



# Timeline of Cardiovascular Disease Treatment

1920s:

The first electrocardiogram (ECG) machines are used to measure the electrical activity of the heart and diagnose arrhythmias and other heart problems.

1930s:

The first coronary angiogram is performed, allowing doctors to see the blood vessels of the heart and detect blockages or narrowing.

1940s:

The first cardiac catheterization is performed, enabling doctors to measure the pressure and oxygen levels in the heart chambers and arteries. The first heart-lung machine is also developed, allowing surgeons to operate on the heart while it is stopped and bypassed by a pump.

1950s:

The first successful open-heart surgery is performed, using a heart-lung machine to repair a congenital heart defect. The first artificial heart valve is implanted, replacing a damaged or diseased valve. The first pacemaker is implanted, delivering electrical impulses to regulate the heartbeat.

1960s:

The first coronary artery bypass graft (CABG) surgery is performed, using a vein from the leg or an artery from the chest to create a detour around a blocked coronary artery. The first heart transplant is performed, replacing a failing heart with a donor heart.

1970s:

The first balloon angioplasty is performed, using a catheter with a balloon tip to widen a narrowed coronary artery. The first drugs to lower blood pressure, a landmark study that showed high blood pressure can decrease life expectancy, and the first cholesterol-lowering drug are also introduced.

1980s:

The first stent is implanted, using a metal mesh tube to keep a coronary artery open after angioplasty. The first implantable cardioverter defibrillator (ICD) is implanted, delivering shocks to restore a normal heartbeat in case of a life-threatening arrhythmia.

1990s:

The first minimally invasive heart surgery is performed, using small incisions and specialized instruments to access the heart. The first drug-eluting stent is implanted, releasing medication to prevent restenosis (re-narrowing) of the coronary artery. The first transcatheter aortic valve replacement (TAVR) is performed, using a catheter to insert a new valve inside the old one without removing it.

2000s:

The first bioresorbable vascular scaffold is implanted, using a biodegradable stent that dissolves over time and leaves behind a natural vessel. The first stem cell therapy for heart failure is tested, using the patient's own cells to regenerate damaged heart tissue. The first transcatheter mitral valve repair (TMVR) is performed, using a clip device to reduce mitral regurgitation (leaking) without surgery.

2010s:

The first wireless pacemaker is implanted, using a tiny device that is inserted directly into the heart without leads or wires. The first 3D-printed heart is created, using a patient's own cells and biomaterials to produce a personalized organ. The first gene therapy for heart failure is tested, using a modified virus to deliver a gene that improves the heart's pumping ability.

# Facts About Cardiovascular Disease

- Cardiovascular disease (CVD) remains the leading cause of death in the United States, accounting for 928,741 deaths in 2020.<sup>1</sup>
- In 2020, the leading cause of deaths attributable to CVD in the United States was coronary heart disease (CHD) at 41.2%, followed by stroke (17.3%), other CVD (16.8%), high blood pressure (12.9%), heart failure (9.2%), and diseases of the arteries (2.6%).<sup>1</sup>
- The direct and indirect costs of total CVD in the United States between 2018 and 2019 were \$407.3 billion (\$251.4 billion in direct costs and \$155.9 billion in lost productivity/mortality).<sup>1</sup>
- On average, someone dies of CVD every 36 seconds in the United States.<sup>2</sup>
- Globally, CVDs are the leading cause of death, accounting for 32% of all global deaths in 2019.<sup>3</sup>

## The future of treating cardiovascular disease



**Wearable devices** that monitor heart rate, blood pressure, oxygen saturation, and other vital signs, and alert patients and doctors of any abnormalities or emergencies.



**Artificial intelligence** that analyzes large amounts of data from electronic health records, imaging, and wearable devices, and provides insights for diagnosis, prognosis, and treatment of cardiovascular disease.



**Stem cell therapy** that uses the patient's own cells to regenerate damaged heart tissue and improve cardiac function.



**Nanotechnology** that delivers drugs or genes to specific targets in the heart, such as plaque, inflammation, or ischemia, and enhances the efficacy and safety of therapies.



**3D printing** that creates personalized models of the heart, valves, vessels, and implants, and facilitates surgical planning, simulation, and training.

## References

1. <https://professional.heart.org/en/science-news/heart-disease-and-stroke-statistics-2023-update>
2. [https://www.heart.org/-/media/phd-files-2/science-news/2/2021-heart-and-stroke-stat-update/2021\\_heart\\_disease\\_and\\_stroke\\_statistics\\_update\\_whats\\_new.pdf](https://www.heart.org/-/media/phd-files-2/science-news/2/2021-heart-and-stroke-stat-update/2021_heart_disease_and_stroke_statistics_update_whats_new.pdf)
3. <https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-%28cvds%29>