

Heart Failure Background

- Confusing classification systems for different stages of heart failure
- General ingredients for medical therapy
- Increasing complexity of medical therapy as heart failure progresses
- What is reversible with support?
- Options for Stage D – refractory heart failure

**I have no relationships with industry.
I receive NHLBI support as an investigator
in the NHLBI National Heart Failure Network
and INTERMACS.**

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Director Heart Failure Program
Brigham and Women's Hospital
Professor of Medicine
Harvard Medical School**

6 Million Patients With Heart Failure

Heart Failure With Low Ejection Fraction Big Weak Heart

Class I – II Symptoms



Class III Symptoms
limit daily life but
comfortable at rest
and routine daily activity
700,000

Class IV Symptoms
At rest or
minimal
activity such
as dressing.

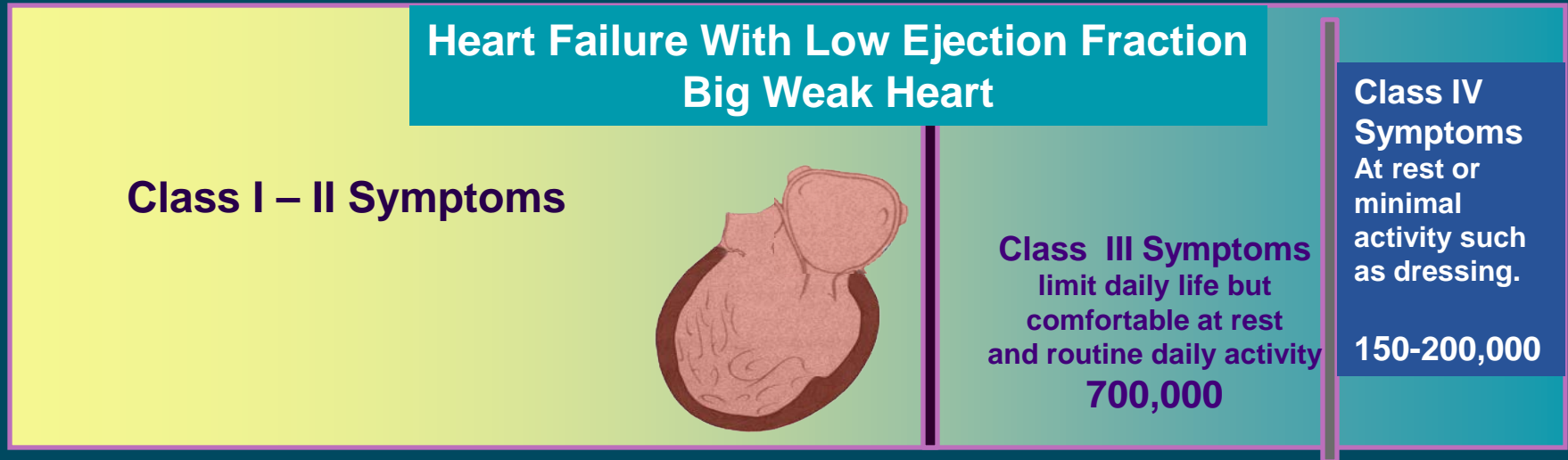
150-200,000



(Heart Failure With Preserved Ejection Fraction)
Stiff Heart

6 Million Patients With Heart Failure

1/2 Have Heart Failure with Low Ejection Fraction



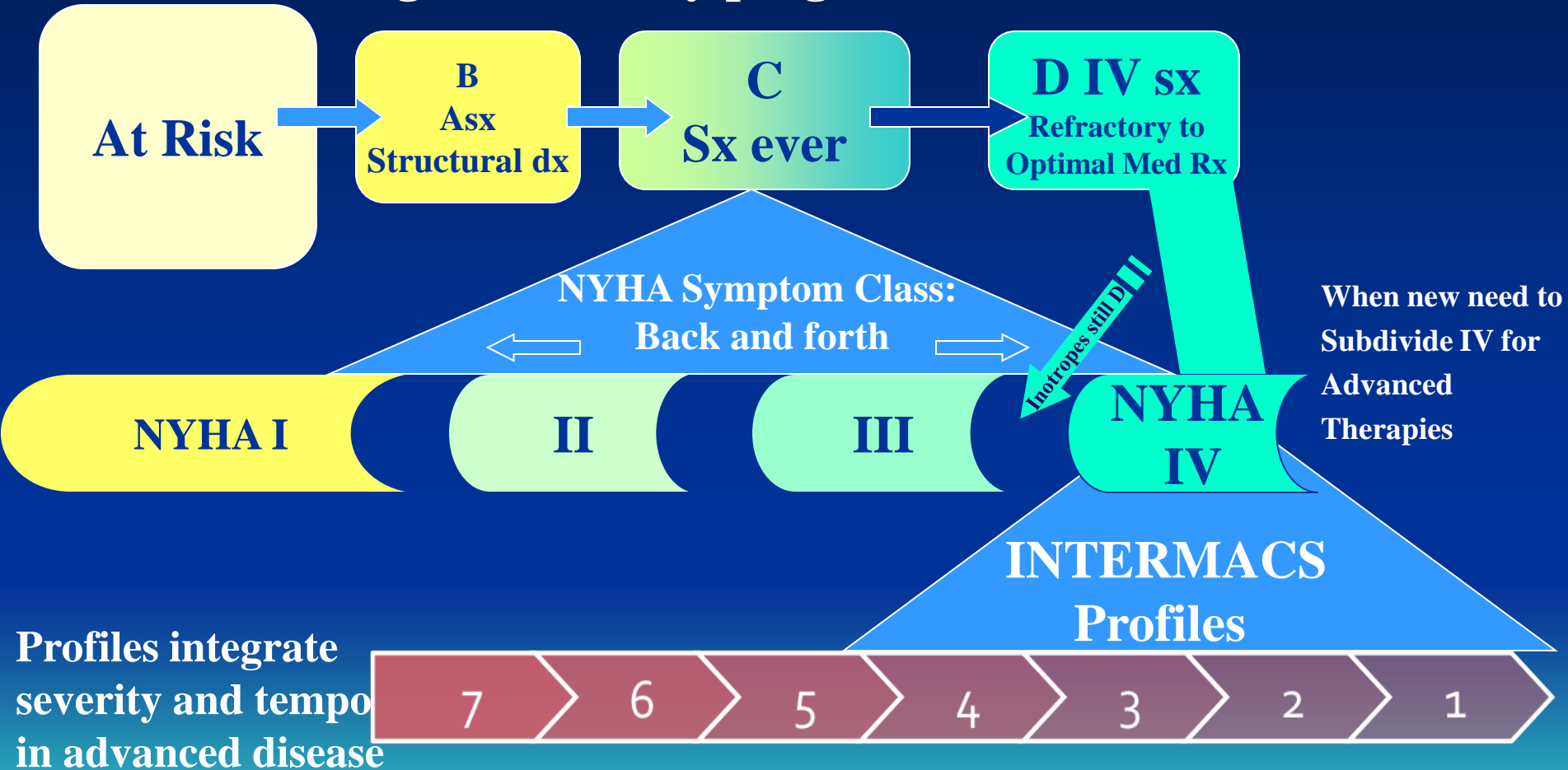
Common Causes:

- Previous heart attacks
- (DCM) Cardiomyopathy
 - Viral
 - Genetic
 - Toxins
 - Idiopathic
- Valve disease
- Congenital heart disease

Evolution of Classification

*When had Rx to decrease
early disease progression*

ACC/AHA Stages: One-way progression



Cornerstones of Medical Therapy for Stage C: Symptomatic Heart Failure

Medications with remarkable extent of safety and efficacy in Stage C

- ACEI/ARB
- Beta blockers
- With diuretics as needed to control fluid retention

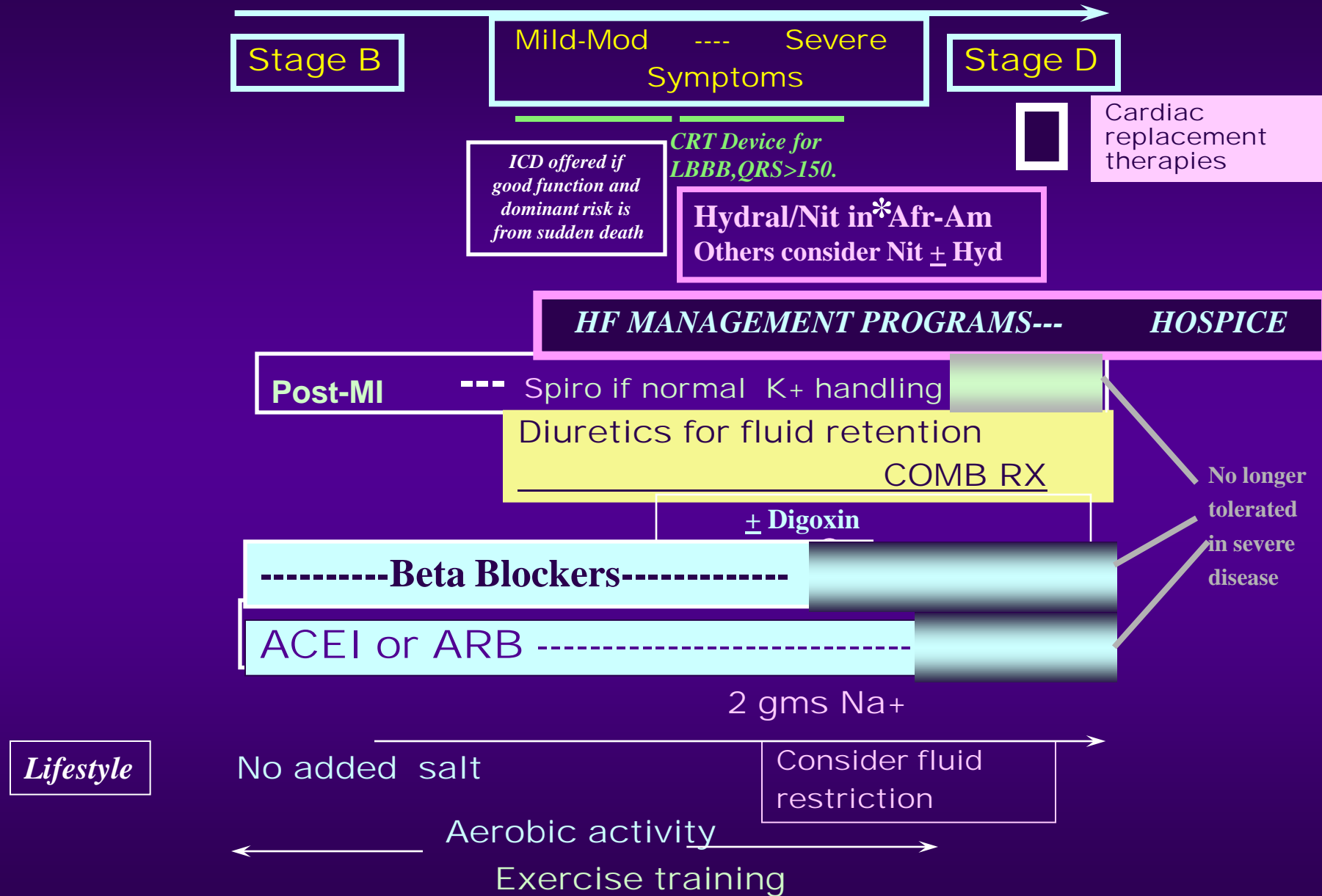
Rhythm Device for Selected Patients

- ICD to prevent sudden death from life-threatening ventricular rhythms
- Cardiac resynchronization therapy to improve pump function and exercise capacity

Selected populations for Adjunct Therapies

- Aldosterone antagonists
- Hydralazine-nitrates

Escalating Therapy for Heart Failure



Picture of Heart Failure

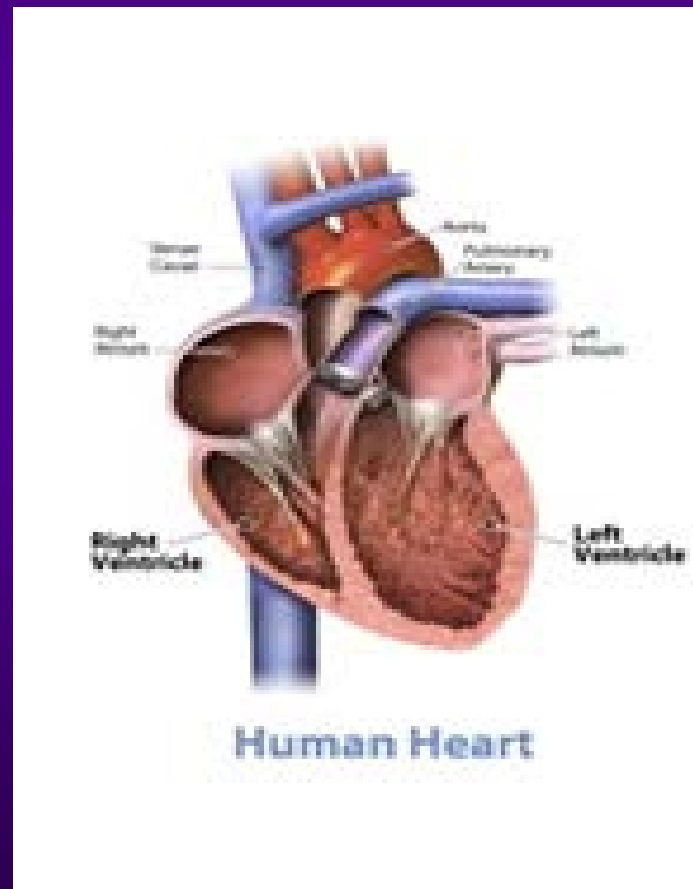
Heart Failure Progression into Stage D

What is Reversible with Support?

- Left heart failure: forward and backward
 - Secondary pulmonary hypertension
 - RIGHT HEART FAILURE – both primary and secondary
- Kidney dysfunction
- Liver dysfunction
- Malnutrition - cachexia
- De-conditioning – frailty
- Exhaustion of personal and family relationships and coping
- *How much of this picture is reversible ?*
 - *With cardiac transplantation*
 - *With mechanical support of the left heart*
 - *Early enough for good post-operative outcome?*
 - *Complete enough for meaningful long-term outcome?*

*Even the best answer is only an experienced guess
Anticipating the known, the known unknown,
and the unknown unknown.*

The Left Ventricle Is Only Half of the Problem



The most common devices support the left heart only

Stage D Therapies

- **Continued vigilance to relieve symptoms of fluid retention with combination diuretics, continue other therapies as tolerated**
- **Intravenous inotropic therapy**
 - Often used as temporary therapy in hospital to help stabilize
 - Weaning not always possible
 - **IIb: Continuous home inotropic infusions may be considered for palliation of end-stage heart failure (Level IIb indication)**
- **Transplantation in highly selected patients (often needing bridge with mechanical circulatory support)**
- **Mechanical circulatory support in carefully selected patients at experienced centers**
- **Focus on symptom palliation for quality of life through the end of life.**

Poor Survival

With Continuous Home IV Inotropic Therapy

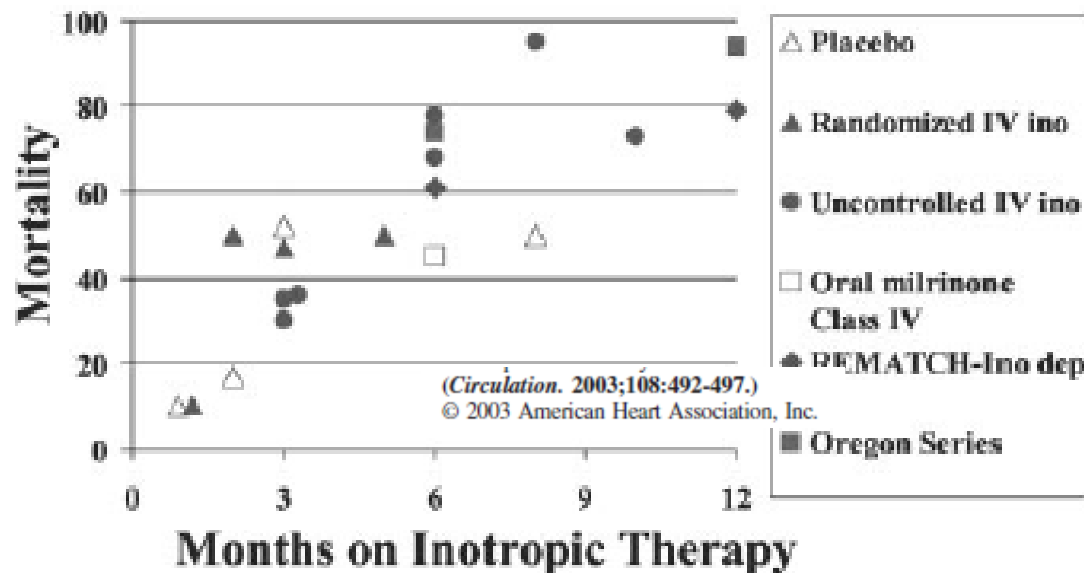
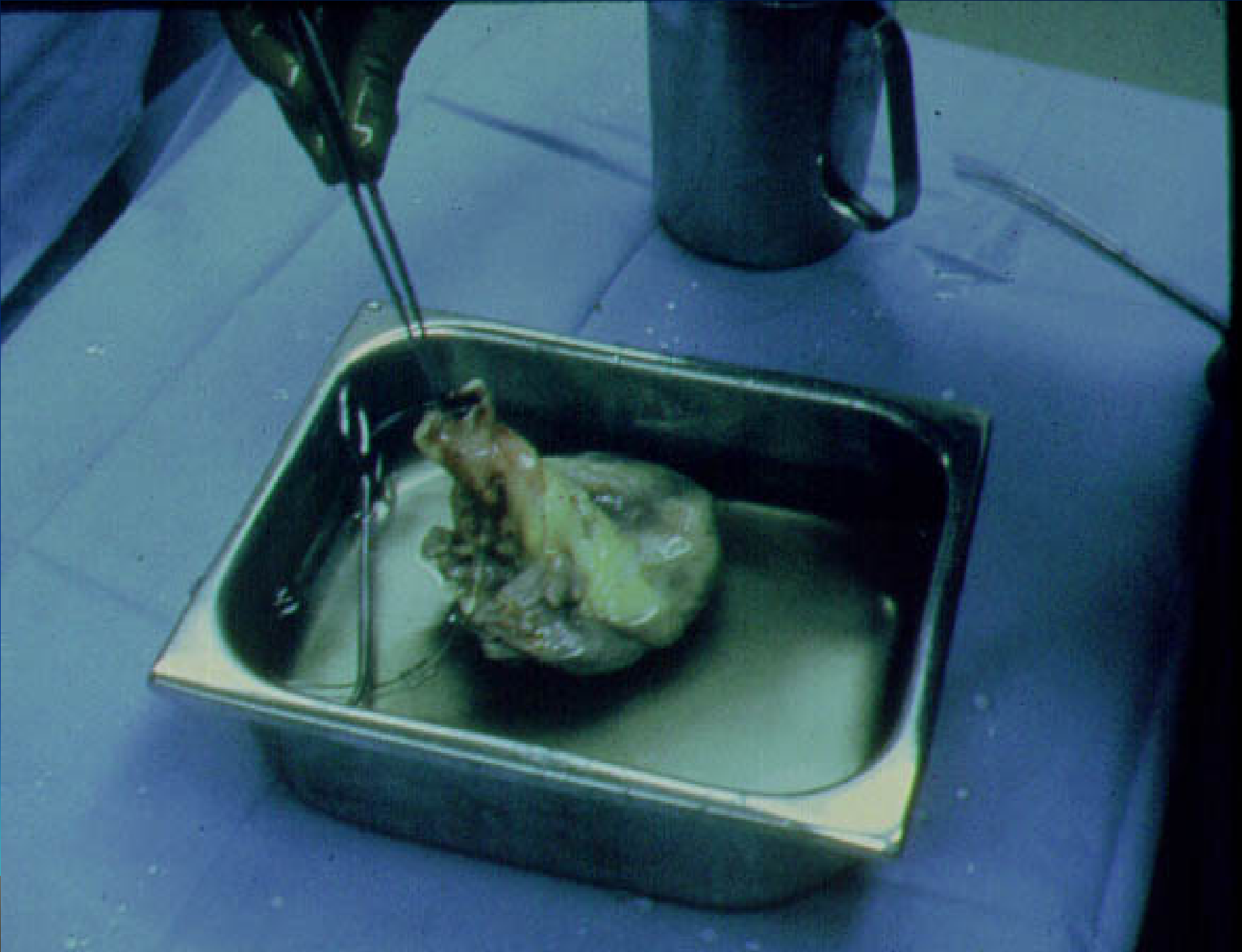


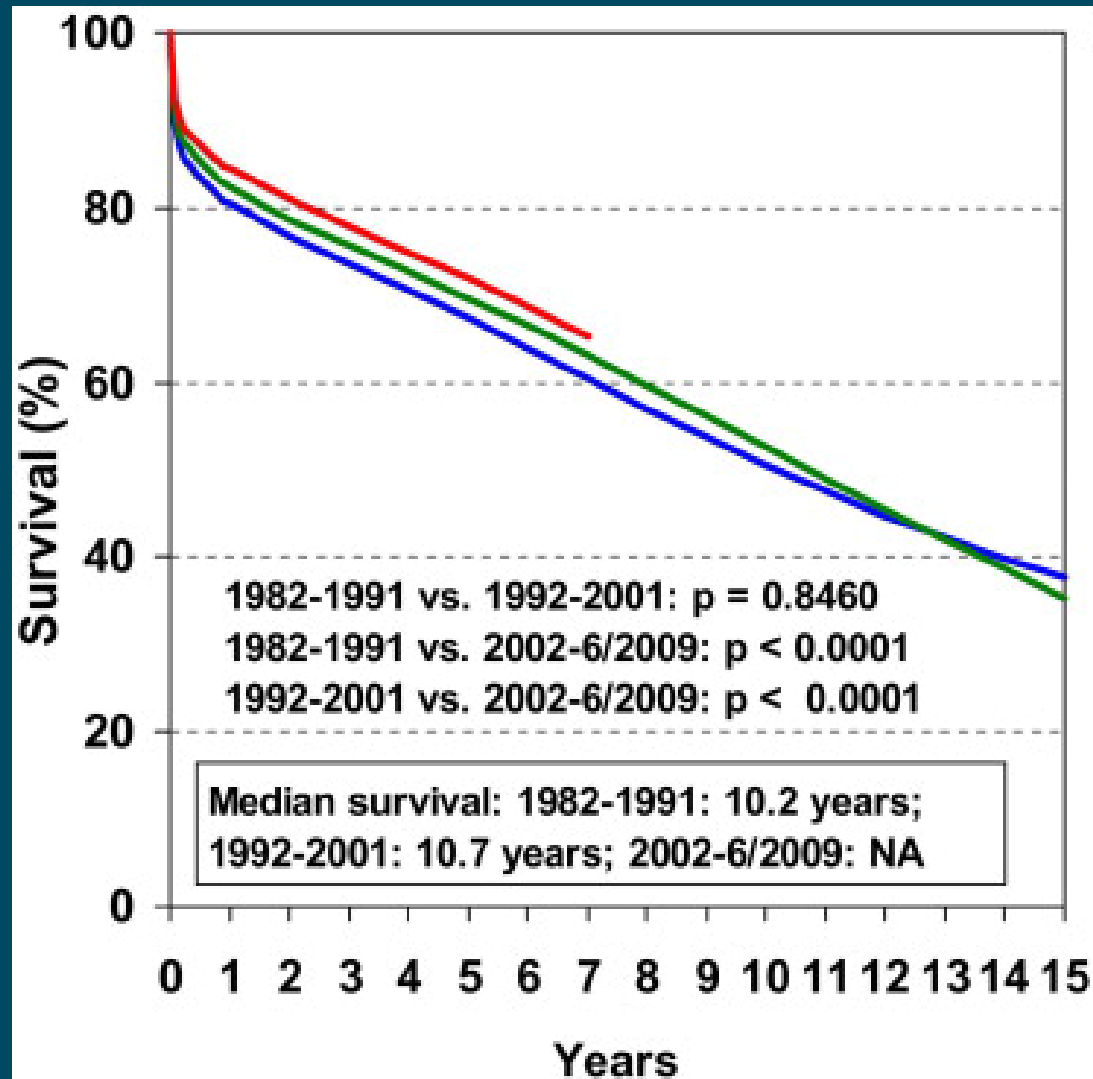
Figure 1. Mortality estimated from selection of experiences with intravenous inotropic (ino) therapy. Mortality in intravenous inotropic trials from controlled experiences is shown in shaded triangles, with placebo mortality in open triangles.¹⁶⁻¹⁹ Circles represent uncontrolled experiences.^{5-7,13,14,35,36} Where available,

(Circulation. 2003;108:492-497.)

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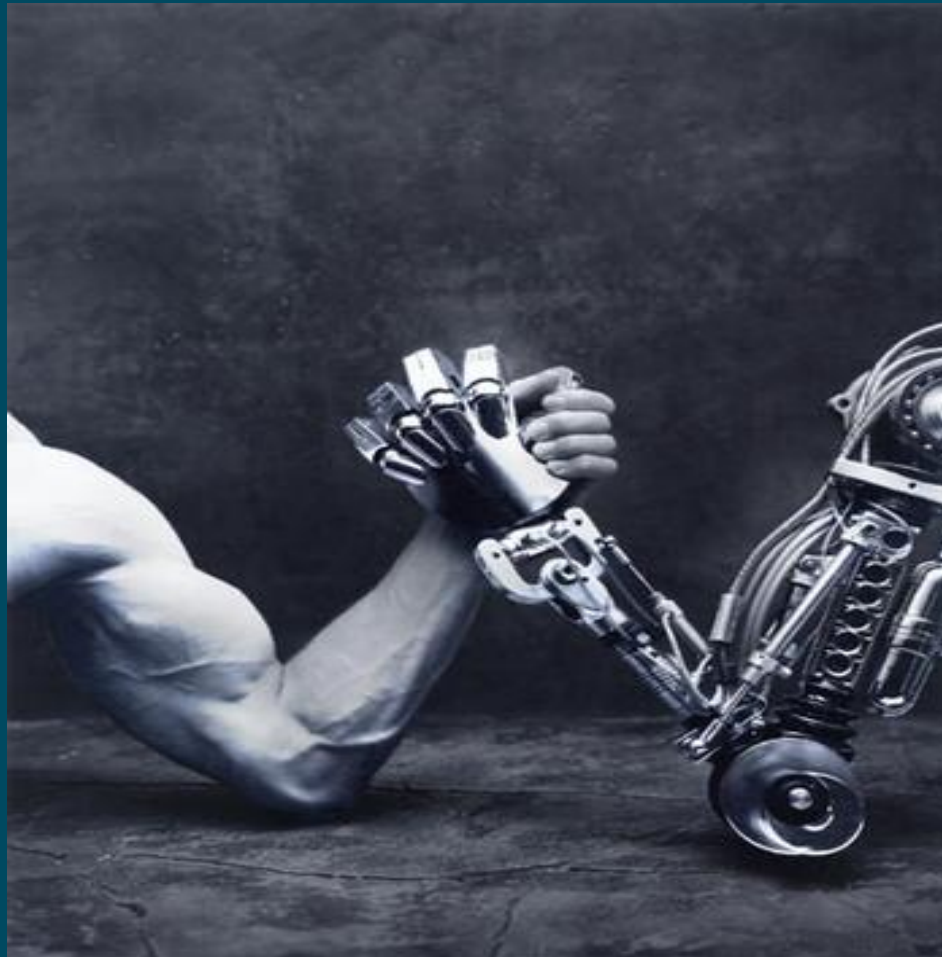
Survival to 1 Year After Transplant for Adult Heart Transplants Performed Between January 1982 and June 2009, Stratified by Era of Transplant.



— 1982-1991 (N=20,504) — 1992-2001 (N=36,879) — 2002-6/2009 (N=22,477)

The Registry of the International Society for Heart and Lung Transplantation-Twenty-eighth Adult Heart Transplant Report-2011. JHLT. 2011 Oct;30(10):1078-1094.

Human and Mechanical Muscle



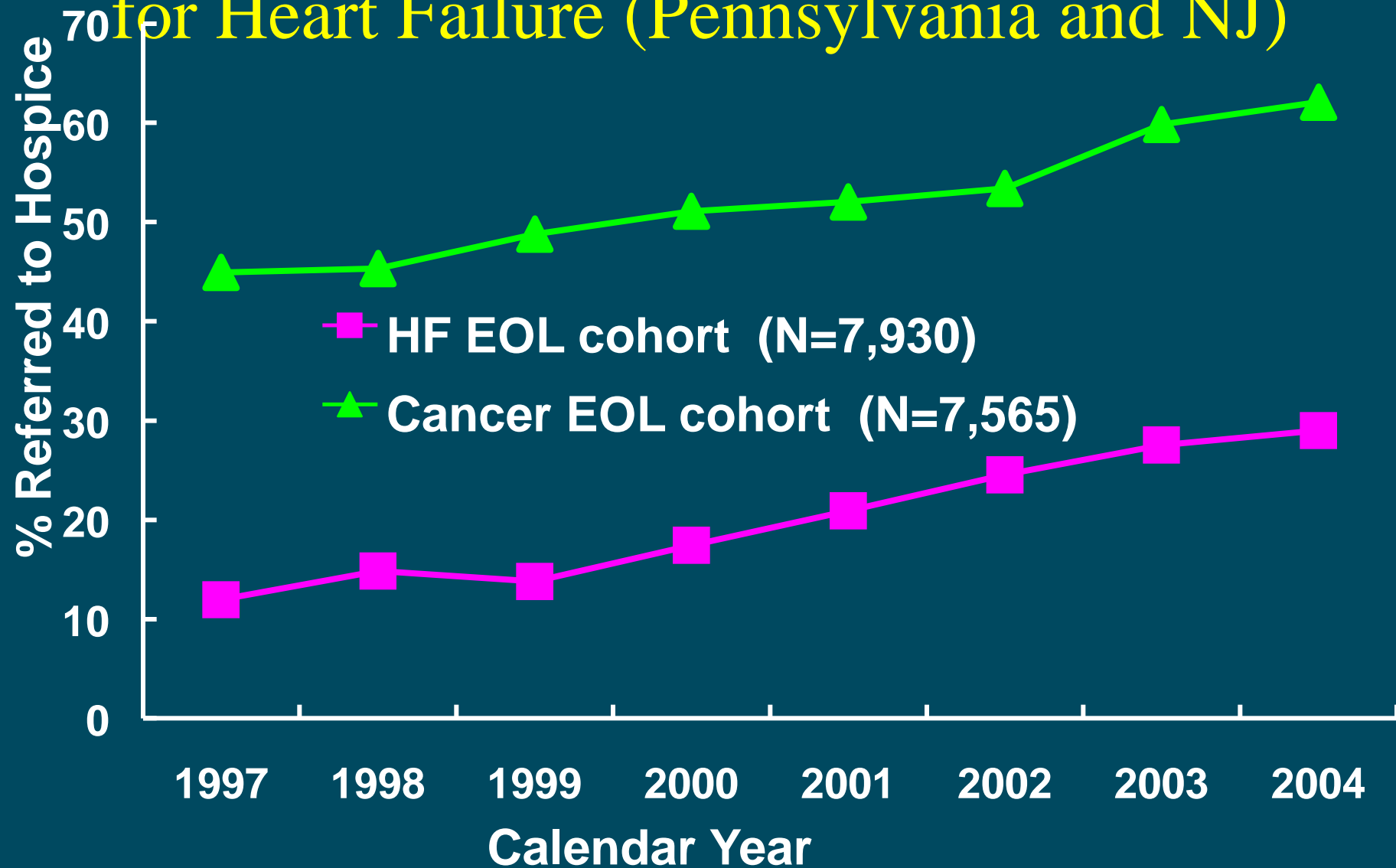
PROFILE-LEVEL	PRIMARY LVADs 2011-12	Official Shorthand	<i>Current CMS Indic</i>	Modifier options
INTERMACS LEVEL 1	16%	“Crash and burn”	MET	± Arrhythmias
INTERMACS LEVEL 2	38%	“Sliding fast” on ino	MET	± Arrhythmias
INTERMACS LEVEL 3	27%	Stable but Ino-Dependent Can be hosp or home	MET	± Arrhythmias ± FF frequent flyer
INTERMACS LEVEL 4	13%	<u>Resting symptoms on oral therapy at home.</u>	<u>MET IF 45/60 dys</u> <u>+ ALSO Exercise Pk VO2 ≤ 14</u>	FF frequent flyer Arrhythmias
INTERMACS LEVEL 5	3%	“Housebound”, Comfortable at rest, symptoms with minimum activity ADL		FF frequent flyer Arrhythmias
INTERMACS LEVEL 6	1.6%	“Walking wounded”-ADL possible but meaningful activity limited		+FF frequent flyer ± Arrhythmias A
INTERMACS LEVEL 7		Advanced Class III		± Arrhythmias

Stage D - Therapies For Refractory Heart Failure

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- **Intravenous inotropic therapy**
for palliation of end-stage heart failure (Level IIb indication)
- **Transplantation in highly selected patients (often needing bridge with mechanical circulatory support)**
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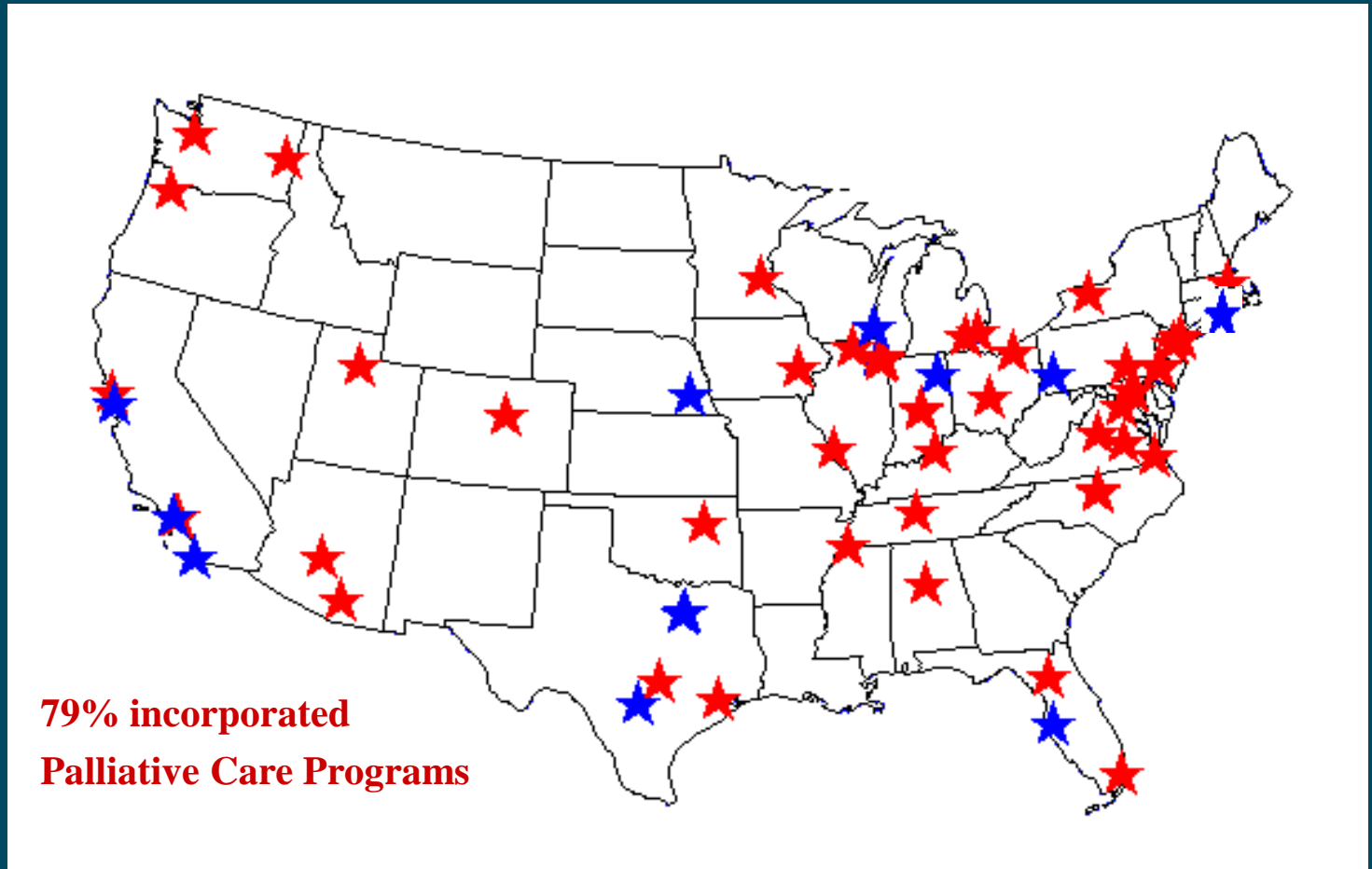
Trend in the Use of Hospice

for Heart Failure (Pennsylvania and NJ)



Vanguard LVAD Centers Integrated Palliative Care Program

Slide courtesy of Diane Meier M.D.
Hertzberg Palliative Care Institute



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