

Heart Failure

Marie I. Amico, FNP-C

Advanced Heart Failure and Cardiomyopathy Center

Valley Health, Winchester Medical Center

Disclosures

▶ None

Objectives

- ▶ Overview of heart failure
- ▶ Review of Medications commonly used in Heart Failure
- ▶ Device Therapy

Heart Failure

- ▶ What is the **ONLY** major cardiovascular disease where incidence and prevalence are increasing?
- ▶ What Cardiovascular diagnosis affects 5.7 million Americans?
- ▶ Over 250,000 people die **ANNUALLY** from this disease
- ▶ There are 670,000 new cases are diagnosed annually
- ▶ In 2001, this diagnosis accounted for \$19.4 **BILLION** in direct health care costs, and additional \$21 **BILLION** in indirect costs.

So, what is heart failure

- ▶ A condition in which the heart is unable to pump blood at an adequate rate or in adequate volume. - Merriam-Webster
- ▶ A condition in which a problem with the structure or function of the heart impairs its ability to supply sufficient blood flow to meet the body's needs. - Wikipedia
- ▶ Condition that results when the body cannot pump strongly enough.
- UCSF Children's Hospital
- ▶ Loss of the heart's pumping power, which causes fluid to collect in the body, especially in the feet and lungs. - Diabetes.org
- ▶ The inability of the heart to adequately pump blood - This can be caused by a number of factors, including untreated hypertension, heart attacks or infections. - Cleveland Clinic

What does heart failure mean to me?

- ▶ A condition where the cardiac function fails to meet the metabolic demands of the body.

Heart Failure and its many names

- ▶ Weakness of the heart
- ▶ Sometimes heart failure is also called
 - ▶ Congestive heart failure
 - ▶ Pulmonary edema
 - ▶ Fluid in lungs

Types of Heart Failure

- ▶ **Low-output Heart Failure**
 - ▶ **Systolic Heart Failure**
 - ▶ Decreased LV ejection fraction
 - ▶ Decreased cardiac output
 - ▶ **Diastolic Heart Failure**
 - ▶ Elevated Left and Right ventricular end-diastolic pressures
 - ▶ May have normal LVEF
- ▶ **High Output Heart Failure**
 - ▶ Seen with peripheral shunting, low systemic vascular resistance, hyperthyroidism, anemia
 - ▶ Often have normal cardiac output
- ▶ **Right Ventricular Failure**
 - ▶ Seen with pulmonary hypertension, large RV infarctions

Types of Heart failure

Systolic (or squeezing) heart failure

- ▶ Decreased pumping function of the heart
- ▶ Get fluid backup in the lungs and heart failure.

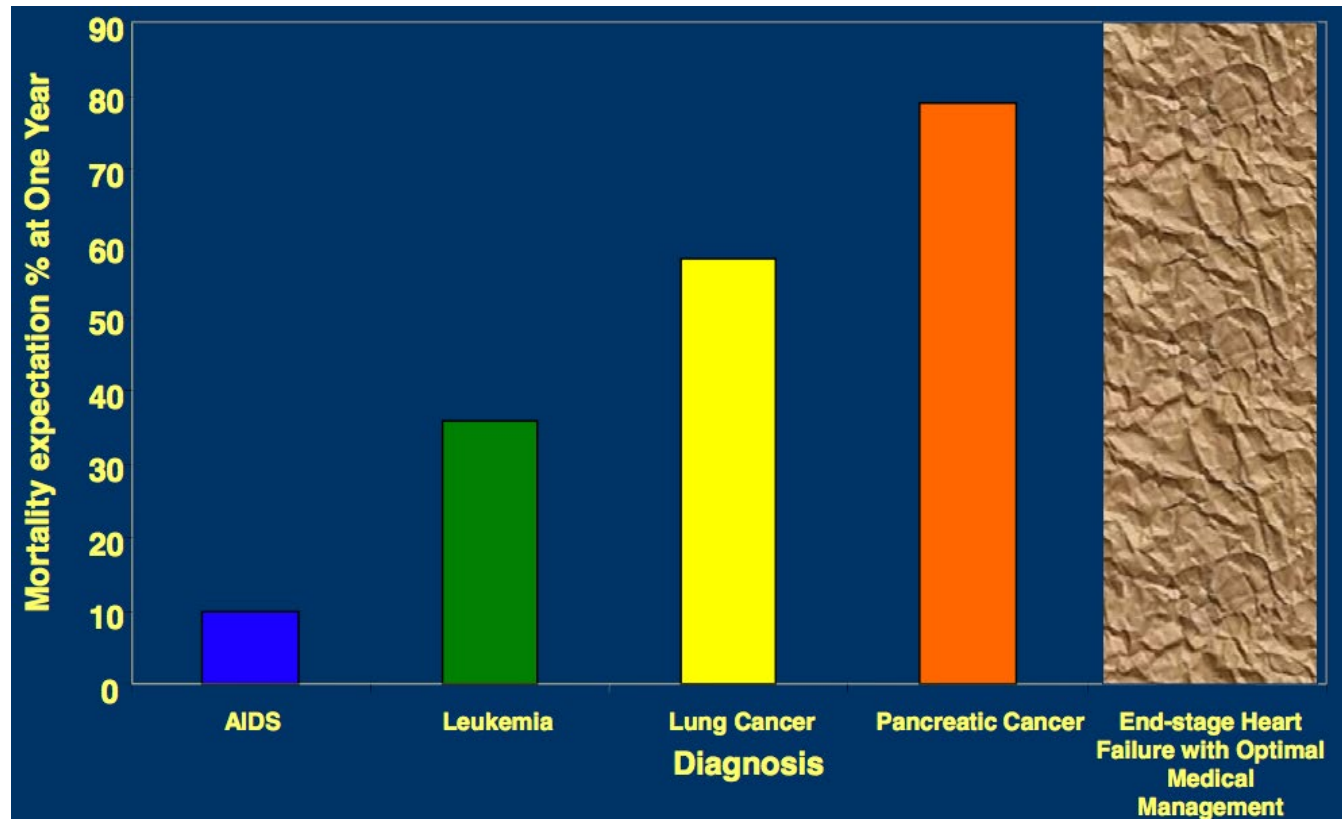
Diastolic (or relaxation) heart failure

- ▶ Thicker and stiff heart muscle
- ▶ Heart does not fill blood properly
- ▶ So, fluid backup into the lungs and heart failure.

Types of Heart Failure

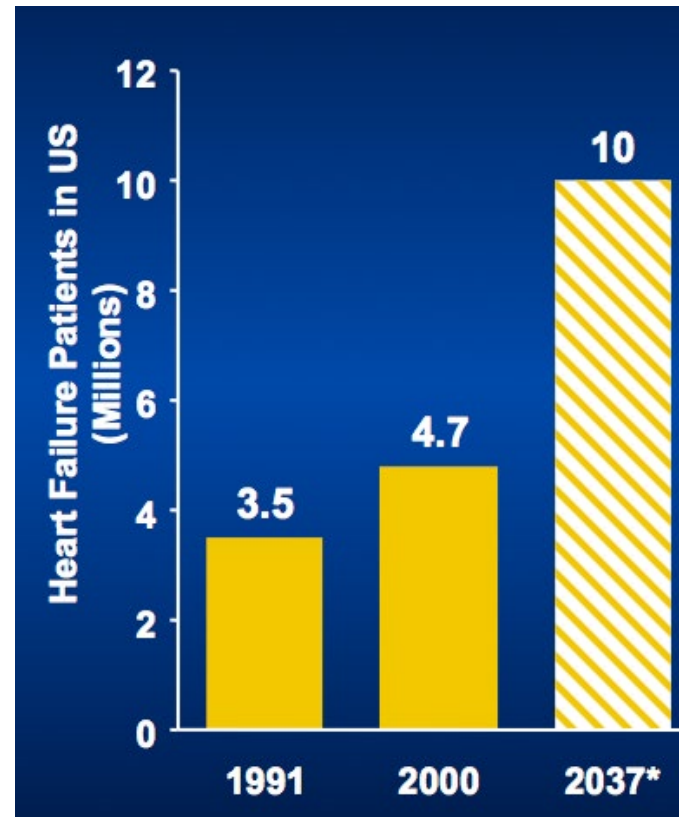
Classification	Ejection Fraction	Description
I. Heart Failure with Reduced Ejection Fraction (HFrEF)	≤40%	Also referred to as systolic HF. Randomized clinical trials have mainly enrolled patients with <u>HFrEF</u> and it is only in these patients that efficacious therapies have been demonstrated to date.
II. Heart Failure with Preserved Ejection Fraction (HFpEF)	≥50%	Also referred to as diastolic HF. Several different criteria have been used to further define HFpEF. The diagnosis of HFpEF is challenging because it is largely one of excluding other potential noncardiac causes of symptoms suggestive of HF. To date, efficacious therapies have not been identified.
a. HFpEF, Borderline	41% to 49%	These patients fall into a borderline or intermediate group. Their characteristics, treatment patterns, and outcomes appear similar to those of patient with HFpEF.
b. HFpEF, Improved	>40%	It has been recognized that a subset of patients with <u>HFpEF</u> previously had <u>HFrEF</u> . These patients with improvement or recovery in EF may be clinically distinct from those with persistently preserved or reduced EF. Further research is needed to better characterize these patients.

Projected Mortality for Advanced Heart Failure Exceeds Other Terminal Disease



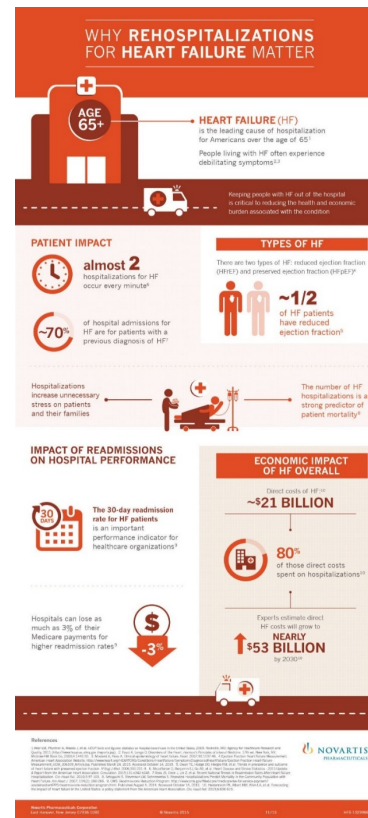
Heart Failure in the US

- ▶ More deaths from HF
- ▶ than from all forms of
- ▶ cancer
- ▶ 670,000 new cases/year
- ▶ 4.7 million symptomatic patients
- ▶ Estimated 10 million in 2037.



Heart Failure admissions

- Over 1.1 HF hospitalizations per year in US
- 825,000 people > 45 years of age newly diagnosed each year
- Mortality for AHA/ACC Stage D Patients
 - 30% die within 1st year
 - 60% die within 5 years



Risk factors for Heart Failure

- ▶ Coronary artery disease or MI
- ▶ Hypertension (LVH)
- ▶ Valvular heart disease
- ▶ Alcohol or other toxins
- ▶ Infection - Viral
- ▶ Diabetes
- ▶ Congenital heart defects
- ▶ Heart muscle disease
- ▶ Severe lung disease
- ▶ Abnormal Heart Rhythms or Tachycardia mediated
- ▶ Obesity
- ▶ Age
- ▶ Smoking
- ▶ High/low hematocrit level
- ▶ Obstructive Sleep Apnea
- ▶ Hyperthyroidism
- ▶ Chemotherapy/radiation

Less Common Causes

- ▶ Amyloid
- ▶ SLE, scleroderma
- ▶ HCM
- ▶ Myocarditis
- ▶ Pericarditis
- ▶ Thyroid disease
- ▶ Diabetes
- ▶ Pheochromocytoma
- ▶ Postpartum
- ▶ Hemochromatosis
- ▶ Sarcoid

Classification of HF: stages and Functional Class

▶ ACC/AHA HF Stages

AHA/ACC Heart Failure Stages	
Stage	Description
A	Presence of heart failure risk factors but no heart disease and no symptoms
B	Heart disease is present but there are no symptoms (structural changes in heart before symptoms occur)
C	Structural heart disease is present AND symptoms have occurred
D	Presence of advanced heart disease with continued heart failure; symptoms requiring aggressive medical therapy

▶ NYHA Functional Class

Class	Patient Symptoms
Class I (Mild)	No limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, or dyspnea (shortness of breath).
Class II (Mild)	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in fatigue, palpitation, or dyspnea.
Class III (Moderate)	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue, palpitation, or dyspnea.
Class IV (Severe)	Unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency at rest. If any physical activity is undertaken, discomfort is increased.

Treatment: Medications

Type	What it does
•ACE inhibitor (angiotensin-converting enzyme)	•Expands blood vessels which lowers blood pressure, neurohormonal blockade
•ARB (angiotensin receptor blockers)	•Similar to ACE inhibitor—lowers blood pressure
•Beta-blocker	•Reduces the action of stress hormones and slows the heart rate
•Digoxin	•Slows the heart rate and improves the heart's pumping function (EF)
•Diuretic	•Filters sodium and excess fluid from the blood to reduce the heart's workload
•Aldosterone blockade	•Blocks neurohormal activation and controls volume

2016/2017 ACC/AHA HF Guideline Update

▶ Sacubitril/valsartan (Entresto) (ARNI)

- ▶ Paradigm HF published 2014 FDA approval 2015 Class I indication if chronic symptomatic HFrEF - NYHA Class II/III
- ▶ Avoid if hx of angioedema, Hold ACE 48 hours before starting Entresto
- ▶ Decreases neurohormonal activation, Vasodilation, Decreases cardiac fibrosis, hypertrophy, Natriuretic
- ▶ It takes the place of their ace or arb

▶ Ivabradine (Corlanor)

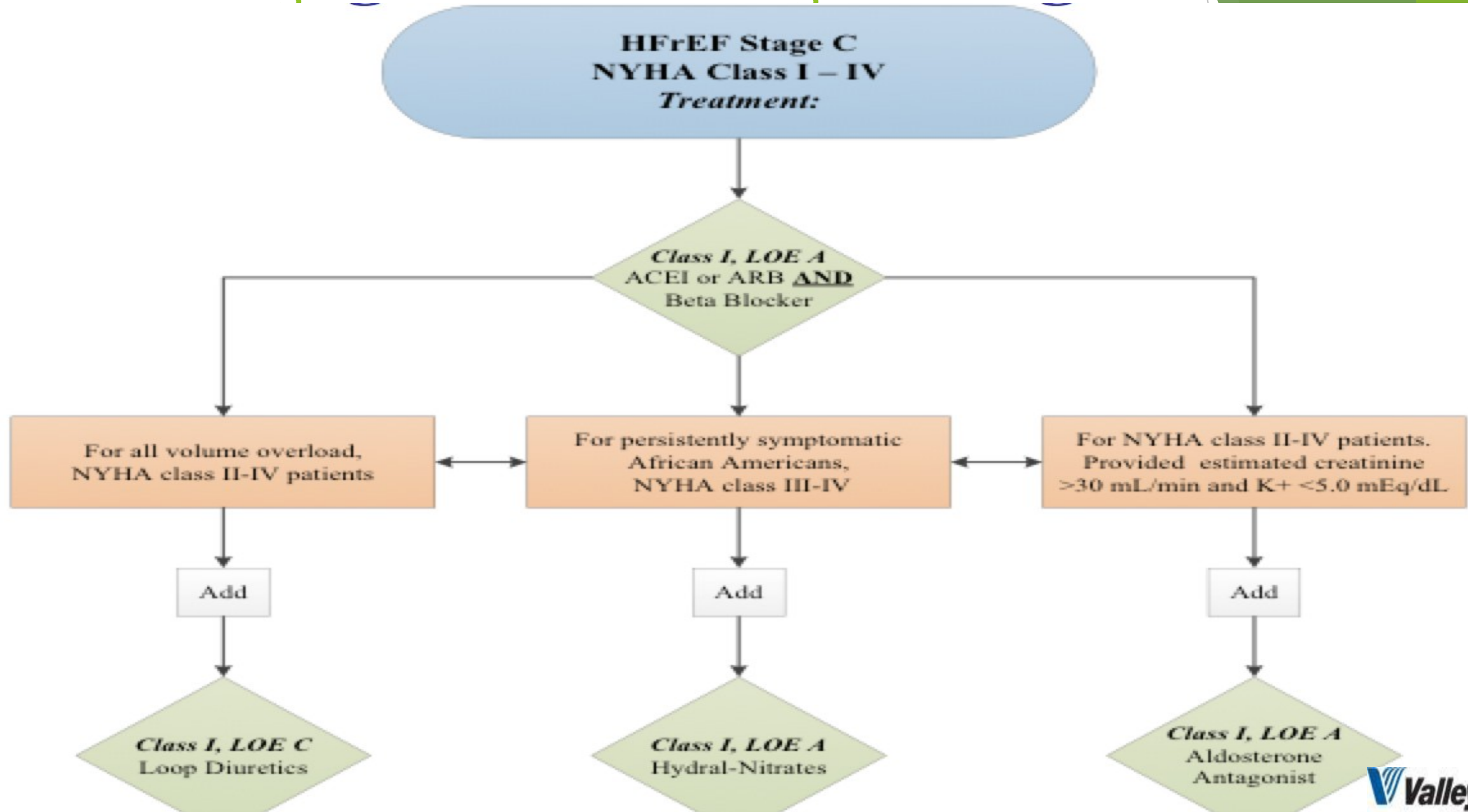
- ▶ Inhibits the IF current in the SA node, reduces heart rate. Ensure goal BB dose before starting
- ▶ SHIFT trial (2010): reduce heart failure admissions of patients with EF <35%, NYHA II-IV, SR, HR>70; no mortality benefit
- ▶ FDA approved 2015 Class IIA recs in 2016

New Frontier

Crossover over diabetes with HF

- ▶ SGL2 - sodium-glucose cotransporter 2 inhibitor
 - ▶ Farxiga (dapagliflozin)
 - ▶ Recently showed it can help reduce the risk of hospitalization for heart failure patients with type 2 diabetes and established cardiovascular disease or multiple cardiovascular risk factors. Reported in recent study to reduce cv death and reduction in hospitalizations for heart failure in patients with hf r EF

Pharmacologic Treatment for Stage C HFrEF



Why all the pills?

- **Improve Symptoms**

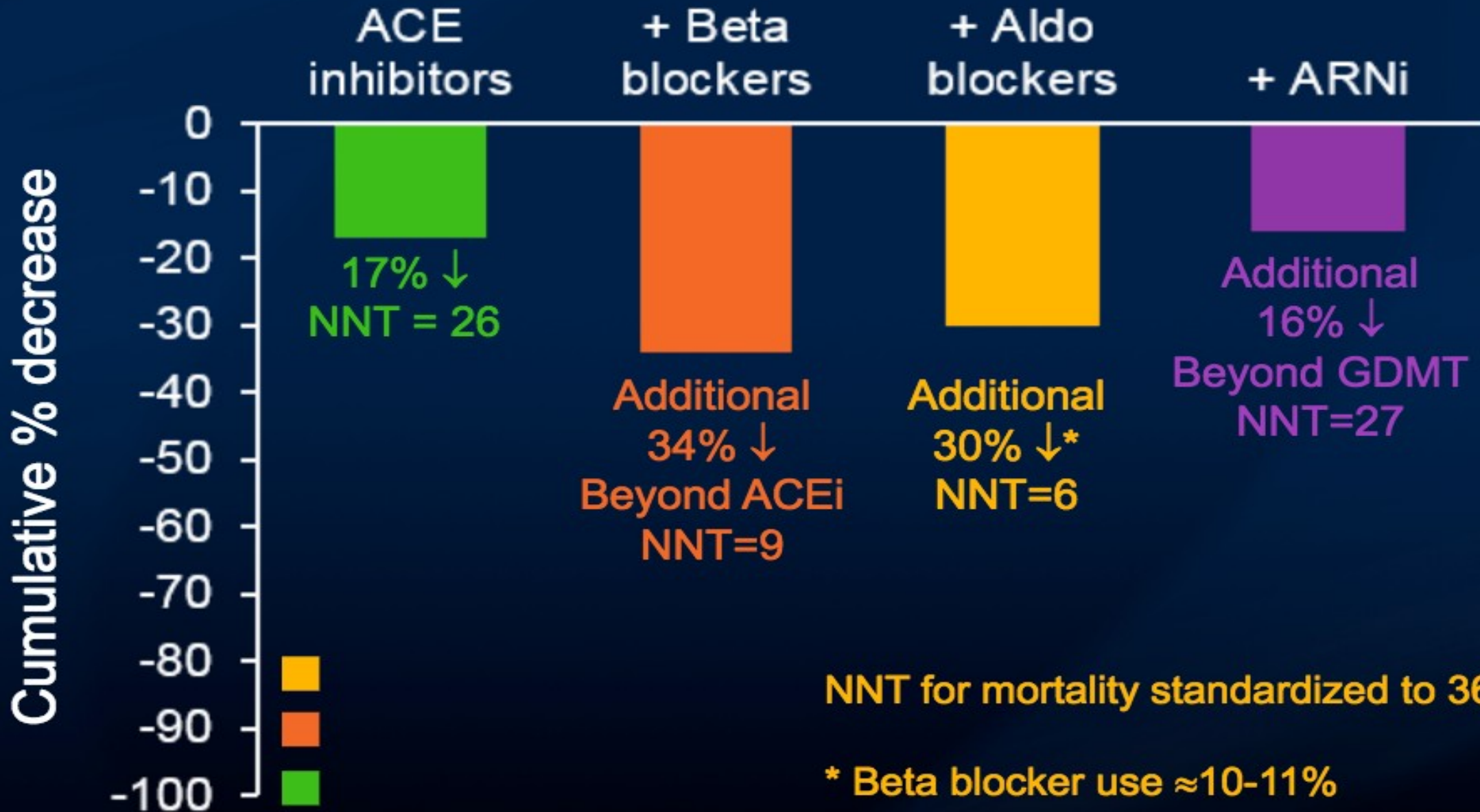
- Diuretics (water pills)
- digoxin



- **Improve Survival**

- Betablockers
- ACE-inhibitors
- Aldosterone blockers
- Angiotensin receptor blockers (ARB' s)

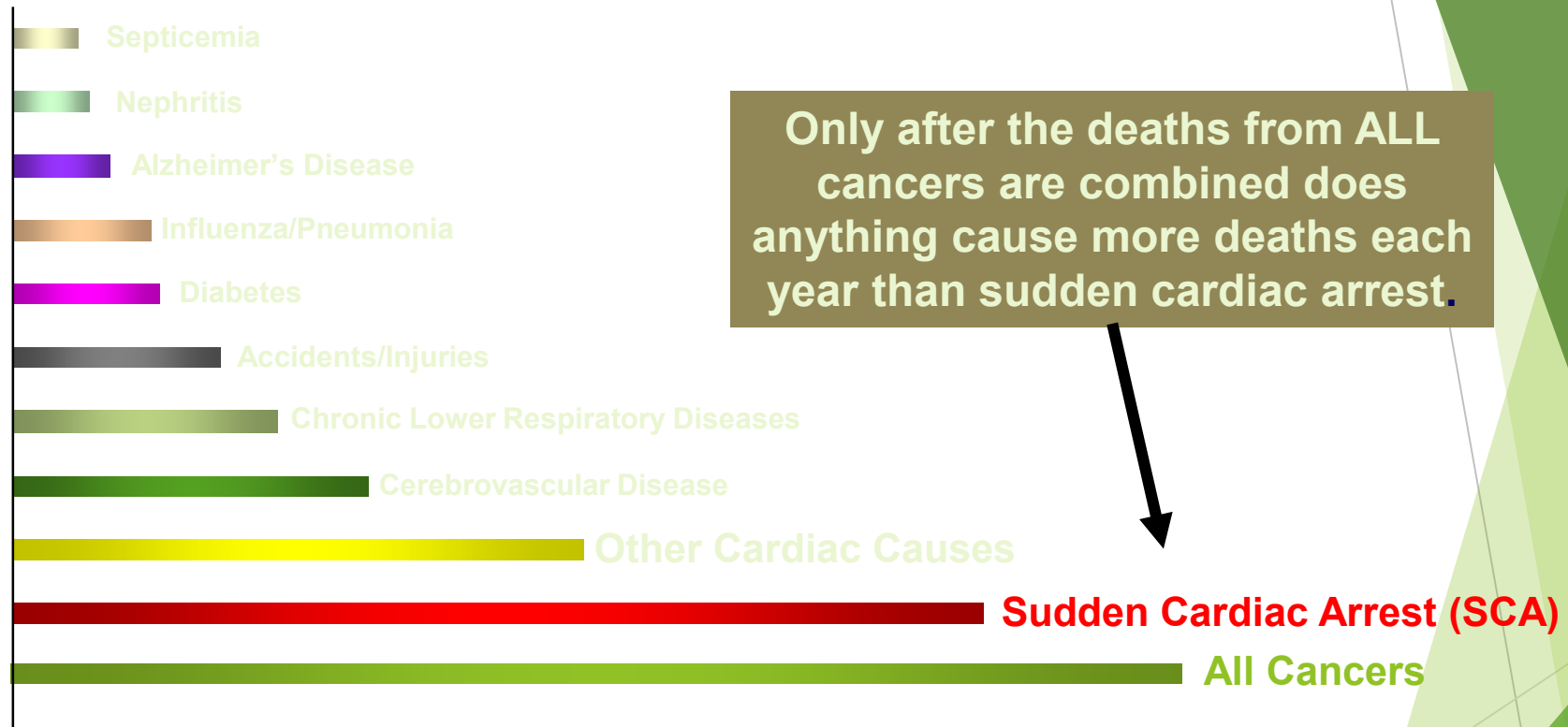
Lower HFrEF Mortality with Medical Therapy



Device Therapy for EF <35%

- ▶ Lifestest - external defibrillator used for time period in which patient is being started on medical therapy
- ▶ ICD - implantable cardioverter defibrillator
- ▶ Subcutaneous ICD therapy
- ▶ BiV ICD or CRT-D - Bi Ventricular ICD therapy or Cardiac Resynchronization therapy
 - ▶ EF <35%
 - ▶ At least 90 days goal directed medical therapy
 - ▶ QRS >150 ms with LBBB

Leading Causes of Death in the US



National Vital Statistics Report, Vol 49 (11), Oct. 12, 2001.
State-specific mortality from sudden cardiac death – United States 1999. *MMWR*. 2002;51:123-126.

Clinical Events and Findings Useful for Identifying Patients with Stage D HF

- ▶ Worsening functional status
- ▶ Recurrent Hf Hospitalizations
- ▶ Increasing Diuretic requirements
- ▶ Poor exercise tolerance
 - ▶ Peak VO₂ <12-14
 - ▶ 6 MWT <300 meters
 - ▶ SOB <1 block walking
- ▶ Intolerance to HF medications
 - ▶ Hypotension
 - ▶ Increasing creatinine
- ▶ Decline in Renal Function
- ▶ Hyponatremia
- ▶ Refractory ventricular arrhythmias/ICD shocks
- ▶ Cardiogenic shock.

When should patients be considered for LVAD therapy?

Patients with the following should be referred for evaluation for advanced heart failure therapies, including LVAD therapy.

1 NYHA CLASS IIIB OR IV HEART FAILURE (INTERMACS[†] 1-6):

NYHA CLASS	CLASS III		CLASS IIIB/IV			CLASS IV	
	7	6	5	4	3	2	1
INTERMACS [†] registry advanced heart failure profiles	Advanced NYHA III symptoms. Living comfortably with limited physical activity	Exertion limited. Walking wounded	Exertion intolerant. Housebound	Resting symptoms. Frequent flyer	Stable but inotropic dependant. Dependant stability	Progressive decline on inotropic support. Sliding on inotropes	Critical cardiogenic shock. Crash and burn

2 ANY ONE OF THE FOLLOWING HIGH-RISK CLINICAL TRIGGERS:

- I** IV Inotropes - Milirone, Dobutamine
- N** NYHA IIIB/IV or persistently elevated natriuretic peptides
- E** End-organ dysfunction (Cr > 1.8 mg/dL or BUN > 43 mg/dL)
- E** Ejection fraction ≤ 35%
- D** Defibrillator shocks
- H** Hospitalizations - Frequent
- E** Edema (or elevated PA pressure) despite escalating diuretics
- L** Low blood pressure, high heart rate
- P** Prognostic medication — decreasing goal directed medical therapy due to hypotension

Additional patient referral considerations:

- CRT nonresponder
- Physical activity limited or impaired quality of life

EVERYDAY ZONE

EVERY DAY:

- Weigh yourself first thing in the morning and write it down.
- Take your medicine as instructed.
- Check for swelling in your feet, ankles, legs and abdomen.
- Eat low-salt food - 2 gram sodium diet.
- Balance activity and rest periods.

GREEN ZONE

ALL CLEAR - THIS ZONE IS YOUR GOAL.

Your symptoms are under control. You have:

- No shortness of breath.
- No weight gain more than 2 pounds.
- No swelling of your feet, ankles, legs or abdomen.
- No chest pain.

YELLOW ZONE

CAUTION: THIS ZONE IS A WARNING - TAKE ACTION.

Call your doctor's office if you have:

- A weight gain of more than 2-3 pounds in one day or a weight gain of 5 pounds or more in one week.
- More shortness of breath with your usual activities.
- More swelling of your feet, ankles, legs or abdomen.
- No energy. Feel more tired.
- A sudden decrease in urination.
- Dizziness.
- Uneasiness; you know something is not right.
- Increased shortness of breath when lying down or you need to sleep sitting up in a chair.

RED ZONE

EMERGENCY!

Go to the emergency room or call 911 if you:

- Are struggling to breathe. Unrelieved shortness of breath while sitting still.
- Are having chest pain.
- Are having confusion or can't think clearly.

Heart Failure Can Be Treated

Although heart failure is a chronic disease (it will never go away no matter how good you feel) it can be treated so that you can continue to live your life.

Heart Failure Can Be Treated with:

- ♥ Medications
- ♥ Procedures
- ♥ Surgery



Thank you!!!

Any questions???

- ▶ Marie I. Amico, FNP-C
- ▶ mamico@valleyhealthlink.com