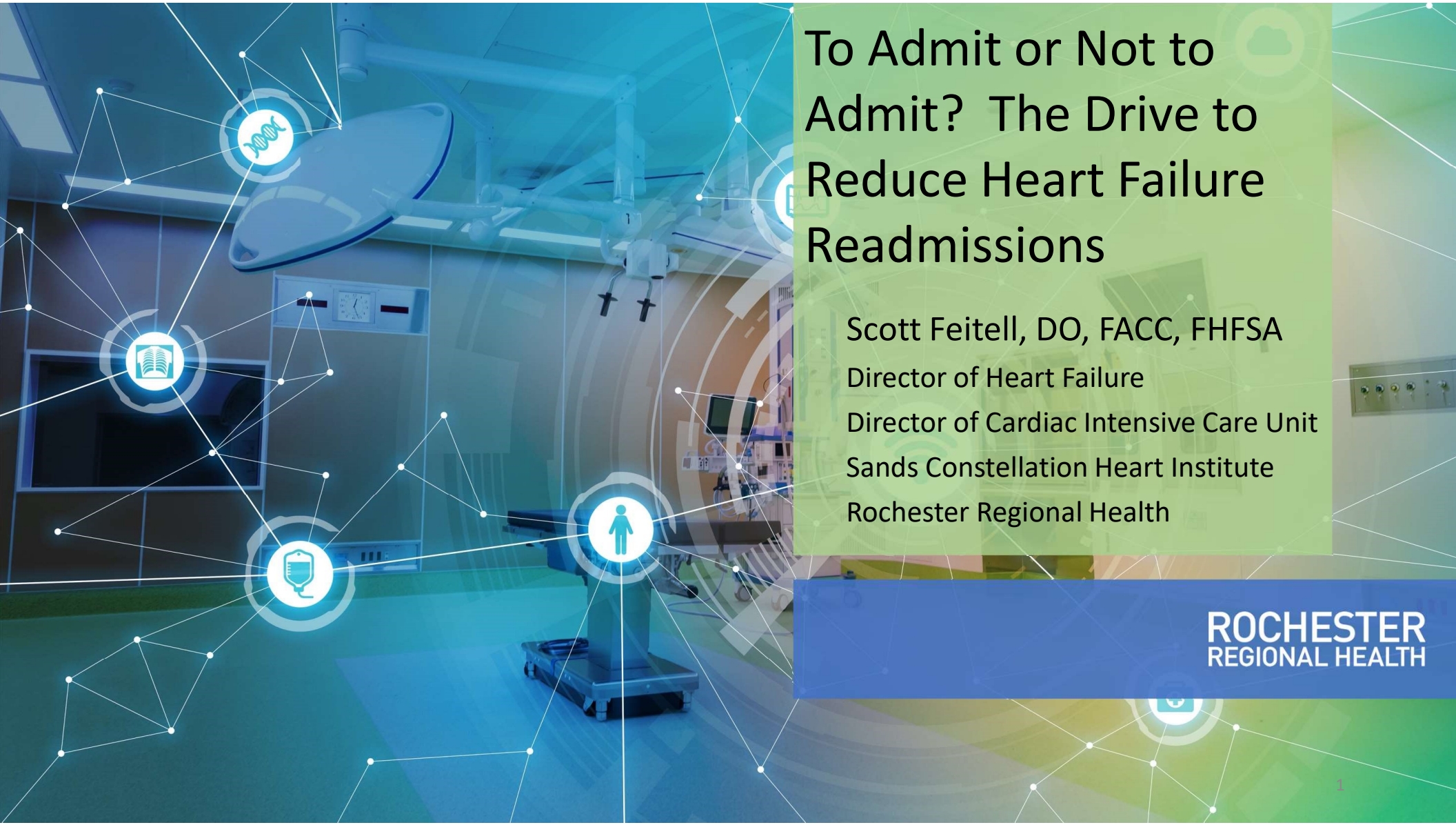


To Admit or Not to Admit? The Drive to Reduce Heart Failure Readmissions

Scott Feitell, DO, FACC, FHFSA

Director of Heart Failure

Director of Cardiac Intensive Care Unit

Sands Constellation Heart Institute

Rochester Regional Health

ROCHESTER REGIONAL HEALTH

The Scope of the Problem

- ~ 5.1 million individuals with history of HF
- > 900,000 new cases per year
- 20% lifetime risk of developing HF

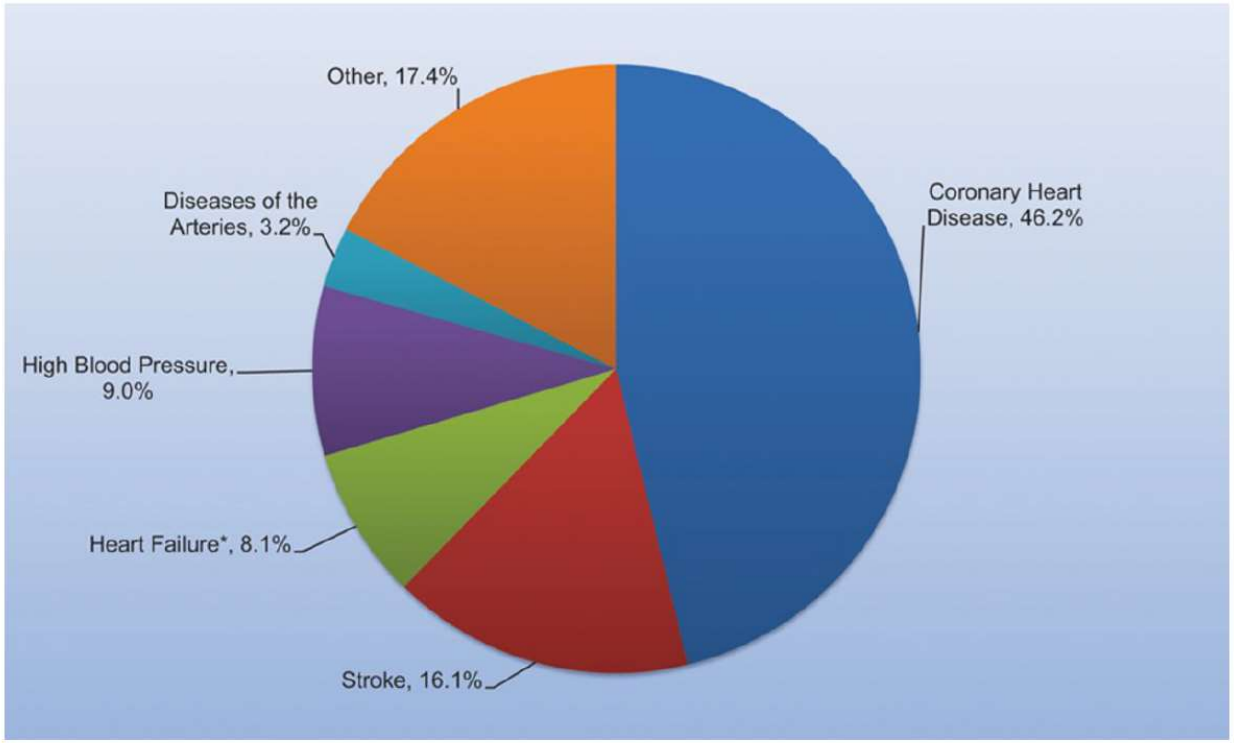
Go, et al., Circ. 2015

Furthermore…

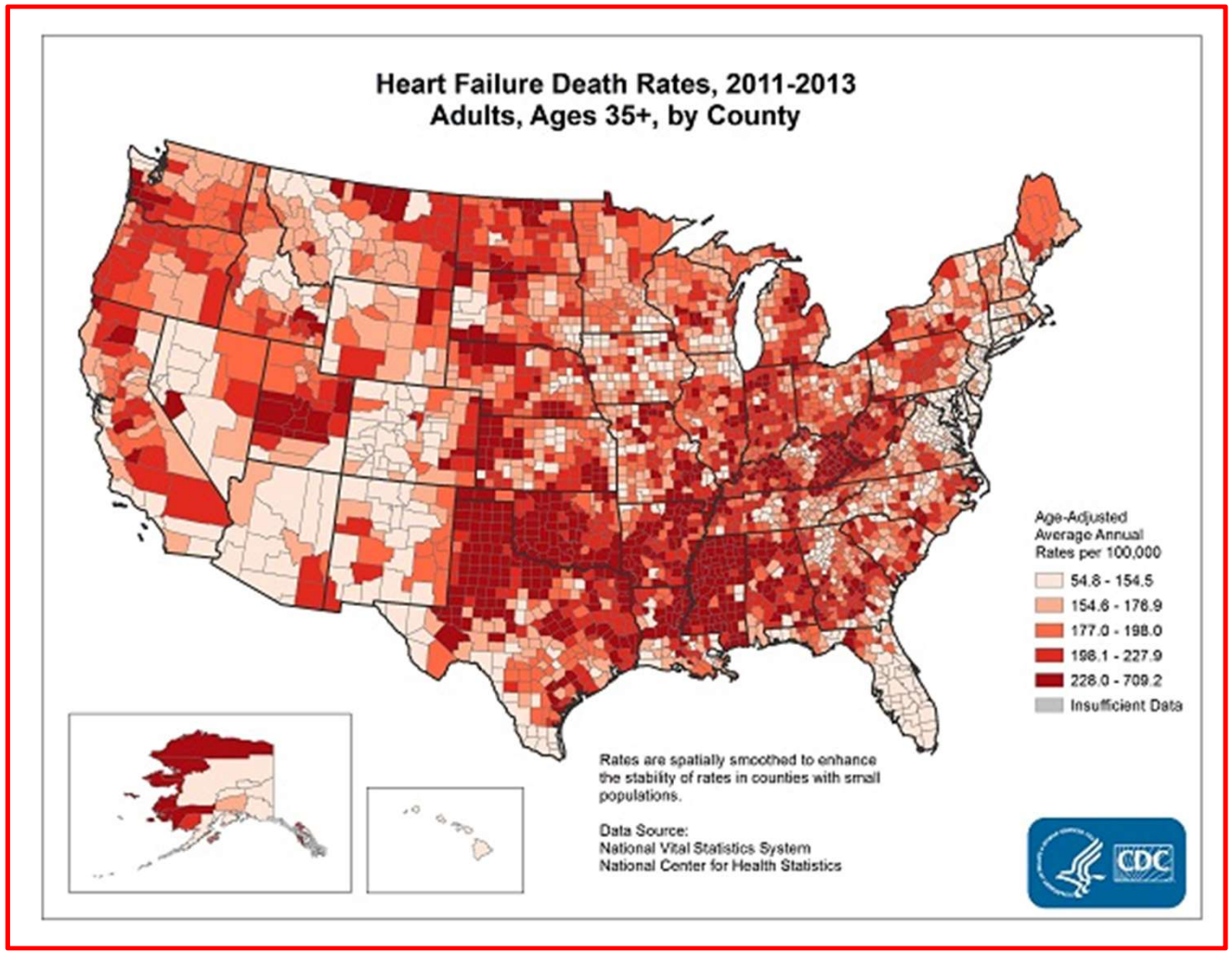
- ~ 50% of people diagnosed with heart failure will die within five years
- > 50 % of patients die from SCD
- >600,000 deaths/year

Loehr LR, etal. Am J Cardiol. 2008

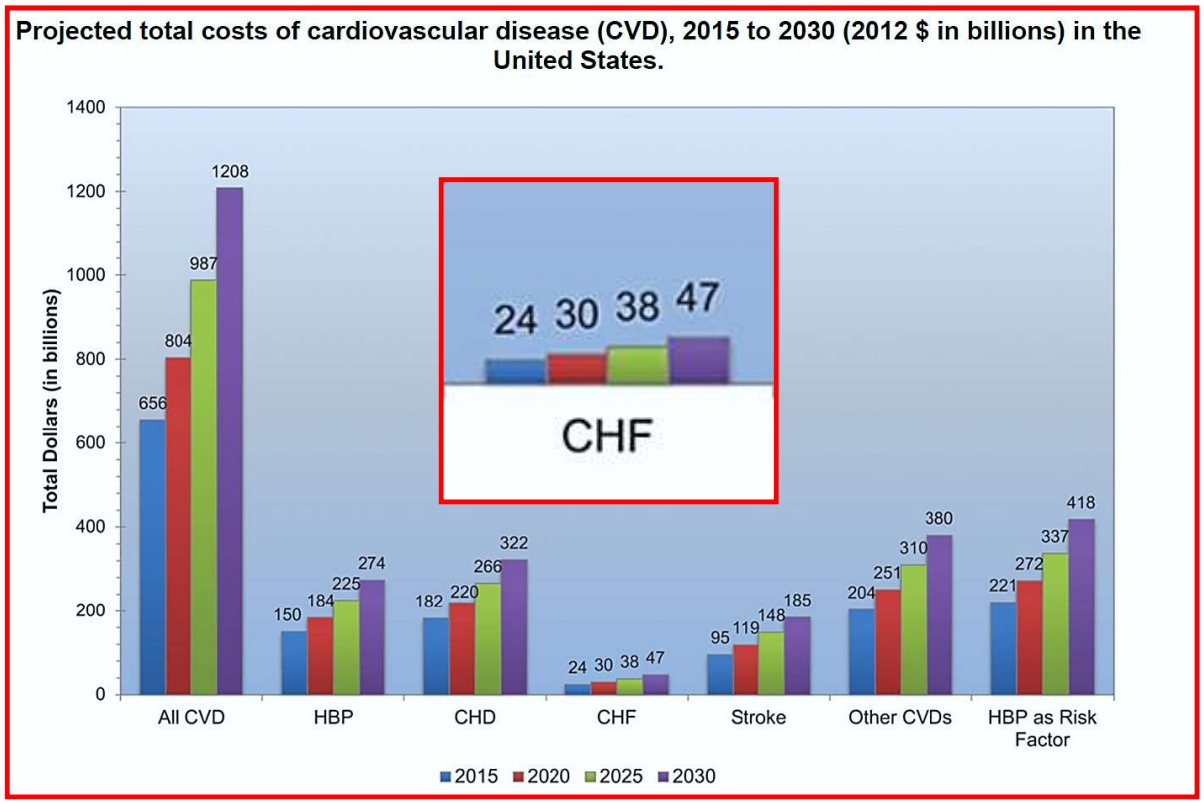
Percentage breakdown of deaths attributable to cardiovascular disease (United States: 2013).



Mozaffarian D, et al. Circ. 2016

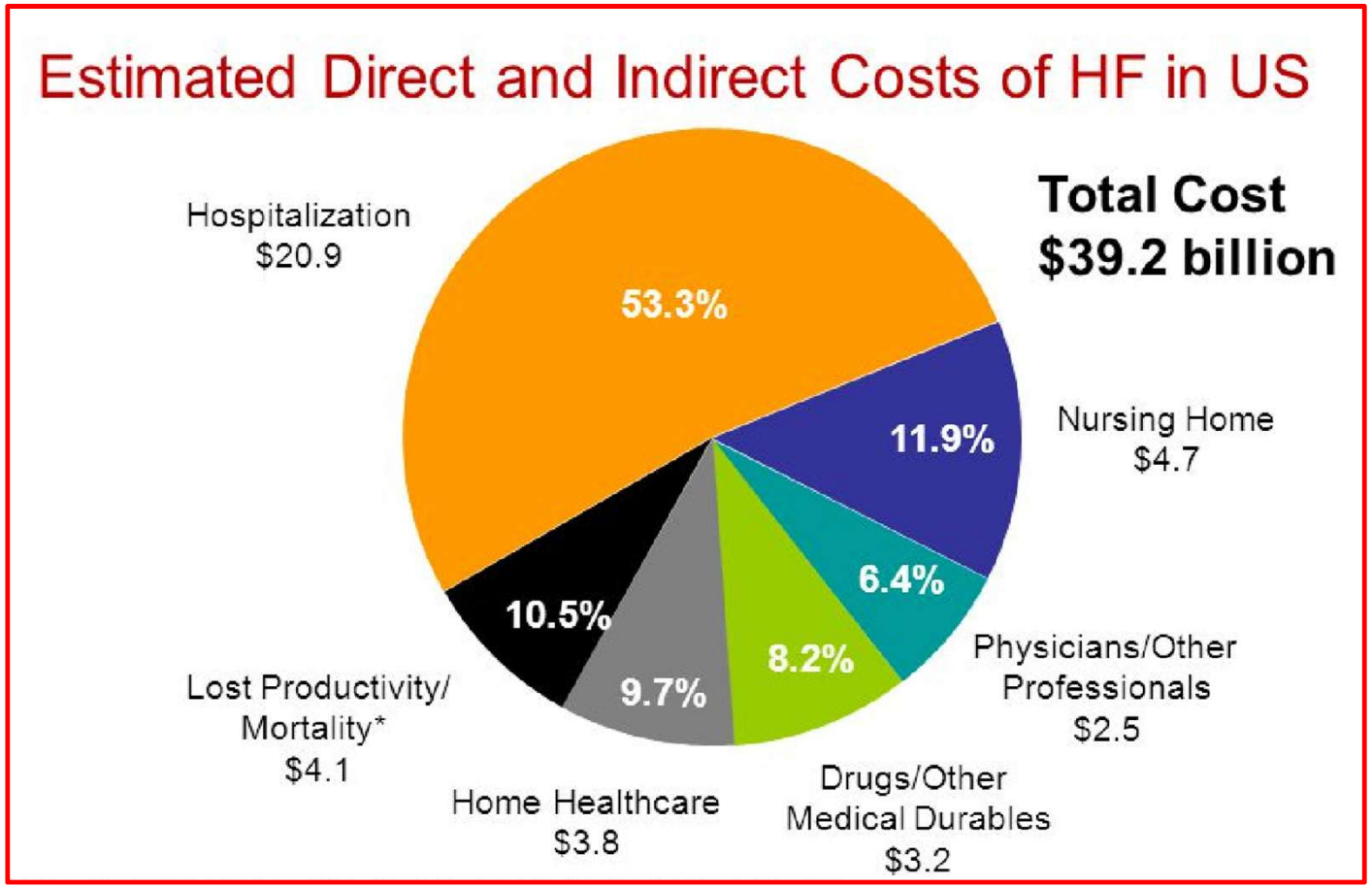

Heart Failure Death Rates, 2011-2013
Adults, Ages 35+, by County
Age-Adjusted
Average Annual
Rates per 100,000
54.8 - 154.5
154.6 - 176.9
177.0 - 198.0
198.1 - 227.9
228.0 - 709.2
Insufficient Data
Rates are spatially smoothed to enhance the stability of rates in counties with small populations.
Data Source:
National Vital Statistics System
National Center for Health Statistics
CDC

www.cdc.gov



Mozaffarian D, et al. Circ. 2016

Estimated Direct and Indirect Costs of HF in US



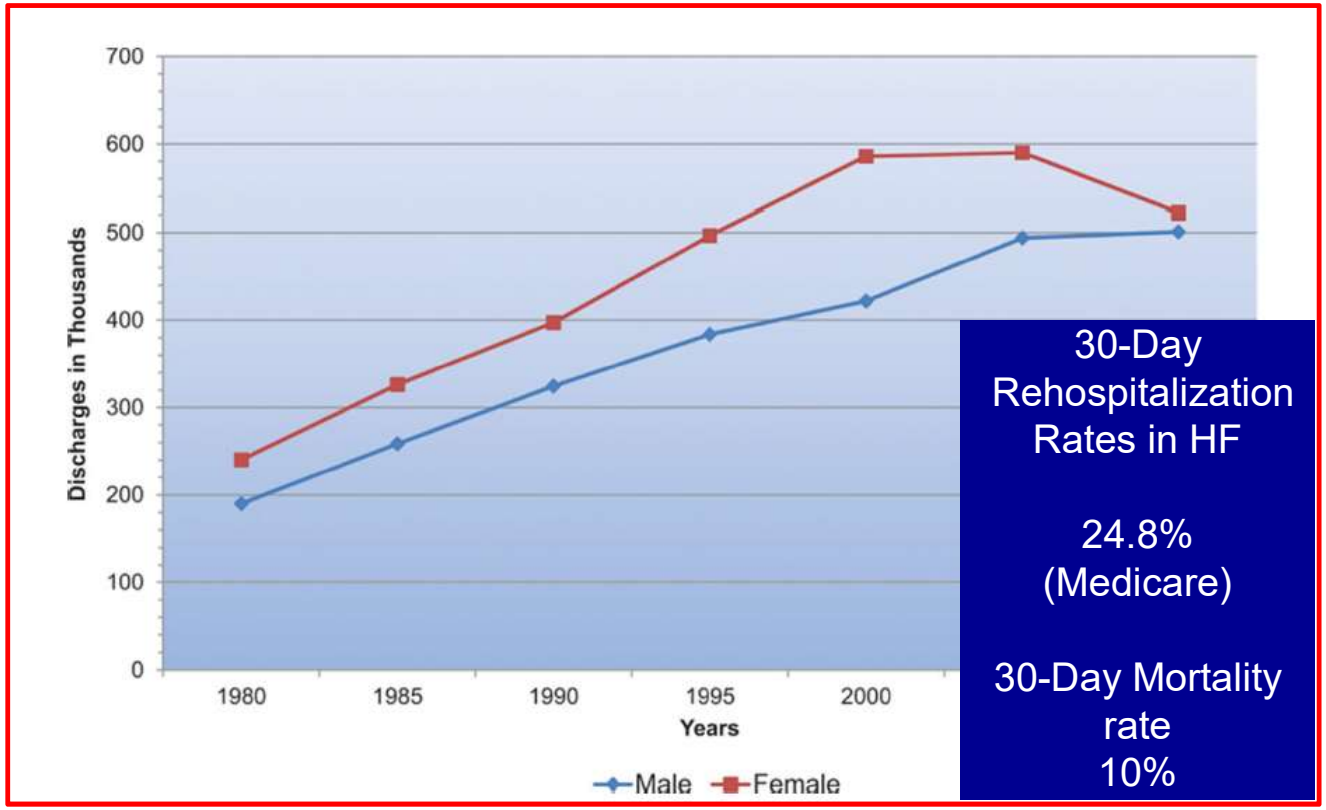
Lloyd-Jones D, et al; Circ. 2010; 121: e46-e215

2010!

*

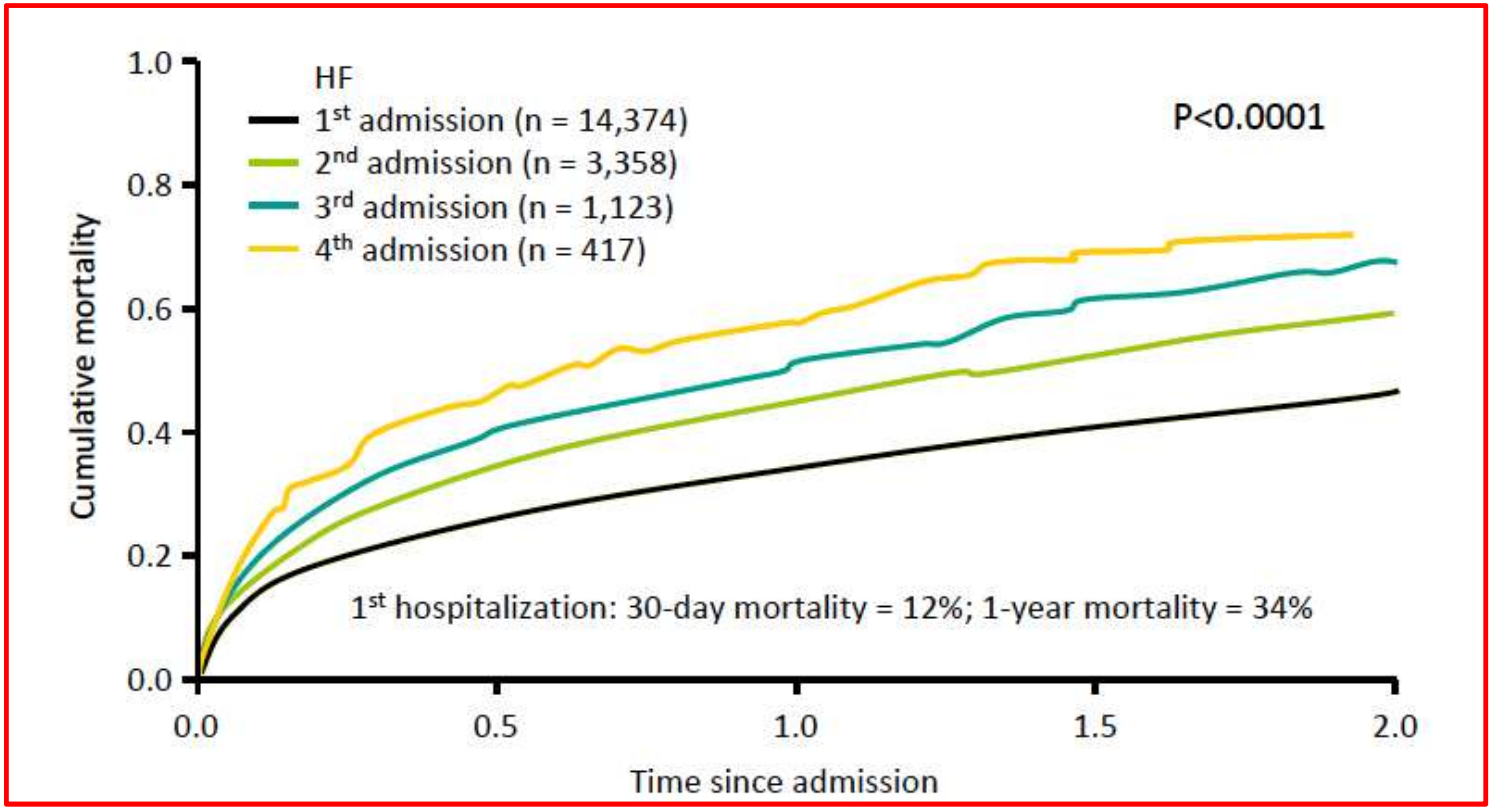
*contains: Hospital Readmissions Reduction Program

Rehospitalization Rates

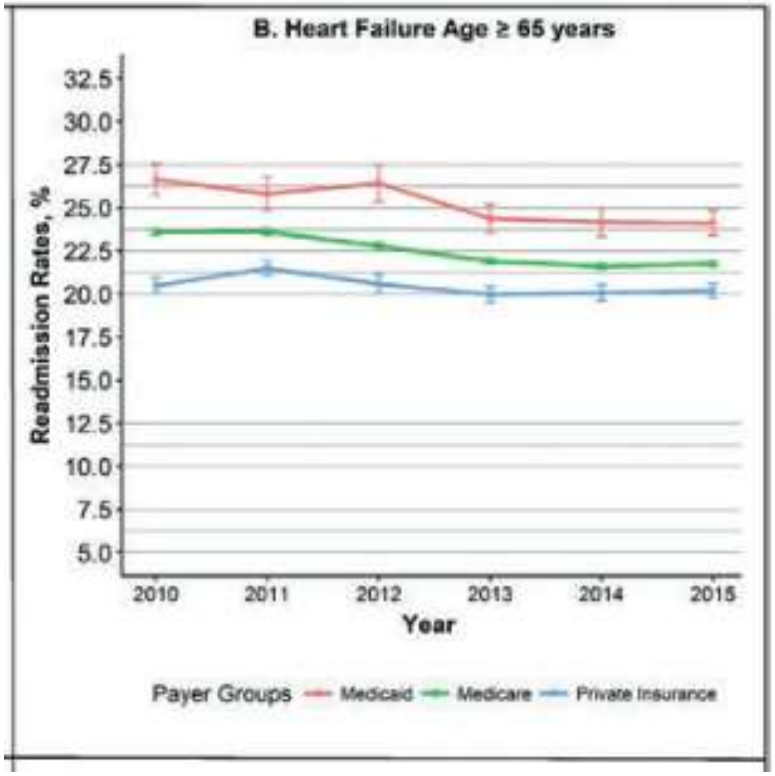


Mozaffarian D, et al. Circ. 2016

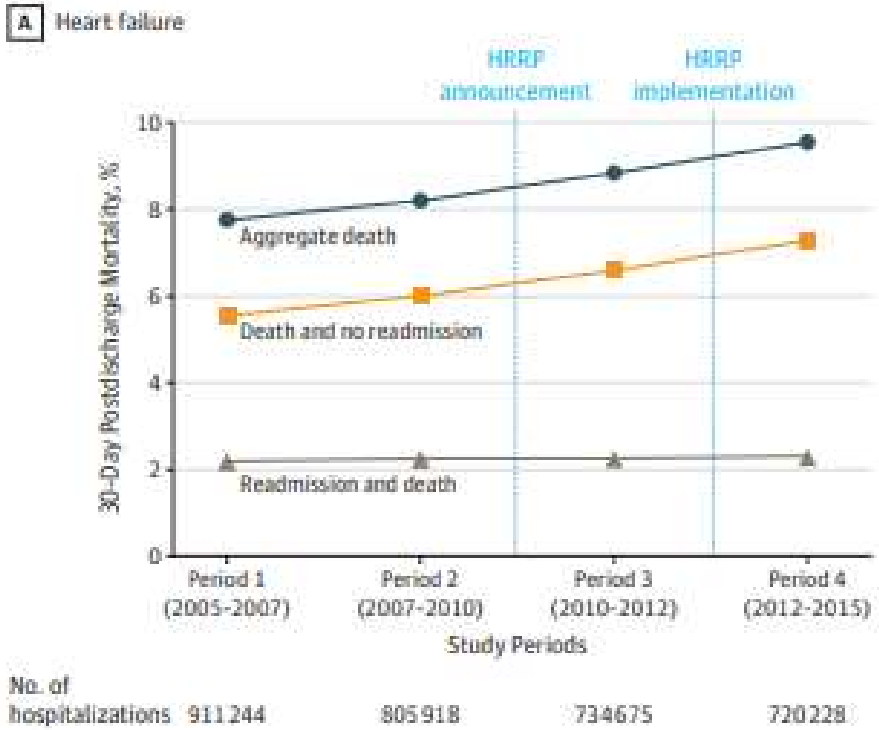
Mortality with Hospitalizations



Setoguchi S, et al. Am heart J. 2007


B. Heart Failure Age ≥ 65 years
Readmission Rates, %
32.5
30.0
27.5
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2010
2011
2012
2013
2014
2015
Year
Payer Groups
Medicaid
Medicare
Private Insurance

AJM 2018

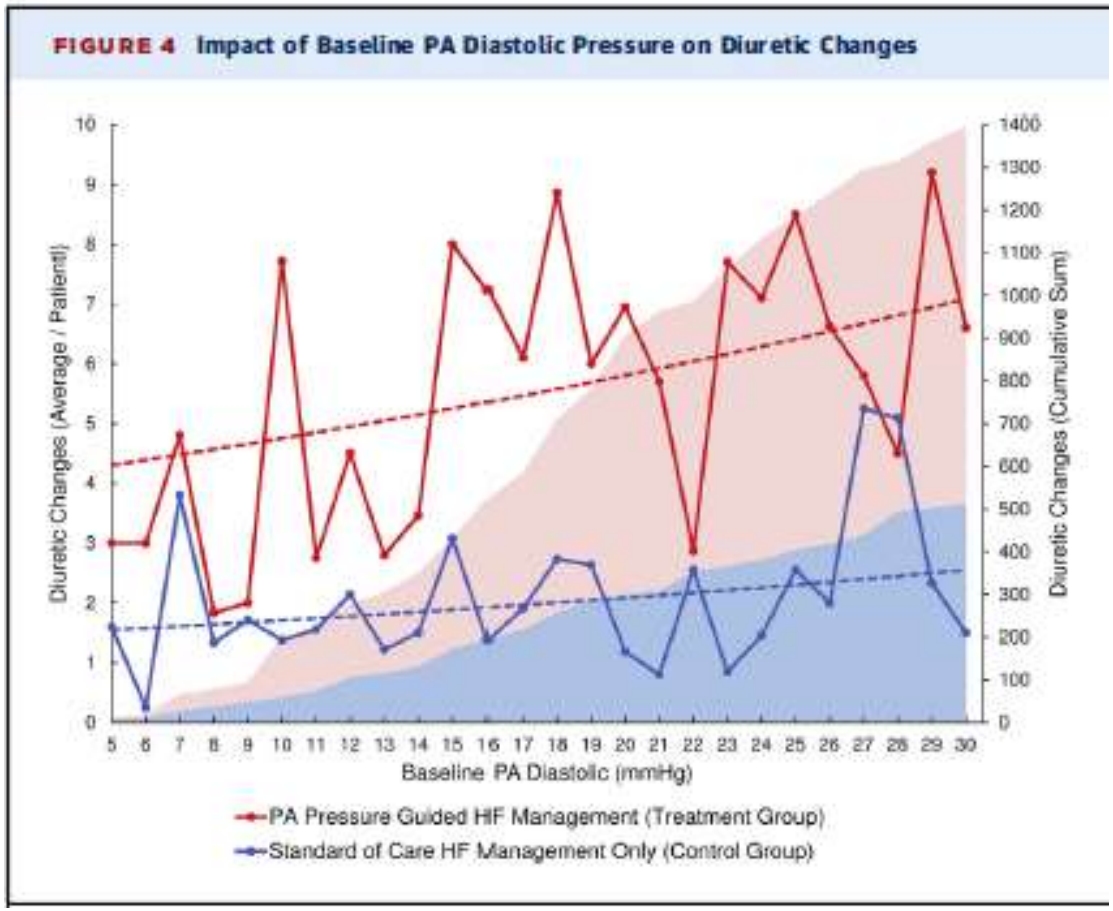

A Heart failure
HRRP announcement
HRRP implementation
30-Day Poststdischange Mortality, %
10
8
6
4
2
0
Aggregate death
Death and no readmission
Readmission and death
Period 1 (2005-2007)
Period 2 (2007-2010)
Period 3 (2010-2012)
Period 4 (2012-2015)
Study Periods
No. of hospitalizations 911 244 805 918 734 675 720 228

JAMA 2018

Challenges to keeping CHF patients out of hospital

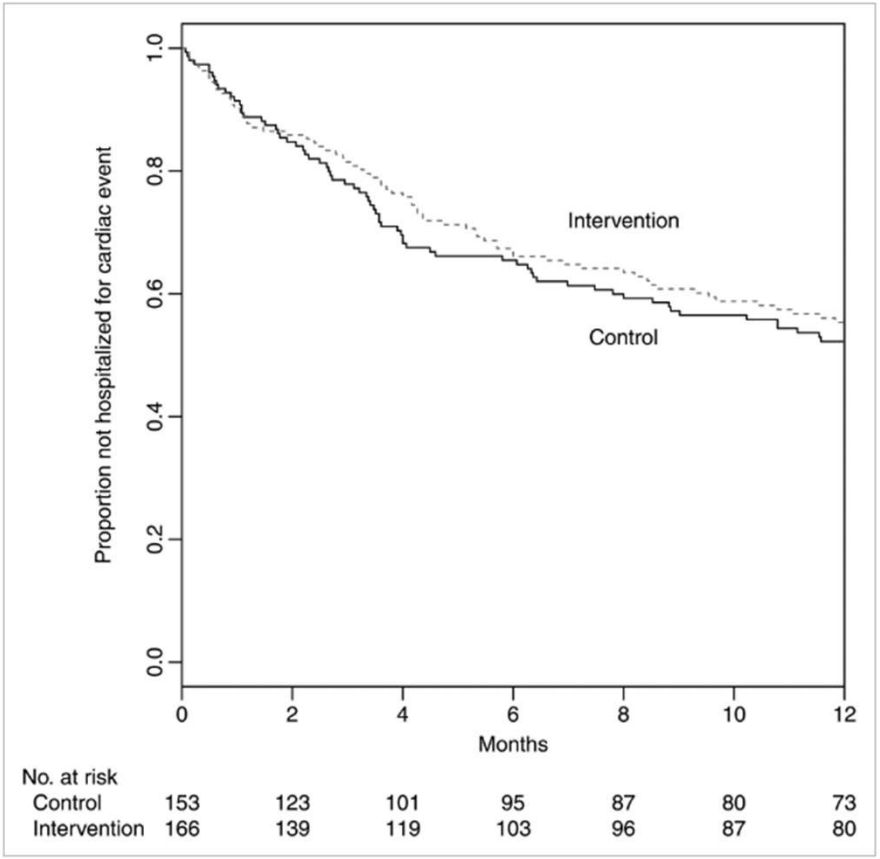
- Heterogeneous population with heterogenous diseases
- Various socio-economic factors
- Various co-morbidities
- Health Literarcy
- Resource intensive population
- Are hospitals best suited to manage outpatient care???
- Proper transitions of care

Can’t we just examine patients?



LANCET 2011

Weight monitoring?



WISH Trial EurJF 2014

Salt and Fluid restrictions

ORIGINAL INVESTIGATION

Aggressive Fluid and Sodium Restriction in Acute Decompensated Heart Failure

A Randomized Clinical Trial

Graziella Badin Aliti, RN, ScD; Eneida R. Rabelo, RN, ScD; Nadine Clausell, MD, PhD; Luís E. Rohde, MD, ScD; Andreia Biolo, MD, ScD; Luis Beck-da-Silva, MD, ScD

READMISSIONS AND EMERGENCY DEPARTMENT VISITS

All visits to the emergency department or hospital admission were computed within a 30-day period after the seventh day or discharge. There were no significant between-group differences in the number of readmissions occurring within 30 days of the end of the study (IG, 11 patients [29%]; CG, 7 patients [19%]; $P = .41$).

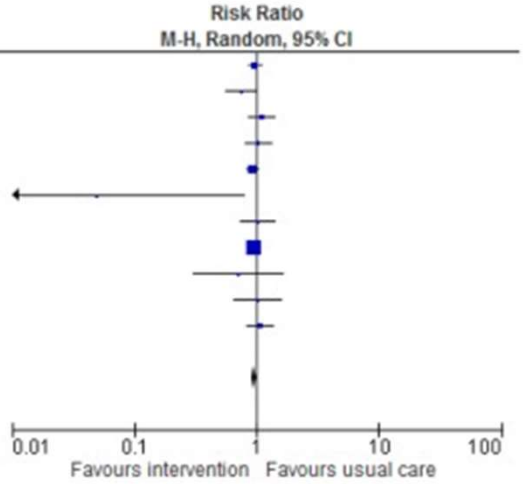
JAMA 2013

Pharmacist guided therapy?

C Composite rate of readmissions and/or ED visits

Study or Subgroup	Intervention Events	Intervention Total	Usual care Events	Usual care Total	Weight	Risk Ratio M-H, Random, 95% CI
Anderegg 2014 [Overall]	373	1652	389	1664	15.4%	0.97 [0.85, 1.09]
Anderegg 2014 [High-risk]	62	358	75	325	2.9%	0.75 [0.56, 1.01]
Farris 2014 [Enhanced]	97	311	88	313	4.5%	1.11 [0.87, 1.41]
Farris 2014 [Minimal]	90	312	88	313	4.2%	1.03 [0.80, 1.32]
Gillespie 2009	134	182	147	186	18.0%	0.93 [0.83, 1.04]
Hawes 2014	0	24	15	37	0.0%	0.05 [0.00, 0.78]
Hellstrom 2011	45	109	41	101	2.5%	1.02 [0.73, 1.41]
Hellstrom 2012	645	1216	1555	2758	46.2%	0.94 [0.88, 1.00]
Koehler 2009	6	20	9	21	0.4%	0.70 [0.30, 1.61]
Schnipper 2006	28	92	25	84	1.3%	1.02 [0.65, 1.61]
Walker 2009	98	358	94	366	4.5%	1.07 [0.84, 1.36]
Total (95% CI)		**4634**		**6168**	**100.0%**	**0.95 [0.90, 1.00]**
Total events	1578		2526			

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 10.62$, df = 10 (P = 0.39); $I^2 = 6\%$
Test for overall effect: Z = 1.80 (P = 0.07)



BMJ 2016

Visiting nurse services?

Table 2

All-cause and heart failure related hospitalization.

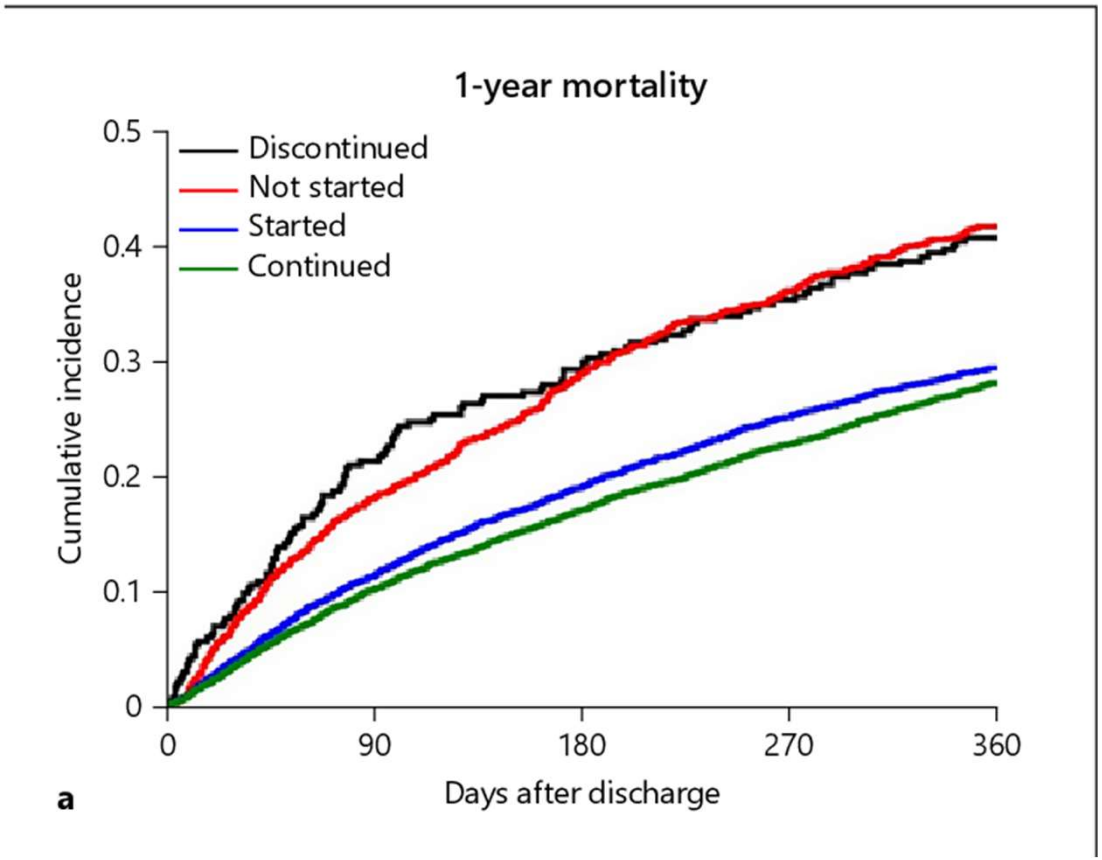
	N	Single Session Only	Multisession		
		Incidence Rate/ Year	Incidence Rate/ Year	Unadjusted Incidence Rate Ratio	Adjusted Incidence Rate Ratio*
All-cause Hospitalization or death					
All	605	0.73	0.75	1.01 (0.83,1.22)	0.96 (0.70,1.31)
Inadequate Literacy	225	0.90	0.73	0.75 (0.45,1.25)	0.73 (0.39,1.36)
Adequate Literacy	380	0.63	0.76	1.22 (0.99,1.50)	1.16 (0.87,1.55)
HF-Related Hospitalization					
All	605	0.30	0.27	0.92 (0.77,1.11)	0.90 (0.70,1.15)
Inadequate Literacy	225	0.40	0.22	0.53 (0.25,1.12)	0.48† (0.24,0.92)
Adequate Literacy	380	0.24	0.30	1.32 (0.92,1.88)	1.34 (0.87,2.07)

Circ 2012

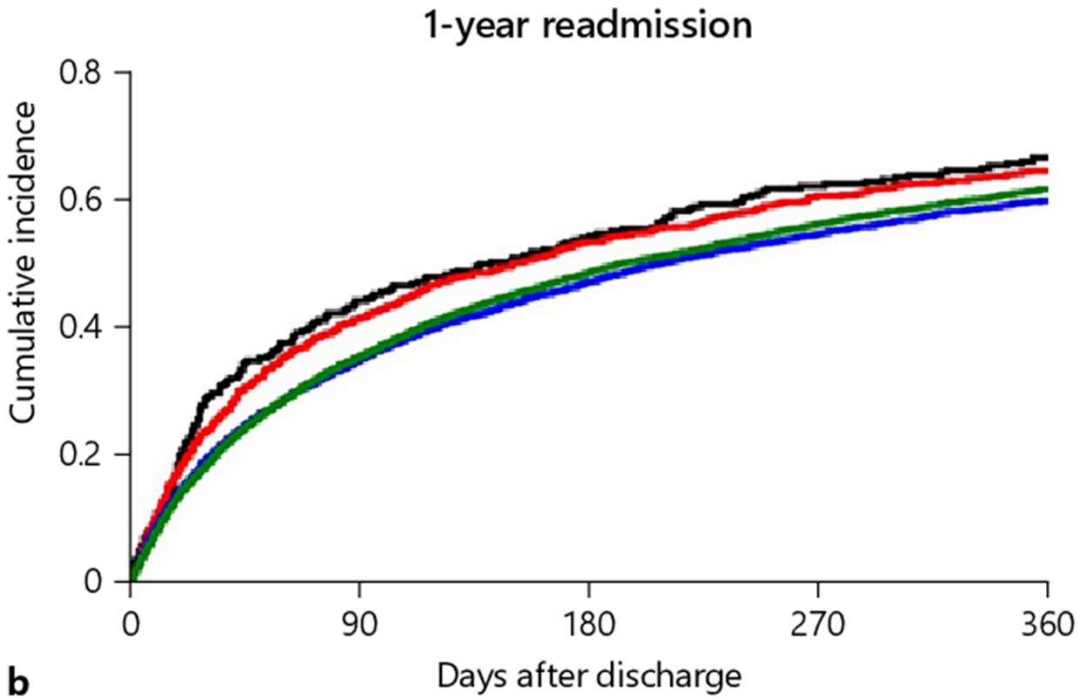
- So what works???

- Medications
- (some) Devices

ACE/ARB/MRA



Cardiorenal Medicine 2020



b

Cardiorenal Medicine 2020

Beta Blockers!

Table 3. Unadjusted and Adjusted Outcomes Based on Beta-Blocker Use During Hospitalization

	Chi-Square	OR (95% CI)	p Value
Rehospitalization			
Unadjusted	1.2	0.70 (0.38–1.31)	0.27
Adjusted*†	3.6	0.45 (0.19–1.03)	0.048
Rehospitalization or death			
Unadjusted	3.7	0.52 (0.27–1.02)	0.053
Adjusted*‡	7.1	0.27 (0.10–0.71)	<0.01

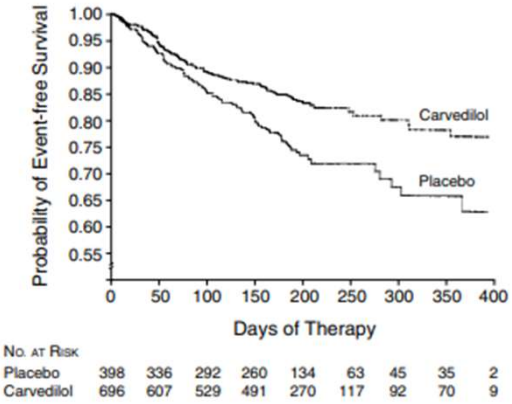
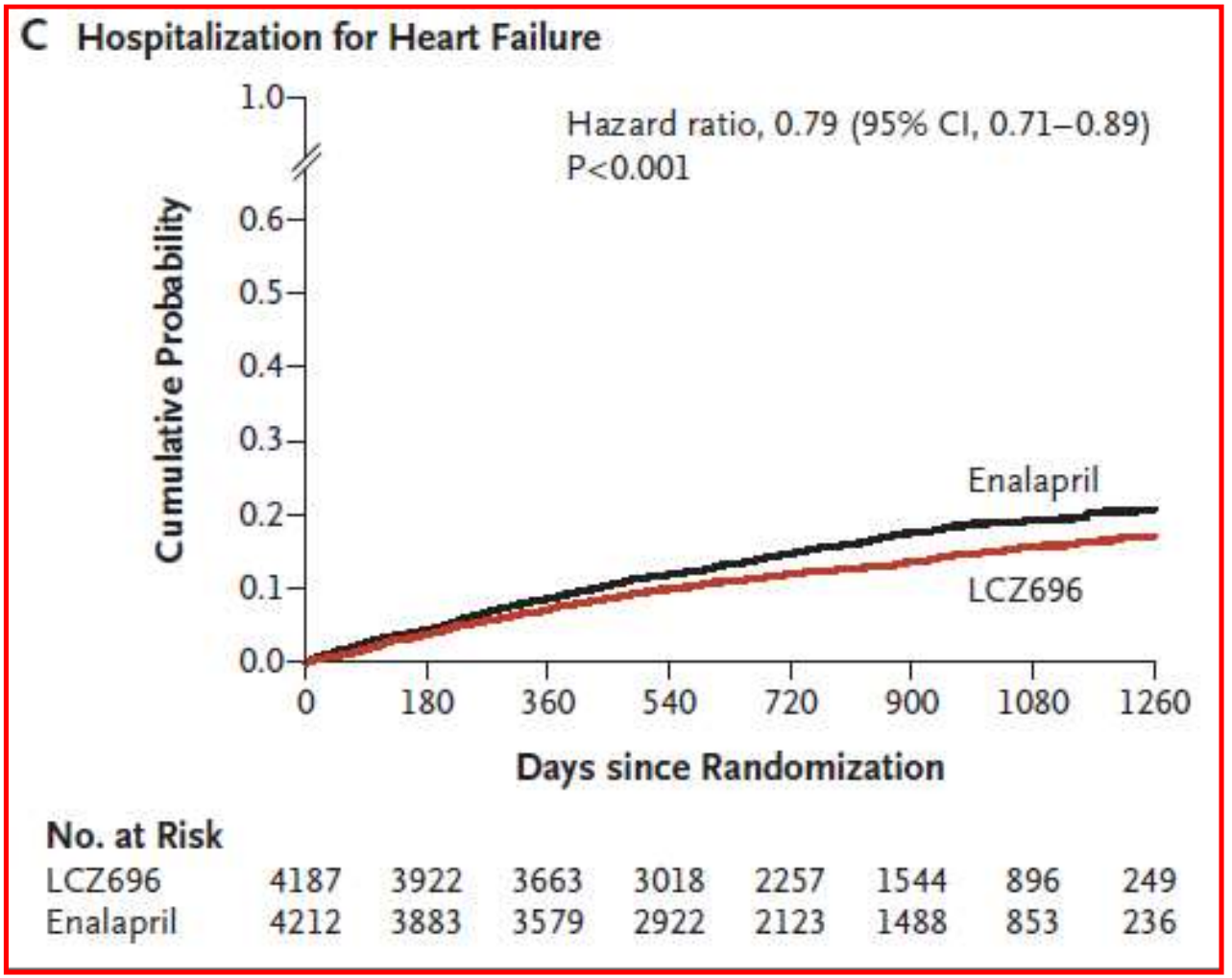


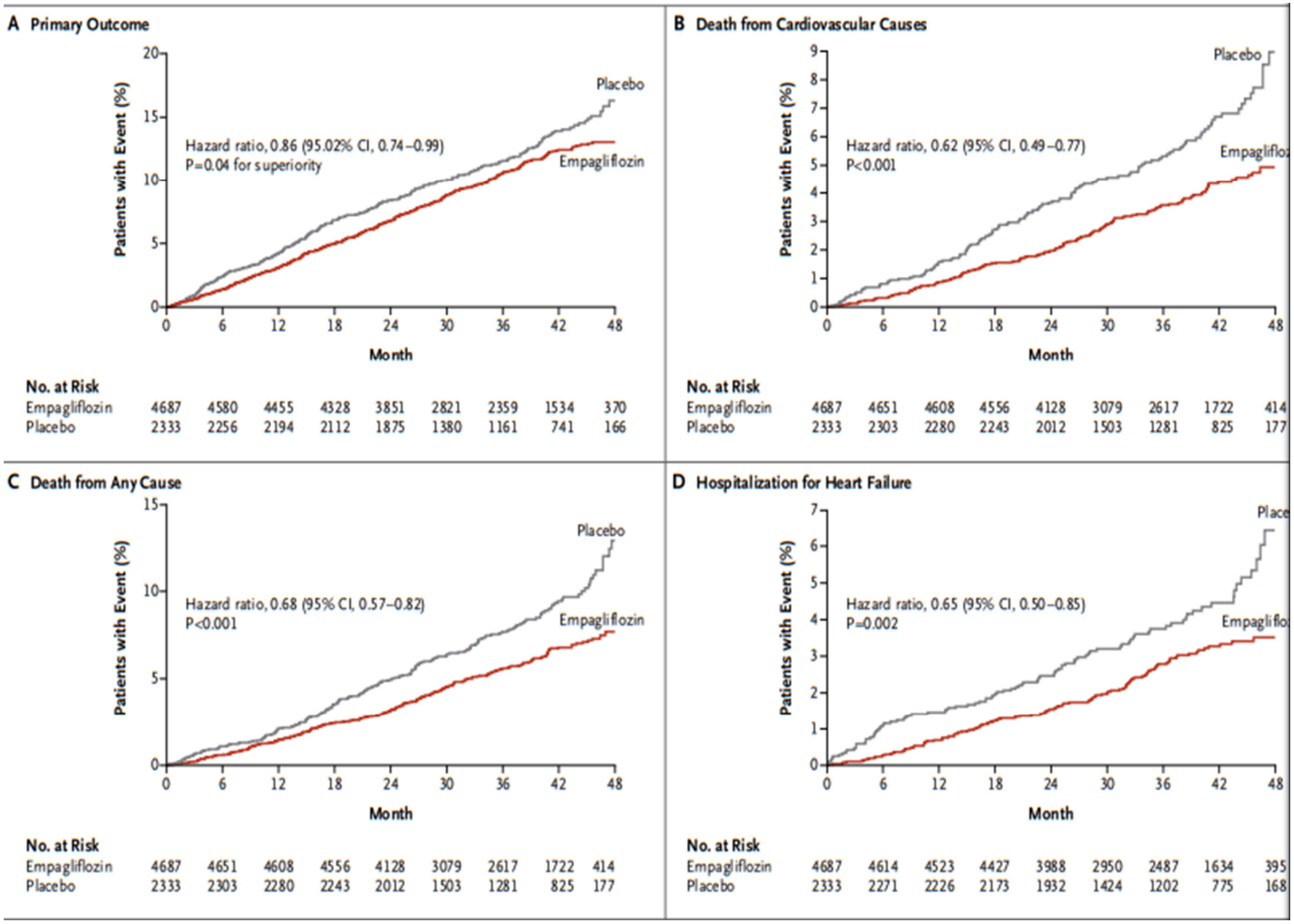
Figure 2. Kaplan–Meier Analysis of Survival without Hospitalization for Cardiovascular Reasons (Event-free Survival) in the Placebo and Carvedilol Groups.

Patients in the carvedilol group had a 38 percent lower risk of death or hospitalization for cardiovascular disease than patients in the placebo group (P<0.001).

ESCAPE Post Hoc JACC 2006
US Carvedilol NEJM 1996



McMurray JJ, et al; NEJM. 2014


A Primary Outcome
Patients with Event (%)
Hazard ratio, 0.86 (95.02% CI, 0.74–0.99)
P=0.04 for superiority
Placebo
Empagliflozin
Month
No. at Risk
Empagliflozin 4687 4580 4455 4328 3851 2821 2359 1534 370
Placebo 2333 2256 2194 2112 1875 1380 1161 741 166
B Death from Cardiovascular Causes
Patients with Event (%)
Hazard ratio, 0.62 (95% CI, 0.49–0.77)
P<0.001
Placebo
Month
No. at Risk
Empagliflozin 4687 4651 4608 4556 4128 3079 2617 1722 414
Placebo 2333 2303 2280 2243 2012 1503 1281 825 177
C Death from Any Cause
Patients with Event (%)
Hazard ratio, 0.68 (95% CI, 0.57–0.82)
P<0.001
Placebo
Empagliflozin
Month
No. at Risk
Empagliflozin 4687 4651 4608 4556 4128 3079 2617 1722 414
Placebo 2333 2303 2280 2243 2012 1503 1281 825 177
D Hospitalization for Heart Failure
Patients with Event (%)
Hazard ratio, 0.65 (95% CI, 0.50–0.85)
P=0.002
Month
No. at Risk
Empagliflozin 4687 4614 4523 4427 3988 2950 2487 1634 395
Placebo 2333 2271 2226 2173 1932 1424 1202 775 168

NEJM 2015

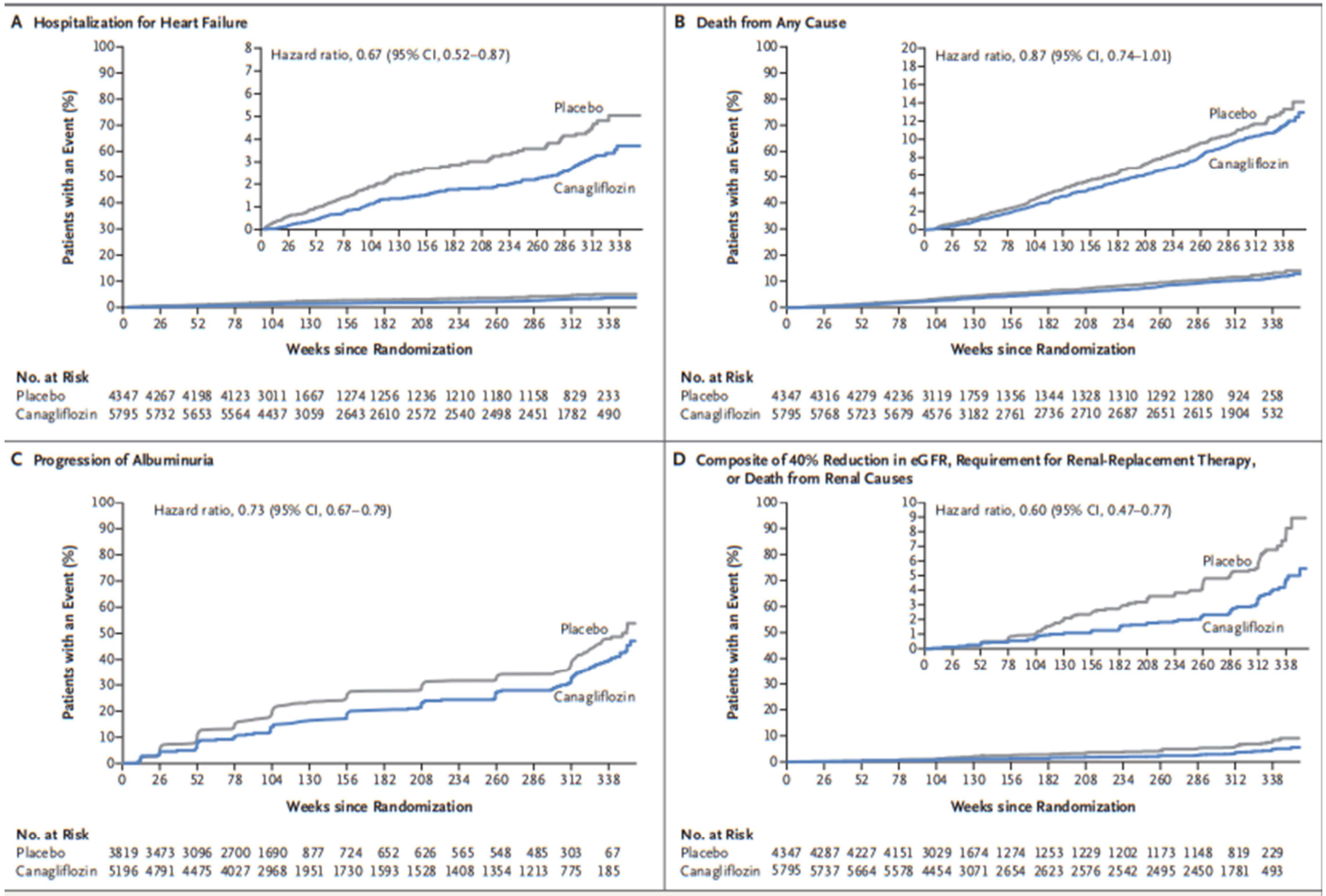


Figure 5. Rates of Hospitalization for Heart Failure, Death from Any Cause, and Renal Outcomes in the Integrated CANVAS Program.

The hazard ratios and 95% confidence intervals were estimated with the use of Cox regression models with stratification according to trial and history of cardiovascular disease for all canagliflozin groups combined versus placebo. Analyses are based upon the full, integrated data set comprising all participants who underwent randomization. The insets in Panels A, B, and D show the same data on enlarged y axes.

NEJM 2017

JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
VOL. ■, NO. ■, 2021

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EXPERT CONSENSUS DECISION PATHWAY

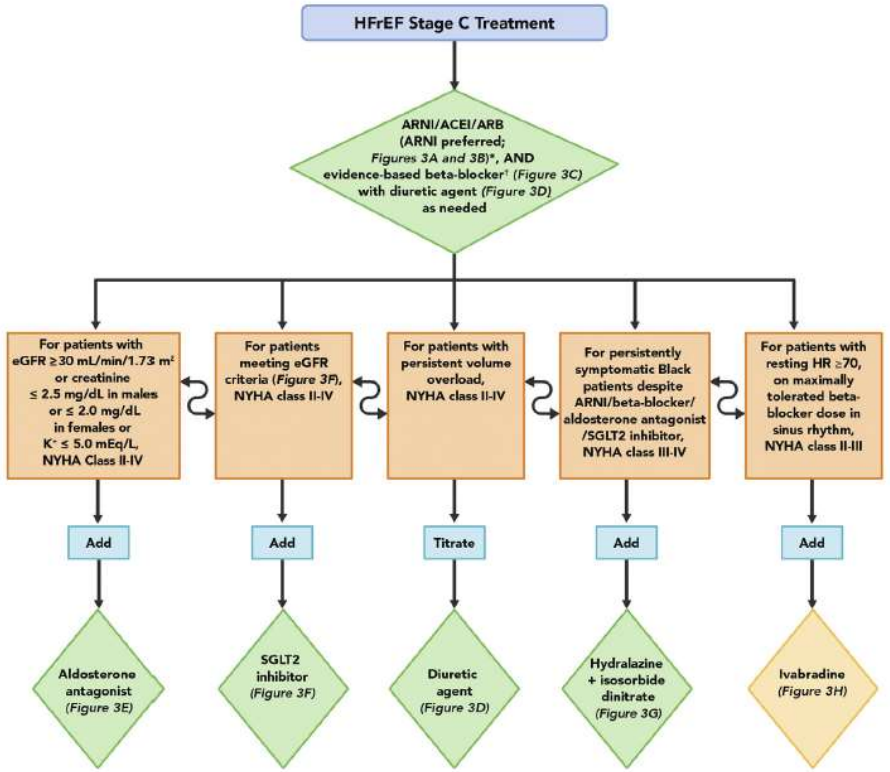
2021 Update to the 2017 ACC Expert Consensus Decision Pathway for Optimization of Heart Failure Treatment: Answers to 10 Pivotal Issues About Heart Failure With Reduced Ejection Fraction

A Report of the American College of Cardiology Solution Set Oversight Committee

Writing Committee

Thomas M. Maddox, MD, MSc, FACC, *Chair*
James L. Januzzi, Jr, MD, FACC, *Vice Chair*
JoAnn Lindenfeld, MD, FACC
Frederick A. Masoudi, MD, MSPH, FACC
Shweta R. Motiwala, MD, MPH

FIGURE 2 Treatment Algorithm for Guideline-Directed Medical Therapy Including Novel Therapies

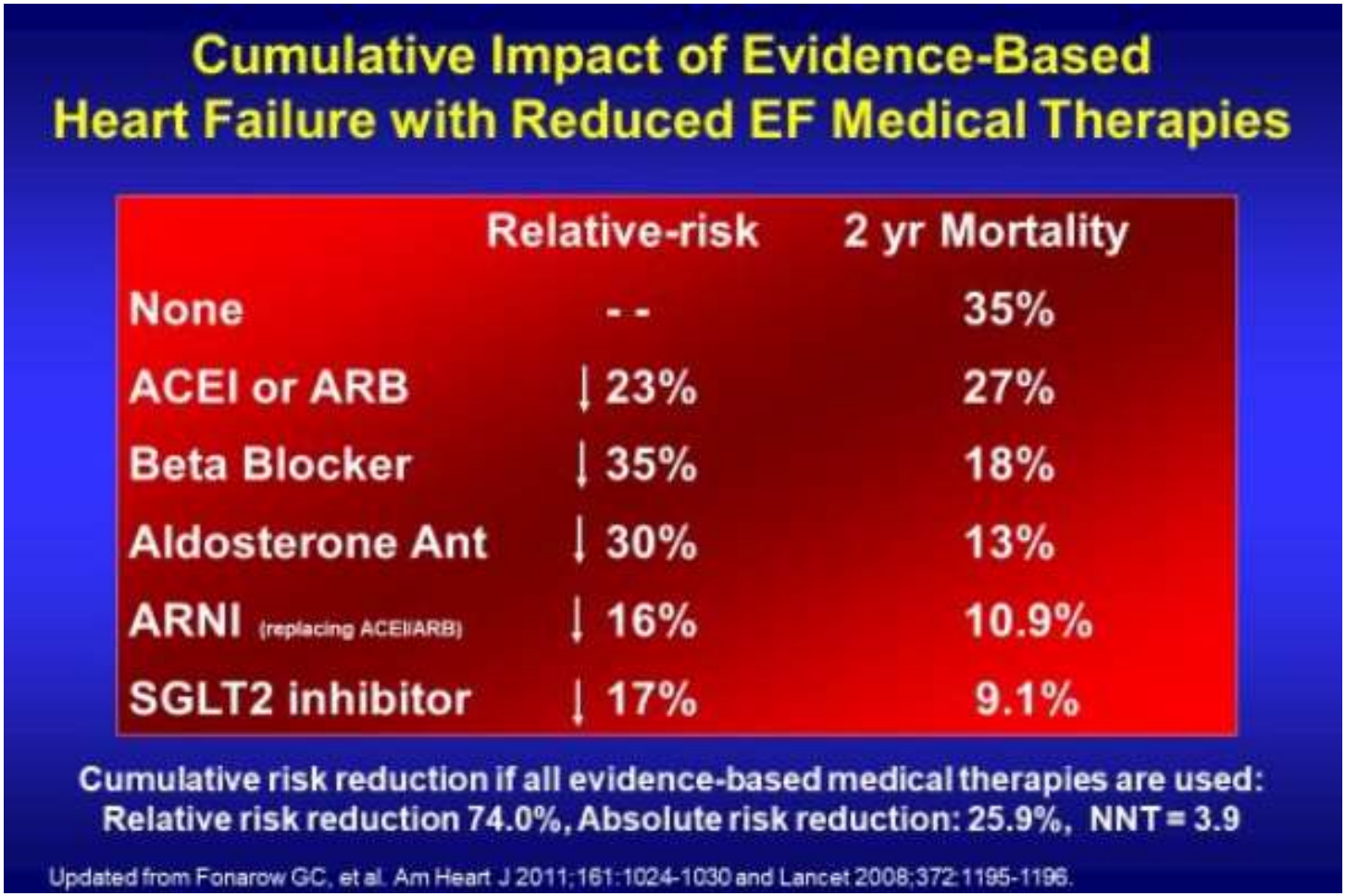


*ACEI/ARB should only be considered in patients with contraindications, intolerance or inaccessibility to ARNI. In those instances, please consult Figure 3 and text for guidance on initiation.

†Carvedilol, metoprolol succinate, or bisoprolol.

ACEI = angiotensin-converting enzyme inhibitors; ARNI = angiotensin receptor-neprilysin inhibitors; ARB = angiotensin receptor blocker; eGFR = estimated glomerular filtration rate; HFrEF = heart failure with reduced ejection fraction; HR = heart rate; K⁺ = potassium; NYHA = New York Heart Association; SGLT2 = sodium-glucose cotransporter-2.

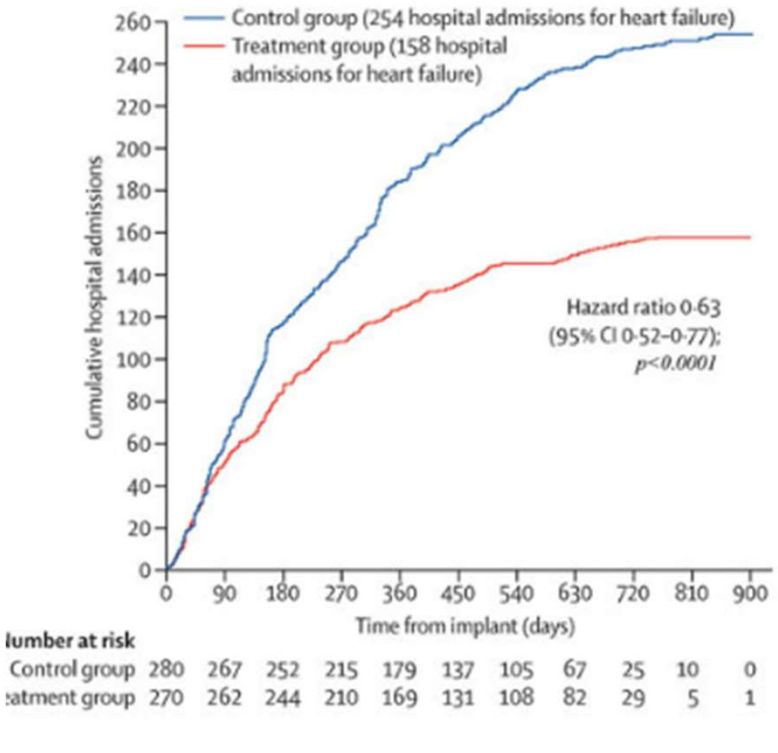
JACC 2021

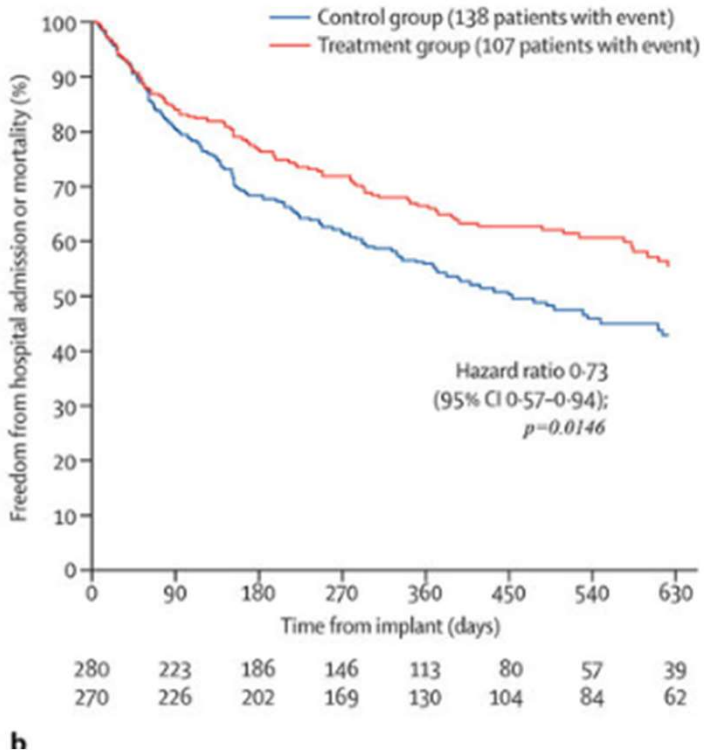


Courtesy of Dr. Fonarow

What about device based therapies?

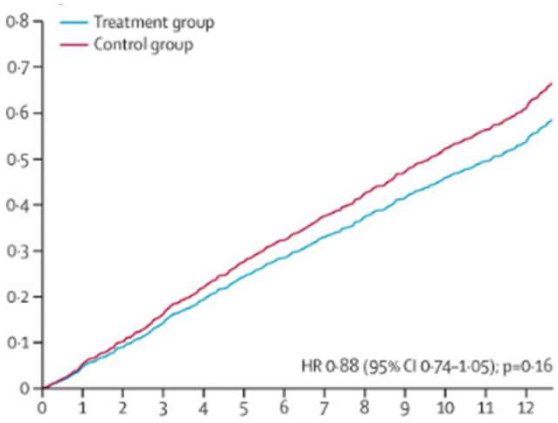
Cardiomems: implantable pulmonary artery sensor





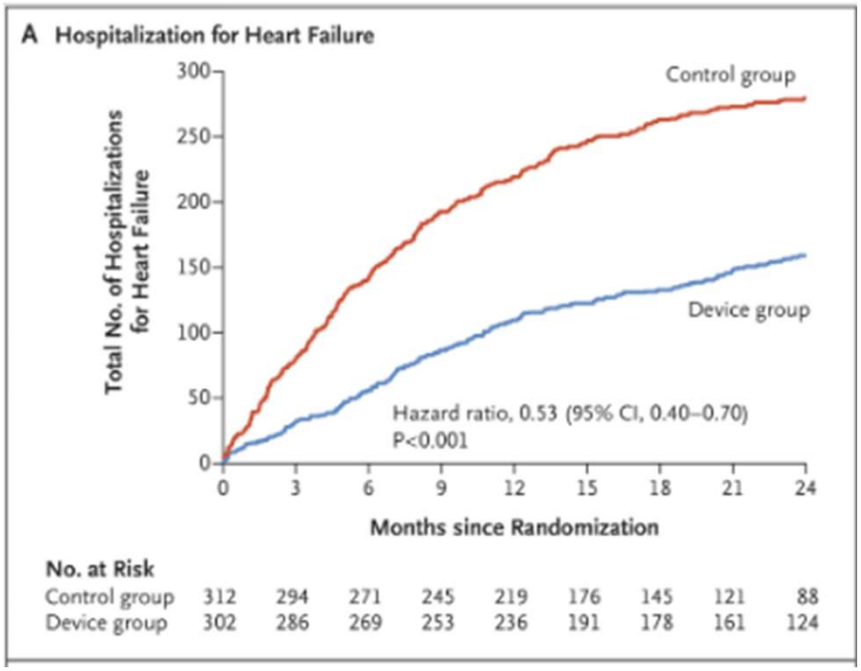
b

CHAMPION Trial Lancet 2011



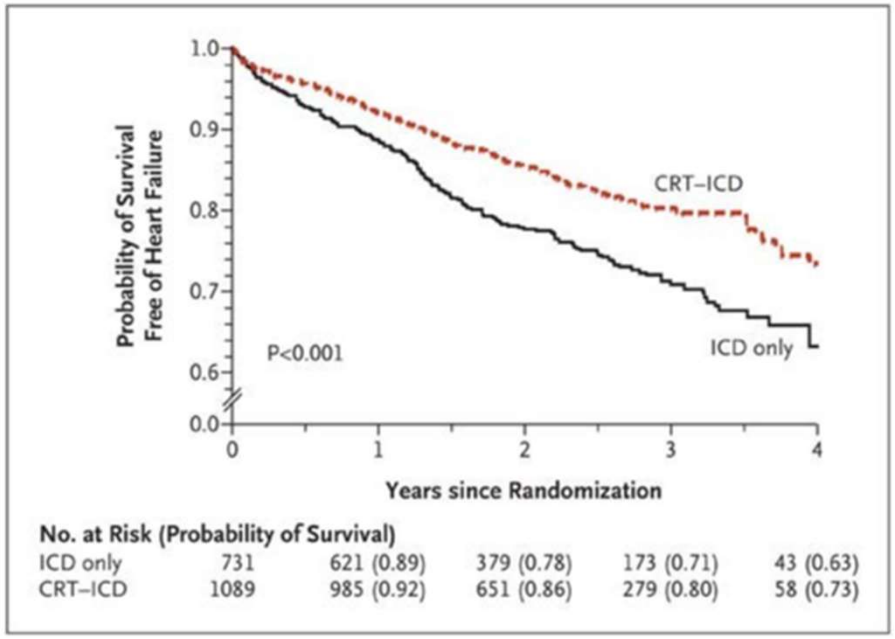
GUIDE HF Lancet 2021

Mitraclip?



COAPT NEJM 2018

CRT?



No. at Risk (Probability of Survival)					
ICD only	731	621 (0.89)	379 (0.78)	173 (0.71)	43 (0.63)
CRT–ICD	1089	985 (0.92)	651 (0.86)	279 (0.80)	58 (0.73)

MADIT- CRT NEJM 2009

Remember acronym to assist in decision-making for referral to advanced heart failure specialist:

I-NEED-HELP (also see *Table 6*)

I: IV inotropes

N: NYHA IIIB/IV or persistently elevated natriuretic peptides

E: End-organ dysfunction

E: Ejection fraction ≤35%

D: Defibrillator shocks

H: Hospitalizations >1

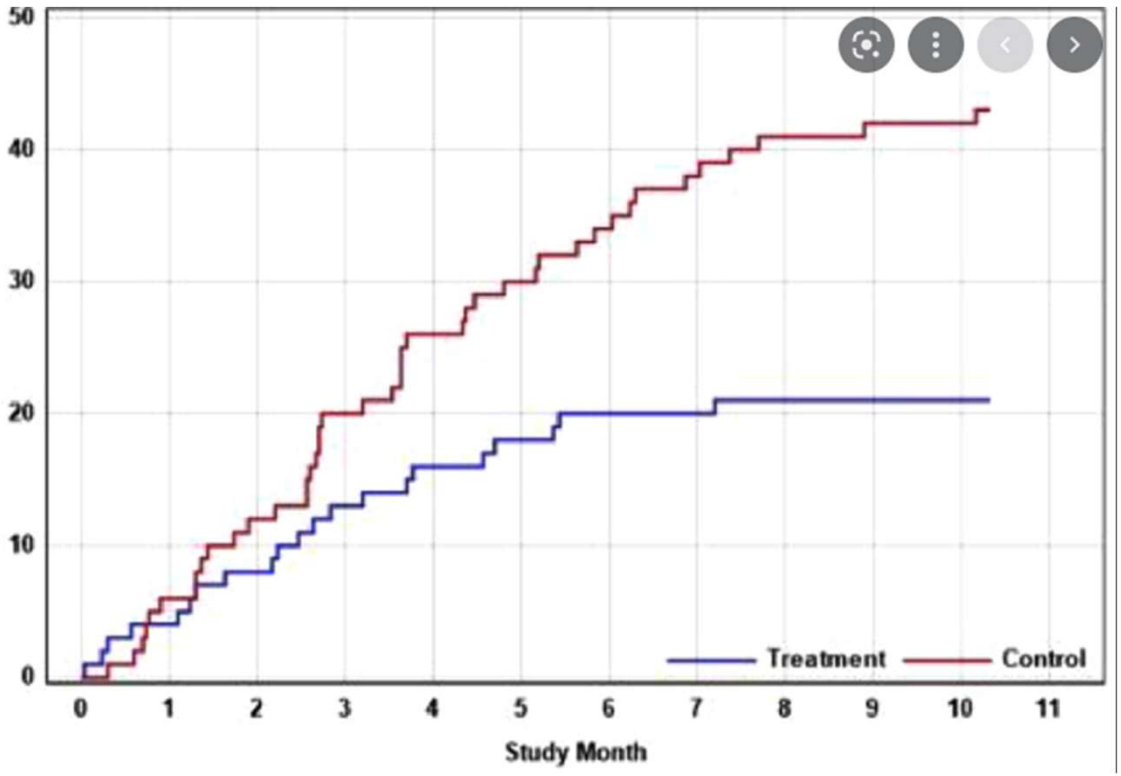
E: Edema despite escalating diuretics

L: Low blood pressure, high heart rate

P: Prognostic medication: progressive intolerance or down-titration of GDMT

JACC 2021

Sensible Medical Reds Vest



SMILE Trial JCF 2019

Summary

- We need to get past stumbling blocks and stop ignoring what works

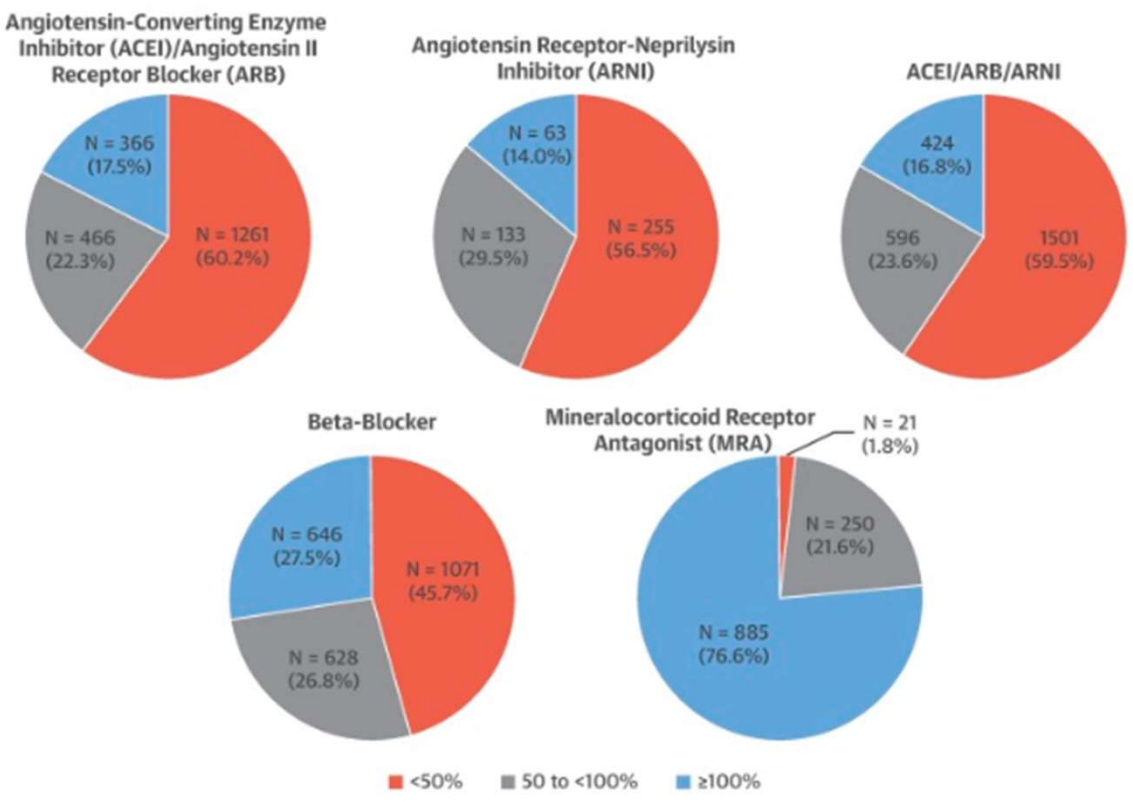
- WE KNOW GDMT WORKS!!!!!!!!!!!!!
  - DECADES AND DECADES OF DATA, REPRODUCED IN NEARLY EVERY TRIAL THAT GDMT IMPROVES MORBIDITY AND MORTALITY
- High Risk Patients need to be evaluated by a heart failure physician and assessed for advanced therapies, newer technologies and clinical trials that may benefit them

CENTRAL ILLUSTRATION: Use and Dosing of Guideline-Directed Medical Therapy Among Patients With Chronic HFrEF in Contemporary U.S. Outpatient Practice

A

	ACEI/ARB	ARNI	ACEI/ARB/ ARNI	Beta-Blocker	MRA
Without Contraindication and Not Treated	1374	3029	920	1159	2317
Treated	2107	452	2536	2351	1163
With Contraindication	37	37	62	8	38

CHAMP HF Registry JACC 2018



CHAMP HF Registry JACC 2018

Real Summary:

- USE GDMT!!!!!!!!!!!!!!
  - IT WORKS!!!!!!!!!
- Make sure we are assessing for things like CRT, mitraclip, clinical trials, etc.
- Consider invasive and non-invasive assessments of volume status
- Strongly consider a Heart Failure consultation!

Thank you!

- Scott.Feitell@rochesterregional.org