

Current Thinking on COVID-19 and Heart Disease

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There has been a growing interest in how COVID-19 affects people with heart disease. This document covers several questions that people with heart disease are asking their doctors:

— Does heart disease put me at higher risk of picking up COVID-19?

Early reports from China suggest that there was a higher rate of COVID-19 infection in people with heart disease, particularly coronary heart disease and diabetes, than in the general population. This increased risk is plausible but not scientifically proven for several reasons.

Nugget



7.4 million people are living with heart and circulatory diseases in the UK

Heart disease is very common, particularly in people over 50 years old, and increasing age is the main risk factor for why people are admitted to hospital with COVID-19. *The research studies have not separated the risk attributed to age from the risk attributed to heart disease.*

As the reports from China are concerned only with COVID-19 hospital admissions, it is possible that people with pre-existing heart disease attended hospital more readily than the general population who stayed at home.

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Patients with more serious heart diseases such as heart failure, cardiomyopathy and previous heart attacks may be at higher risk of developing COVID-19.

Sensible measures of self-isolation and social distancing are the best way to reduce the risk of infection.

— Heart medication and COVID-19

The issue of specific heart medications known as ACE inhibitors and Angiotensin Receptor Blockers (ARB medications) and COVID-19 is complex. Many people with heart disease, high blood pressure or diabetes take

ACE inhibitors (e.g. Ramipril, Lisinopril, Perindopril, Enalapril) or ARB medications (e.g. Losartan, Candesartan, Valsartan, Telmisartan, Olmesartan). Heart failure medication Entresto also contains Valsartan.

- There is some evidence to suggest taking ACE inhibitors and ARB medications could increase the risk of infection if you are exposed.
- However there is also some science to suggest that, once infected with COVID-19, taking ACE inhibitors and ARB medications may be protective.

Neither of these concepts is scientifically proven, and the advice from the professional cardiac organisations of the UK and Europe is not to stop these medications if you are currently taking them prescribed by your GP or cardiologist.

Do any heart medications increase the risk of me catching COVID-19?

This is currently a very hot and complicated topic. It arose from the observation of a higher rate of COVID-19 infections in China in people with coronary artery disease or diabetes.

In people with the most serious heart diseases (heart failure, large heart attacks) these medications often provide health benefits over days, weeks and months. They provide life-saving benefits for many people taking these medications. **Stopping them if you have one of these conditions carries a significant risk and is not advisable.** In people with milder heart diseases (well controlled high blood pressure, coronary disease without heart attacks) the benefits are measured over 5-10 years.

The concern regarding ACE inhibitors, ARB medications and the current COVID-19 virus (also known as SARS-CoV2) comes from previous scientific observations and studies of the SARS-CoV1 virus which caused the bird flu outbreak in Asia in 2002-2003.

Research studies have shown that the bird flu virus enters the human body by attaching to a protein called ACE2 on the surface of cells inside our lungs and intestine. Once it has attached to ACE2 the virus and the ACE2 molecule are transported inside the cells of the lung and intestine - allowing the virus to start the infection.

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Recent data shows that the structure of COVID-19 is 75% similar to bird flu (SARS-CoV1), including the region on the surface of the virus which docks with the ACE2 protein. Therefore, whilst not proven, current data suggests COVID-19 may also enter our bodies by binding to the ACE2 protein.

ACE2 is also found in our hearts, blood vessels and kidneys, so once the COVID-19 virus has entered our bodies and starts replicating, the virus may enter these organs as well.

Previous animal studies in heart disease research have shown that taking ACE inhibitors and ARB medications leads to higher levels of ACE2 in the lungs, intestine, heart, blood vessels and kidneys. It is presumed, but not proven, to be the same in humans. Higher ACE2 levels may be part of the treatment benefit for heart diseases as high ACE2 levels offer many beneficial effects to heart and blood vessel health.

Therefore, people taking ACE inhibitors and ARB medications may indeed be at increased risk of COVID-19 infection, but only if all of the above hypotheticals are indeed correct. New knowledge about the virus continues to emerge and the information on which such theories are based is ever developing.

— Do any heart medications protect me if I develop COVID-19?

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In contrast to the concern above, some research supports the idea that these medications may decrease the risk of the more serious complications of COVID-19. If this is true then it may be beneficial to be taking ACE inhibitors and ARB medications. Though there is a basis for this idea it has not been scientifically proven.

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It relates to the complex role of the ACE2 protein in the body. It is possible that when the COVID-19 virus docks on the ACE2 protein it can no longer deliver its beneficial effects. As infection requires lots of virus particles to enter the body, it is possible that the COVID-19 infection overwhelms the ACE2 and causes the levels of ACE2 in the body to fall.

This leads to a rebound increase in a hormone called angiotensin 2. In many heart diseases (heart attack, heart failure, high blood pressure) rise in angiotensin 2 levels causes damage to the heart muscle, kidneys and blood vessels. ACE inhibitors and ARB medications block the effects of high levels of angiotensin 2.

ACE2 also lowers angiotensin 2 levels, and therefore it could be considered as the 'natural ACE inhibitor' in our body. Some research studies suggest that high angiotensin 2 levels may contribute to the serious lung diseases which occurred with bird flu.

If this is the case, people taking ACE inhibitors and ARB medications may theoretically be more protected from this surge in angiotensin 2 if it occurs during COVID-19 infection. They may then be less likely to develop the more life threatening complications.

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There are research trials currently underway treating people in hospital with COVID-19 with one of the ARB medications to see if it reduces the risk of lung failure and increases survival in people with COVID-19.

— Will COVID-19 affect my heart disease?

Catching any flu, whether caused by COVID-19 or the 'usual' influenza virus, can often unsettle pre-existing heart conditions. Many people feel unwell, off their food, and perhaps do not drink plenty of water to keep hydrated. The stress of the illness can also cause blood pressure to rise and place extra strain on your heart. This can cause people with heart disease to have more problems with their heart condition.

Continue taking your medication and keep well hydrated if you develop the COVID-19 flu. Take paracetamol and avoid ibuprofen, for the muscle aches and fever.

— Can COVID-19 cause heart disease?

The increasing data from China and Italy, and now from experience in the UK and USA, suggests that COVID-19 can cause heart problems directly. This is currently believed to be rare compared to the lung problems developed from COVID-19 and over the next weeks and months we will learn how many people have new heart problems caused by COVID-19.

— What can I do to stay well?

Everyone, and especially people with heart disease, should try and stay healthy with the following strategies to help both their heart health and their immunity:

- Regular exercise – in self isolation consider a workout programme from an online instructor, focussing on aerobic exercise
- Jogging on the spot for 10 minutes each day is a gentle workout which can be performed in self isolation either inside or outside
- Healthy diet with fruit and vegetables
- Avoid excessive alcohol consumption
- Take your regular heart medication as prescribed by your doctor

Useful links

Staying healthy whilst you self isolate: [🔗 https://www.bhf.org.uk/information-support/heart-matters-magazine/wellbeing/how-to-keep-healthy-while-you-cant-go-out](https://www.bhf.org.uk/information-support/heart-matters-magazine/wellbeing/how-to-keep-healthy-while-you-cant-go-out)

British Heart Foundation COVID-19 advice: [🔗 https://www.bhf.org.uk/information-support/heart-matters-magazine/news/coronavirus-and-your-health](https://www.bhf.org.uk/information-support/heart-matters-magazine/news/coronavirus-and-your-health)

European Society of Cardiology on COVID-19: [🔗 https://www.escardio.org/Education/COVID-19-and-Cardiology](https://www.escardio.org/Education/COVID-19-and-Cardiology)

World Heart Foundation: [🔗 https://www.world-heart-federation.org/covid-19-outbreak/](https://www.world-heart-federation.org/covid-19-outbreak/)

BHF dietary advice: [🔗 https://www.bhf.org.uk/information-support/support/healthy-living/healthy-eating](https://www.bhf.org.uk/information-support/support/healthy-living/healthy-eating)