

2018 Update on Heart Failure Management

Where we are today....

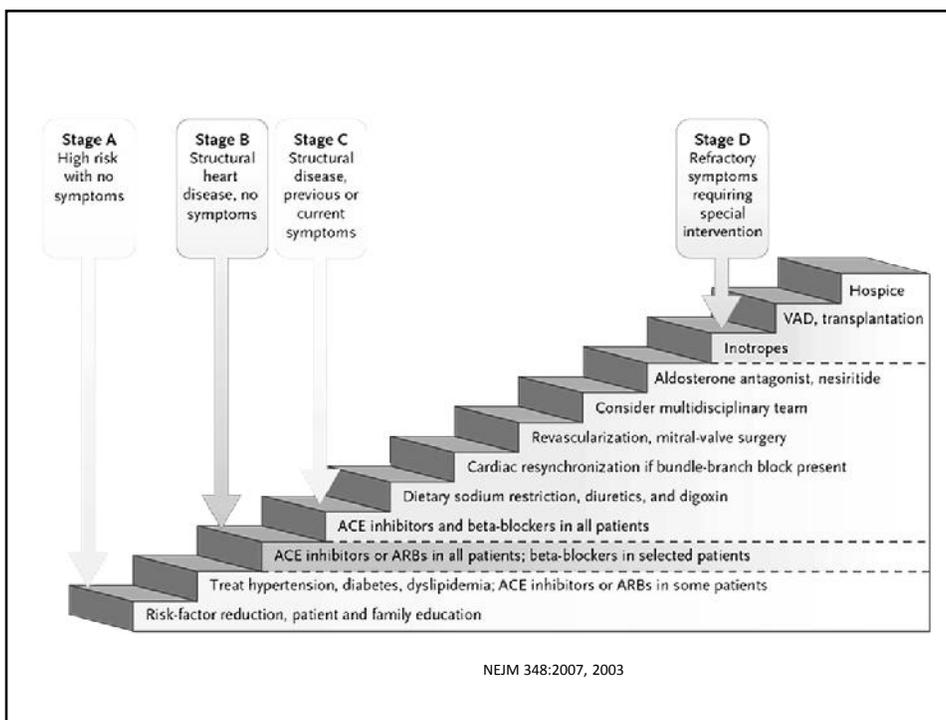
Mitchell Saltzberg, MD
Medical Director
Comprehensive Heart Failure and Transplant Program

HEART FAILURE

Current State of Heart Failure

- 5.7M Americans diagnosed with Heart Failure
- Overall spending of roughly \$30.7 billion
- 68% of costs are attributed to direct medical expenditures
 - The majority being due to hospitalizations for decompensated heart failure
- Unplanned readmissions remain common with ~25% of patients being readmitted within 30 days of discharge

Bergethon et. al. , Circulation: Heart Failure. 2016;9:e002594



Readmission Risk and Timing of Readmission

- High readmission rates persist....

25% within 30 days

50% within 6 months

Heart Failure

– 13.4% readmitted within 0-3 days

– 31.7% readmitted within 0-7 days

– 61% admitted within 0-15 days

1. Krumholz HM, et al. Circ Cardiovas Qual Outcomes 2009.
2. Wexler DJ, et al. Am Heart J 2001.

Dharmarajan K. et al. JAMA 2013. Vol 309, No. 4



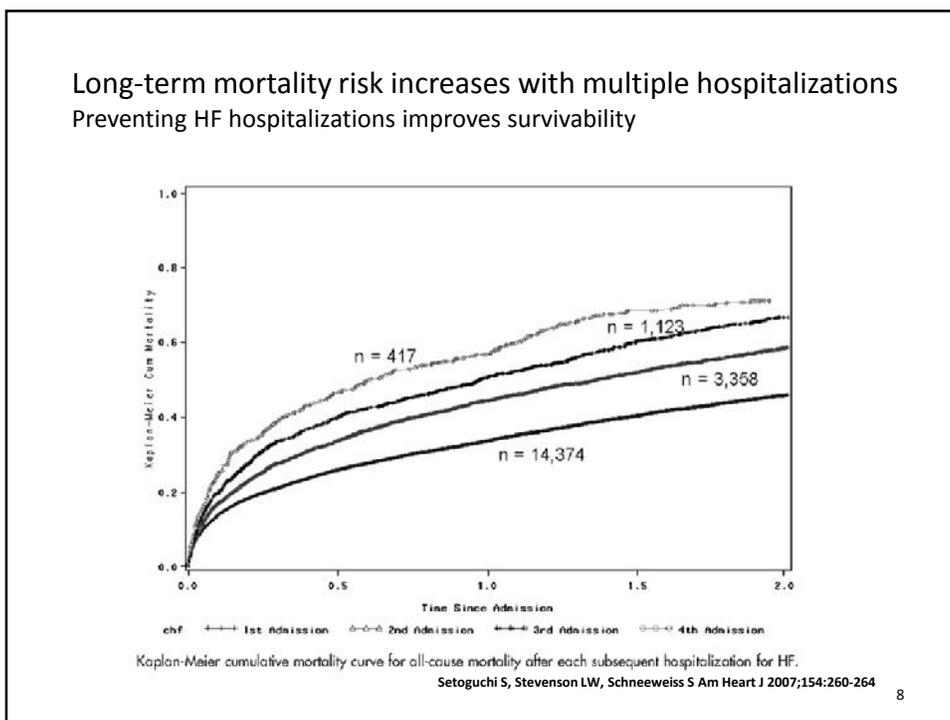
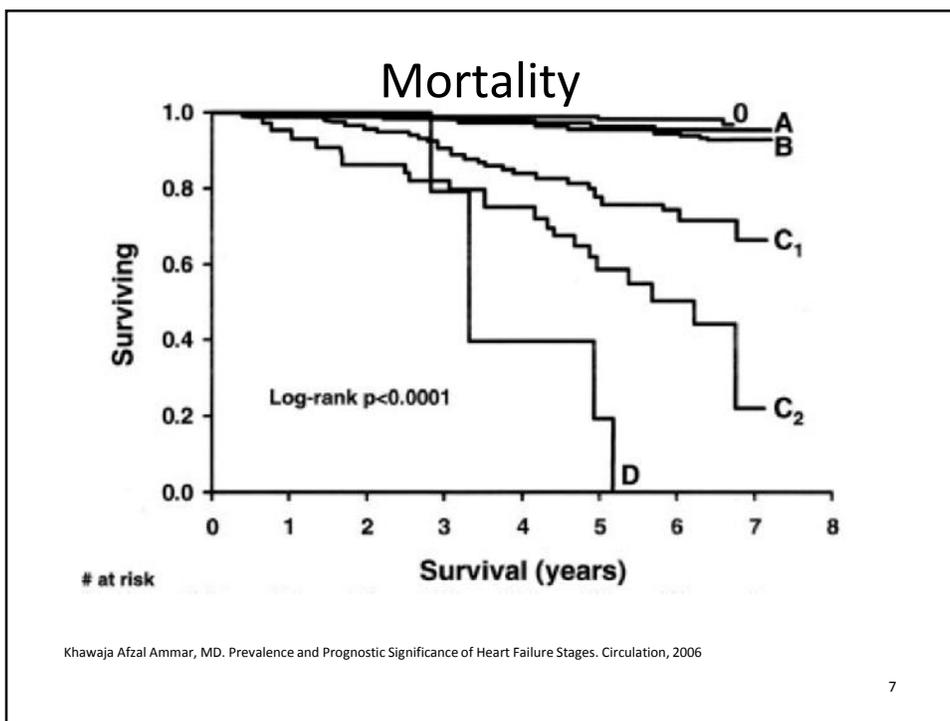
Mortality

- For AHA/ACC stage C/D patients diagnosed with HF:

- **30% mortality rate in the first year.** ³⁻⁵

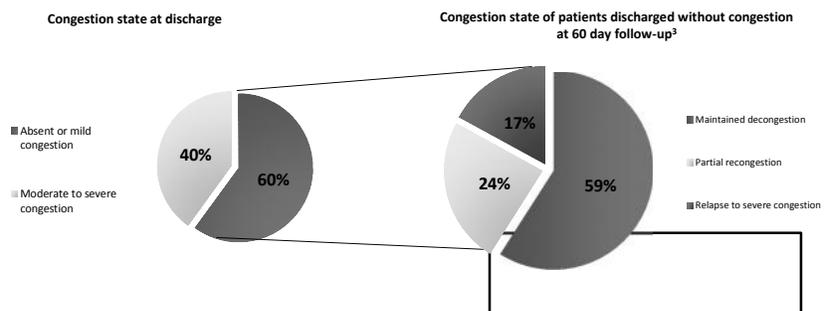
- **60% mortality rate within 5 years.**⁵

1. Curtis et al. Arch Intern Med, 2008.
2. Roger et al. JAMA, 2004.
3. Cowie et al. EHJ, 2002.
4. Heidenreich PA et al. Circ Heart Failure 2013.



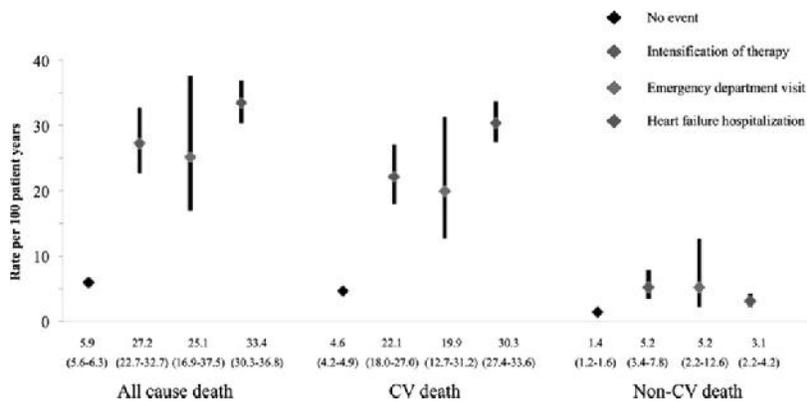
PRO-ACTIVE CARE MANAGEMENT

Congestion and Outcome



1. Lala A, et al. JCF 2013

Decompensation events requiring more intensive therapy are associated with higher mortality risk



Naoki Okumura et al. *Circulation*. 2016;133:2254-2262

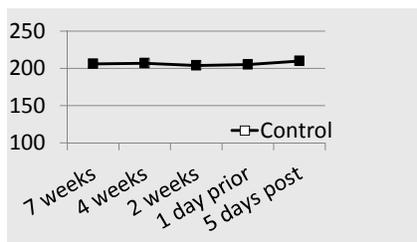


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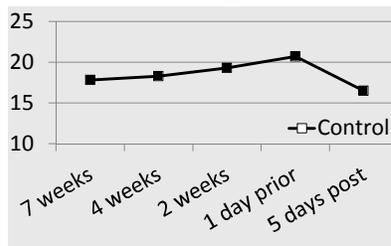
Do Daily Weight Measurements “Work”?

	Sensitivity%	Specificity%
2 kg weight gain over 48-72 hrs ¹	9%	97%
2% weight gain over 48-72 hrs ¹	17%	94%
3 lbs in 1 day or 5 lbs in 3 days ²	22.5%	-

Body Weight³
lbs

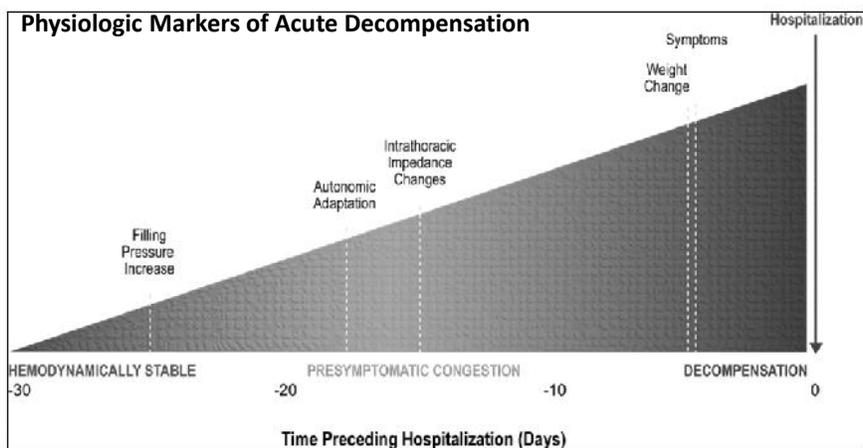


RV Diastolic Pressure³
mmHg



1. Lewin J, et al. *Eur J HF* 2005; 7:963-7
 2. Abraham WT, et al. *Cong Heart Failure*. 2011; 17: 51-5.
 3. COMPASS-HFTrial

Time Course of Decompensation

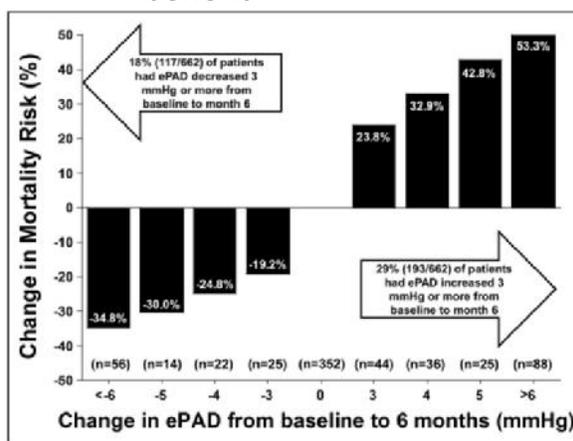


* Graph adapted from Adamson PB, et al. Curr Heart Fail Reports, 2009.

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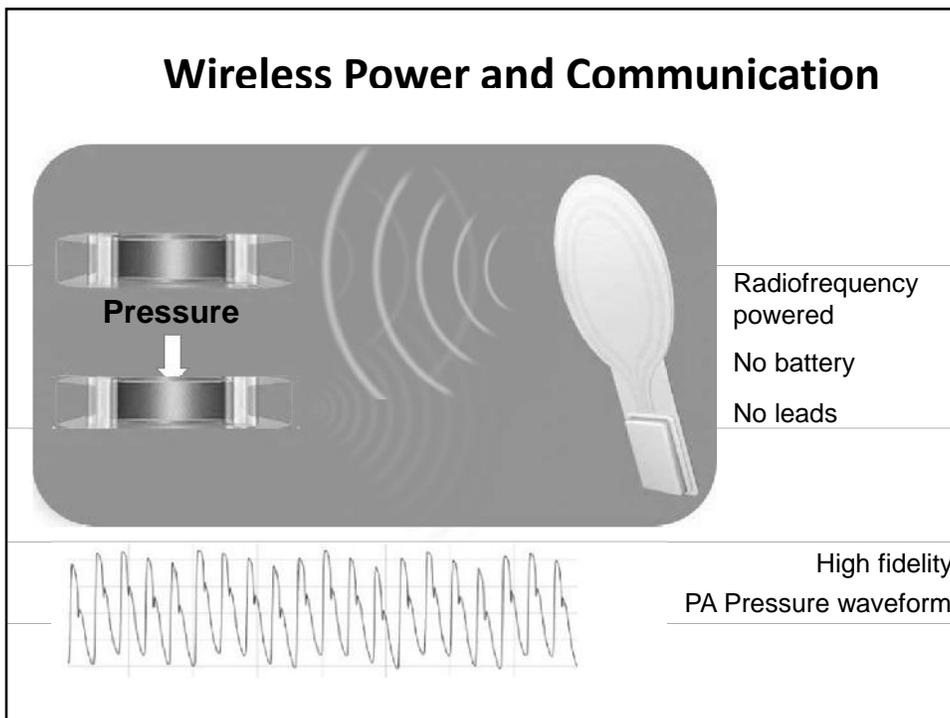
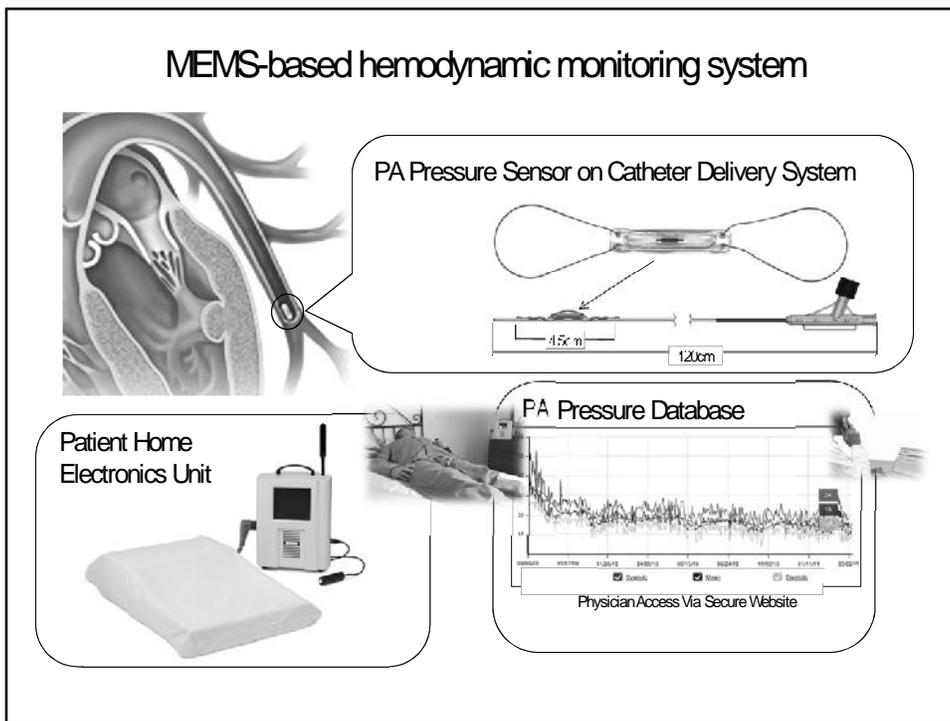
Strong relationship between baseline estimated PA diastolic (ePAD) pressure improvement and survival benefit

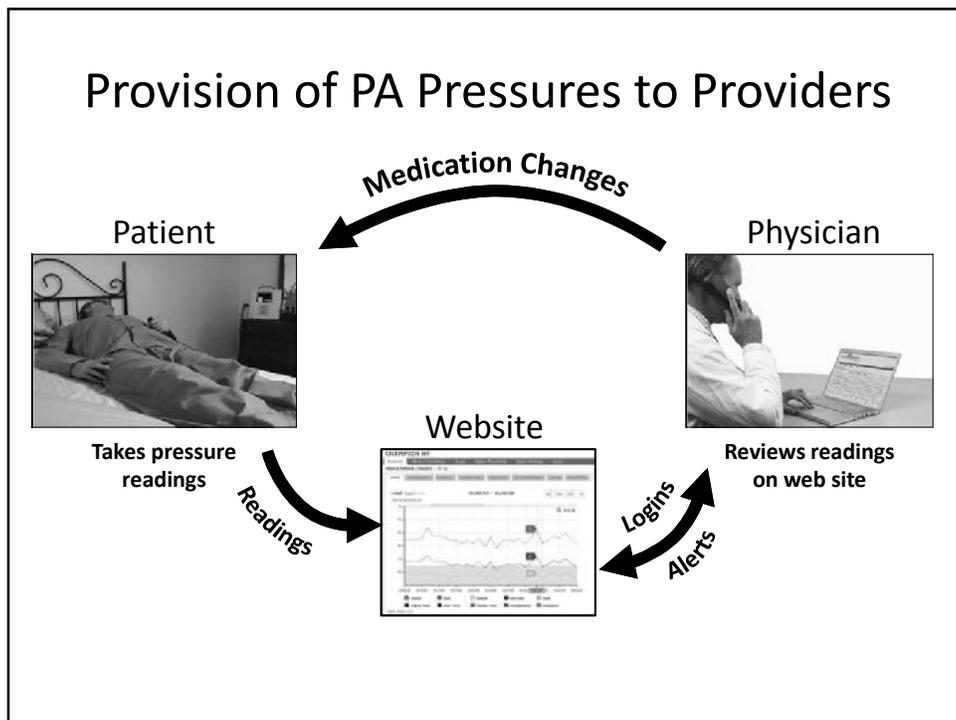
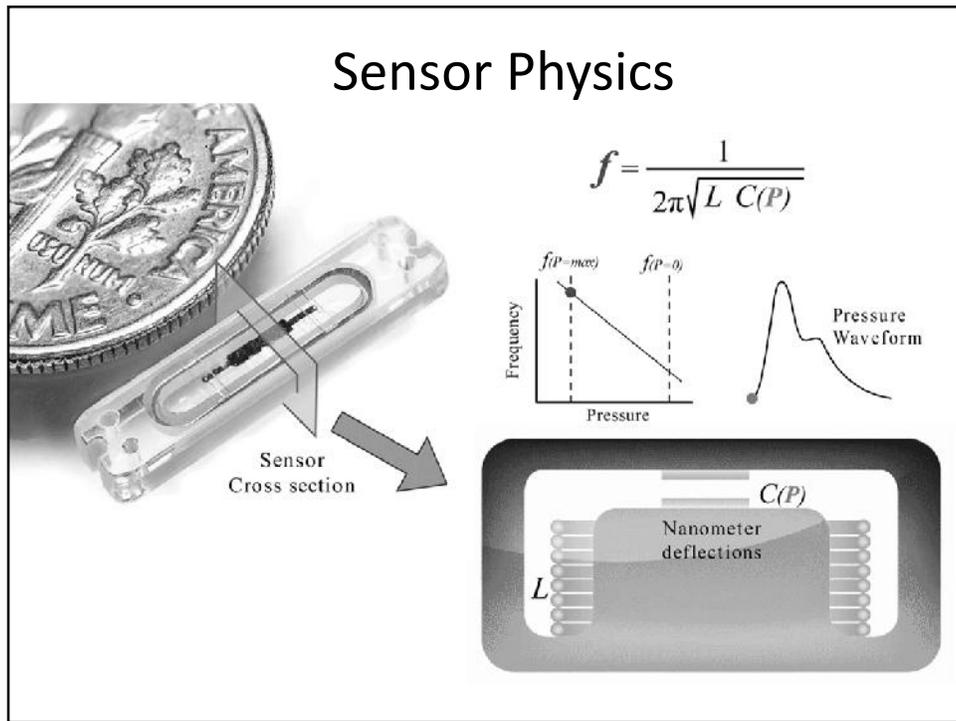
- Patients who have a high PA pressure have a higher probability of death
- A 5 mm HG reduction in ePAD is associated with a 30% survival benefit

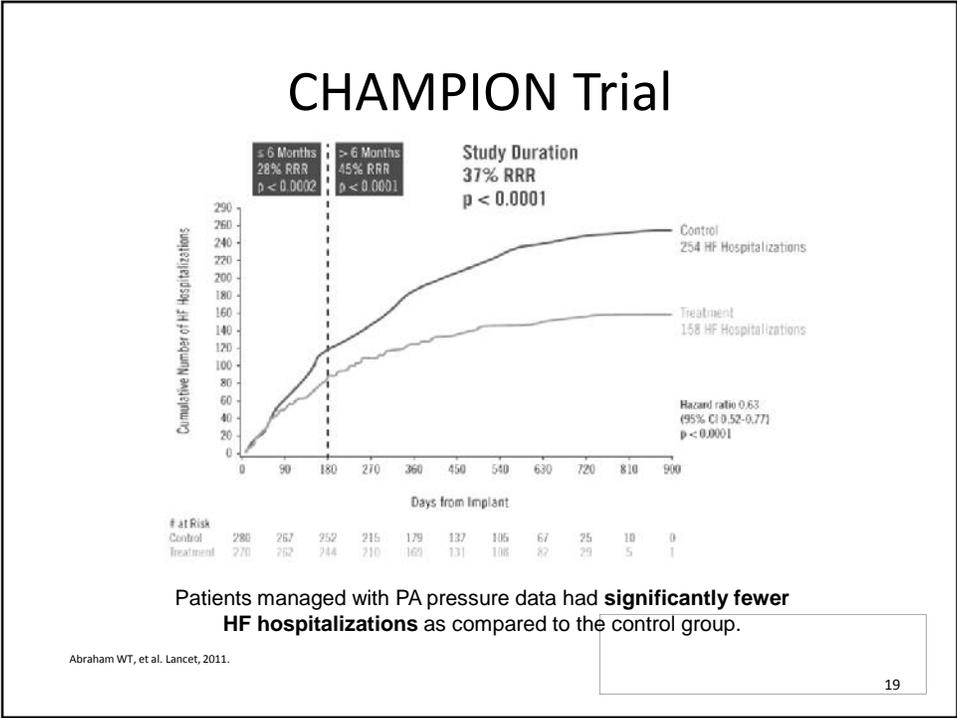


Zile MR, Bennett TD, El Hajj S, Kueffer FJ, Baicu CF, Abraham WT, Bourge RC, Warner Stevenson L. Intracardiac Pressures Measured Using an Implantable Hemodynamic Monitor: Relationship to Mortality in Patients With Chronic Heart Failure. Circ Heart Fail. 2017 Jan;10(1). pii: e003594. doi: 10.1161/CIRCHEARTFAILURE.116.003594.

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CHAMPION Trial: The Number Needed to Treat (NNT) to Prevent One HF-related Hospitalization

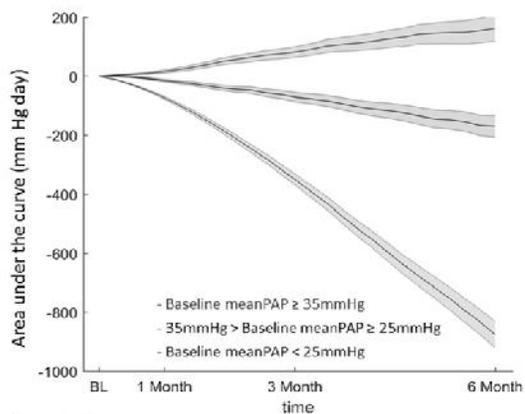
Intervention	Trial	Mean Duration of Randomized Follow-Up	Annualized Reduction in HF Hospitalization Rates	NNT per year to Prevent 1 HF Hospitalization
Beta-blocker	COPERNICUS	10 months	33%	7
Aldosterone antagonist	RALES	24 months	36%	7
CRT	CARE-HF	29 months	52%	7
Beta-blocker	MERIT-HF	12 months	29%	15
ACE inhibitor	SOLVD	41 months	30%	15
Aldosterone antagonist	EMPHASIS-HF	21 months	38%	16
Digoxin	DIG	37 months	24%	17
Angiotensin receptor blocker	Val-HeFT	23 months	23%	18
Angiotensin receptor blocker	CHARM	40 months	27%	19
PA pressure monitoring	CHAMPION	17 months	33%	4

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CardioMEMS Real World Experience:

Providers effectively treat pressures over time

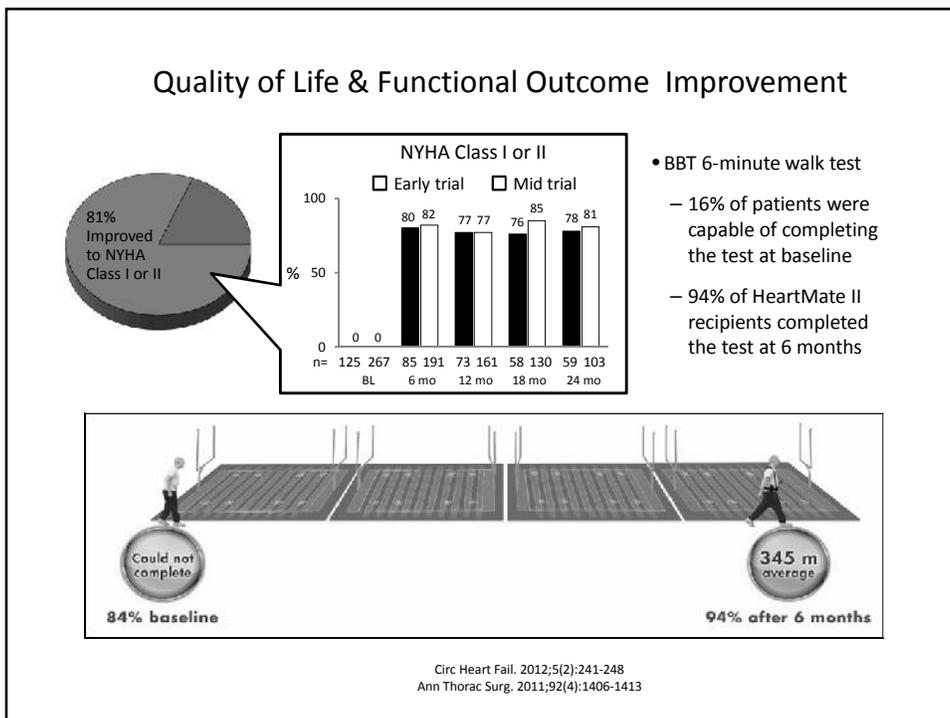
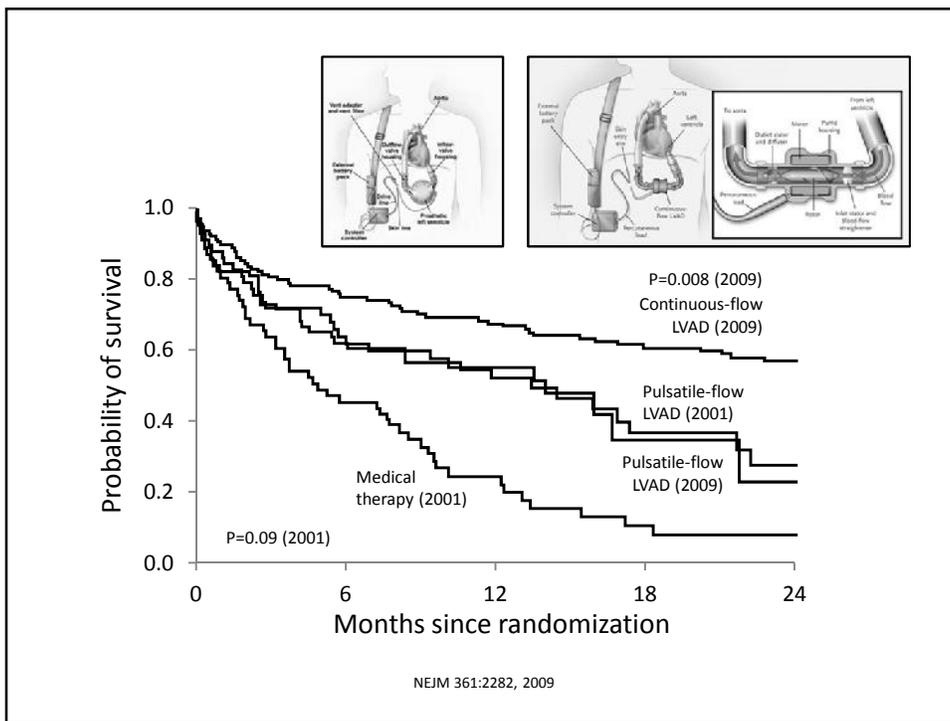
Treatment effect in the real world (n=2,000) is greater than in CHAMPION

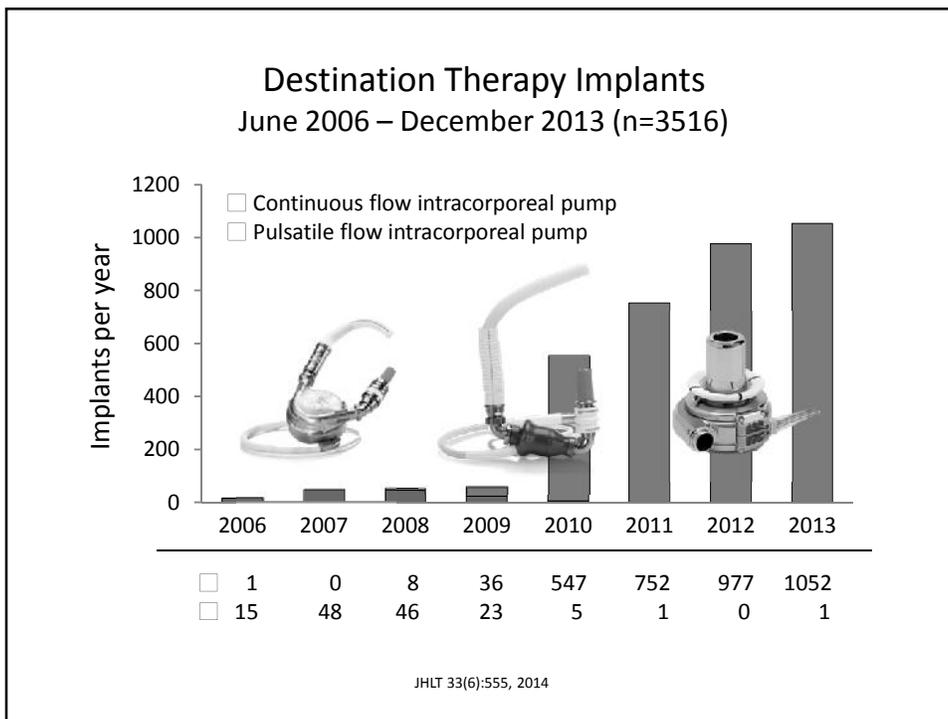


	BL	1 Month	3 Month	6 Month
Baseline meanPAP ≥ 35mmHg (998pts)	49.58	316.94	316.94	475.85
35mmHg > Baseline meanPAP ≥ 25mmHg (600pts)	-12.15	-61.77	-61.77	-169.13
Baseline meanPAP < 25mmHg (399pts)	24.12	76.62	76.62	163.04

Heywood JT et al Circulation 2017 Feb 20, 2017 online publication

SURGICAL THERAPIES FOR ADVANCED HEART FAILURE

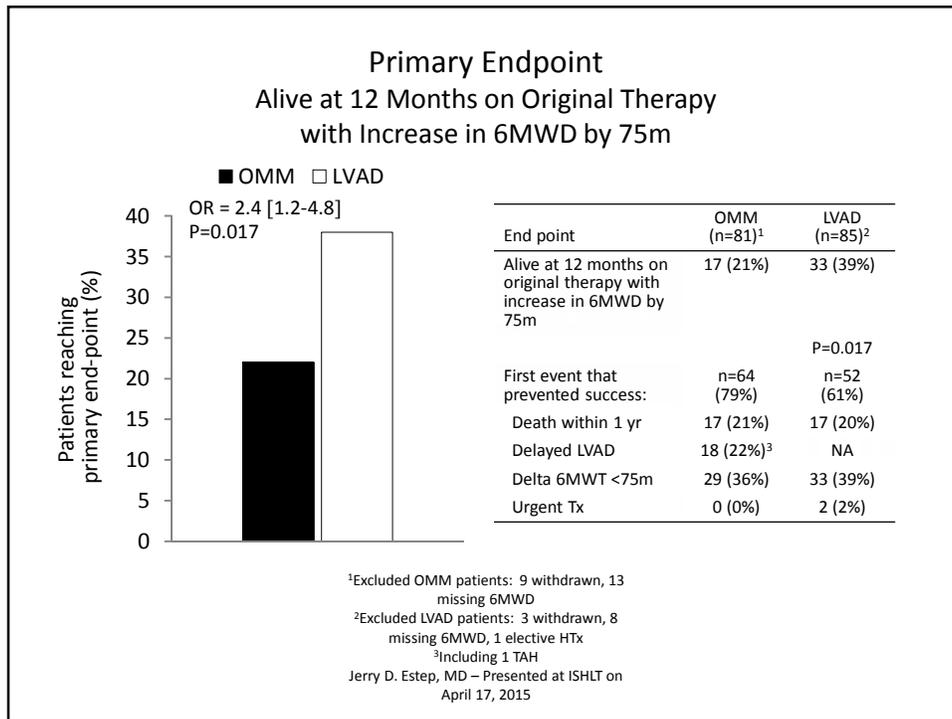




Recommendations for Inotropic Support, MCS and Cardiac Transplantation

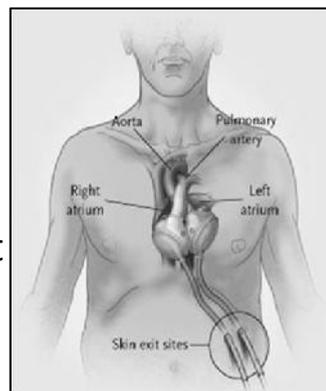
Recommendations	COR	LOE
Inotropic support		
Cardiac shock pending definitive therapy or resolution	I	C
BTT or MCS in stage D refractory to GDMT	IIa	B
Short-term support for threatened end-organ dysfunction in hospitalized patients with stage D and severe HFrEF	IIb	B
Long-term support with continuous infusion palliative therapy in select stage D HF	IIb	B
Routine intravenous use, either continuous or intermittent is potentially harmful in stage D HF	III: Harm	B
Short-term intravenous use in hospitalized patients without evidence of shock or threatened end-organ performance is potentially harmful	III: Harm	B
MCS		
MCS is beneficial in carefully selected* patients with stage D HF in whom definitive management (eg, cardiac transplantation) is anticipated or planned	IIa	B
Nondurable MCS is reasonable as a "bridge to recovery" or "bridge to decision" for carefully selected* patients with HF and acute profound disease	IIa	B
Durable MCS is reasonable to prolong survival for carefully selected* patients with stage D HFrEF	IIa	B
Cardiac transplantation		
Evaluation for cardiac transplantation is indicated for carefully selected patients with stage D HF despite GDMT, device and surgical management	I	C

Circulation 128:e240, 2013



Syncardia Total Artificial Heart

- Bridge to Transplant
- NYHA Class IV
- BSA 1.7-2.5
- 10 cm AP Dimension
- Hemodynamic impairment
 - CI \leq 2.0 and
 - SBP \leq 90
 - CVP \geq 18
 - 2 inotropes or IABP



Mechanical Circulatory Assist Program



CARDIAC TRANSPLANTATION

The History Of Heart Transplantation



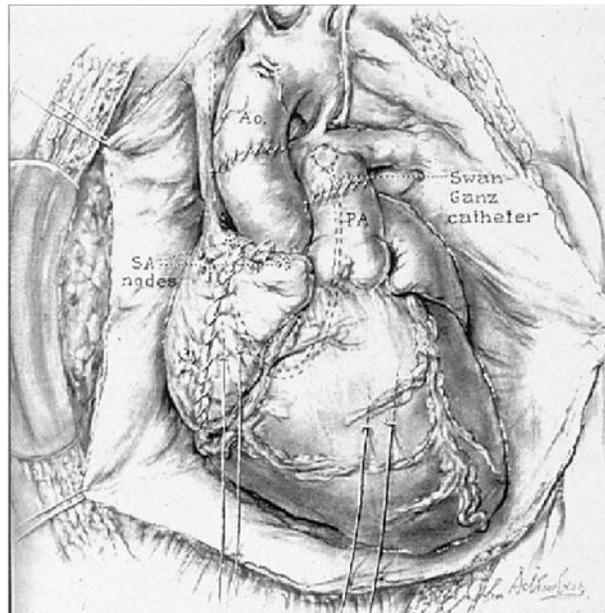
3rd December 1967

50 years and 69,000 transplants since 1967

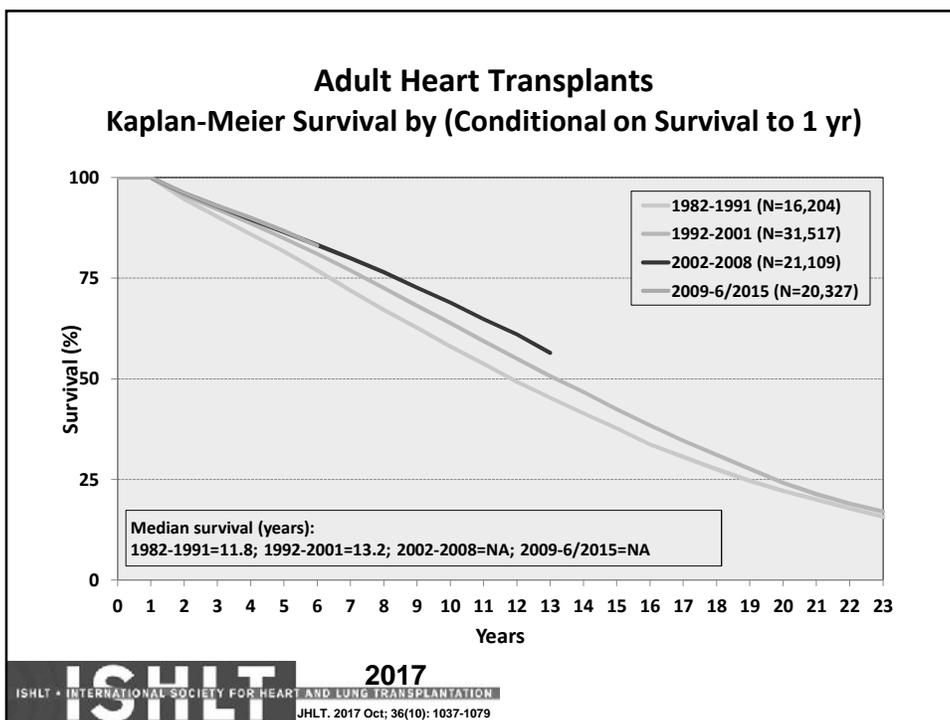
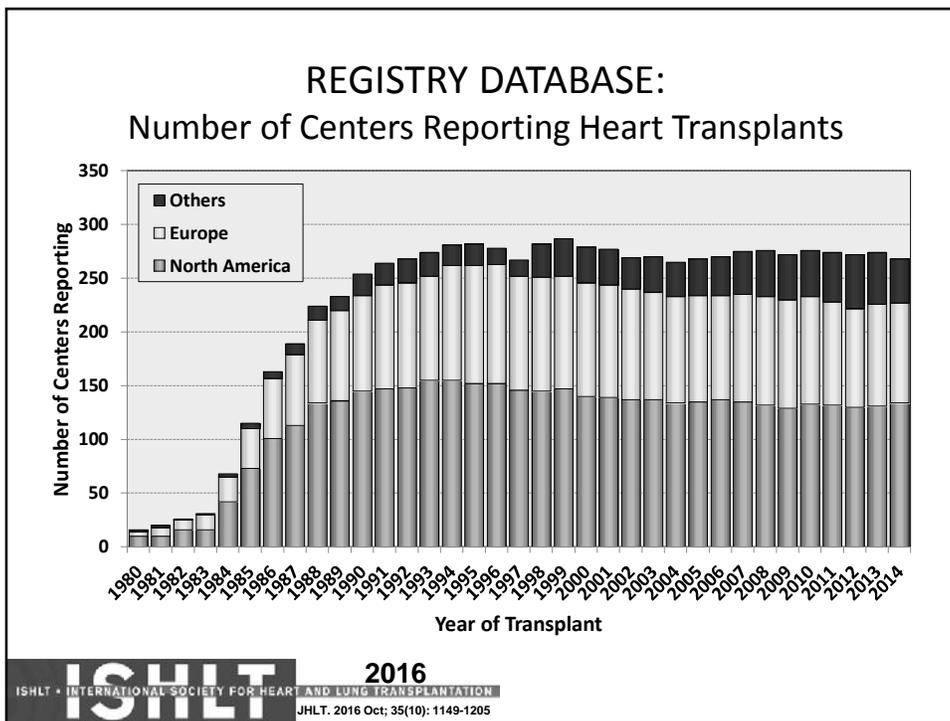
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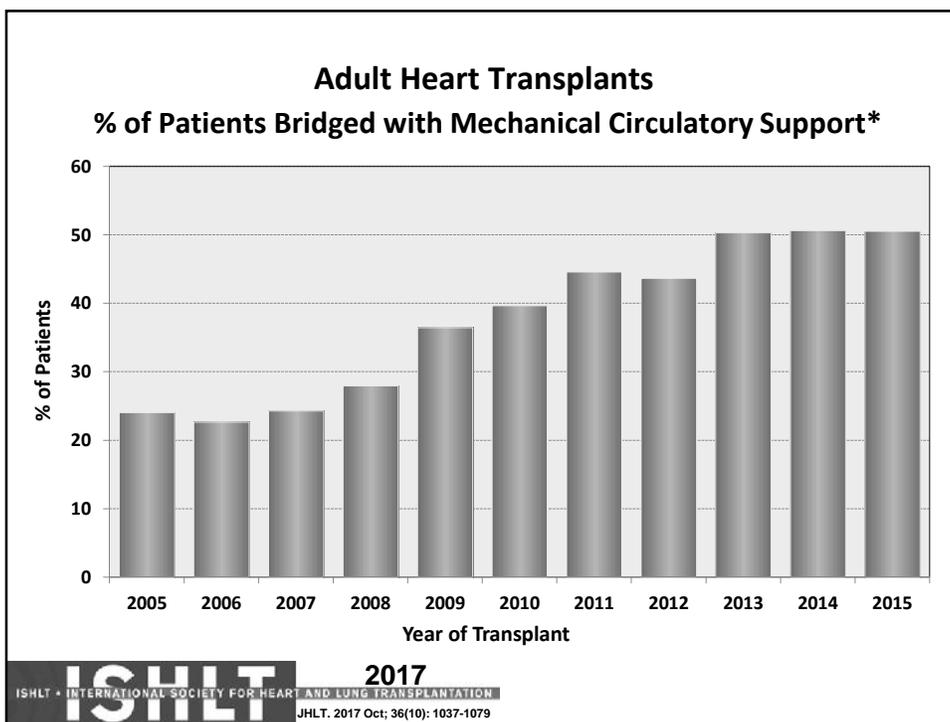
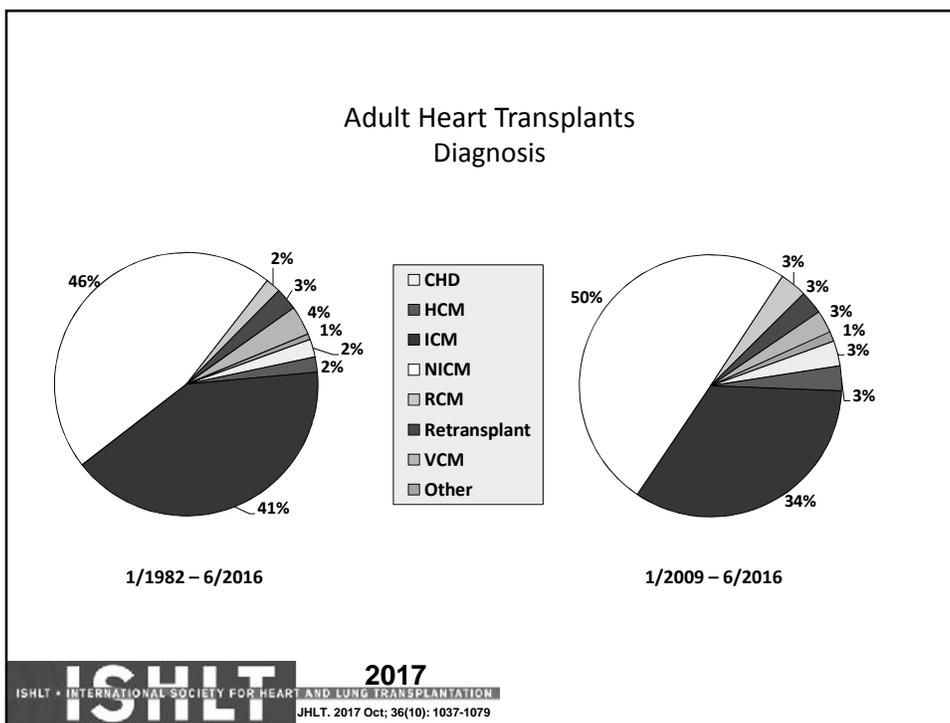
Orthotopic Implantation

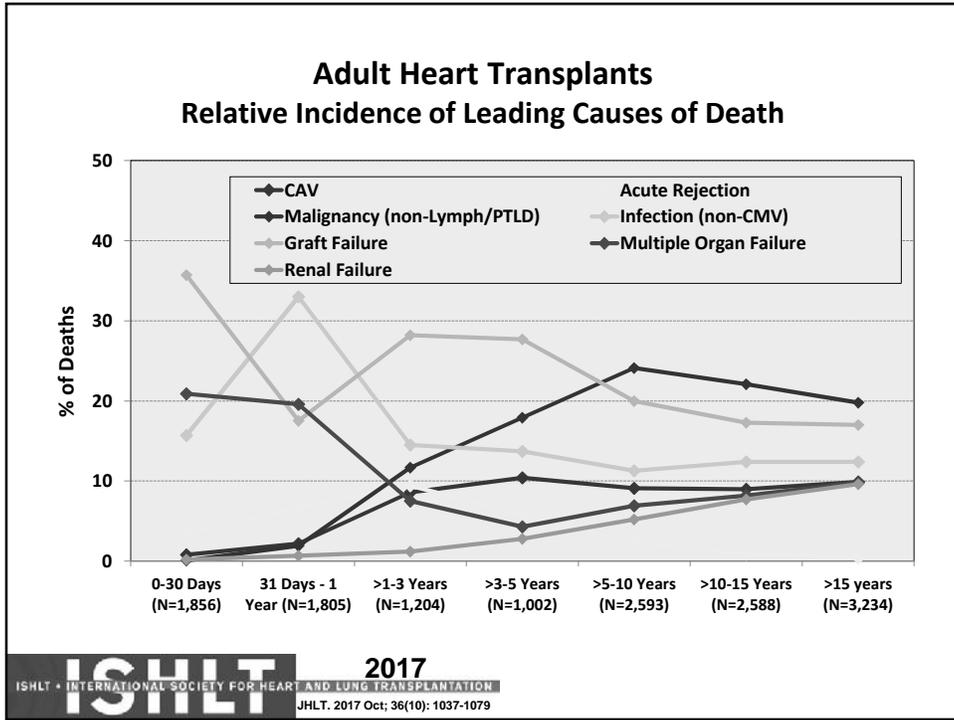
- Completed transplant
- Pacing wires on donor portion of right atrium and ventricle
- Pericardium left open



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CONCLUSIONS

Triggers for Referral

- Very Low EF Patients ($\leq 25\%$)
- Frequent Heart Failure admissions
- Cardio-Renal Syndrome
 - BUN > 40, Creat > 1.8
- Intolerance / Need to reduce GDMT
 - SBP < 100
- Electrical Instability (ICD Shock)
- Failure to improve with CRT
- Hyponatremia (Na < 135)

Take Home Points

- Heart Failure population continues to grow
- Increasing use of pro-active care strategies to reduce risk of hospitalization
- Rapid and ongoing growth in MCS therapies
- 50+ years of cardiac transplantation
- Froedtert and MCW:
 - Active Transplant and MCS programs with rapid growth
 - 15+ Transplants and 50+ MCS devices
 - Excellent outcomes
 - Strong community partnerships

How to reach us...

- **Access Center: 877-804-4700**
 - Referrals, transfers, doctor to doctor consultations, outpatient referrals

- **Mitchell T. Saltzberg, MD**
 - Cell: 302-757-9869
- **Lyle Joyce, MD**
 - Cell: 612-618-1556
- **David Joyce, MD**
 - Cell: 650-450-1685