RUSH UNIVERSITY
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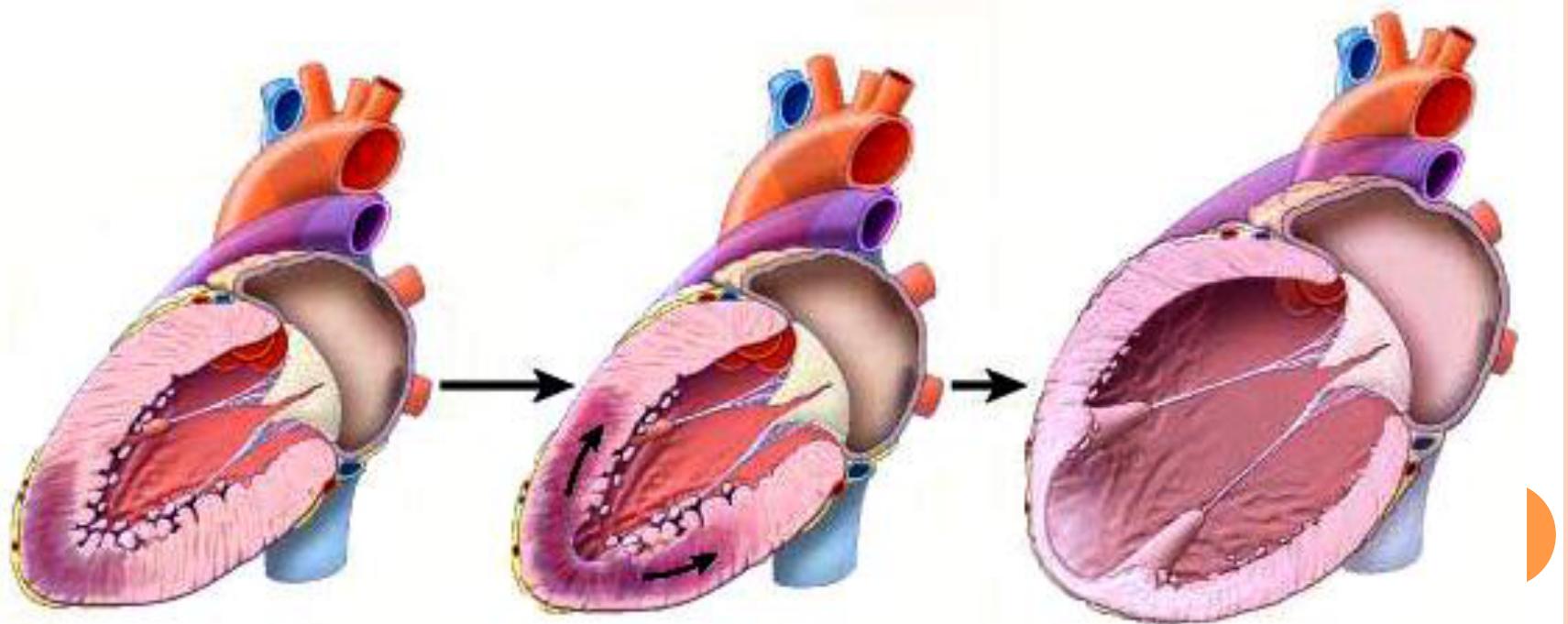# PREVENTION, SYMPTOMS AND TREATMENT OF HEART FAILURE

**Burhan Mohamedali, MD**

**Medical Director: Advanced Heart Failure/ Transplant Program**
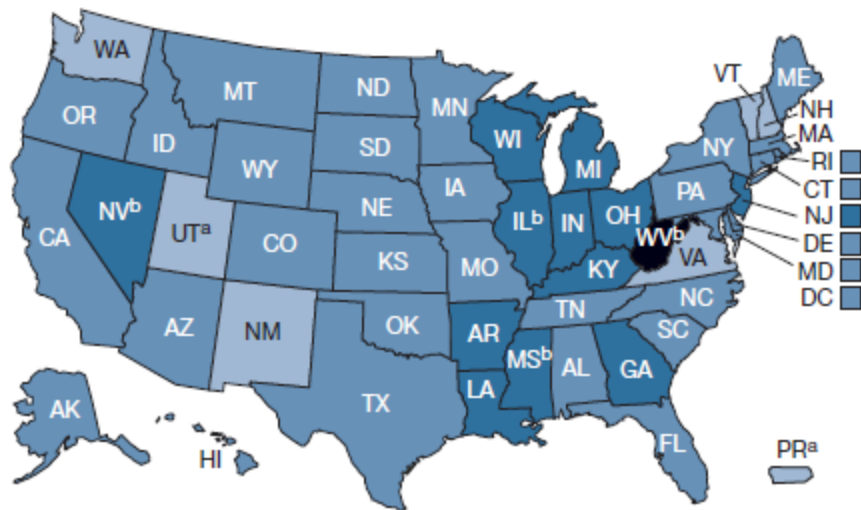
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# WHAT IS CONGESTIVE HEART FAILURE

- HF is a complex clinical syndrome that results from any
  - Structural
  - Functional impairment
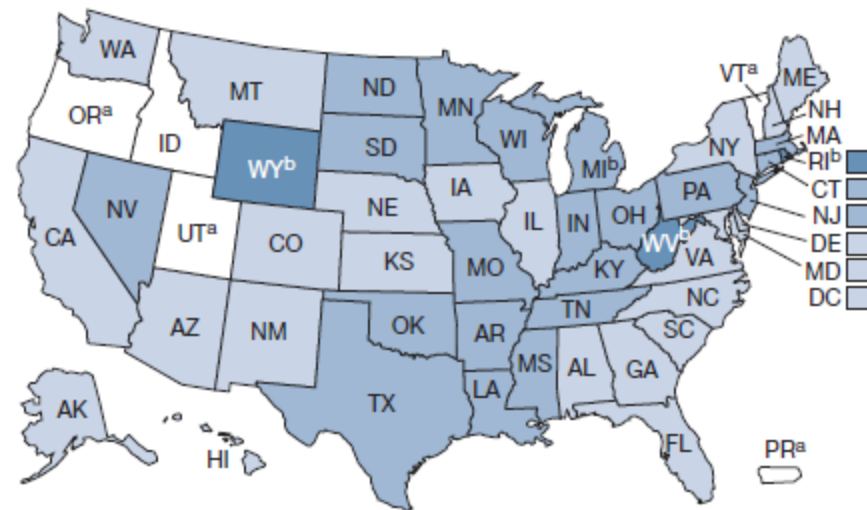    - ventricular filling OR ejection of blood.

**Jessup and Brozena, NEJM 2003: 348:2007-18**

# HEART FAILURE



Risk-Standardized Heart Failure Hospitalization Rate by State in 1998 and 2008

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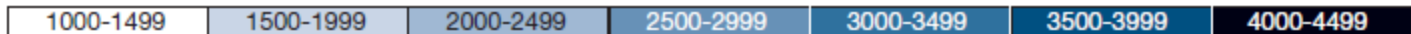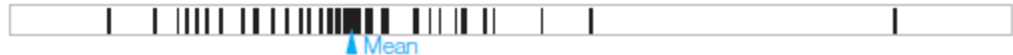
# ECONOMIC BURDEN OF CONGESTIVE HEART FAILURE

- 5.8 Million Patients
- >550,000 new diagnosis
- 6.5 Million hospital days each year
- >1 million hospitalizations
- 7% of all deaths
- Cost of heart failure care is 1-2% of overall heath spending
- Over half of the heart failure cost is cost of hospitalizations

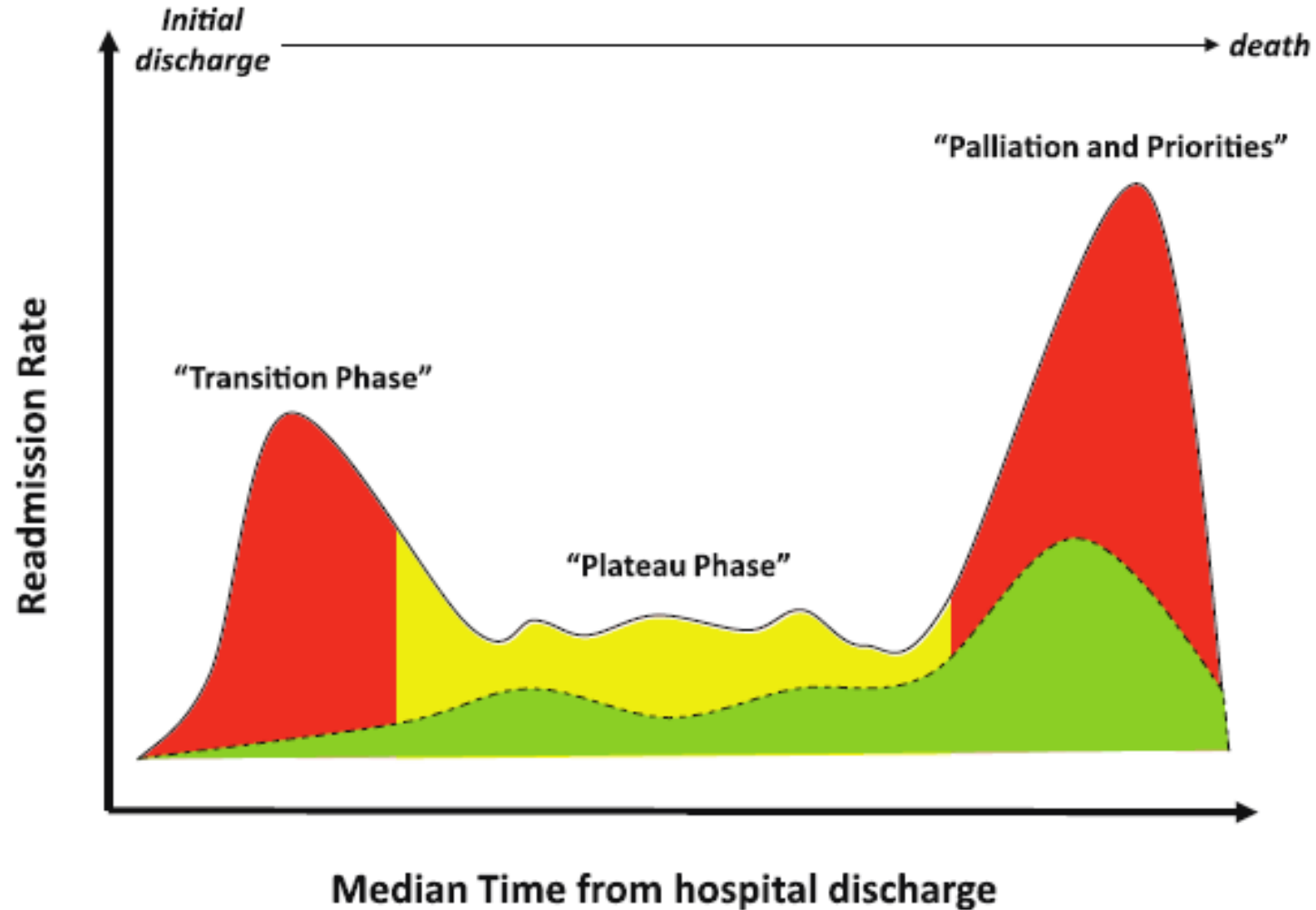AHA/ACC Guidelines.

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# Heart Failure Spending
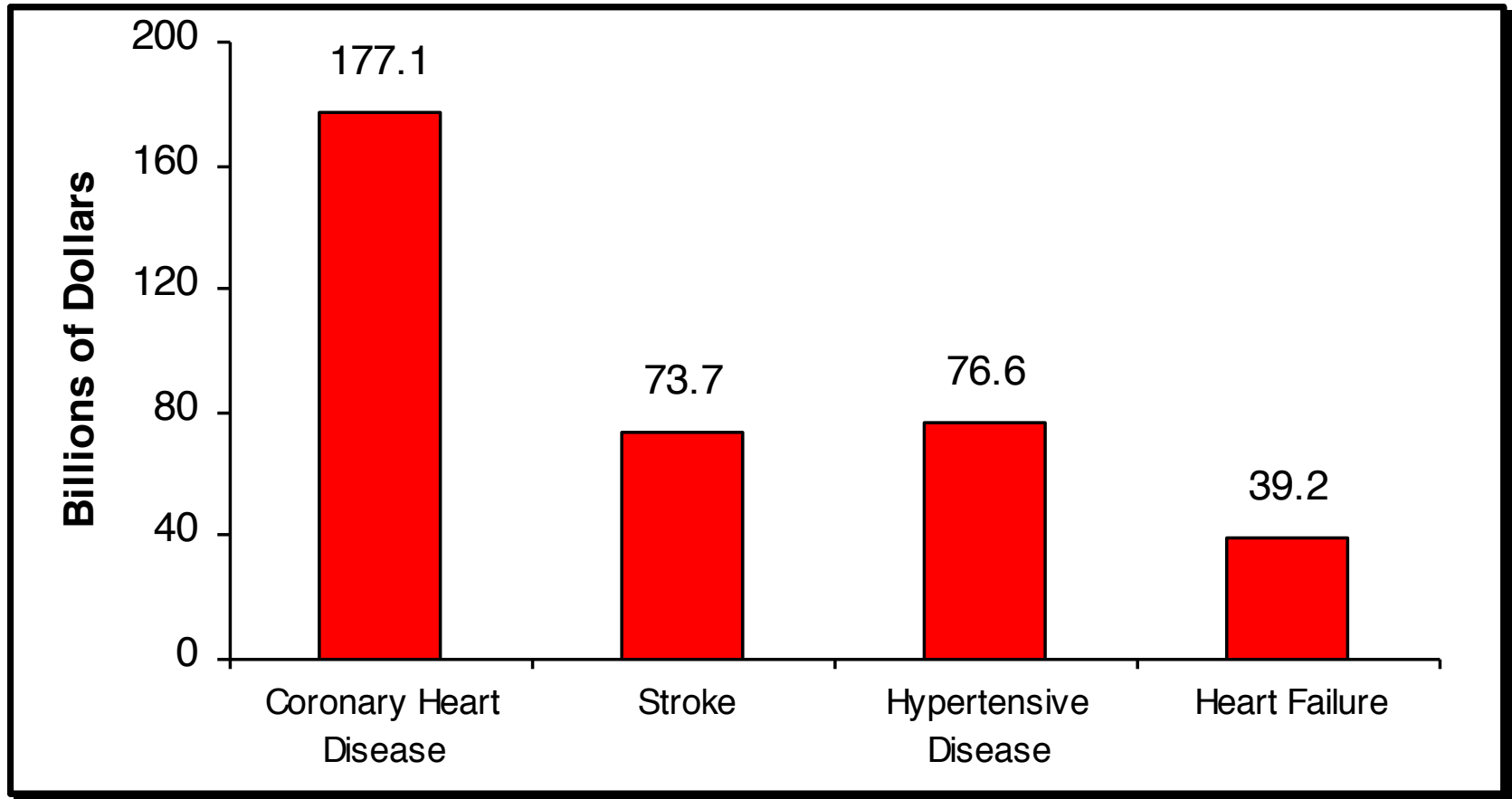


Source: NCHS and NHLBI. 2010 Data.

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# READMISSION AFTER HF READMISSIONS



Desai A, Stevenson LW, Circulation 2012; 126: 501-6

# PREVENTION

- Heart Failure Society of America

**Table 3.1.** Goals for the Management of Risk Factors for the Development of Heart Failure

| Risk Factor | Population | Treatment Goal | Strength of Evidence |
|---|---|---|---|
| Hypertension | No diabetes or renal disease | <140/90 mmHg | A |
| | Diabetes | <130/80 mmHg | A |
| | Renal insufficiency and >1g/day of proteinuria | 127/75 | A |
| | Renal insufficiency and ≤1 g/day of proteinuria | 130/85 | A |
| | Everyone with hypertension | Limit sodium to ≤1500 mg/day | A |
| Diabetes | See American Diabetes Association (ADA) Guideline | | |
| Hyperlipidemia | See National Cholesterol Education Program (NCEP) Guideline | | |
| Physical Inactivity | Everyone | Sustained aerobic activity 20-30 minutes, 3-5 times weekly | B |
| Obesity | BMI >30 | Weight reduction to achieve BMI <30 | C |
| Excessive alcohol intake | Men | Limit alcohol intake to 1-2 drink equivalents per day | C |
| | Women | 1 drink equivalent per day | |
| | Those with propensity to abuse alcohol or with alcoholic cardiomyopathy | Abstention | |
| Smoking | Everyone | Cessation | A |
| Vitamin/mineral deficiency | Everyone | Diet high in $K^+$/calcium | B |
| Poor diet | Everyone | 4 or more servings of fruit and vegetables per day; One or more servings of breakfast cereal per week | B |

# High Blood Pressure

- Single most important modifiable risk factor
- The incidence of heart failure is greater with higher levels of blood pressure, older age, and longer duration of hypertension.

# HYPERTENSION
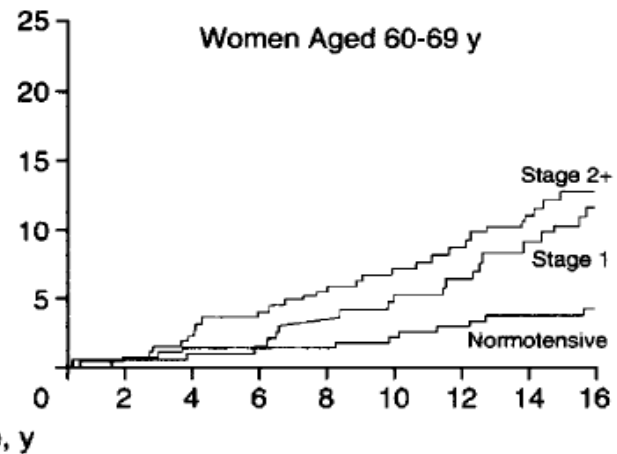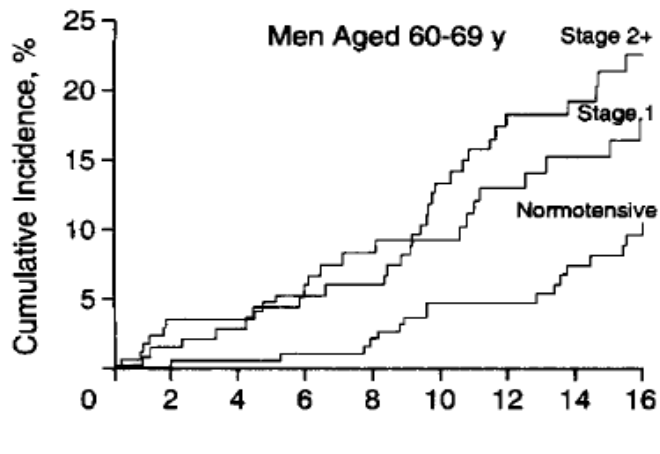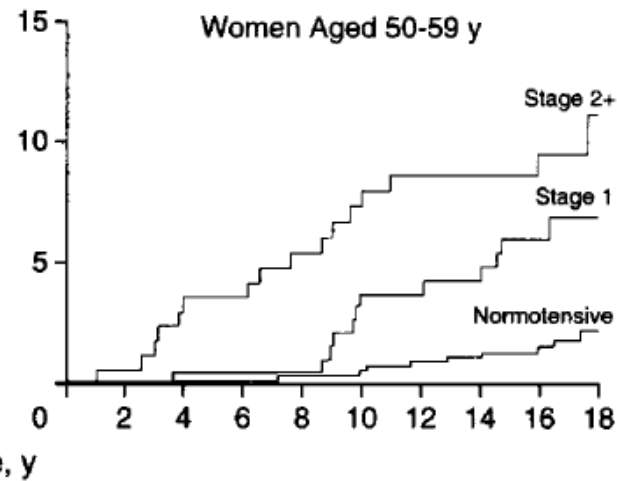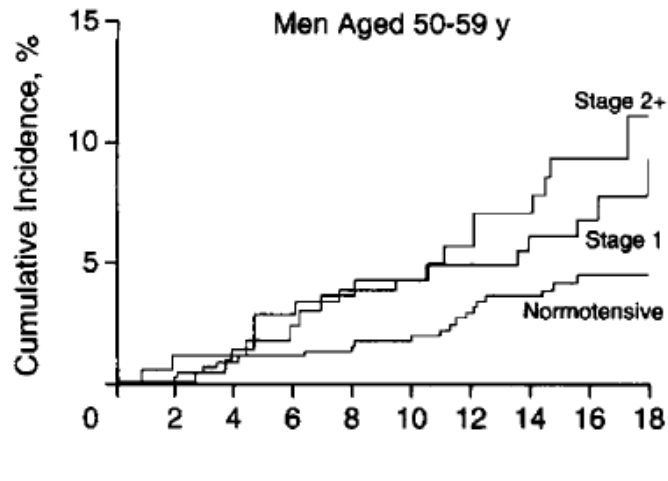
# Diabetes

- The presence of clinical diabetes mellitus markedly increases the likelihood of developing HF

- Women with diabetes are at particular risk

- Also adversely affects the outcomes of patients with established HF.

# Sugar Control as Risk Factors For New Onset Heart Failure

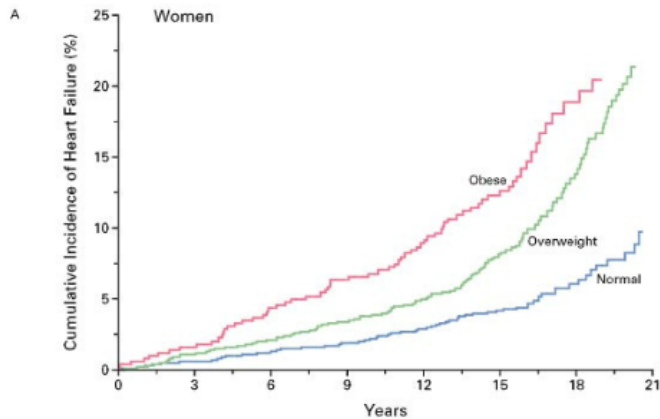| Hemoglobin $A_{Ic}C$ % | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| All (n=48 858; 935 events) | | | | |
| <7 | 1 | 1 | 1 | 1 |
| 7 to <8 | 1.20 (0.97–1.48) | 1.21 (0.98–1.50) | 1.15 (0.92–1.42) | 1.15 (0.93–1.43) |
| 8 to <9 | 1.25 (1.01–1.56) | 1.26 (1.01–1.57) | 1.12 (0.89–1.39) | 1.10 (0.88–1.38) |
| 9 to <10 | 1.64 (1.31–2.04) | 1.62 (1.30–2.03) | 1.42 (1.13–1.78) | 1.39 (1.11–1.74) |
| ≥10 | 1.83 (1.48–2.25) | 1.80 (1.45–2.22) | 1.57 (1.27–1.95) | 1.56 (1.26–1.93) |

# Obesity

- Obesity is risk factor for the development of cardiovascular disease.
- Weight reduction has been shown to improve most of the adverse effects of obesity.
- It is thought that weight reduction reduces the likelihood of heart failure

# Obesity and New Onset Heart Failure
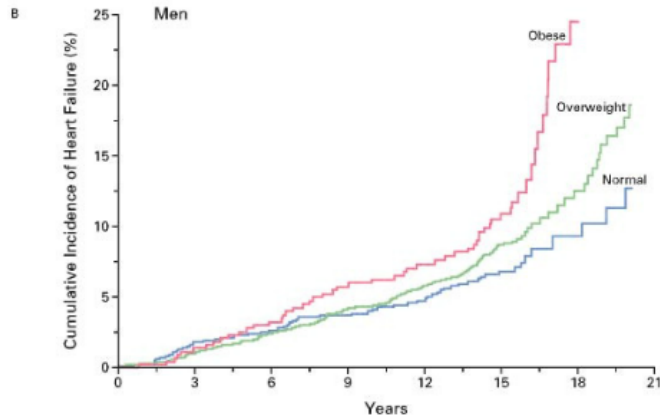


**Figure 1. Cumulative Incidence of Heart Failure According to Category of Body-Mass Index at the Base-Line Examination.**

The body-mass index was 18.5 to 24.9 in normal subjects, 25.0 to 29.9 in overweight subjects, and 30.0 or more in obese subjects.

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# Physical Inactivity

- The benefits of exercise are well documented and include reduction of heart attacks, improved exercise capacity, improved affect and quality of life, and better control of high blood pressure.
- Minimum of 20-30 minutes exercise 3-5 times per week
- Exercise significantly reduces the lifetime risk of developing heart failure.

# SMOKING AND ALCOHOL

- Alcoholic is a poison to the heart (70 g or greater per day of chronic ingestion).

- 2 drinks per day for men and 1 drink per day for women is considered acceptable

- A glass of red wine??

- Quitting smoking is associated with a 50% improvement in survival after heart attacks

# SYMPTOMS

# Symptoms of Congestive Heart Failure

- Shortness of Breath at rest or on exertion
- Less exercise capacity
- Shortness of breath when laying flat
- Waking up short of breath at night
- Swelling in the legs
- Fluid accumulation in the belly
- Some men can have fluid build up in the scrotum

# OTHER LESS COMMON SYMPTOMS

- Feeling full early
- Nausea and vomiting
- Belly discomfort
- Wheezing or cough
- Unexplained tiredness
- Confusion

# CLASSIFICATION OF SYMPTOMS

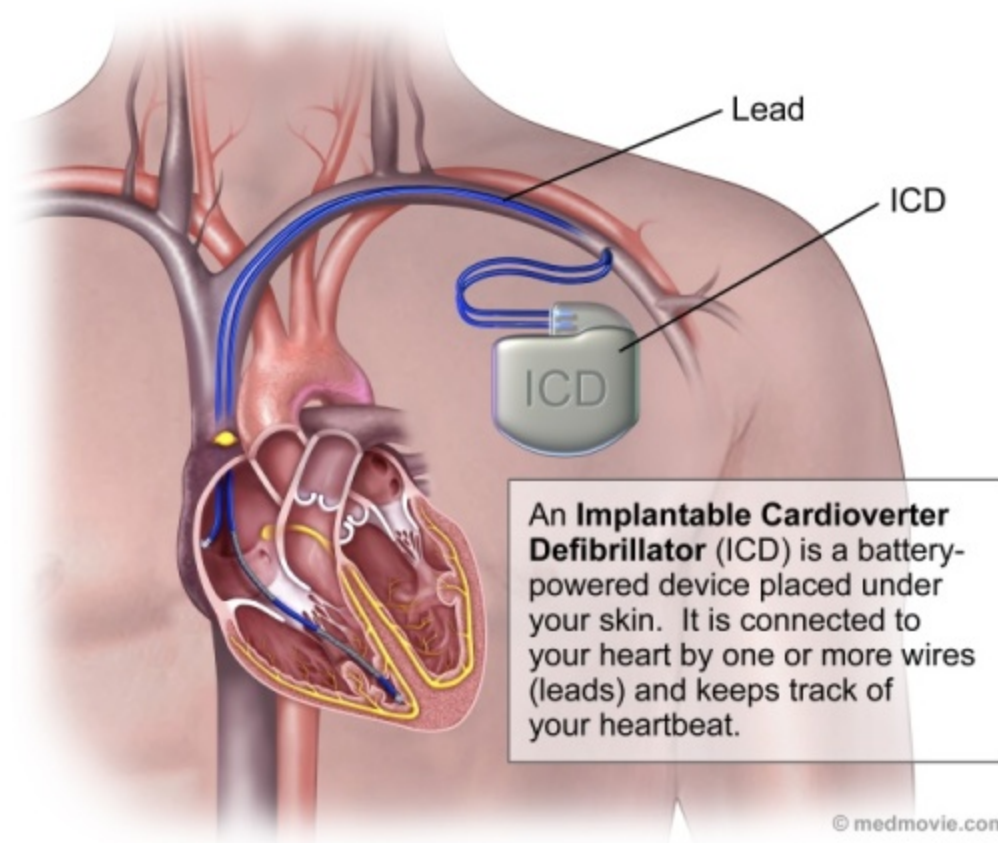| Class | Patient Symptoms |
|---|---|
| Class I | Ordinary physical activity does not cause symptom |
| Class II | Slight limitation. Comfortable at rest, but ordinary physical activity results in fatigue |
| Class III | Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes fatigue |
| Class IV | Symptoms at Rest. Unable to carry out any physical activity without discomfort |

# TREATMENT

# Treatment

- Most people will need Water pills
- Almost all will be on medications called
  - Beta Blockers
  - Ace Inhibitors
  - Spironolactone
  - Hydralazine
  - Nitrates
  - Digoxin

# DEFIBRILLATORS

- Some people needs defibrillators to prevent sudden cardiac arrest

- Some patient may need a special pacemaker called biventricular pacemaker/defibrilator

Lead

ICD

An **Implantable Cardioverter Defibrillator** (ICD) is a battery-powered device placed under your skin. It is connected to your heart by one or more wires (leads) and keeps track of your heartbeat.

© medmovie.com

# HEART TRANSPLANT/HEART PUMP

- If symptoms get worse

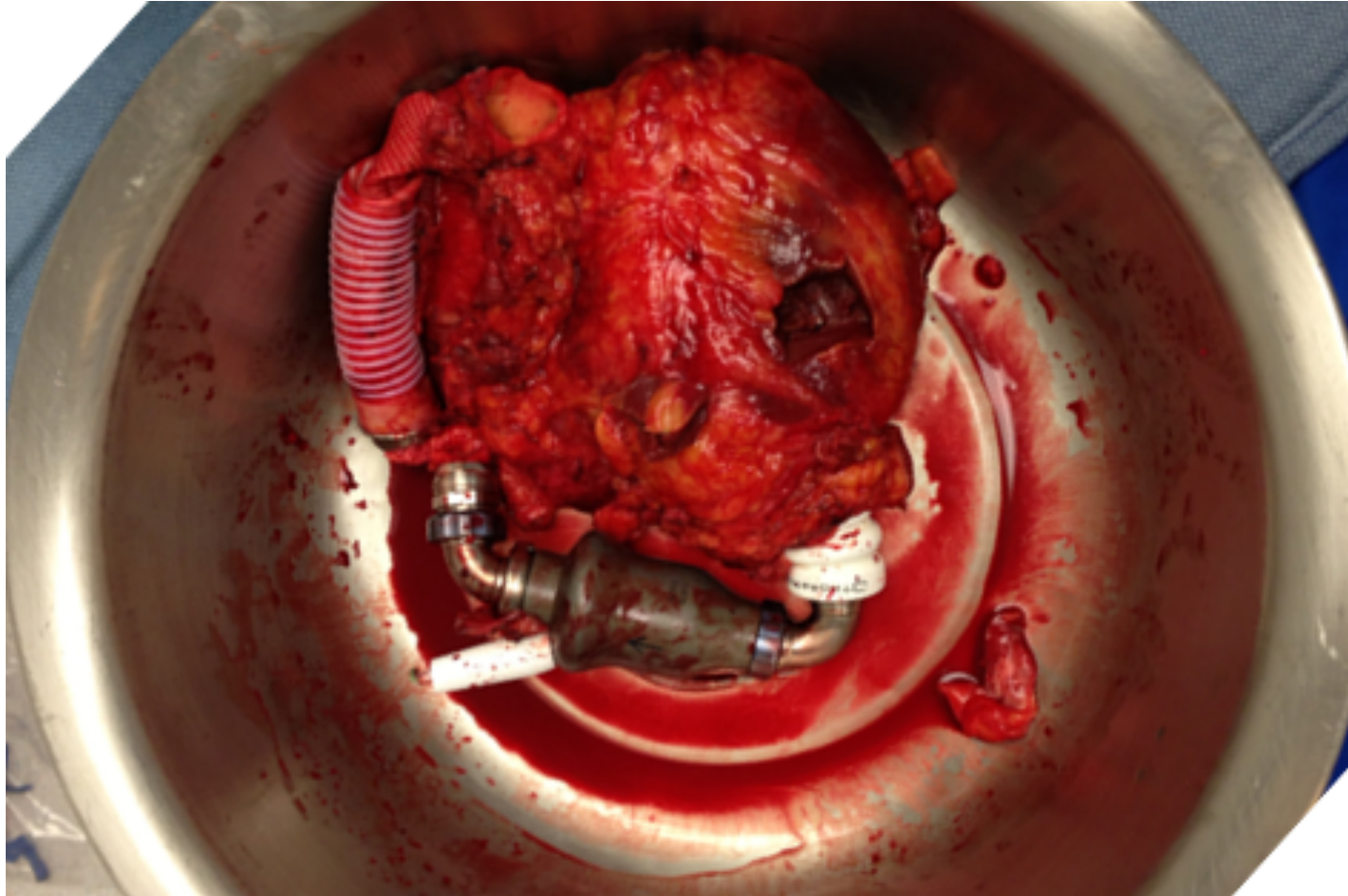- Some patients needs to be evaluated for heart transplantation or heart pumps

Ross et al. ISHLT Academy

# HM II LVAD

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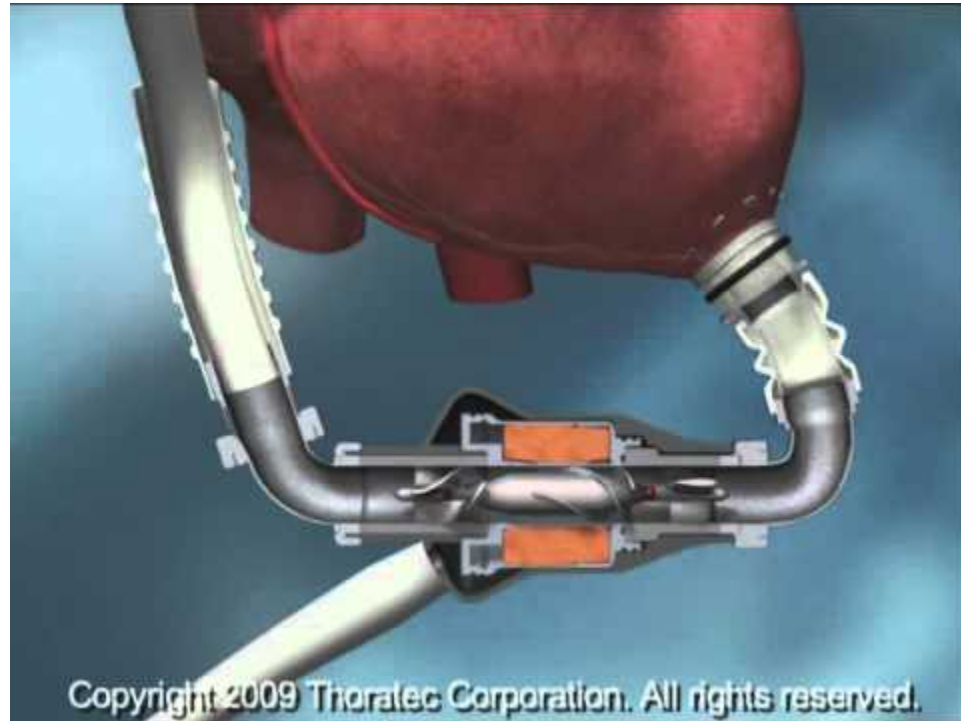
# HMII Pump

# Summary

- Prevention of Congestive Heart Failure
- Symptoms of Heart failure
- Treatment of Heart Failure
- Devices in Heart Failure
- Heart Transplantation

# THANK YOU