Heart Failure Fact Sheet - Causes, Costs and Treatment Options

The Human Heart: The human heart is divided into four chambers, two upper chambers, or atria, and the two lower chambers, or ventricles. The left side of the heart houses one atrium and one ventricle, and the right side of the heart contains the other atrium and ventricle. A wall, known as the septum, separates each side of the heart. The right and left atria receive blood returning from the body and lungs via the veins, while the right and left ventricles pump blood into the arteries.

The average normal adult heart weighs approximately 300 grams (averaging 255.15 grams in a female and 297.67 grams in a male) and is located in the middle of the chest and behind the breastbone. A healthy heart muscle pumps 60 to 80 times per minute, approximately 4,300 gallons of blood per day. A diseased heart, in failure, is often twice the size of a normal heart and barely able to pump half the normal amount of blood through the body.

Heart Failure: Heart failure is typically caused by persistent high blood pressure, heart attack, valve disease, and other forms of heart disease or birth defects. It is a costly and widespread chronic condition in which the lower chambers of the heart cannot pump sufficient amounts of blood to tissues and vital organs of the body. This causes the organs to progressively fail, resulting in numerous medical complications that erode a person’s quality of life and often leads to death.

Heart failure can involve the left side of the heart, the right side or both, but it usually affects the left side first.

Left vs. Right Side Heart Failure: Left-ventricular heart failure involves the left ventricle (lower chamber) of the heart. Oxygen-rich blood travels from the lungs to the left atrium, then to the left ventricle and is pumped to the rest of the body. Because this chamber supplies most of the heart's pumping power, it is larger.
than the other chambers and is crucial to normal function. Problems arise when blood coming into the left atrium from the lungs “backs up,” causing fluid to leak into the lungs (pulmonary edema). As the heart's ability to pump decreases, blood flow slows down, causing fluid to build up in tissues throughout the body (edema). This excess fluid, or congestion, explains the term “congestive heart failure (CHF).”

Right-ventricular heart failure usually occurs as a result of left-sided failure. When the left ventricle fails, increased fluid pressure is transferred back through the lungs, ultimately damaging the heart's right side. When the right side loses pumping power, blood backs up in the body's veins, usually causing swelling in the legs and ankles.

**Disease Statistics:**
- The American Heart Association has reported that cardiovascular disease is the main cause of death in the United States.
- More than 5 million Americans have CHF. It is responsible for over 250,000 deaths annually and approximately 550,000 new cases are diagnosed each year in the United States.
- The five-year mortality rate from heart failure is approximately 50 percent.
- Heart failure is the only major cardiovascular disease that is rising in incidence and prevalence, with the number of deaths in the United States more than doubling since 1979.
- According to the National Institutes of Health’s National Heart, Lung and Blood Institute, heart failure is so prevalent that it should be considered “a new epidemic.”
- Heart failure is responsible for more than 15 million office visits and more than 1 million hospitalizations for 6.5 million days each year, making it the most frequent cause of hospitalization for people age 65 and older.
- With the overall aging of the population, the prevalence of heart failure is expected to grow—approximately two percent of the population has heart failure, and 75-80 percent of these patients are older than 65. The chance of heart failure increases 6-10 percent in people 65 years old or older.
- Incident rates, mortality and hospitalizations related to heart failure are continuing to rise, due to the growing elderly population. Some estimate an increase of 50 percent in the population over the age of 65 over the next 30 years.

**Cost:** The American Heart Association estimates that $34.8 billion in direct and indirect costs was spent on heart failure in 2008.

**Conventional Treatment:**
- Conventional care for managing advanced-stage heart failure patients often involves drug therapy. The most common drugs
include: diuretics, angiotensin converting enzyme (ACE) inhibitors, beta-blockers and digoxin combined with strict diet and exercise programs.

- For most, heart transplantation is the only hope of survival, yet many advanced heart failure sufferers are ineligible for transplant due to age or other extenuating health reasons.
- More than 2,100 advanced-stage heart failure patients receive heart transplants each year, while over 250,000 patients have no viable treatment option and are considered at high risk for repeated hospitalizations, severely diminished quality of life and limited life expectancy.
- In the U.S. 25,000 to 50,000 people in the U.S. die each year while waiting for a heart transplant.

Mechanical Circulatory Support (MCS) Therapy:

- Mechanical circulatory support (MCS) therapy boosts hemodynamic function in failing hearts via ventricular assist devices (VADs).
- American College of Cardiology (ACC) and American Heart Association (AHA) issued guidelines in 2005 recommending early therapeutic interventions to reduce morbidity and mortality. This includes the consideration of mechanical circulatory support (MCS) therapy with VADs as permanent or long-term therapy.
- MCS can trigger a favorable physiological cascade of events, significantly improving both survival and quality of life. Cardiac output is restored at once, enhancing the functioning of end organs such as the liver and kidneys. Molecular and cellular improvements in the myocardium follow, as well as improvement in neurohormonal modulation.
- With timely intervention, most NYHA Class IV patients treated with a VAD improve to NYHA Class I or II.\(^4\)

Indications for MCS Therapy:

- For bridge to heart transplant-eligible patients facing an extended wait for a donor heart, MCS can provide Bridge-to-Transplantation Therapy. Moreover, an analysis of heart transplant recipients has revealed that the risk of chronic real dysfunction, a major complication of heart transplantation, is greater in patients bridged to transplant with inotropes than with mechanical circulatory support.\(^4\)
- For other patients unable to wean from cardiopulmonary bypass, MCS can provide support during the Post-Cardiotomy Recovery period.\(^5\)
- Some VADs are specially designed to provide short-term support in acute hemodynamic compromise while more definitive treatment decisions are made.\(^5\)
- Through extensive ongoing clinical research, it has been
demonstrated that VADs can be implanted for long-term or permanent use (DT), in patients ineligible for a transplant by increasing their survival time and quality of life beyond that of medically managed patients, who were treated with drugs, diet and exercise.

- DT provides a new treatment option for advanced heart failure sufferers who do not qualify for a heart transplant due to age, existing medical condition or other criteria not conducive to transplant.
- The DT indication can potentially treat the sickest heart failure patients among the 50,000-100,000 Americans each year who have no alternative for their debilitating disease.

References: This document contains information from the American Heart Association (AHA), American College of Cardiology (ACC), National Institutes of Health (NIH), the Heart Failure Society of America, Centers for Medicare & Medicaid Services (CMS) and the American Journal of Cardiology.


3. Russell SD. Advanced Heart Failure—When to Refer. Presented at the Heart Failure Society of America Scientific Sessions, September 10, 2006, Seattle, WA.


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