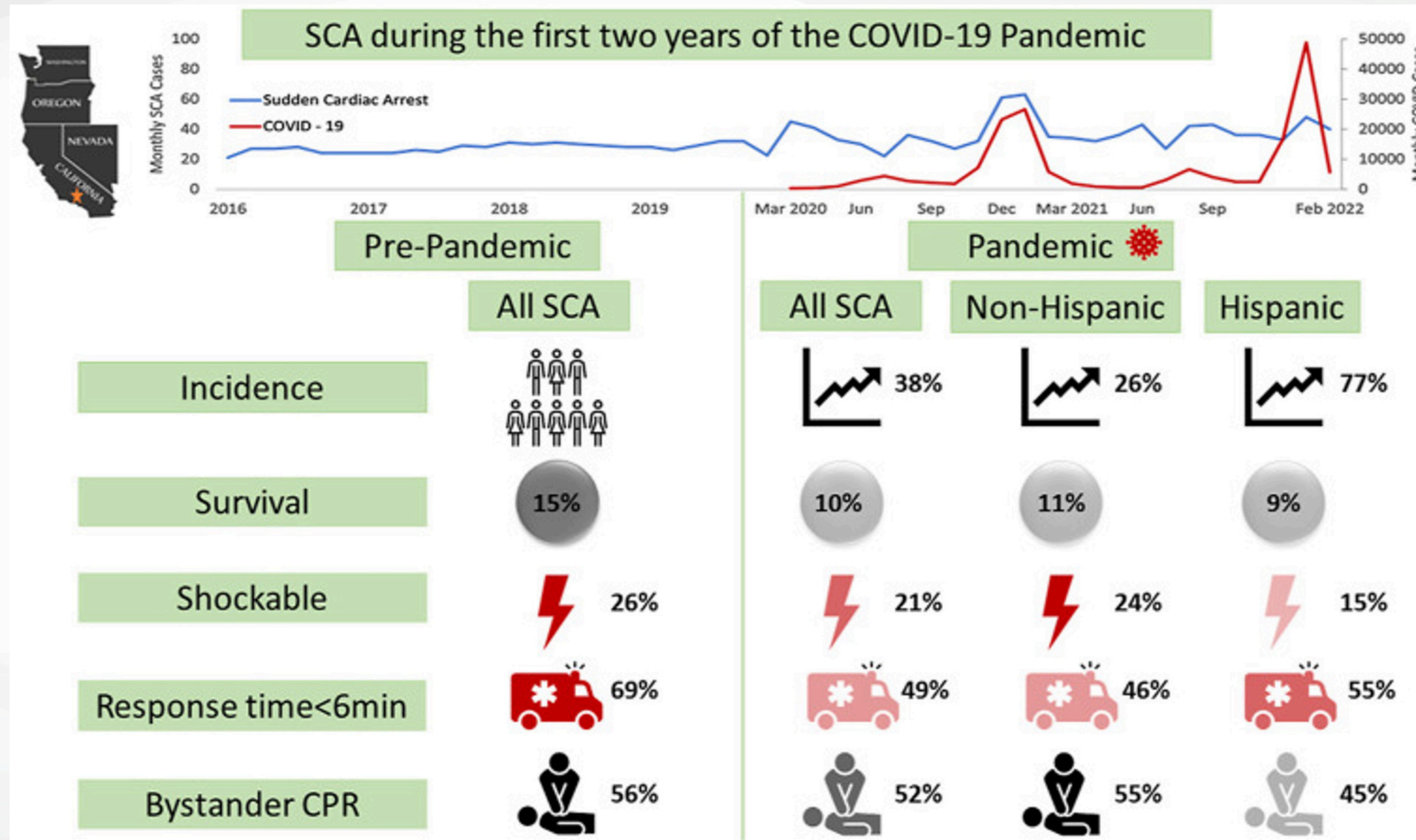
COVID & Sudden Cardiac Arrest

Sudden Cardiac Arrest (SCA) in COVID



- A worldwide study found that about **5%** of people with COVID experienced serious heart rhythm problems:
 - 4.8% (VT/VF) & 5.6% (PEA/Asystole)
 - COVID-RHYTHM Registry (n=666): 4.5%
- The number of out-of-hospital cardiac arrests (OHCAs) **more than doubled** during the early months of the pandemic compared to 2019.
- A larger proportion of OHCA happened at home.
- Fewer people received CPR from bystanders than in 2019, likely due to safety concerns and limited contact.

Increased Risk of SCA During COVID Pandemic



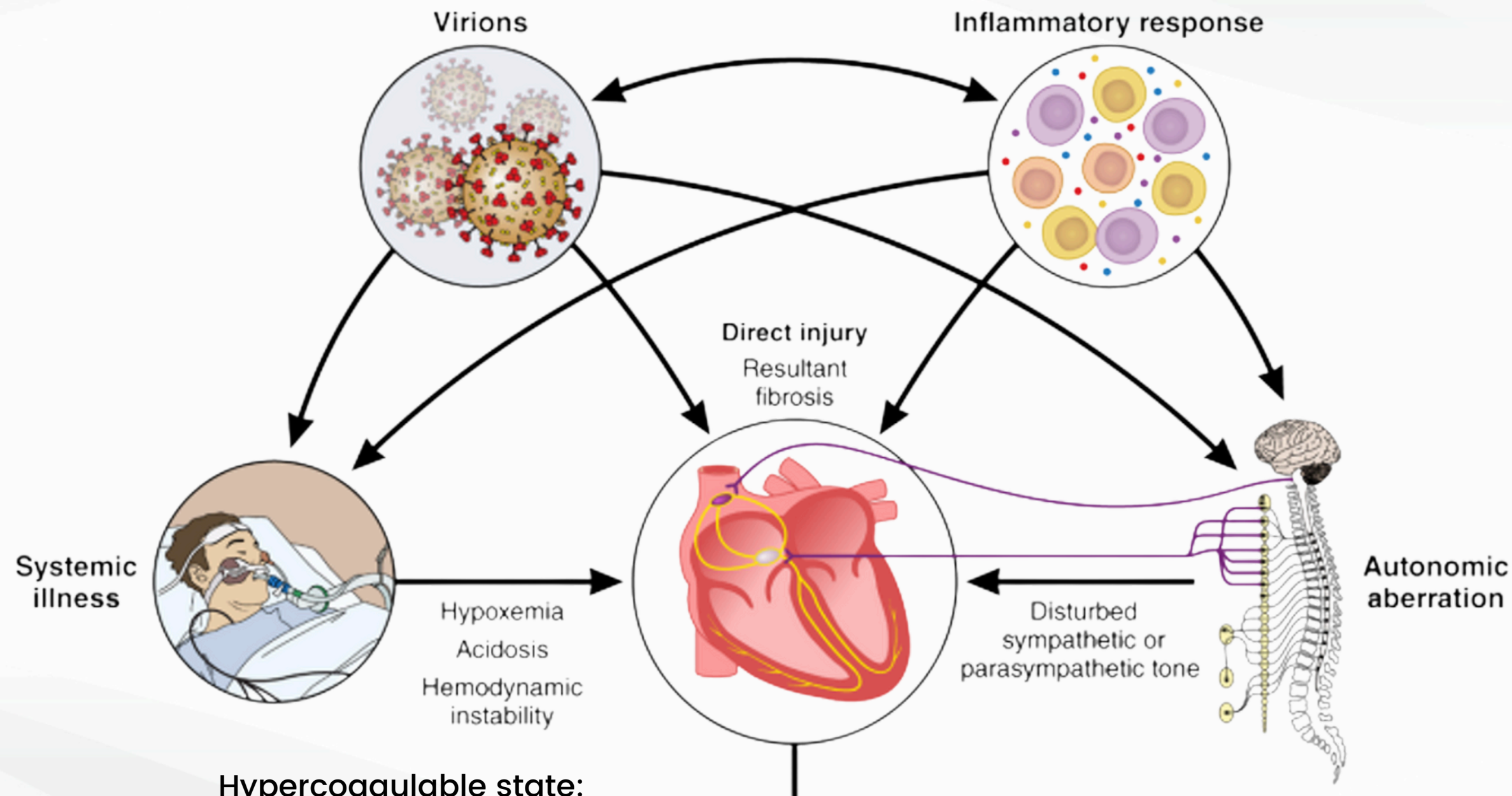
How COVID & SCA Can Affect the Heart



Increased risk of life-threatening heart rhythm disorders due to:

- **Direct injury** to the heart (myocarditis)
- **Blood clots** (hypercoagulable state): These can block blood flow to the lungs (pulmonary embolism) or heart (heart attack).
- **Reduced oxygen levels** and respiratory failure
- An **imbalance of the autonomic nervous system**
- **Drug-induced ECG abnormalities** (QT prolongation): Some medicines used to treat COVID-19 can temporarily change the heart's rhythm.

Mechanisms of Arrhythmias and SCA in COVID-19



Hypercoagulable state:
Clots in blood vessels of
lungs and heart

COVID & Myocarditis

Myocarditis is the **inflammation of the heart muscle**, leading to the heart becoming swollen or irritated.

- WHO Data for COVID infection (as of October 2025):
 - 7.78 million confirmed cases; 7.1 million deaths
 - 13.64 billion vaccine doses
- People who contracted COVID were about **15 times more likely** to develop myocarditis than those who didn't have COVID.
- **Myocarditis after COVID vaccination is very rare** — about 1 to 10 people per million (slightly more often in men <40 years, usually after the second dose of mRNA vaccine)

COVID & Myocarditis: Symptoms & Onset



When:

- Early: within 1–2 weeks after infection, when the virus directly affects the heart.
- Later: 2–6 weeks after infection, when the body's immune system reacts and causes inflammation.

Common symptoms:

- General: fever, tiredness, feeling unwell
- Heart-related:
 - Chest pain or pressure
 - Fast or irregular heartbeat (palpitations)
 - Shortness of breath
 - Swelling in legs or ankles
 - Feeling dizzy or fainting

How doctors check for it:

- Blood tests showing higher heart enzyme levels
- Heart scans (Echocardiogram, MRI, or PET) to look for inflammation
- May show abnormal heart rhythms on ECG

**Early diagnosis and treatment
lead to better recovery and
fewer complications.**

Preventing SCA During & After COVID



1. Recognize early warning signs.

- Watch for chest pain, shortness of breath, or irregular heartbeats.
- Doctors may use ECG tests, blood work, and heart scans to check for inflammation or strain.

2. Know who's at higher risk. People with existing heart disease, heart failure, or past rhythm problems (arrhythmias) should be extra careful.

3. Treat heart issues promptly. Quick care for inflammation (myocarditis), irregular rhythms, or blood clots can prevent serious complications.

4. Control what you can.

- Manage blood pressure, cholesterol, and blood sugar.
- Quit smoking, eat healthy, and stay active.

5. Stay protected.

- Get vaccinated and boosted, especially if you have heart disease or other health risks.
- Vaccines reduce the chances of severe COVID and heart complications.

SCA & COVID Response & Management



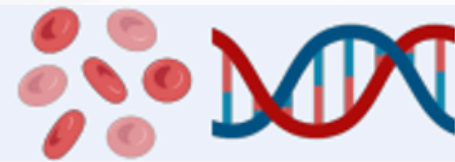
- **Emergency care first:** Medical teams perform CPR and defibrillation using protective gear to keep everyone safe.
- **Supportive treatment:** Doctors ensure the person gets enough oxygen and that blood continues to circulate throughout the body.
- **Treating the cause:** Infections and other health problems are treated to help the heart recover.
- **Managing heart rhythm problems:**
 - Use of medications to control irregular heartbeats
 - Procedures like catheter ablation or ICD (implantable defibrillator) if needed
- **Preventing blood clots:** Doctors may use blood thinners to stop dangerous clots in the heart or lungs.

Long-Term Arrhythmia Risks in Patients Who Recovered From COVID



- Some people continue to have symptoms for months after recovering from COVID — this is known as **Long COVID Syndrome**.
- These symptoms may include chest pain, shortness of breath, fatigue, or heart palpitations (a feeling that your heart is racing or skipping beats).
- Around **1 in 5 people with Long COVID experience heart-related issues**.
- This can happen because COVID may cause:
 - Ongoing inflammation in the heart
 - Immune or nervous system imbalances
 - Lingering heart muscle weakness (myocarditis or cardiomyopathy)
- Early follow-up with a heart specialist and regular monitoring help detect and manage rhythm problems early.

Long COVID & Cardiovascular Disease



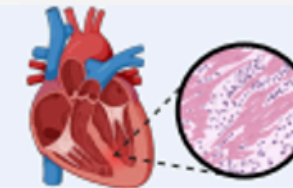
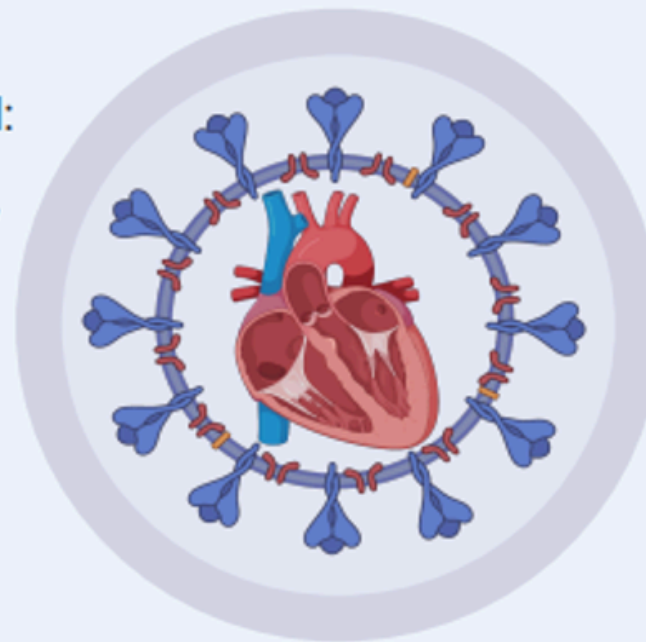
Pathophysiology

- Augmented immune response has a key role.
- Exact mechanisms remain unclear but the following may be implicated:
 - Genetic predisposition
 - Immune response mediated by B and T cells
 - Inflammatory response and auto-antibodies



Risk Factors

- Patients with pre-existing heart failure or ischaemic heart disease have increased risk of developing Long COVID syndrome.
- Obesity and diabetes are also important risk factors.
- Evidence is conflicting about other cardiac conditions (hypertension, atrial fibrillation etc).



Complications

- New onset cardiovascular diseases have been noted in patients with Long COVID syndrome (commonly hypertension and diabetes).
- Long COVID may also have an impact on the myocardium (resulting in myocardial oedema, inflammation or fibrosis and potentially functional impairment).



Prevention & Treatment

- Optimal control of modifiable risk factors may be of value in disease prevention but there is lack of definitive evidence.
- Vaccination and medications (antivirals, metformin) may have a role in the prevention of Long COVID.
- No specific treatment found to be effective and efficient but the use of antivirals and cardio-selective treatments may ameliorate symptoms

References

1. Gopinathannair R, Russo AM et al. J Interv Card Electrophysiol. 2020
2. Lai PH et al. JAMA Cardiol 2020;5:1154–63
3. Uy–Evenado A et al. JACC Clin Electrophysiol. 2021
4. Chugh HS et al. Heart Rhythm. 2023 Jul;20(7):947–955.
5. Gopinathannair R et al. Circulation 2024; 150: e449–e465
6. COVID-19 cases | WHO COVID-19 dashboard
7. MMWR Morb Mortal Wkly Rep. 2021;70:1228–1232
8. Nature Medicine 2022;28:410–422
9. Vassiliou VS et al. Eur J Prev Cardiol. 2025
10. Gopinathannair R et al. Circulation 2024; 150: e449–e465
11. Vassiliou VS et al. Eur J Prev Cardiol. 2025
12. Tsampasian V, et al. Eur J Prev Cardiol. 2025 Apr 22;32(6):485–498

