STATE OF GET WITH THE GUIDELINES-HEART FAILURE 2019

FEBRUARY 11, 2019

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American Heart Association.

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STATE OF GET WITH THE GUIDELINES-HEART FAILURE 2019

GUIDELINE DERIVED CARE ALGORITHMS; THE DO'S AND DON'TS"

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NO RELEVANT DISCLOSURES

ACC/AHA/HFSA GUIDELINES

Yancy et al
2017 ACC/AHA/HFSA Heart Failure Focused Update

2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure

A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Failure Society of America

Developed in Collaboration With the American Academy of Family Physicians, American College of Chest Physicians, and International Society for Heart and Lung Transplantation

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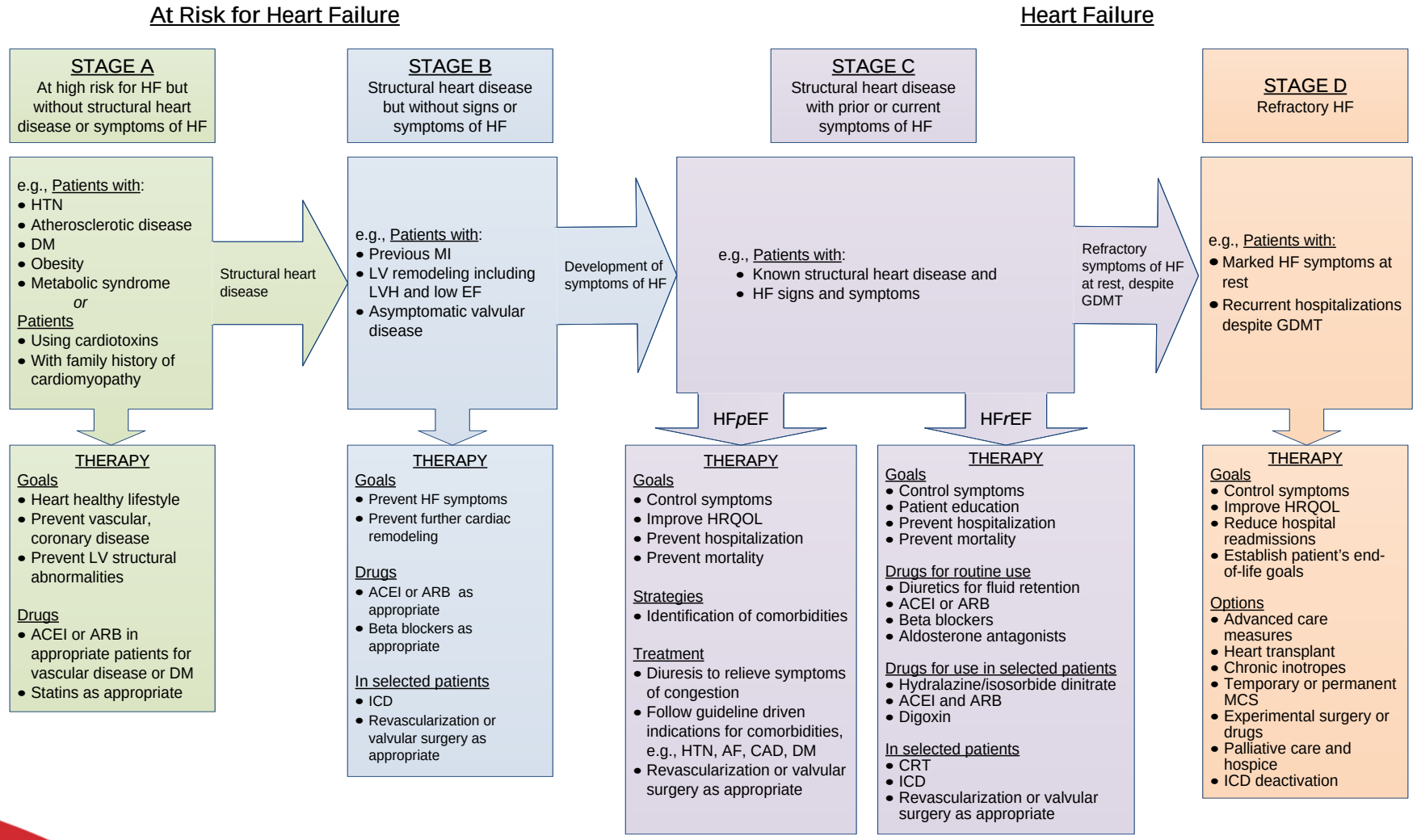
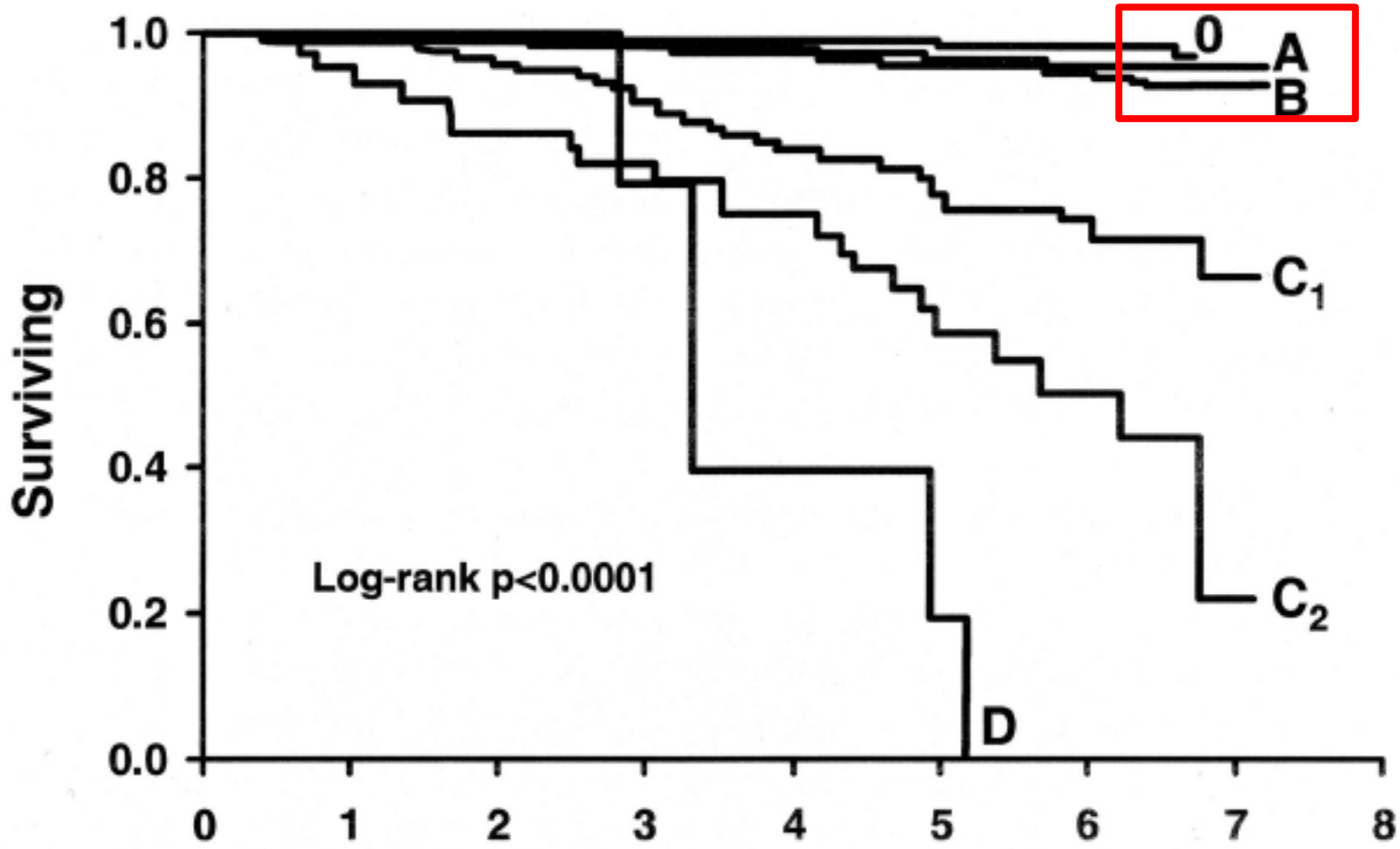
STAGES, PHENOTYPES AND TREATMENT OF HF



Yancy C, et al. JACC, 2013

American Heart Association.

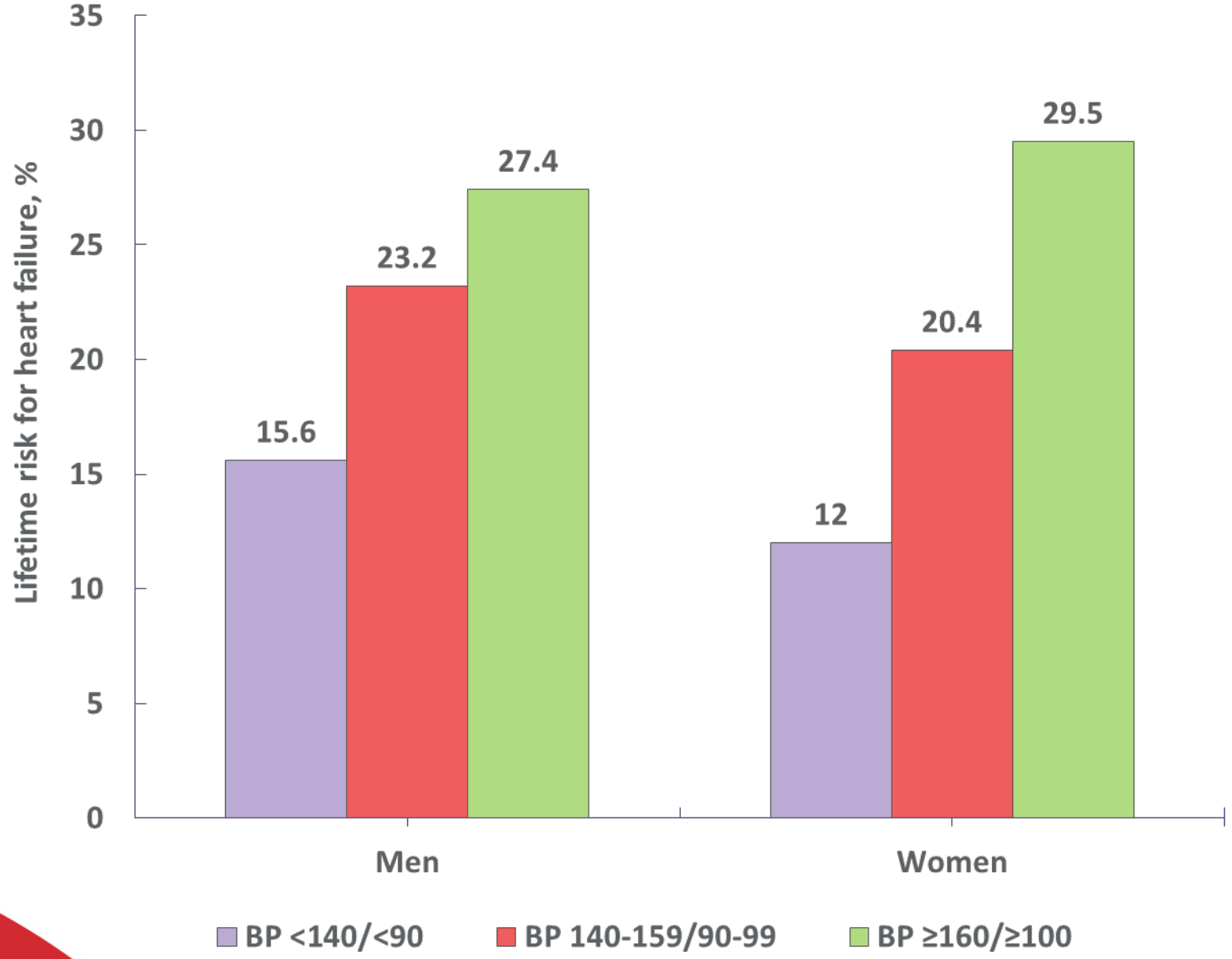
PREVALENCE AND PROGNOSTIC SIGNIFICANCE OF HF STAGES



Ammar et al. *Circulation* 2007; 115:1563

American Heart Association.

LIFETIME RISK FOR HF; INDEXED TO BLOOD PRESSURE & SEX



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NOVEMBER 26, 2015

A Randomized Trial of Intensive versus Standard Blood-Pressure Control

The SPRINT Research Group*

Outcome	Intensive Treatment		Standard Treatment		Hazard Ratio (95% CI)	P Value
	no. of patients (%)	*% per year*	*no. of patients (%)*	*% per year*		
All participants	**(N=4678)**		**(N=4683)**			
Primary outcome†	243 (5.2)	1.65	319 (6.8)	2.19	0.75 (0.64–0.89)	<0.001
Secondary outcomes						
Myocardial infarction	97 (2.1)	0.65	116 (2.5)	0.78	0.83 (0.64–1.09)	0.19
Acute coronary syndrome	40 (0.9)	0.27	40 (0.9)	0.27	1.00 (0.64–1.55)	0.99
Stroke	62 (1.3)	0.41	70 (1.5)	0.47	0.89 (0.63–1.25)	0.50
Heart failure	62 (1.3)	0.41	100 (2.1)	0.67	0.62 (0.45–0.84)	0.002
Death from cardiovascular causes	37 (0.8)	0.25	65 (1.4)	0.43	0.57 (0.38–0.85)	0.005
Death from any cause	155 (3.3)	1.03	210 (4.5)	1.40	0.73 (0.60–0.90)	0.003
Primary outcome or death	332 (7.1)	2.25	423 (9.0)	2.90	0.78 (0.67–0.90)	<0.001

Patients at high risk for CV events, without diabetes, targeting a systolic BP of less than 120 mm Hg, compared with less than 140 mm Hg, resulted in lower rates of fatal and nonfatal major CV events and death from any cause.

American Heart Association.

Hypertension

TREATING HYPERTENSION TO REDUCE THE INCIDENCE OF HF

COR	LOE	Recommendations	Comment/ Rationale
I	**B-R**	In patients at increased risk, stage A HF, the optimal blood pressure in those with hypertension should be less than 130/80 mm Hg.	NEW: Recommendation reflects new RCT data.

The JAMA Network

From: **The Metabolodiuretic Promise of Sodium-Dependent Glucose Cotransporter 2 InhibitionThe Search for the Sweet Spot in Heart Failure**

JAMA Cardiol. 2017;2(9):939-940. doi:10.1001/jamacardio.2017.1891

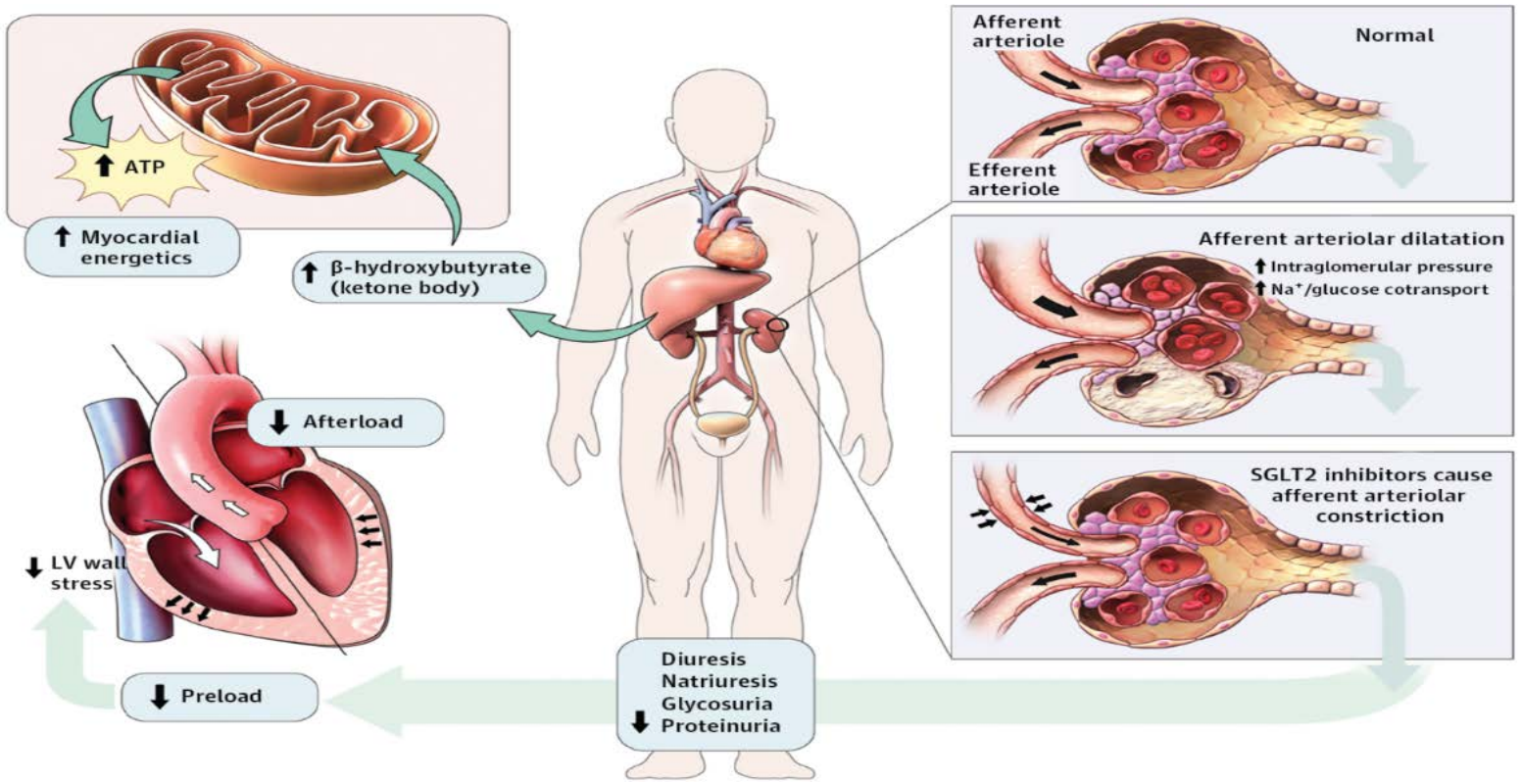

Figure Legend:

Proposed Mechanism of Cardiorenal Protection With Sodium-Dependent Glucose Cotransporter 2 (SGLT2) InhibitorsAt the level of the kidney, SGLT2 inhibition promotes glycosuria and natriuresis. It also promotes afferent arterioral constriction resulting in a decrease in intraglomerular pressure. A reduction in preload and resultant left ventricular (LV) wall stress improves overall LV filling conditions. Additionally, metabolic effects of SGLT2 inhibition to improve myocardial energetics and reduce afterload have also been proposed as cardioprotective mechanisms. ATP indicates adenosine triphosphate.

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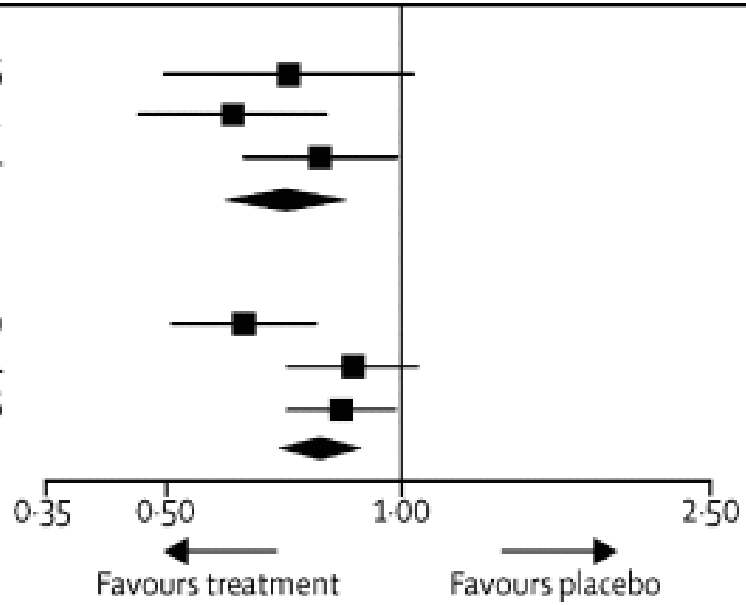
META-ANALYSIS; SGLT2 INHIBITORS AND HEART FAILURE HOSPITALIZATIONS

LANCET. 2019 JAN 5;393(10166):31–39.

	Patients		Events	Events per 1000 patient-years		Weight (%)	HR (95% CI)
	Treatment (n)	Placebo (n)		Treatment	Placebo		
Patients with history of heart failure							
EMPA-REG OUTCOME	462	244	124	63·6	85·5	23·6	0·72 (0·50–1·04)
CANVAS Program	803	658	203	35·4	56·8	34·1	0·61 (0·46–0·80)
DECLARE-TIMI 58	852	872	314	45·1	55·5	42·4	0·79 (0·63–0·99)
Fixed effects model for history of heart failure (p<0·0001)							**0·71 (0·61–0·84)**
Patients with no history of heart failure							
EMPA-REG OUTCOME	4225	2089	339	15·5	24·9	30·0	0·63 (0·51–0·78)
CANVAS Program	4992	3689	449	13·6	15·2	32·4	0·87 (0·72–1·06)
DECLARE-TIMI 58	7730	7706	599	8·9	10·5	37·6	0·84 (0·72–0·99)
Fixed effects model for no history of heart failure (p<0·0001)							**0·79 (0·71–0·88)**



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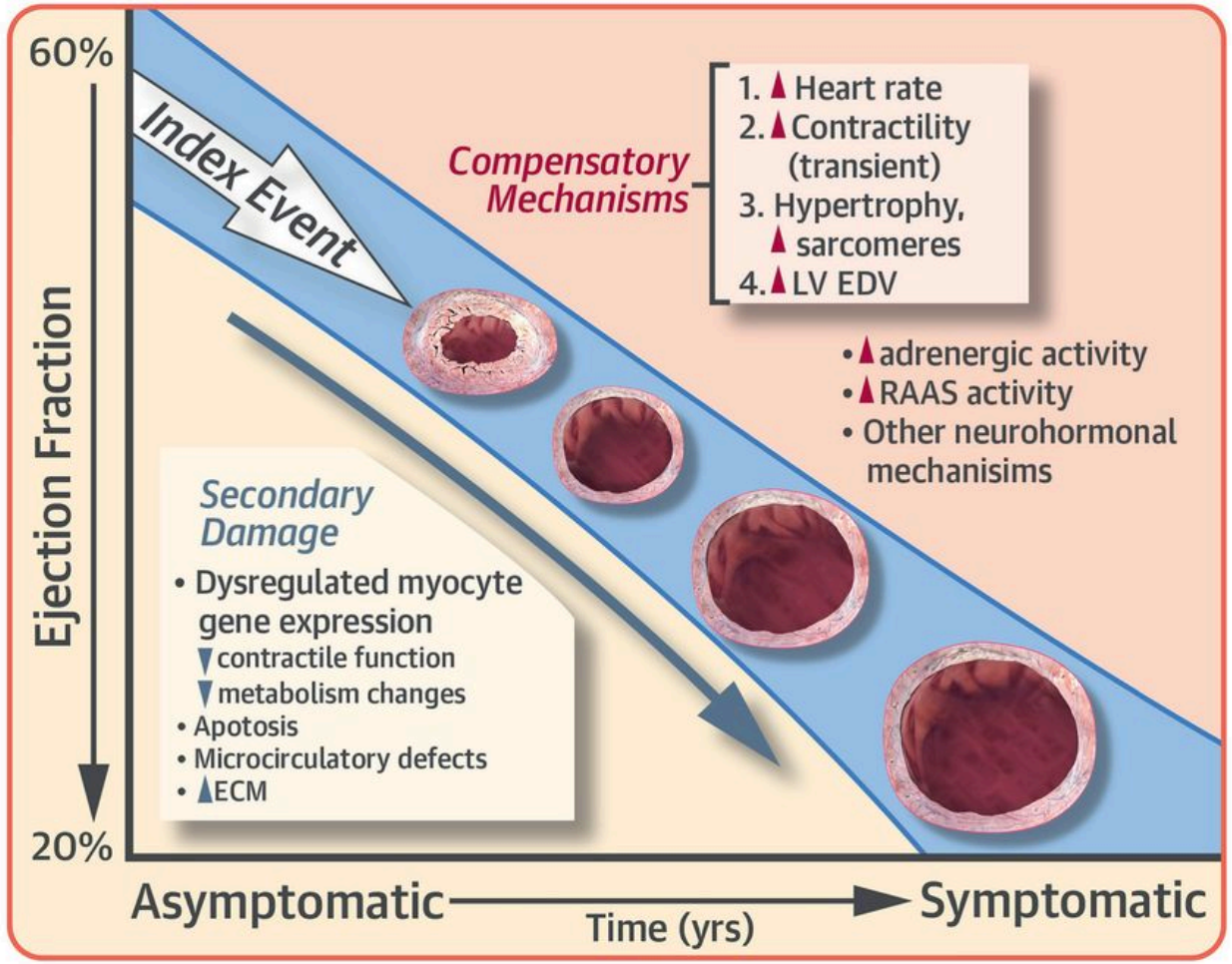
TREATMENT OF HEART FAILURE

CENTRAL ILLUSTRATION: Natural History of HFrEF Phenotype



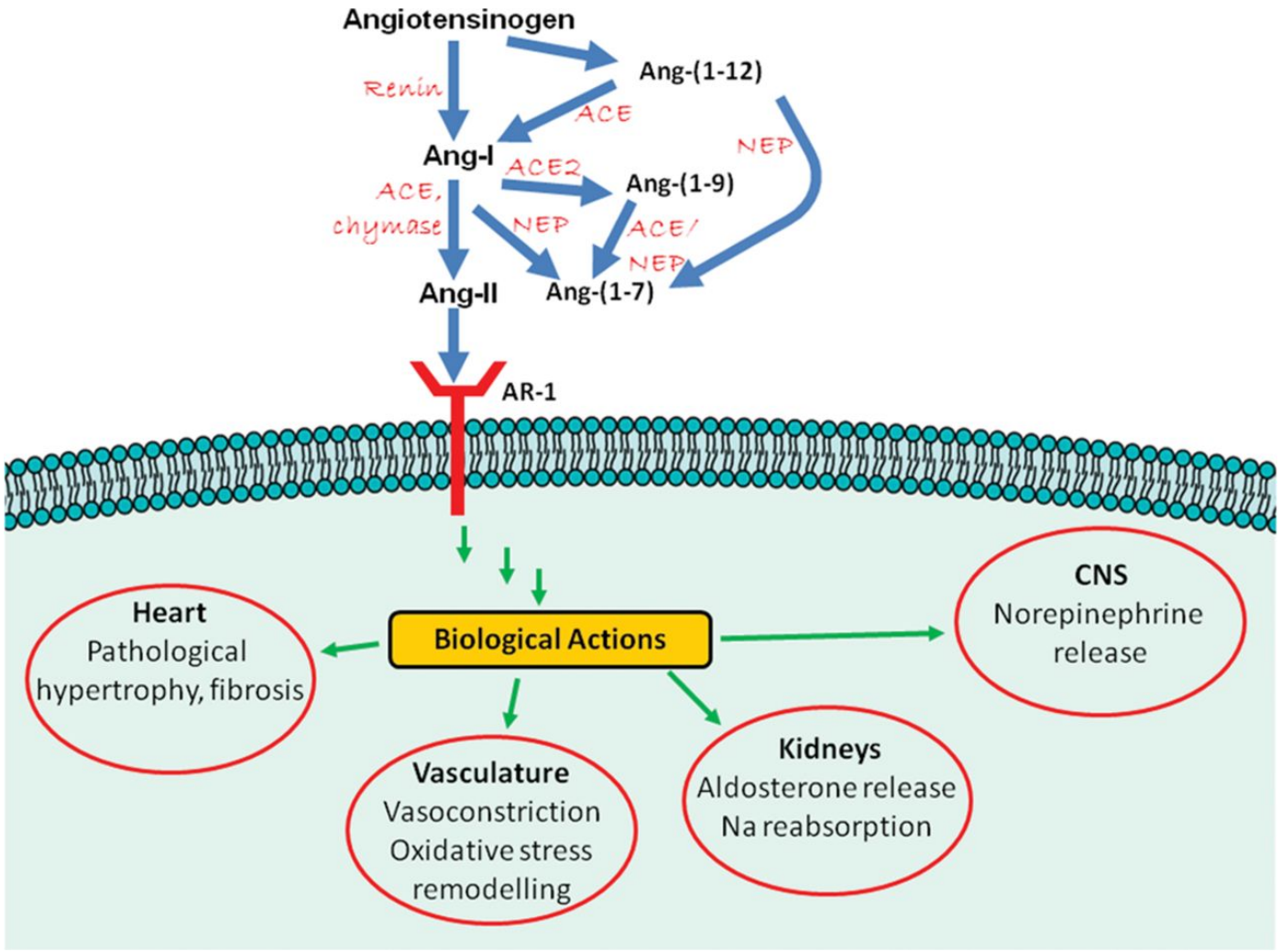
Bristow, M.R. et al. J Am Coll Cardiol HF. 2017;5(11):772-81.

Michael R. Bristow et al. JCHF 2017;5:772-781

JACC Heart Failure

American Heart Association.

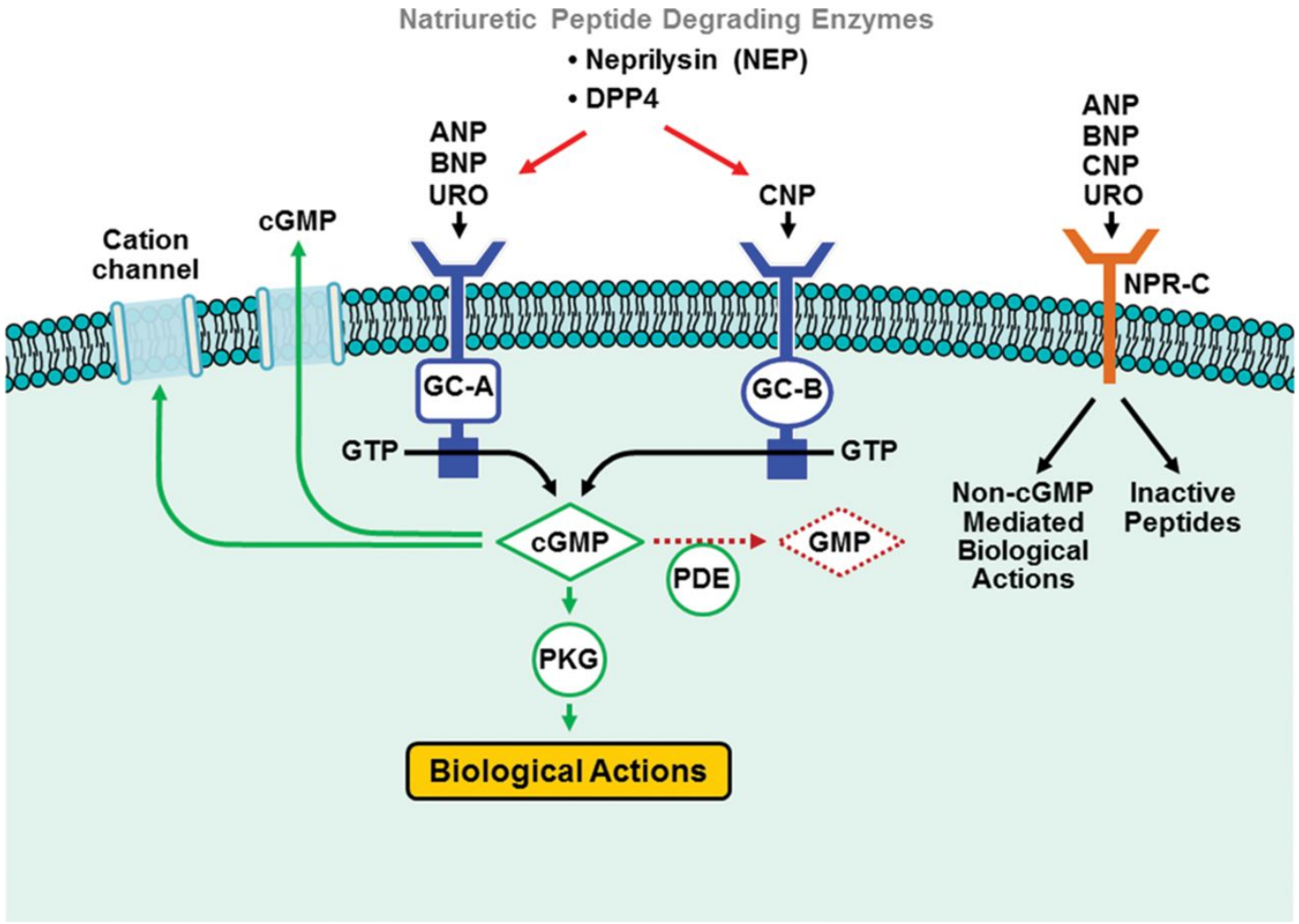
SIMPLIFIED SCHEMATIC OF THE RENIN–ANGIOTENSIN–ALDOSTERONE SYSTEM



von Lueder T G et al. Circ Heart Fail. 2013;6:594-605

American Heart Association.

SIMPLIFIED SCHEMATIC OF THE NATRIURETIC PEPTIDE SYSTEM (NPS)



von Lueder T G et al. Circ Heart Fail. 2013;6:594-605

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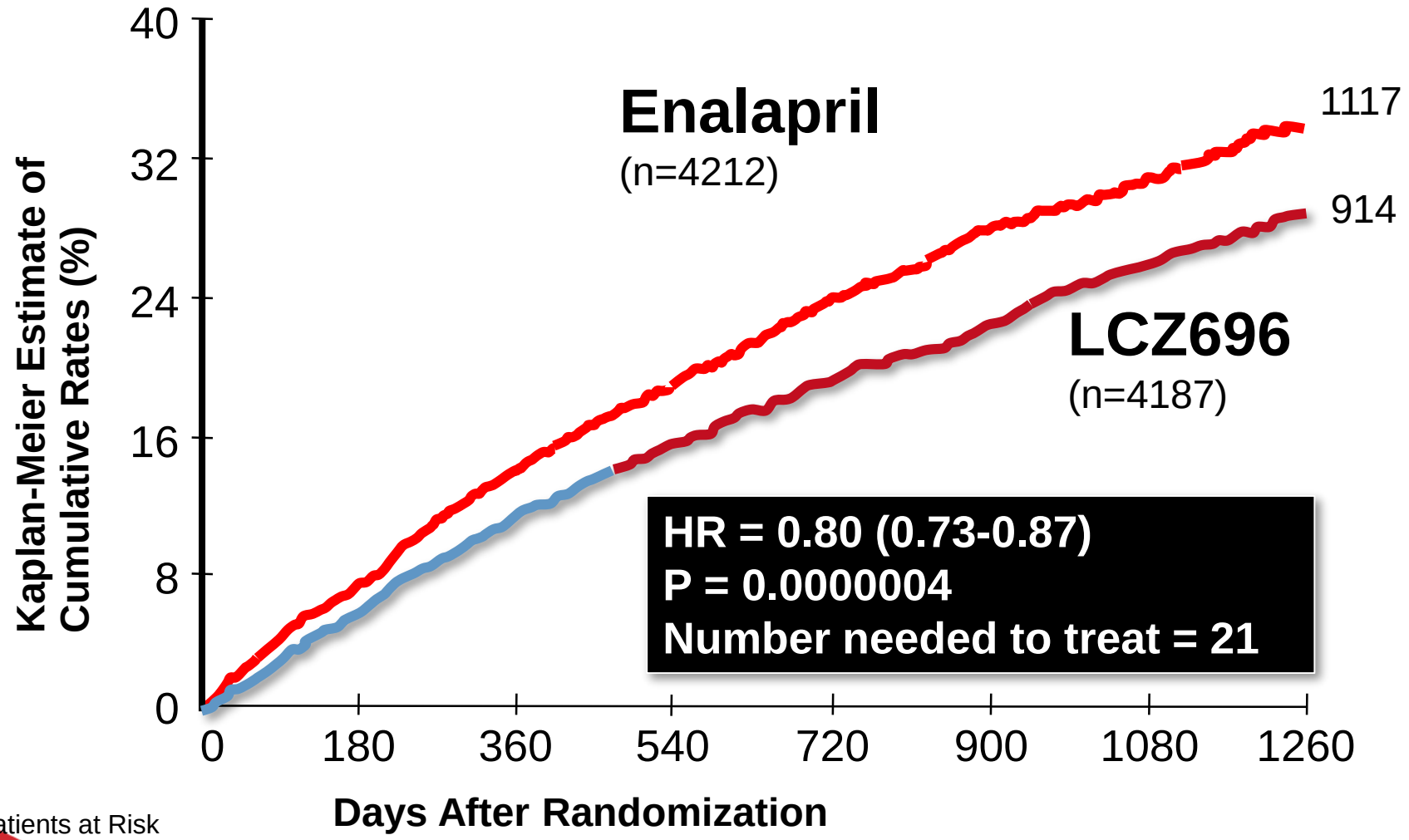
PARADIGM-HF: Cardiovascular Death or Heart Failure Hospitalization (Primary Endpoint)



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RAAS INHIBITION- 2016

7.3.2. Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction: Recommendations

7.3.2.10. Renin-Angiotensin System Inhibition With Angiotensin-Converting Enzyme Inhibitor or Angiotensin Receptor Blocker or ARNI: Recommendations

See the *Online Data Supplement* (http://jaccjacc.acc.org/Clinical_Document/2016_Heart_Failure_Focused_Update_Data_Supplement_New_Therapy_Only_S5.pdf) for evidence supporting these recommendations.

Recommendations for Renin-Angiotensin System Inhibition With ACE Inhibitor or ARB or ARNI		
COR	**LOE**	**Recommendations**
I	ACE: A	The clinical strategy of inhibition of the renin-angiotensin system with ACE inhibitors *(Level of Evidence: A)* (9-14), OR ARBs *(Level of Evidence: A)* (15-18), OR ARNI *(Level of Evidence: B-R)* (19) in conjunction with evidence-based beta blockers (20-22), and aldosterone antagonists in selected patients (23, 24), is recommended for patients with chronic HF*r*EF to reduce morbidity and mortality.
	ARB: A	
	ARNI: B-R	

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Pharmacological Treatment for Stage C HF With Reduced EF

RENIN-ANGIOTENSIN SYSTEM INHIBITION WITH ACE-INHIBITOR OR ARB OR ARNI

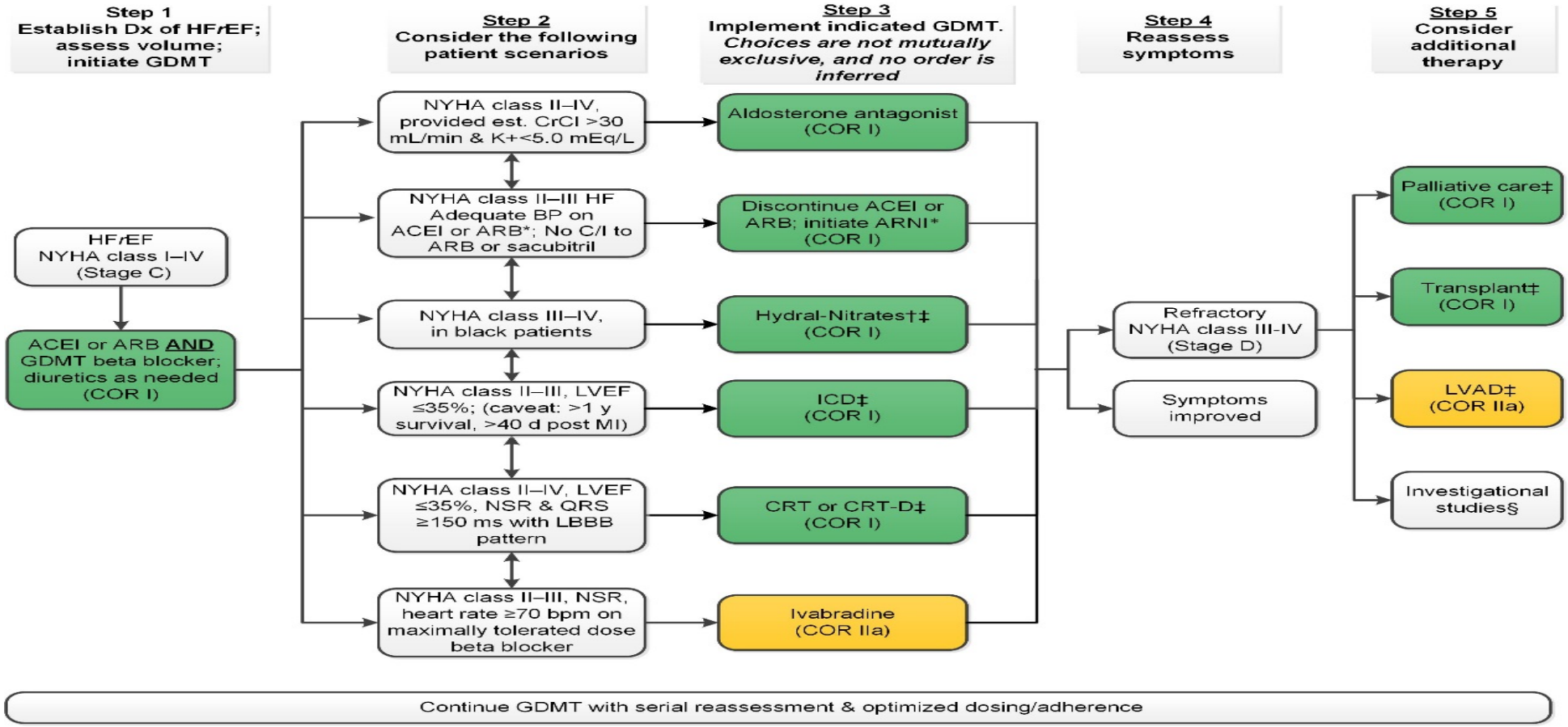
COR	LOE	Recommendations	Comment/ Rationale
I	ARNI: B-R	In patients with chronic symptomatic HF*r*EF NYHA class II or III who tolerate an ACE inhibitor or ARB, replacement by an ARNI is recommended to further reduce morbidity and mortality.	NEW: New clinical trial data necessitated this recommendation.

Pharmacological Treatment for Stage C HF With Reduced EF

RENIN–ANGIOTENSIN SYSTEM INHIBITION WITH ACE-INHIBITOR OR ARB OR ARNI

COR	LOE	Recommendations	Comment/ Rationale
III: Harm	**B-R**	ARNI should not be administered concomitantly with ACE inhibitors or within 36 hours of the last dose of an ACE inhibitor.	NEW: Available evidence demonstrates a potential signal of harm for a concomitant use of ACE inhibitors and ARNI.
III: Harm	**C-EO**	ARNI should not be administered to patients with a history of angioedema.	NEW: New clinical trial data.

TREATMENT OF HFREF STAGE C AND D



†Hydral-Nitrates green box: The combination of ISDN/HYD with ARNI has not been robustly tested. BP response should be carefully monitored.
‡See 2013 HF guideline.
§Participation in investigational studies is also appropriate for stage C, NYHA class II and III HF.
ACEI indicates angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor-blocker; ARNI, angiotensin receptor-neprilysin inhibitor; BP, blood pressure; bpm, beats per minute; C/I, contraindication; COR, Class of Recommendation; CrCl, creatinine clearance; CRT-D, cardiac resynchronization therapy–device; Dx, diagnosis; GDMT, guideline-directed management and therapy; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; ICD, implantable cardioverter-defibrillator; ISDN/HYD, isosorbide dinitrate hydral-nitrates; K+, potassium; LBBB, left bundle-branch block; LVAD, left ventricular assist device; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NSR, normal sinus rhythm; and NYHA, New York Heart Association.

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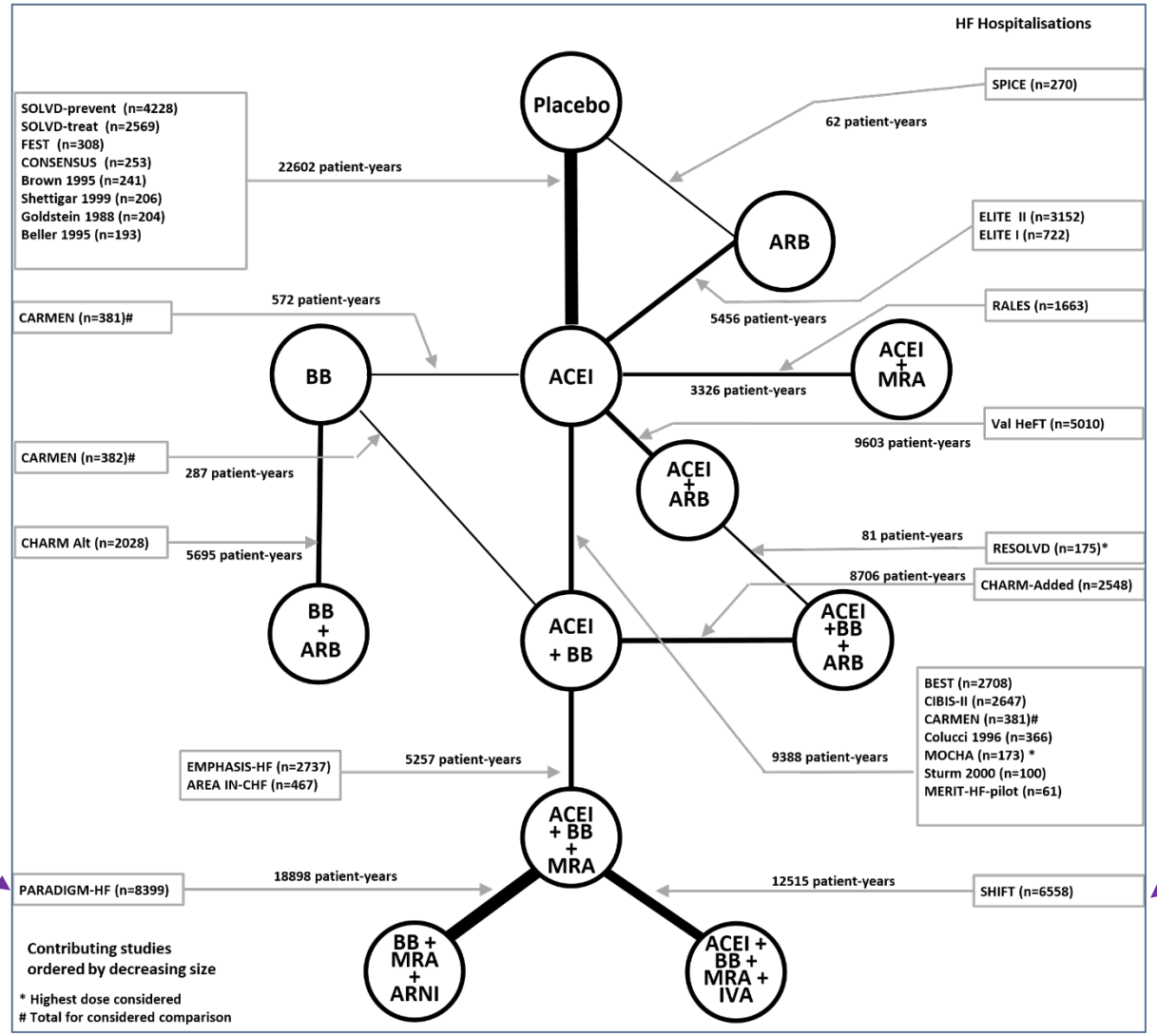
INCREMENTAL BENEFIT OF DRUG THERAPIES FOR HFREF; A NETWORK META-ANALYSIS. KOMAJDA M. ET AL. EJ HEART FAILURE 2018

combination of ARNI, BB, MRA, HR. 0.38, mortality



Combination of ACE-I, BB, MRA IVA. HR 0.58, All-cause hospitalizations

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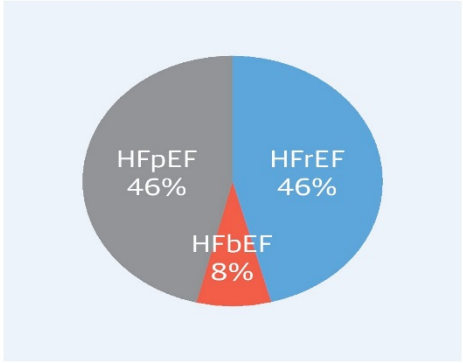
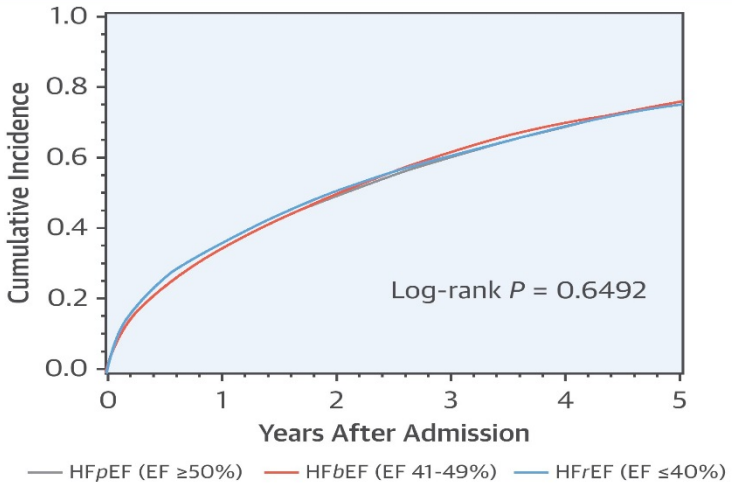
BUT HERE IS OUR
CHALLENGE…

CENTRAL ILLUSTRATION: 5-Year Outcomes in Patients Hospitalized With HF With Preserved, Borderline, and Reduced EF

Heart Failure



5-Year Mortality



Outcomes – 5-Year Event Rates (%)					
	Mortality	Readmission	CV Readmission	HF Readmission	Mortality/Readmission
HFrEF	75.3	82.2	63.9	48.5	96.4
HFbEF	75.7	85.7	63.3	45.2	97.2
HFpEF	75.7	84.0	58.9	40.5	97.3

Shah, K.S. et al. J Am Coll Cardiol. 2017;70(20):2476–86.

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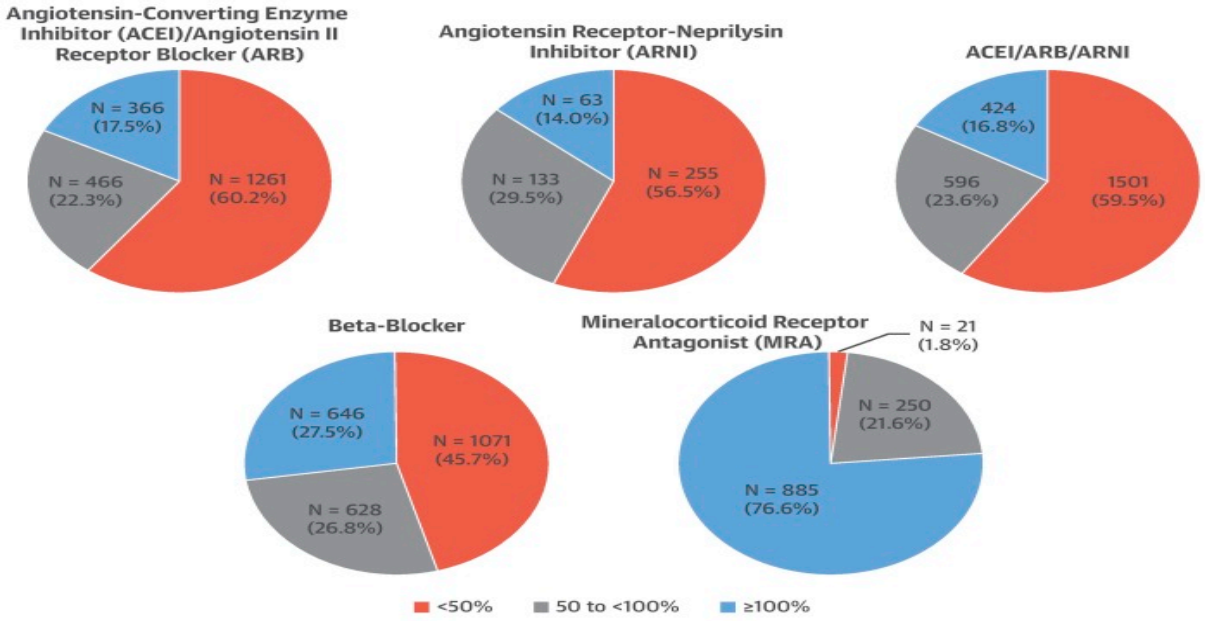
"Only 1% of eligible patients were simultaneously treated with target does of ACEI/ARB/ARNI, beta-blocker, and MRA therapy, and <25% of patients simultaneously received any dose of all 3 medications."

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

B



Greene, S.J. et al. J Am Coll Cardiol. 2018;72(4):351-66.

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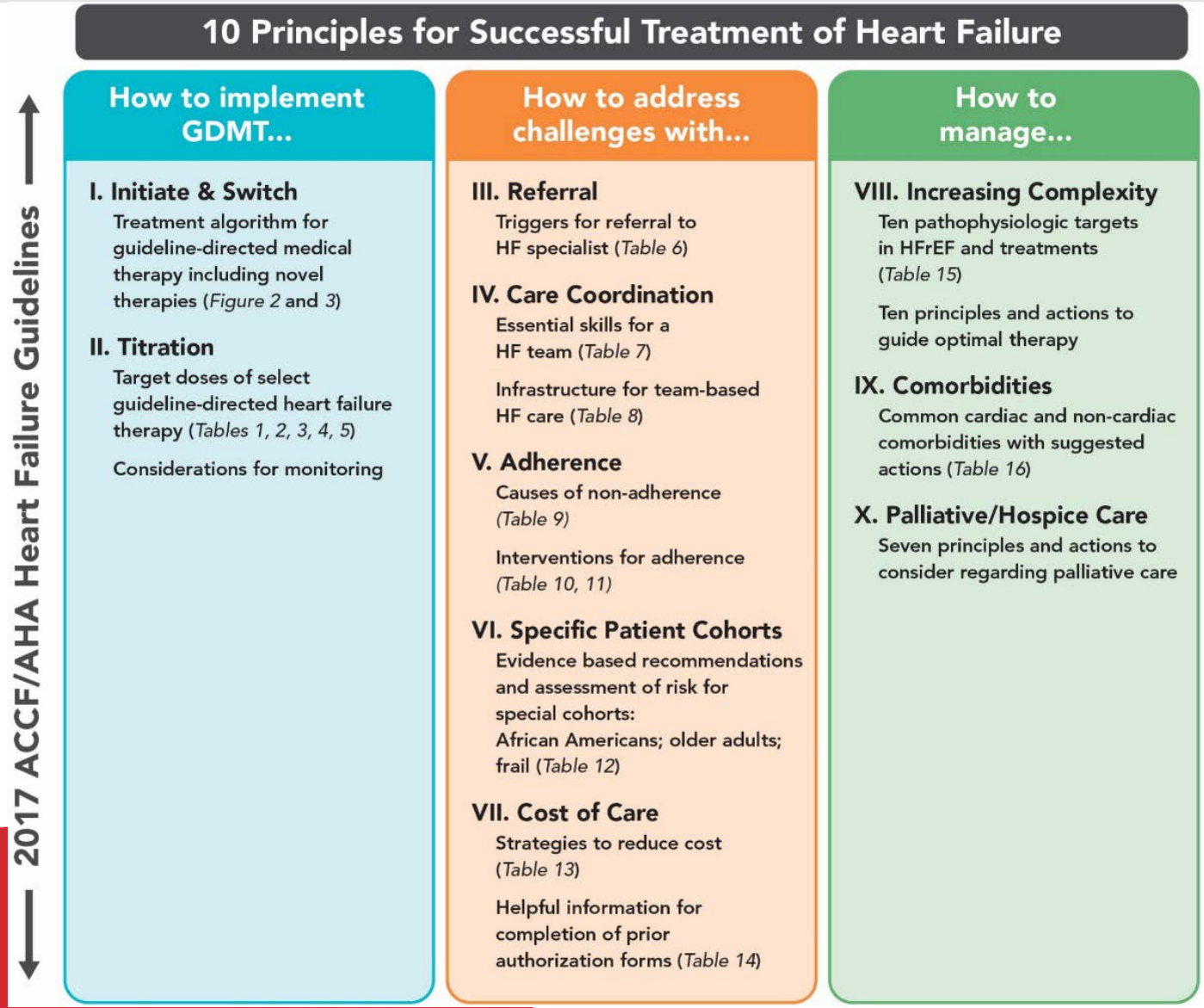
2017 ACC Expert Consensus Decision Pathway for Optimization of Heart Failure Treatment



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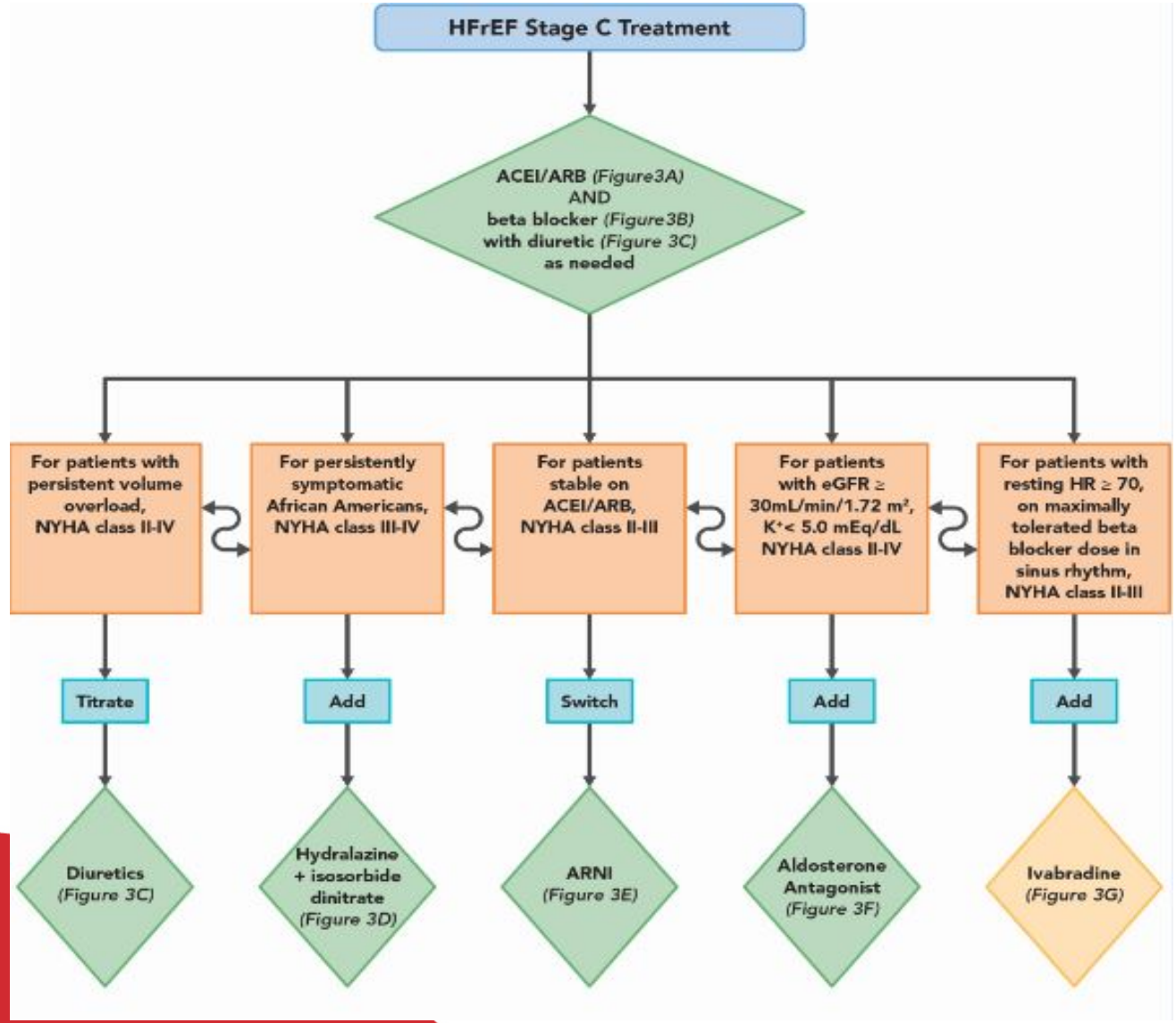
Treatment Algorithm for Guideline-Directed Medical Therapy Including Novel Therapies



Excerpted from:

Optimization of Heart Failure Treatment: Answers to 10 Pivotal Issues About Heart Failure with Reduced Ejection Fraction

December 2017
DOI: 10.1016/j.jacc.2017.11.025

AMERICAN COLLEGE of CARDIOLOGY

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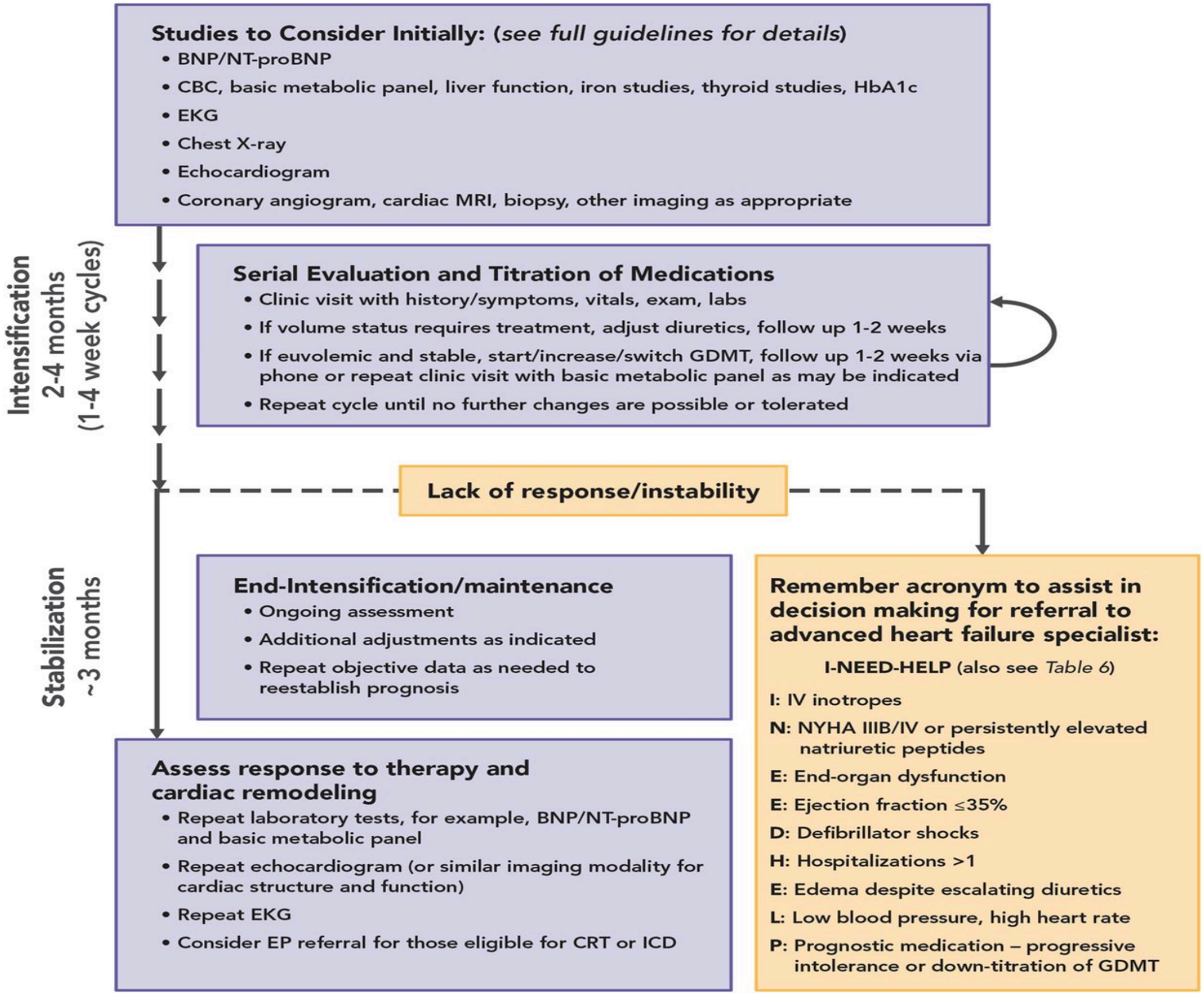

Clyde W. Yancy et al. JACC 2018;71:201-230

JACC

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Translated Into Clinical Apps

TreatHF App

This App helps clinicians confirm which therapies are suggested for their symptomatic heart failure patients with reduced ejection fraction (HFrEF) and provides guidance on the use of each therapy.

- Enter patient indications
- Review individualized next steps for medical therapy
- Email or print a summary of the next steps
- Reference detailed information on:
  - Initiation, titration, and monitoring of each medication
  - Guidance for optimizing your overall medication strategy

GWTG-HF UPDATE AND REDUCING READMISSIONS SAFELY

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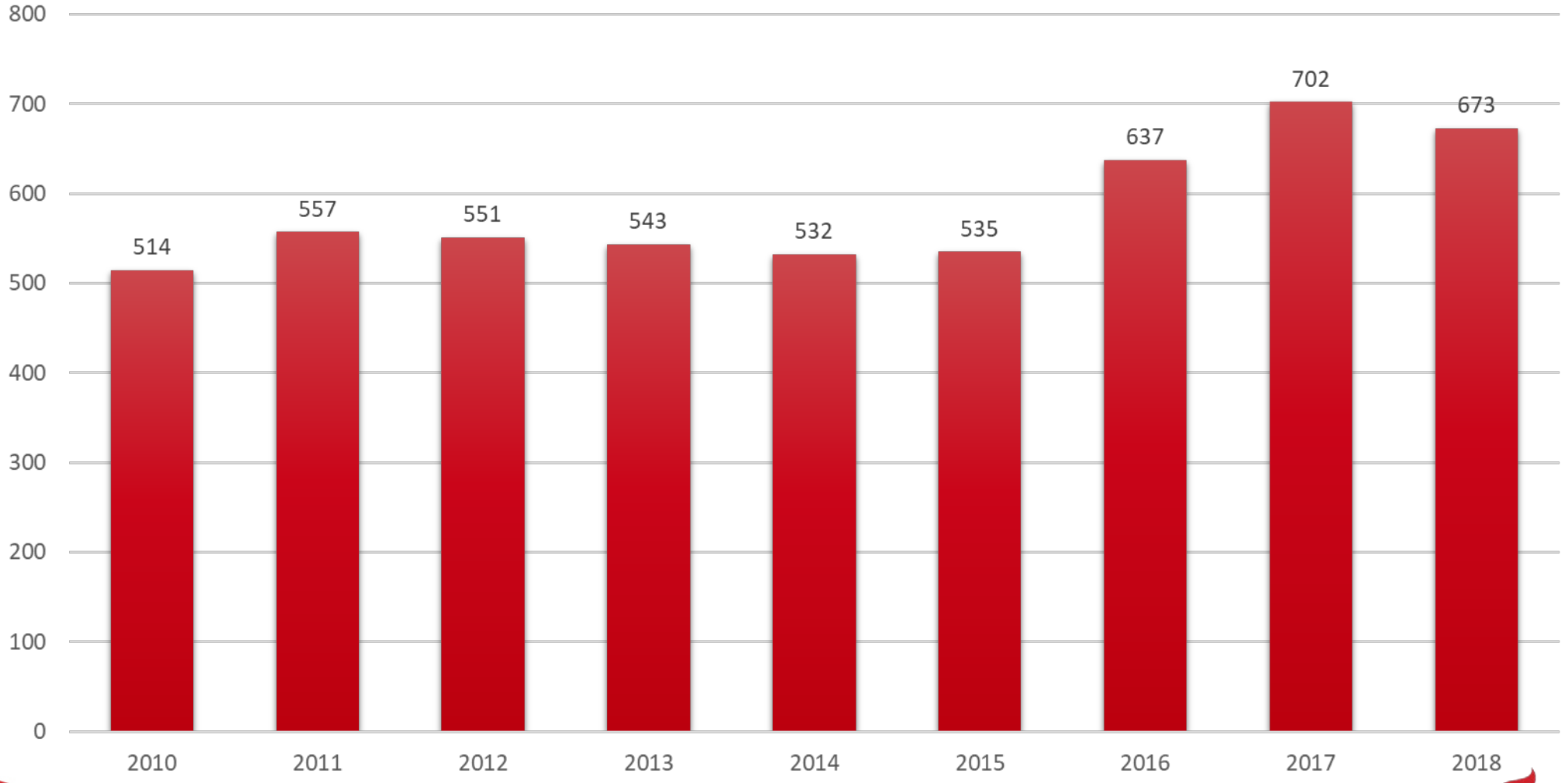
Eliot Corday Chair of Cardiovascular Medicine and Science

Co-Chief UCLA Division of Cardiology

Director, Ahmanson-UCLA Cardiomyopathy Center, Los Angeles, CA

GWTG-Heart Failure Enrolled Hospitals

Data through Dec. 2018



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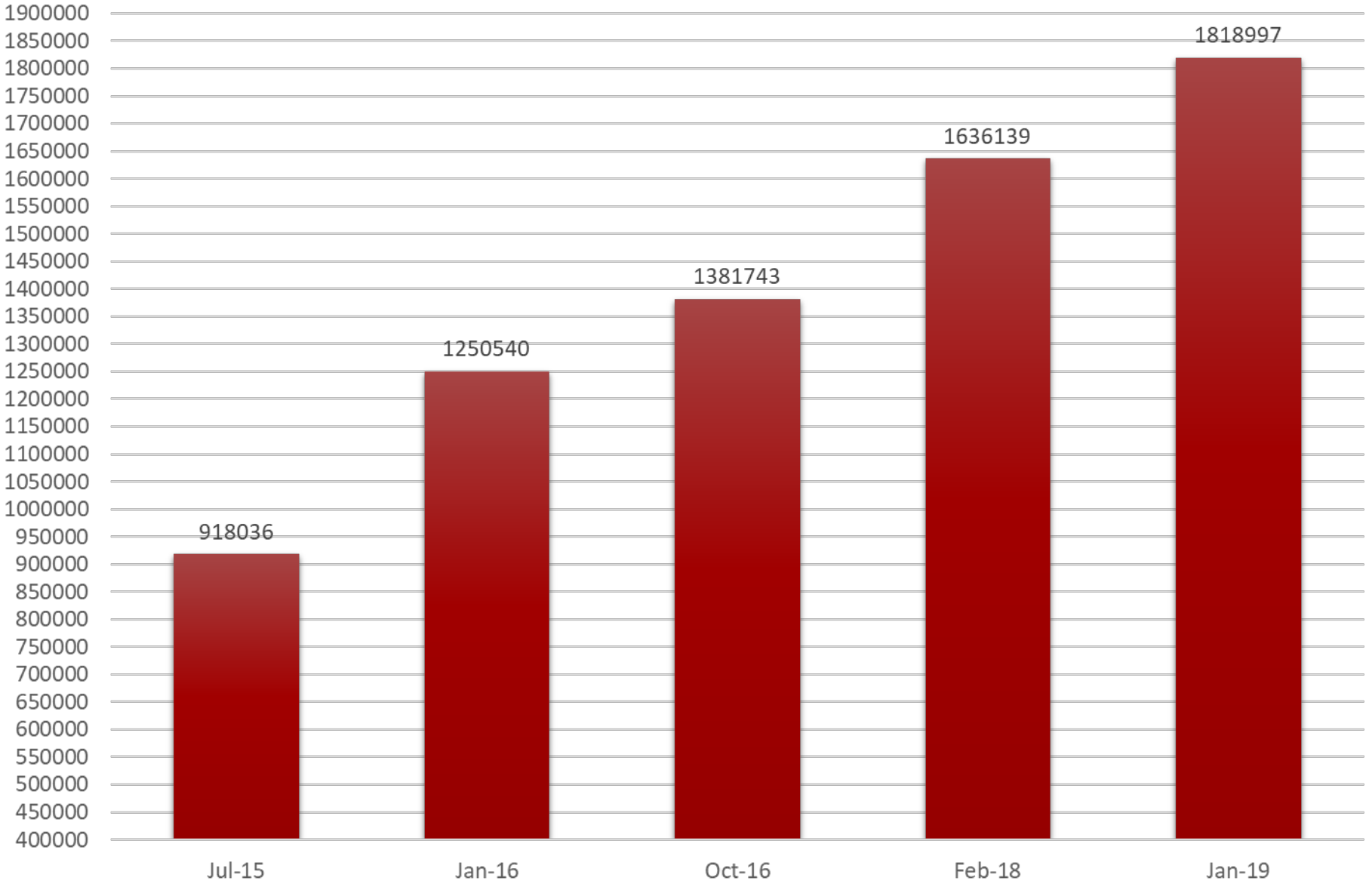
GWTG-HF: Hospitalization Episodes Entered

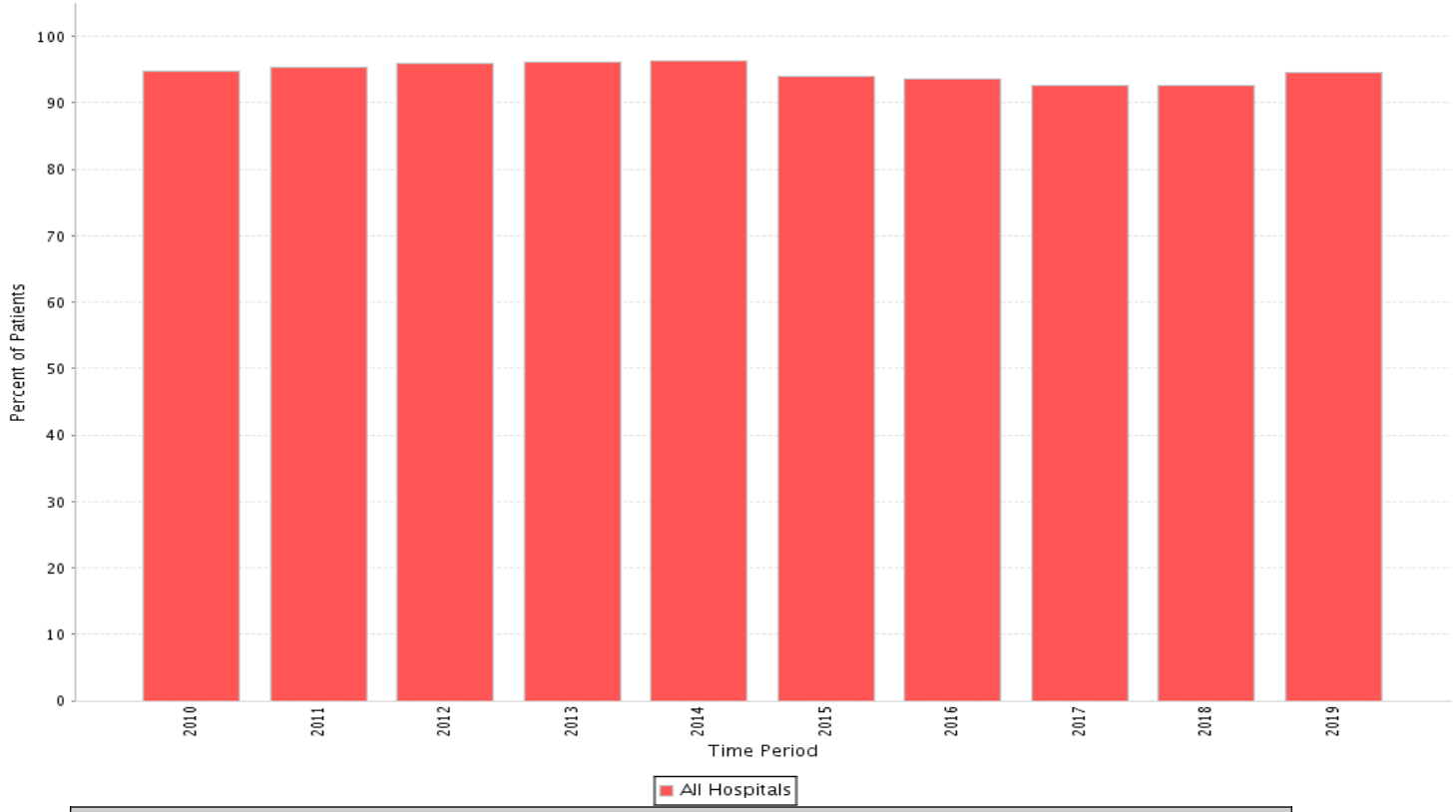
Data as of 1-30-2019



ACEI/ARB or ARNI at Discharge*

Percent of heart failure patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACEI) and angiotensin receptor blocker (ARB) or angiotensin-receptor/neprilysin inhibitor (ARNI) contraindications who are prescribed an ACEI, ARB, or ARNI at hospital discharge.

Time Period: 01/2010 - 01/2019



Data For: ACEI/ARB or ARNI at Discharge*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	35947	37974	94.7%
All Hospitals	2011	36960	38791	95.3%
All Hospitals	2012	35702	37215	95.9%
All Hospitals	2013	35615	37036	96.2%
All Hospitals	2014	35677	37029	96.3%
All Hospitals	2015	36394	38728	94.0%
All Hospitals	2016	37913	40498	93.6%
All Hospitals	2017	38446	41558	92.5%
All Hospitals	2018	34270	37015	92.6%
All Hospitals	2019	481	509	94.5%

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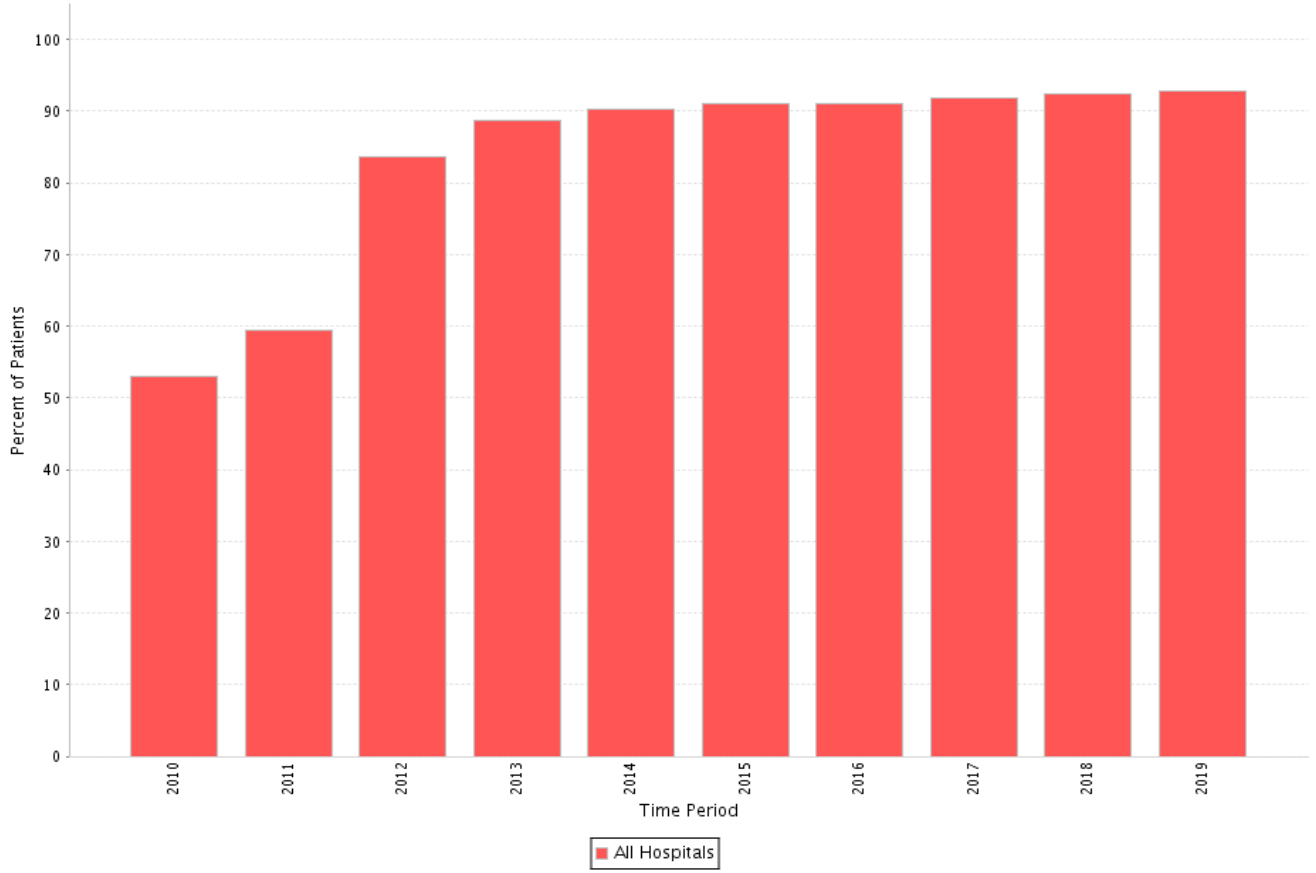
Evidence-Based Specific Beta Blockers*

Percent of HF patients who were prescribed evidence-based specific beta blockers (Bisoprolol, Carvedilol, Metoprolol succinate CR/XL) at discharge

Time Period: 01/2010 - 01/2019



Data For: Evidence-Based Specific Beta Blockers*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	24744	46725	53.0%
All Hospitals	2011	29050	48899	59.4%
All Hospitals	2012	39443	47166	83.6%
All Hospitals	2013	42017	47319	88.8%
All Hospitals	2014	43374	48030	90.3%
All Hospitals	2015	46226	50814	91.0%
All Hospitals	2016	49108	53882	91.1%
All Hospitals	2017	51901	56549	91.8%
All Hospitals	2018	46720	50604	92.3%
All Hospitals	2019	662	713	92.8%

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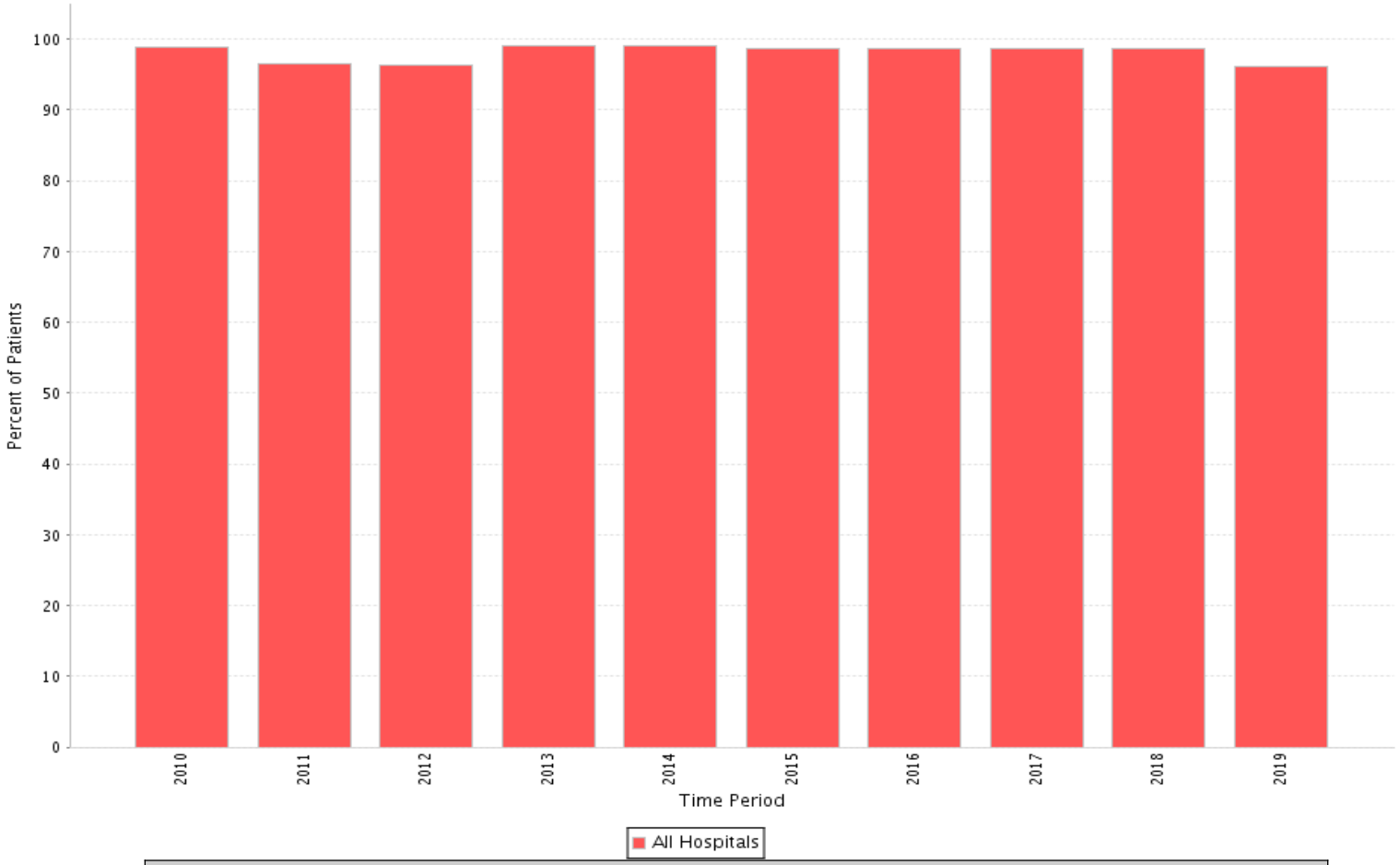
Measure LV Function*

HF patients with documentation in the hospital record that left ventricular function (LVF) was assessed before arrival, during hospitalization, or is planned for after discharge.

Time Period: 01/2010 - 01/2019



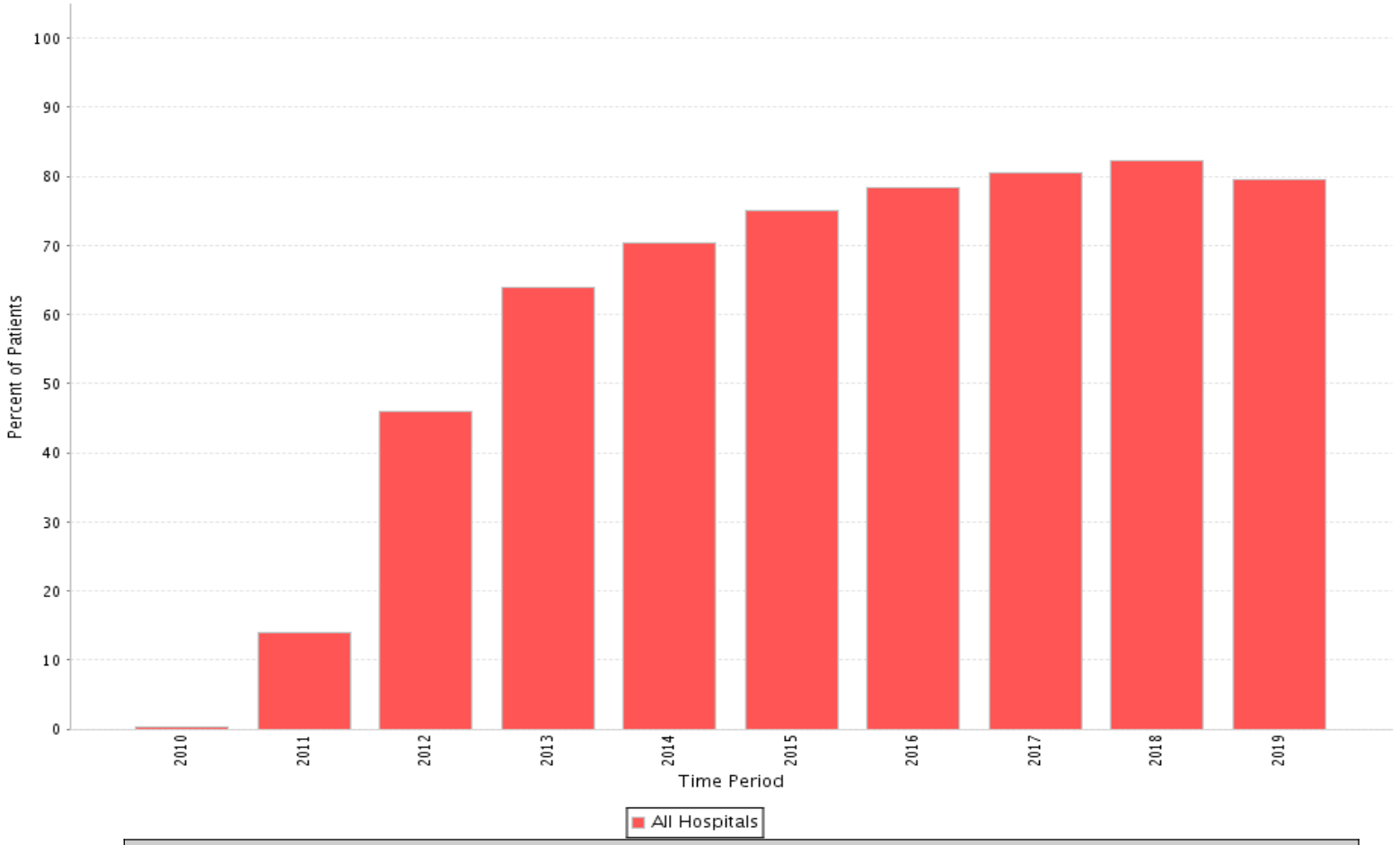
Data For: Measure LV Function*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	114028	115416	98.8%
All Hospitals	2011	121726	126094	96.5%
All Hospitals	2012	117291	121711	96.4%
All Hospitals	2013	118994	120215	99.0%
All Hospitals	2014	122849	124100	99.0%
All Hospitals	2015	128422	130098	98.7%
All Hospitals	2016	142136	144069	98.7%
All Hospitals	2017	152394	154497	98.6%
All Hospitals	2018	138770	140720	98.6%
All Hospitals	2019	2028	2108	96.2%

American Heart Association.

Post Discharge Appointment for Heart Failure Patients

Percent of eligible heart failure patients for whom a follow-up appointment was scheduled and documented including location, date, and time for follow up visits, or home health visit.

Time Period: 01/2010 - 01/2019



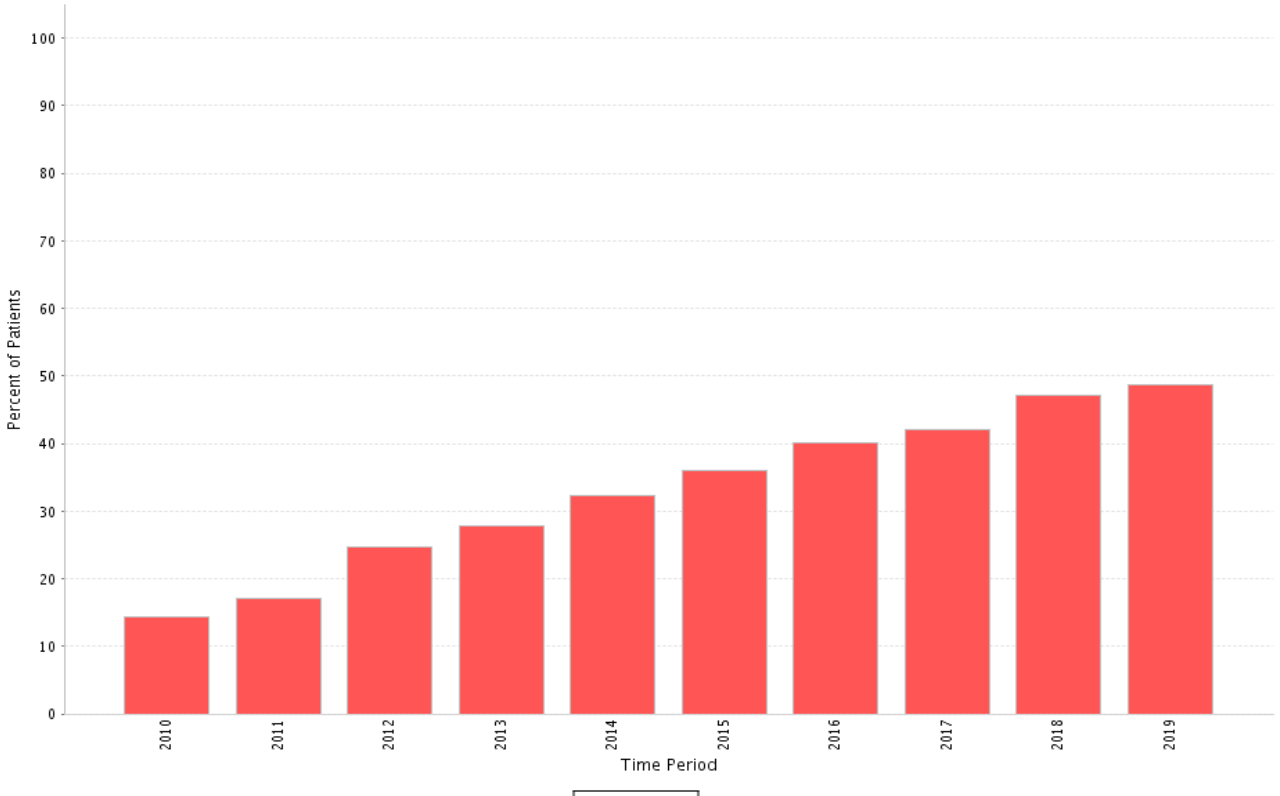
Data For: Post Discharge Appointment for Heart Failure Patients				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	322	96710	0.3%
All Hospitals	2011	14447	103931	13.9%
All Hospitals	2012	45109	98001	46.0%
All Hospitals	2013	61211	95783	63.9%
All Hospitals	2014	68995	98148	70.3%
All Hospitals	2015	77122	102698	75.1%
All Hospitals	2016	89124	113668	78.4%
All Hospitals	2017	98267	122033	80.5%
All Hospitals	2018	91232	111010	82.2%
All Hospitals	2019	1298	1631	79.6%

American Heart Association.

Aldosterone Antagonist at discharge for Patients with HFrEF

Percent of heart failure patients with left ventricular ejection fraction <=35% or a qualitative assessment of moderate/severe dysfunction with no contraindications or documented intolerance who were prescribed Aldosterone Antagonist at discharge.

Time Period: 01/2010 - 01/2019

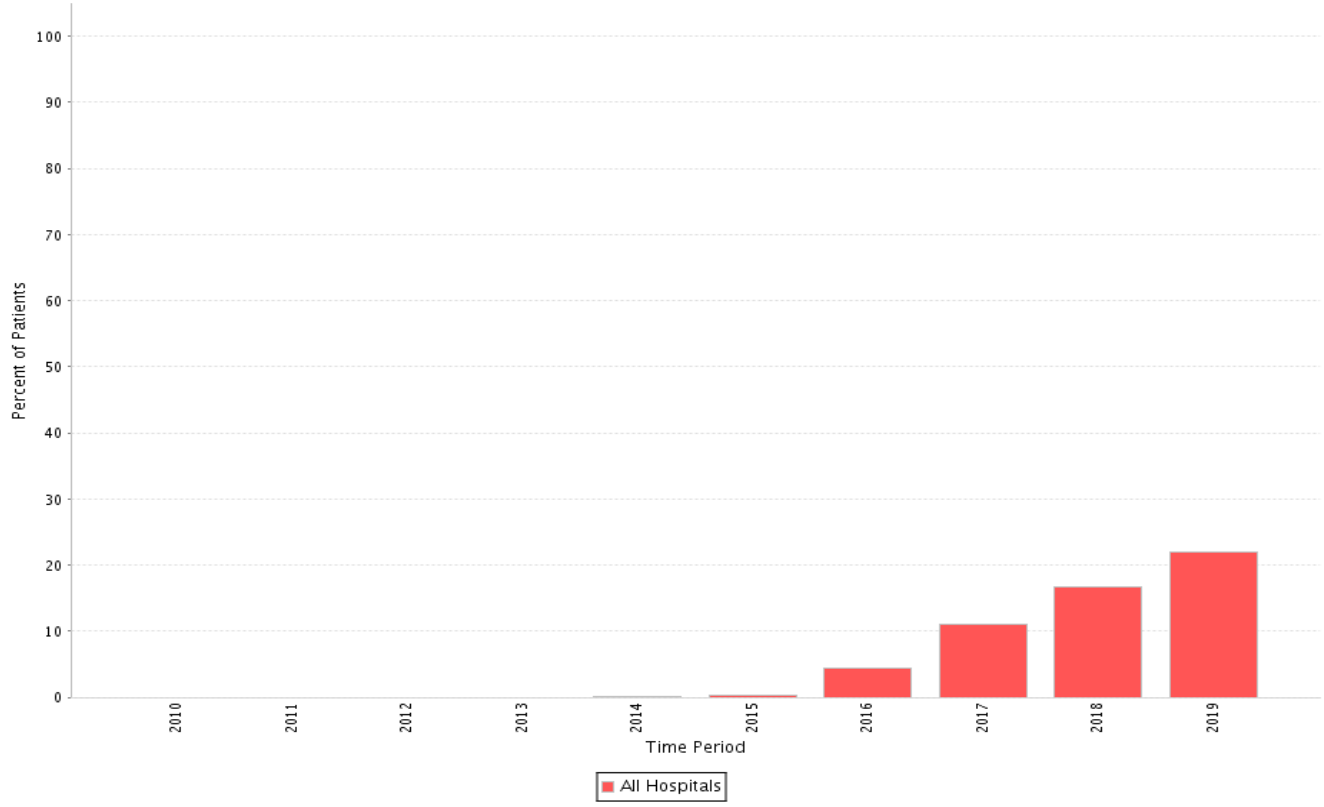


Data For: Aldosterone Antagonist at discharge for Patients with HFrEF				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	6357	44444	14.3%
All Hospitals	2011	7701	45027	17.1%
All Hospitals	2012	10047	40557	24.8%
All Hospitals	2013	10829	38822	27.9%
All Hospitals	2014	12218	37889	32.2%
All Hospitals	2015	13768	38205	36.0%
All Hospitals	2016	15801	39386	40.1%
All Hospitals	2017	16778	39812	42.1%
All Hospitals	2018	15734	33361	47.2%
All Hospitals	2019	236	485	48.7%

American Heart Association.

Angiotensin Receptor-Neprilysin Inhibitor (ARNI) at Discharge

Percentage of eligible patients with heart failure who are prescribed an ARNI at hospital discharge.
Time Period: 01/2010 - 01/2019



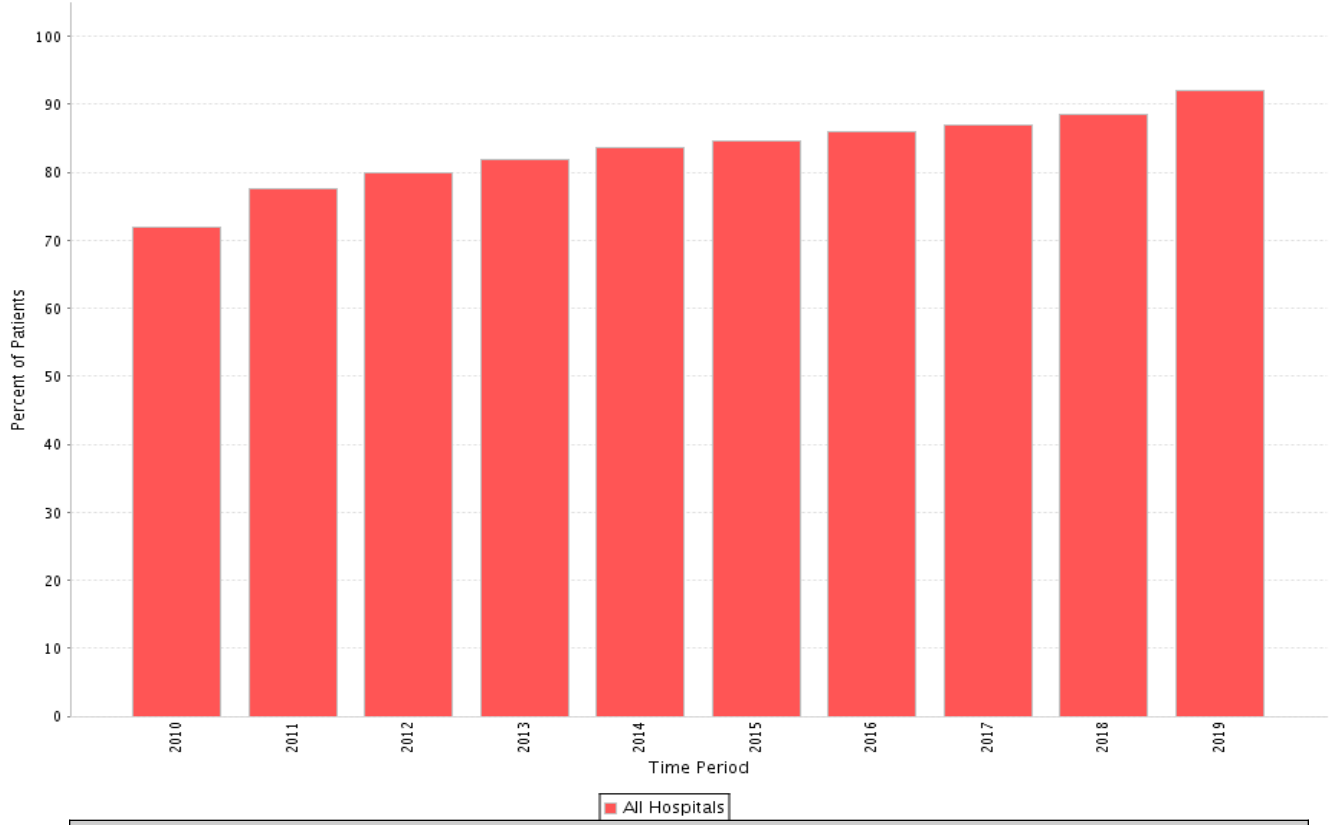
Data For: Angiotensin Receptor-Neprilysin Inhibitor (ARNI) at Discharge				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	0	35939	0.0%
All Hospitals	2011	0	37078	0.0%
All Hospitals	2012	0	35636	0.0%
All Hospitals	2013	0	35487	0.0%
All Hospitals	2014	1	35046	0.0%
All Hospitals	2015	83	34393	0.2%
All Hospitals	2016	1456	32811	4.4%
All Hospitals	2017	3302	30090	11.0%
All Hospitals	2018	4402	26416	16.7%
All Hospitals	2019	82	373	22.0%

American Heart Association.

Anticoagulation for Atrial Fibrillation or Atrial Flutter

Percent of patients with chronic or recurrent atrial fibrillation or atrial flutter at high risk for thromboembolism, according to CHADS2 risk stratification prescribed Anticoagulation at discharge.

Time Period: 01/2010 - 01/2019



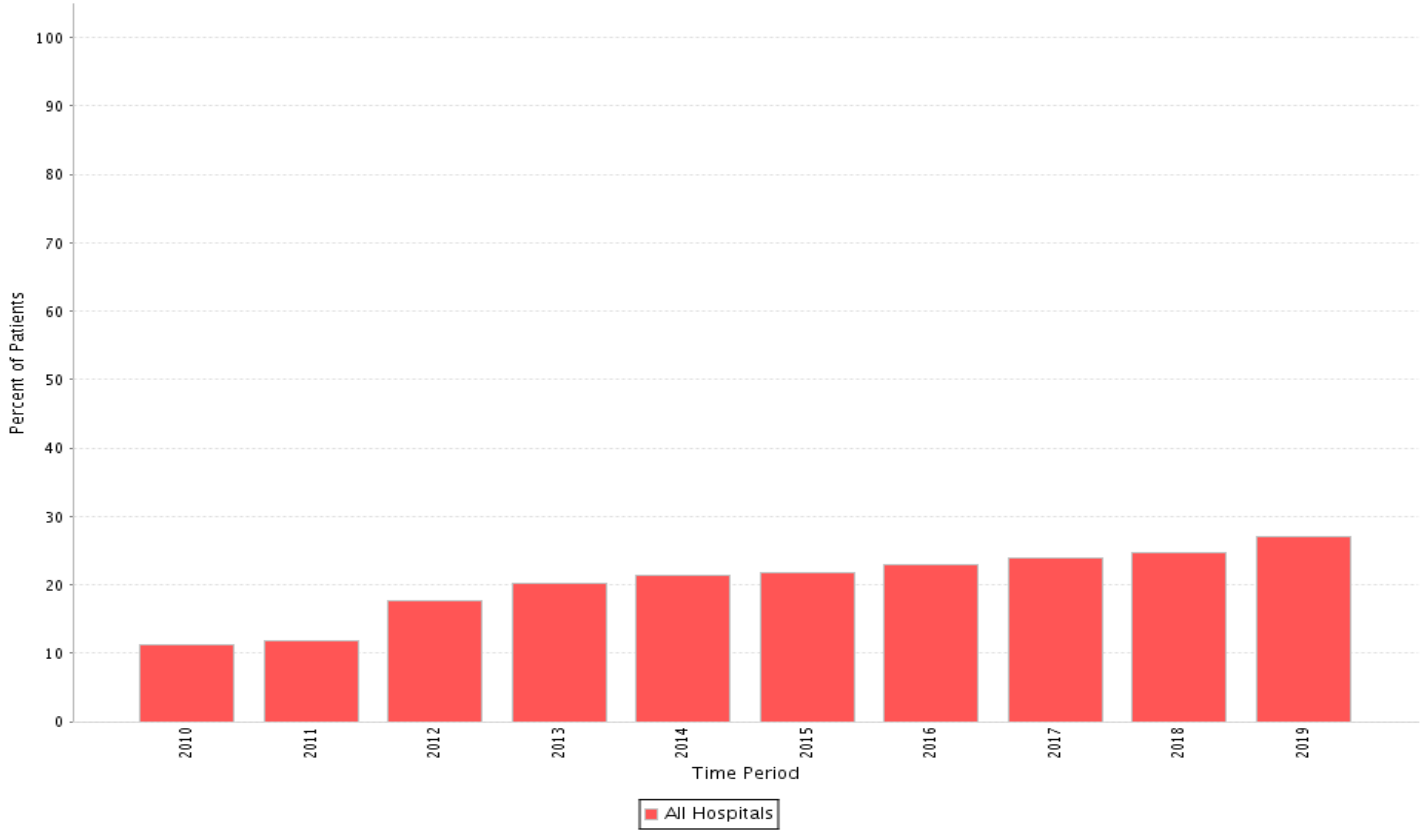
Data For: Anticoagulation for Atrial Fibrillation or Atrial Flutter				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	12104	16832	71.9%
All Hospitals	2011	14960	19262	77.7%
All Hospitals	2012	21130	26436	79.9%
All Hospitals	2013	24707	30188	81.8%
All Hospitals	2014	25160	30115	83.5%
All Hospitals	2015	29904	35372	84.5%
All Hospitals	2016	36117	42042	85.9%
All Hospitals	2017	41295	47471	87.0%
All Hospitals	2018	40494	45750	88.5%
All Hospitals	2019	658	715	92.0%

American Heart Association.

Hydralazine Nitrate at Discharge*

Black Heart failure patients with left ventricular systolic dysfunction (LVSD) with no contraindications or documented intolerance who were prescribed a combination of hydralazine and isosorbide dinitrate at discharge. Note this treatment is recommended in addition to ACEI or ARB and beta blocker therapy at discharge.

Time Period: 01/2010 - 01/2019

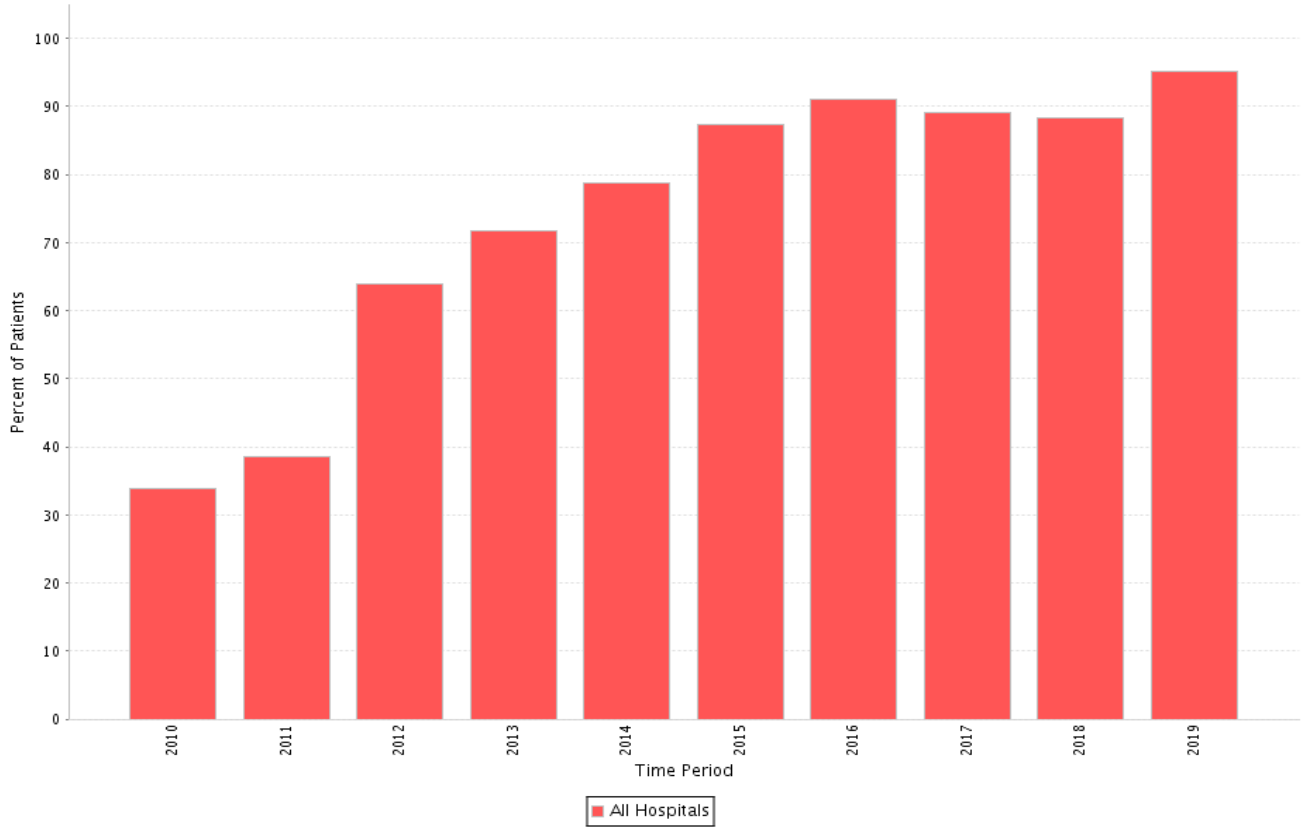


Data For: Hydralazine Nitrate at Discharge*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	1286	11375	11.3%
All Hospitals	2011	1480	12463	11.9%
All Hospitals	2012	2139	12106	17.7%
All Hospitals	2013	2365	11741	20.1%
All Hospitals	2014	2828	13232	21.4%
All Hospitals	2015	2875	13236	21.7%
All Hospitals	2016	3192	13944	22.9%
All Hospitals	2017	3507	14616	24.0%
All Hospitals	2018	3246	13109	24.8%
All Hospitals	2019	59	219	26.9%

American Heart Association.

DVT Prophylaxis

Percent of patients with heart failure and who are non-ambulatory
who receive DVT prophylaxis by end of hospital day two.
Time Period: 01/2010 - 01/2019



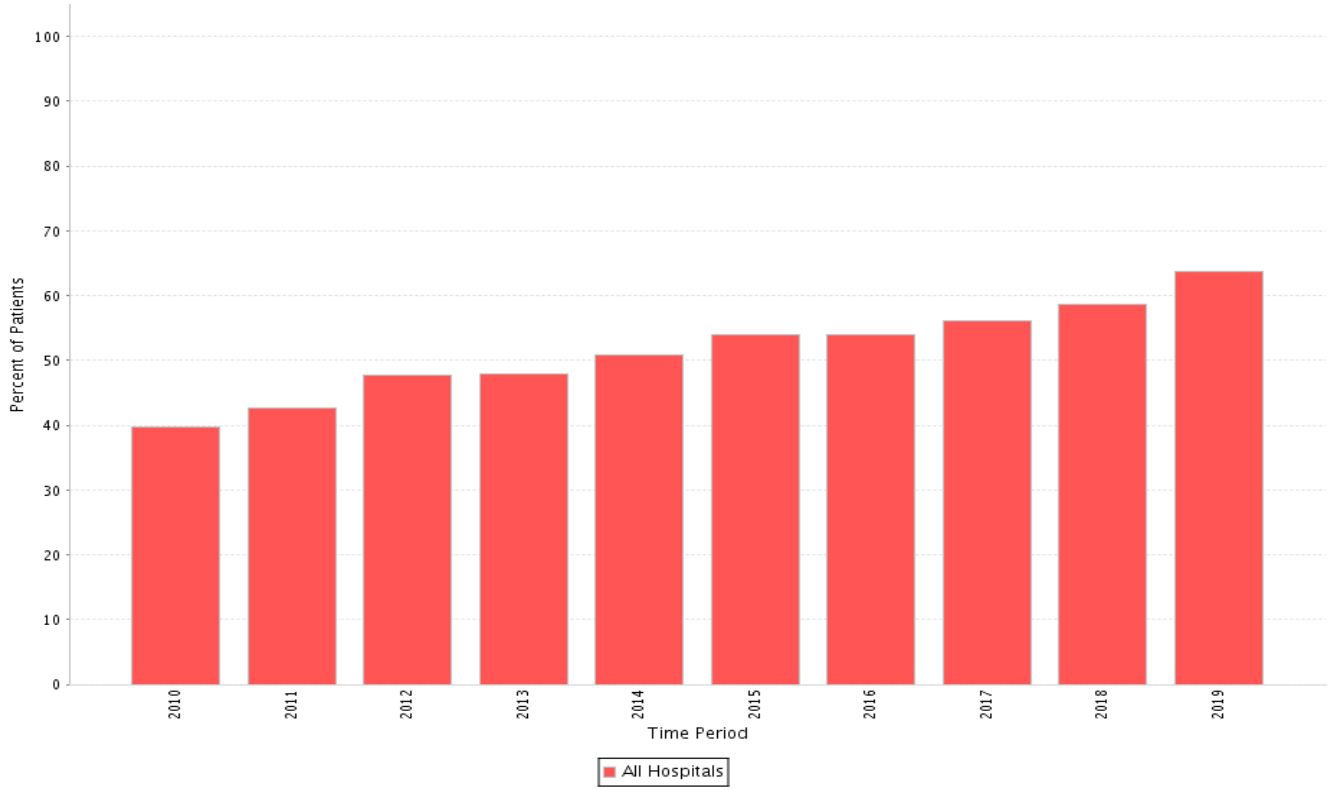
Data For: DVT Prophylaxis				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	15227	45076	33.8%
All Hospitals	2011	19647	50999	38.5%
All Hospitals	2012	27426	42932	63.9%
All Hospitals	2013	32308	45051	71.7%
All Hospitals	2014	36429	46208	78.8%
All Hospitals	2015	41265	47221	87.4%
All Hospitals	2016	46434	50984	91.1%
All Hospitals	2017	52763	59267	89.0%
All Hospitals	2018	47403	53624	88.4%
All Hospitals	2019	671	705	95.2%

American Heart Association.

CRT-D or CRT-P Placed or Prescribed at Discharge

Percent of heart failure patients with left ventricular ejection fraction less than or equal to 35% with a QRS duration of 120 ms or above and Left Bundle Branch Block or QRS 150ms or above regardless of QRS morphology, with no contraindications, documented intolerance, or any other reason against who have CRT-D or CRT-P, had CRT-D or CRT-P placed, or were prescribed CRT-D or CRT-P at discharge.

Time Period: 01/2010 - 01/2019

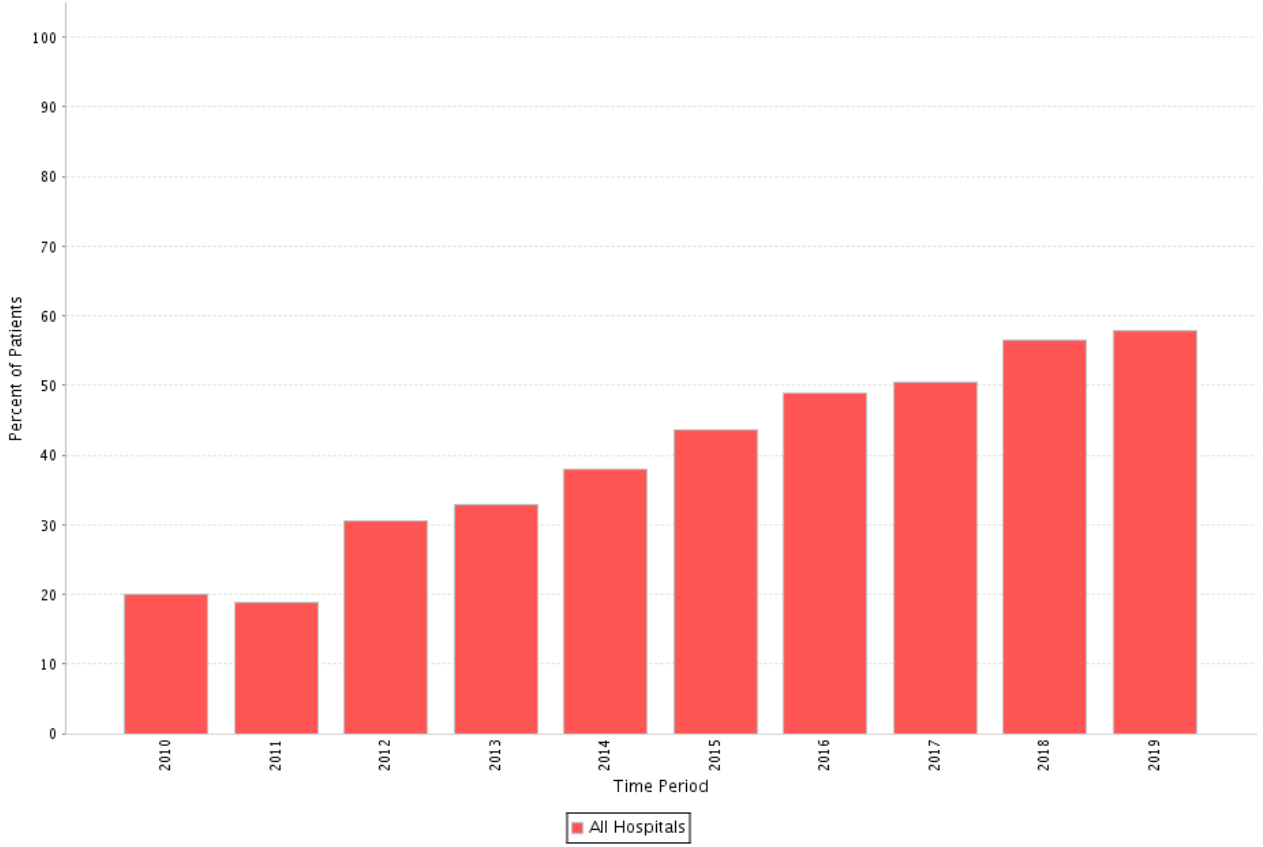


Data For: CRT-D or CRT-P Placed or Prescribed at Discharge				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	1765	4440	39.8%
All Hospitals	2011	2485	5831	42.6%
All Hospitals	2012	3301	6923	47.7%
All Hospitals	2013	2715	5669	47.9%
All Hospitals	2014	2836	5583	50.8%
All Hospitals	2015	3152	5848	53.9%
All Hospitals	2016	3422	6351	53.9%
All Hospitals	2017	3851	6871	56.0%
All Hospitals	2018	3558	6064	58.7%
All Hospitals	2019	67	105	63.8%

American Heart Association.

ICD Counseling or ICD placed or prescribed at discharge

Percent of heart failure patients with left ventricular ejection fraction less than or equal to 35% with no contraindications, documented intolerance, or any other reason against who had ICD counseling provided, who have ICD prior to hospitalization, had an ICD placed, or were prescribed an ICD at discharge

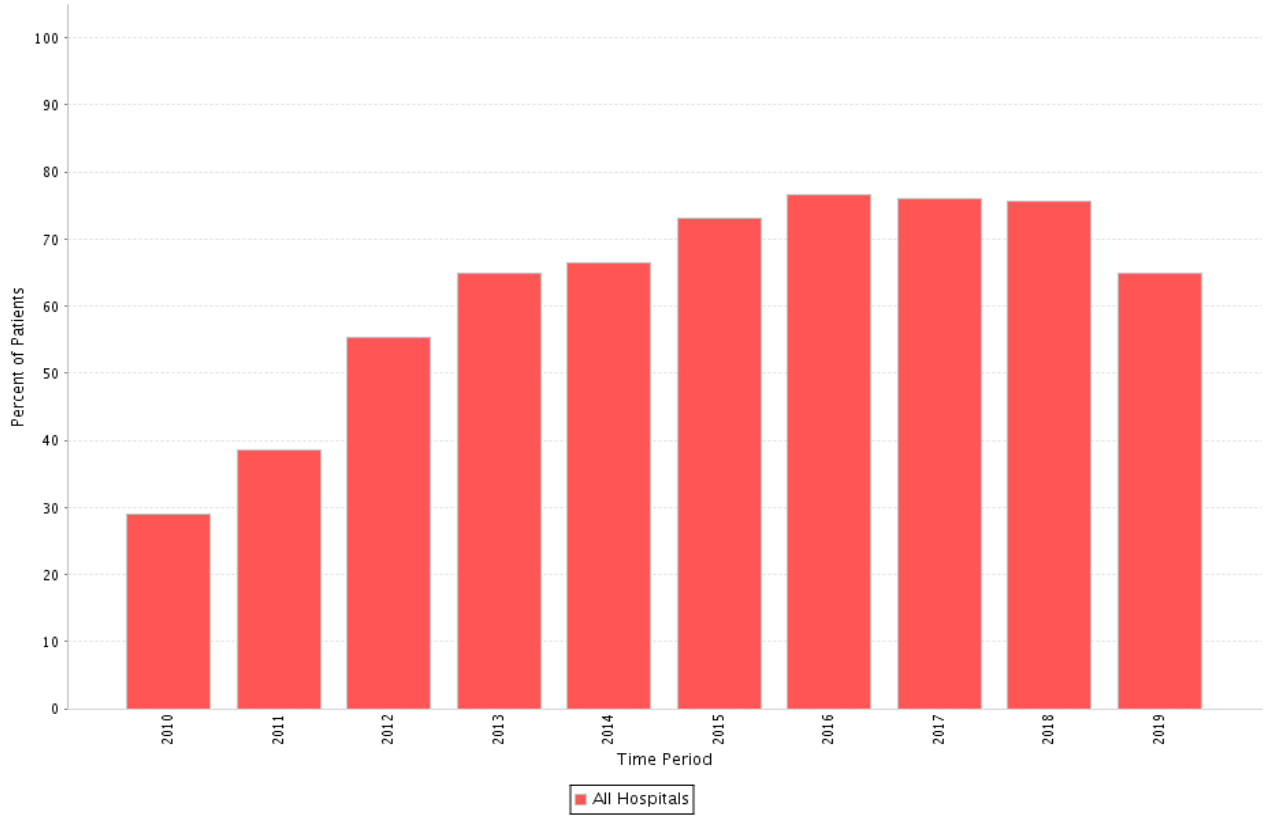


Data For: ICD Counseling or ICD placed or prescribed at discharge				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	7970	40023	19.9%
All Hospitals	2011	6666	35408	18.8%
All Hospitals	2012	9505	31205	30.5%
All Hospitals	2013	9935	30122	33.0%
All Hospitals	2014	11197	29571	37.9%
All Hospitals	2015	13128	30148	43.5%
All Hospitals	2016	15344	31404	48.9%
All Hospitals	2017	16132	32005	50.4%
All Hospitals	2018	15563	27585	56.4%
All Hospitals	2019	237	410	57.8%

American Heart Association.

Influenza Vaccination During Flu Season

Percent of patients that received an influenza vaccination prior to discharge during flu season
Time Period: 01/2010 - 01/2019

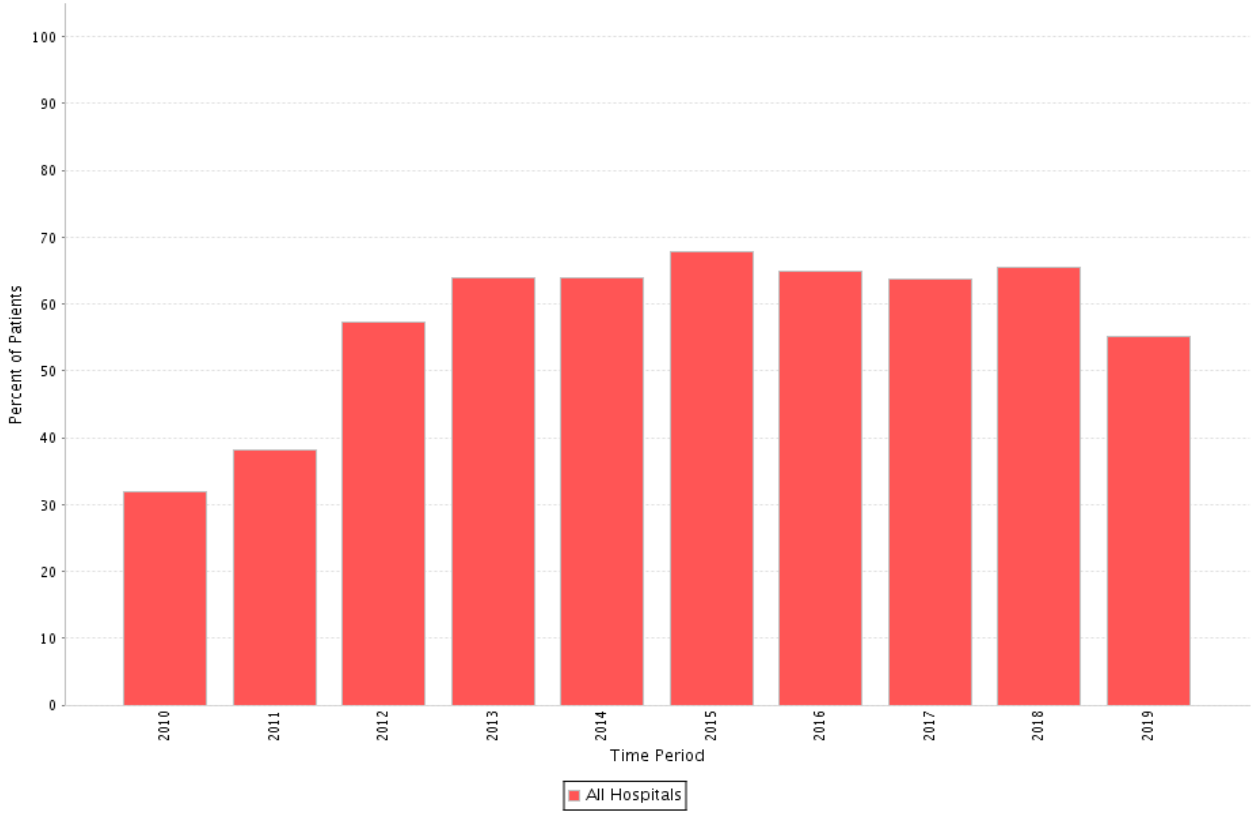


Data For: Influenza Vaccination During Flu Season				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	16926	58249	29.1%
All Hospitals	2011	22967	59587	38.5%
All Hospitals	2012	30404	54987	55.3%
All Hospitals	2013	34218	52747	64.9%
All Hospitals	2014	36543	55040	66.4%
All Hospitals	2015	40176	54924	73.1%
All Hospitals	2016	45066	58762	76.7%
All Hospitals	2017	47859	62934	76.0%
All Hospitals	2018	42527	56214	75.7%
All Hospitals	2019	1343	2067	65.0%

American Heart Association.

Pneumococcal Vaccination

Percent of patients that received a Pneumococcal vaccination prior to discharge.
Time Period: 01/2010 - 01/2019



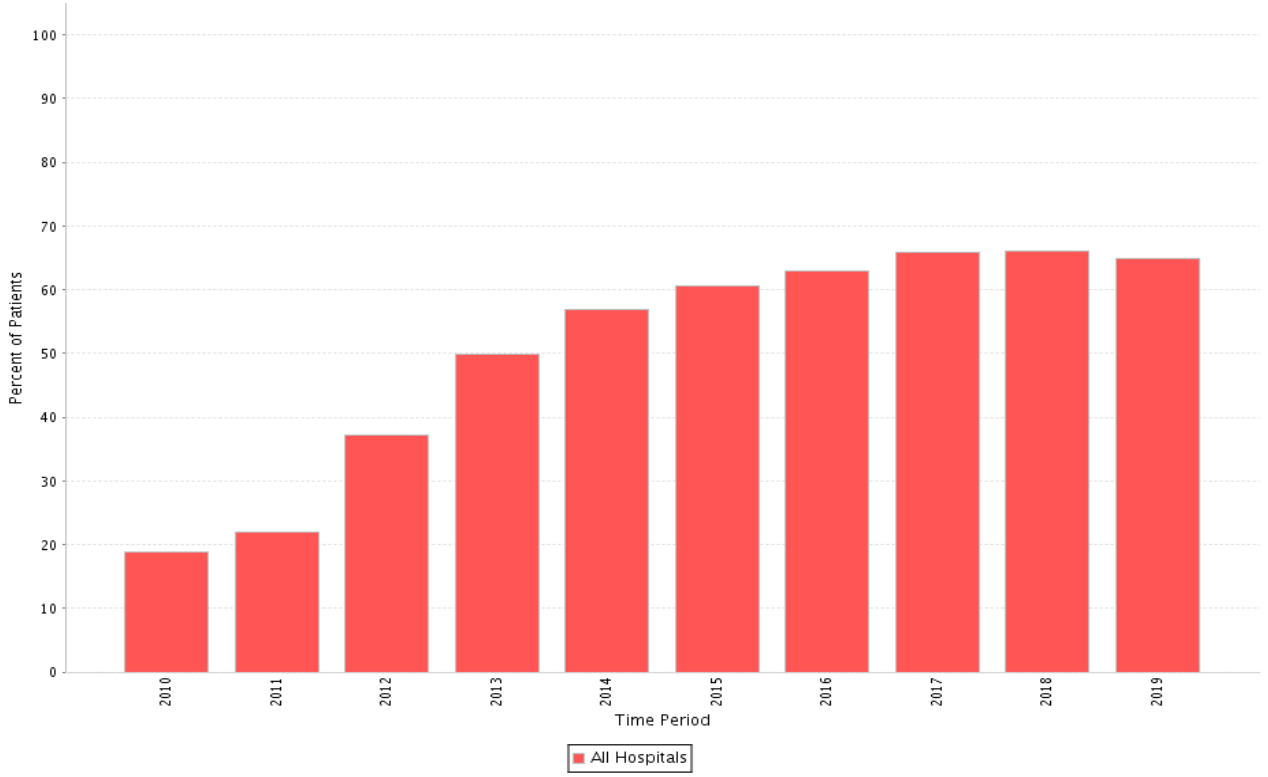
Data For: Pneumococcal Vaccination				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	35444	111332	31.8%
All Hospitals	2011	44821	117604	38.1%
All Hospitals	2012	61686	107720	57.3%
All Hospitals	2013	66848	104590	63.9%
All Hospitals	2014	70926	110927	63.9%
All Hospitals	2015	76255	112456	67.8%
All Hospitals	2016	78712	121332	64.9%
All Hospitals	2017	83912	131708	63.7%
All Hospitals	2018	80503	122946	65.5%
All Hospitals	2019	1208	2191	55.1%

American Heart Association.

Follow-up Visit Within 7 Days or Less

Percent of eligible patients with a follow-up visit scheduled within 7 days or less from time of hospital discharge

Time Period: 01/2010 - 01/2019



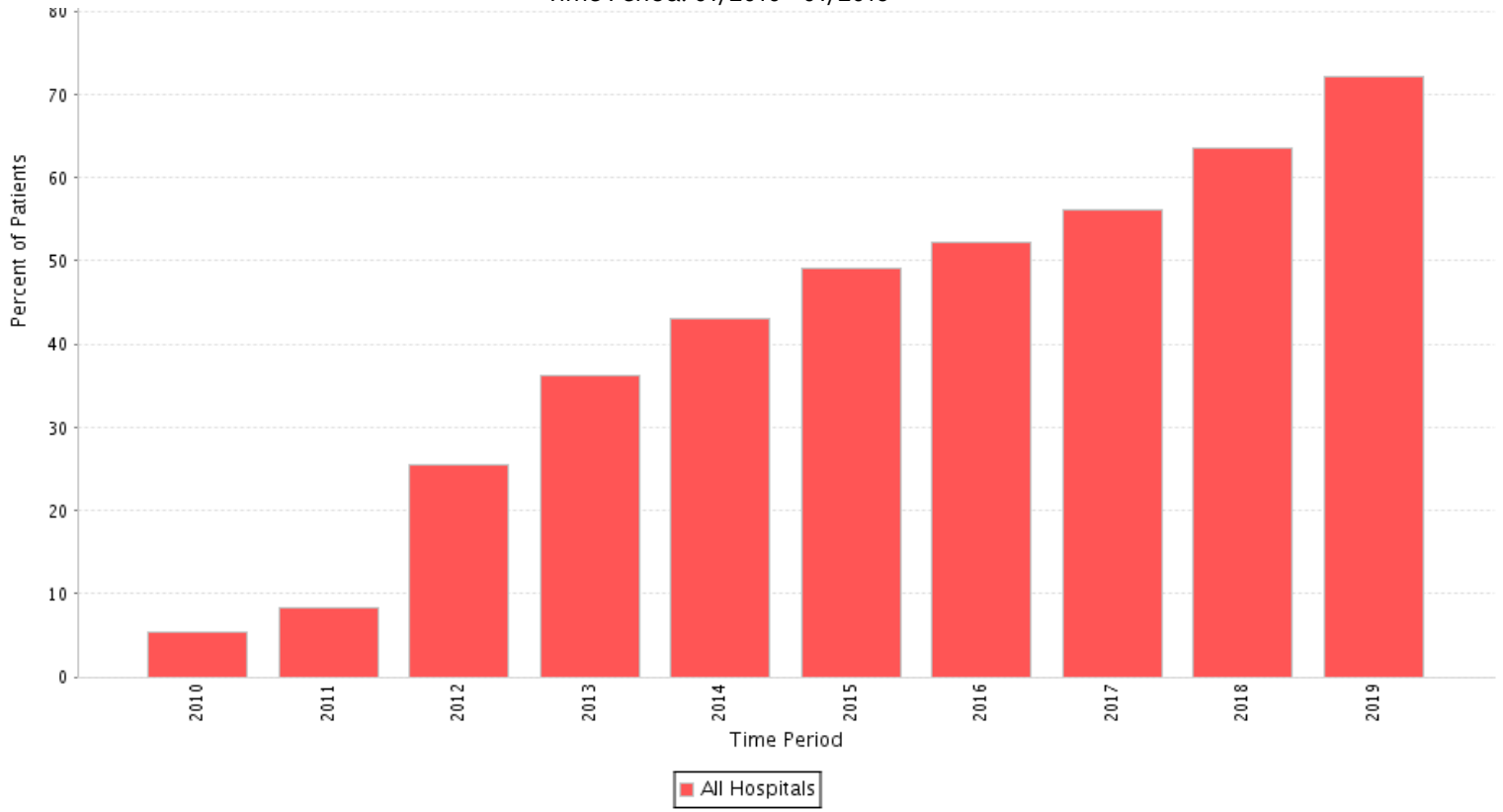
Data For: Follow-up Visit Within 7 Days or Less				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	12174	64572	18.9%
All Hospitals	2011	17989	81874	22.0%
All Hospitals	2012	34324	92309	37.2%
All Hospitals	2013	46237	92761	49.8%
All Hospitals	2014	53336	93812	56.9%
All Hospitals	2015	59905	98785	60.6%
All Hospitals	2016	69649	110744	62.9%
All Hospitals	2017	78222	118822	65.8%
All Hospitals	2018	72079	108982	66.1%
All Hospitals	2019	1054	1625	64.9%

American Heart Association.

Referral to HF Disease Management, 60 Minutes Patient Education, HF Interactive Workbook or Referral to Outpatient Cardiac Rehabilitation Program

Percent of heart failure patients who were referred to heart failure disease management, received 60 minutes of patient education by a qualified educator, or received an AHA heart failure interactive workbook, or were referred to an outpatient cardiac rehabilitation program

Time Period: 01/2010 - 01/2019



Data For: Referral to HF Disease Management, 60 Minutes Patient Education, HF Interactive Workbook or Referral to Outpatient Cardiac Rehabilitation Program				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	6651	123483	5.4%
All Hospitals	2011	10807	130862	8.3%
All Hospitals	2012	31397	122873	25.6%
All Hospitals	2013	43867	120953	36.3%
All Hospitals	2014	53692	124651	43.1%
All Hospitals	2015	64123	130719	49.1%
All Hospitals	2016	75505	144735	52.2%
All Hospitals	2017	86983	155264	56.0%
All Hospitals	2018	89769	141505	63.4%
All Hospitals	2019	1543	2140	72.1%

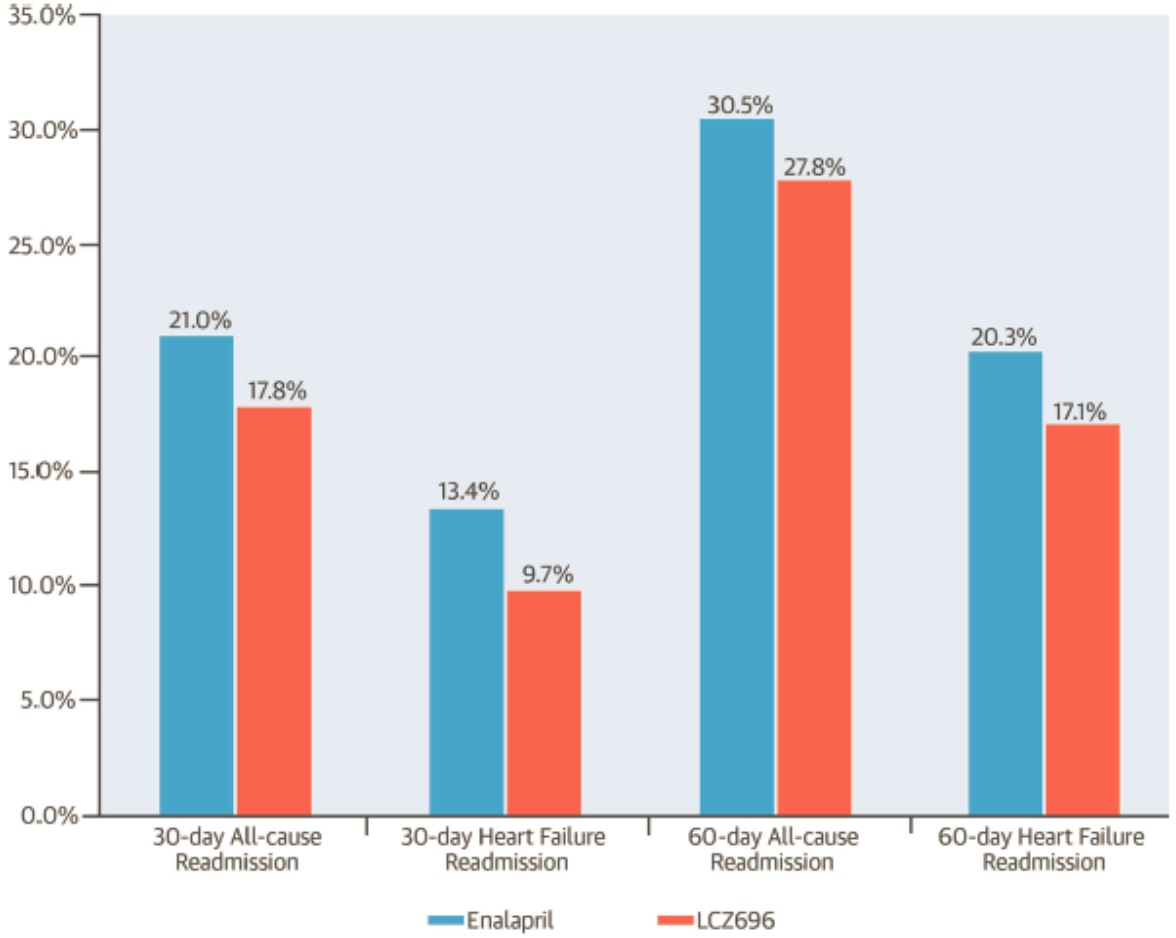
American Heart Association.

EVIDENCE-BASED HFREF THERAPIES

Guideline Recommended Therapy	Relative Risk Reduction in Mortality	Number Needed to Treat for Mortality	NNT for Mortality (standardized to 36 months)	Relative Risk Reduction in HF Hospitalizations
ACEI/ARB	17%	22 over 42 months	26	31%
ARNI	16%	36 over 27 months	27	21%
Beta-blocker	34%	28 over 12 months	9	41%
Aldosterone Antagonist	30%	9 over 24 months	6	35%
Hydralazine/Nitrate	43%	25 over 10 months	7	33%
CRT	36%	12 over 24 months	8	52%
ICD	23%	14 over 60 months	23	NA
Ivabradine	NA	NA	NA	26%

Updated from Fonarow GC, et al. *Am Heart J.* 2011;161:1024-1030.

INFLUENCE OF SACUBITRIL/VALSARTAN ON READMISSION RATES AFTER HF HOSPITALIZATION: PARADIGM HF



30 Day All Cause Readmission
Odds Ratio: 0.74;
95% CI 0.56-0.97

30 Day HF Readmission
Odds Ratio: 0.62;
95% CI 0.45-0.87

2,383 investigator-reported HF hospitalizations, of which 1,076 (45.2%) occurred in subjects assigned to sacubitril/valsartan and 1,307 (54.8%) occurred in subjects assigned to enalapril.

Desai, A.S. et al. J Am Coll Cardiol. 2016;68(3):241–8.

American Heart Association.

PIONEER-HF: In-Hospital ARNI

Goal: To Evaluate the In-Hospital Initiation of Sacubitril/Valsartan in Stabilized Patients Hospitalized with HFrEF irrespective of Prior HF Diagnosis or ACEI/ARB use

Inclusion:

- Admitted to the hospital with the primary diagnosis of HF, NYHA class II-IV, including signs and symptoms of fluid overload
- At randomization (between 24 hours and 10 days from initial presentation), hospitalized patients were defined as stable by:
  - SBP ≥100 mmHg for 6 hours prior to randomization, no symptomatic hypotension
  - No increase (intensification) in IV diuretic dose within 6 hours prior to randomization
  - No IV inotropic drugs for 24 hours prior to randomization
  - No IV vasodilators including nitrates within last 6 hours prior to randomization
- LVEF ≤40%
- NT-proBNP ≥1600 pg/mL OR BNP ≥400 pg/mL during current hospitalization

Exclusion:

- Hypersensitivity, contraindications or intolerance to study drugs
- Known history of angioedema with ACEi/ARB
- eGFR <30ml/min/1.73m^2
- Serum potassium >5.2mEq/L at screening
- Primary dyspnea from non-cardiac, non-heart failure cause
- Implantation of cardiac resynchronization device in 3 months prior or intent to implant
- Pregnancy or potential to become pregnant (not using two birth control methods)

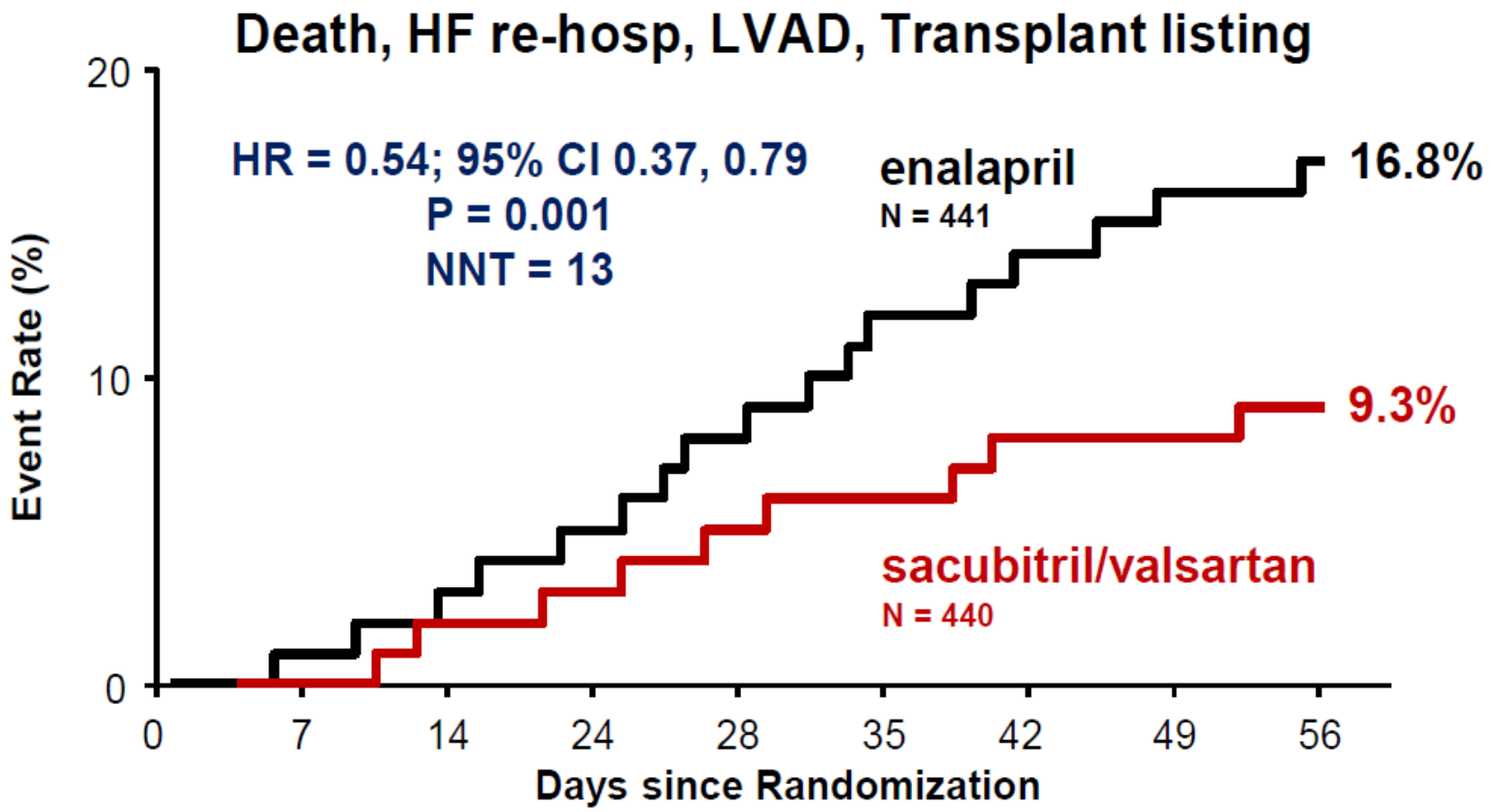
Primary End Point
Time-averaged proportional change in NT-proBNP at weeks 4 and 8

Safety Assessments
Worsening renal function, Hyperkalemia, Symptomatic hypotension, Angioedema

Exploratory Clinical Outcomes
To examine the effect of sacubitril/valsartan vs Enalapril on incidence of rehospitalization through day 30

Velazquez EJ, et al. *Am Heart J*. 2018;198:145-151.

Serious Composite Clinical Endpoint



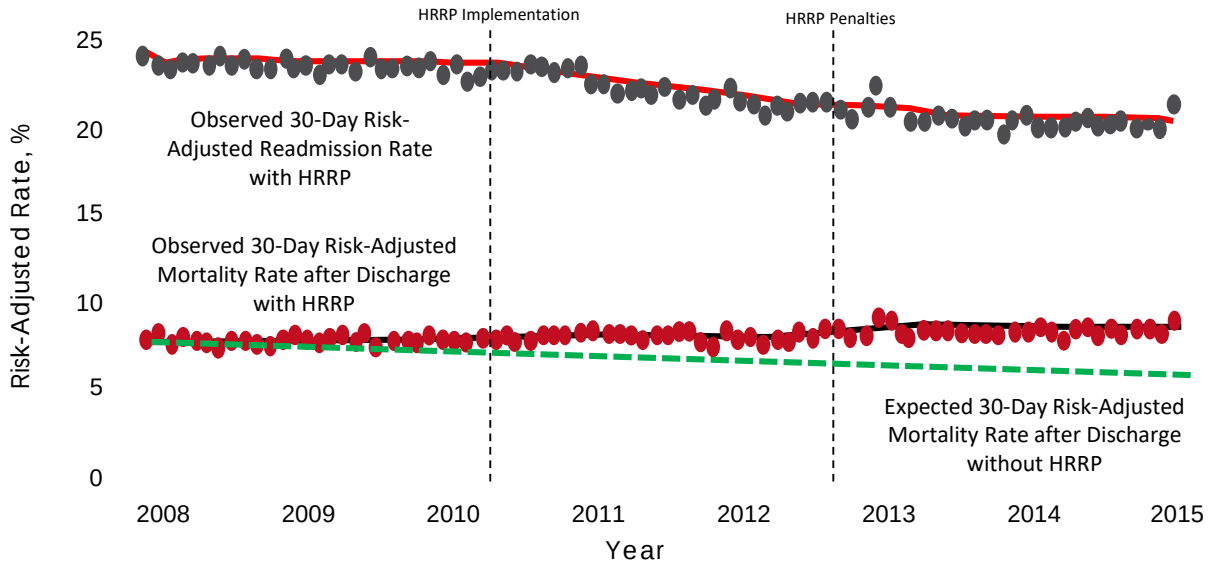
Velazquez EJ, et al. NEJM 2018 DOI: 10.1056/NEJMoa1812851

HOSPITAL READMISSION REDUCTION PROGRAM

- UP TO 3% CUT TO ALL DRGS FOR READMISSIONS OVER THE EXPECTED %
- UP TO 1% IN FISCAL YEAR 2013, 2% IN FISCAL YEAR 2014, AND 3% IN FISCAL YEAR 2015 AND BEYOND
- INITIALLY AMI, HEART FAILURE, AND PNEUMONIA
- EXPAND TO COPD, CABG, PCI, AND OTHER VASCULAR CONDITIONS IN 2015
- 10 YEAR DECREASE IN REIMBURSEMENT TO HOSPITALS $7.1 BILLION
- PUBLIC REPORTING BEGAN IN 2010 AND THE HOSPITAL FINANCIAL PENALTIES BEGAN OCTOBER 2012 (BEGINNING OF FISCAL YEAR 2013)

Medicare Penalizing 2,211 Hospitals For Excess Readmissions

HRRP Impact: Decreasing 30-Day HF Readmissions Accompanied by Increasing 30 Day Risk-Adjusted Mortality



5,200 additional deaths in 2014 may be related to the HRRP

10,400 additional deaths a year if previous declines in mortality had continued

	Year							
Outcomes	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**Delta**
30-Day Risk Adjusted Readmission with HRRP	23.5%	23.5%	23.4%	23.0%	22.5%	21.6%	21.4%	-2.1%
30-Day Mortality after discharge with HRRP	7.9%	8.1%	8.4%	8.7%	8.8%	9.1%	9.2%	+1.3%
30-Day Mortality after discharge without HRRP (projected)	7.9%	7.8%	7.5%	7.2%	7.0%	6.7%	6.6%	-1.3%

Fonarow GC et al JACC 2017 Oct 10;70(15):1931-1934 Data from Dharmarajan K et al. *J Am Med Assoc*. 2017;318:270-278.

HAS HRRP REPORTING OF HOSPITAL READMISSION RATES AND PENALTIES AFFECTED PATIENT OUTCOMES?

JAMA Cardiology | Original Investigation

Association of the Hospital Readmissions Reduction Program Implementation With Readmission and Mortality Outcomes in Heart Failure

Ankur Gupta, MD, PhD; Larry A. Allen, MD, MHS; Deepak L. Bhatt, MD, MPH; Marguerite Cox, MS, MGIST; Adam D. DeVore, MD, MHS; Paul A. Heidenreich, MD, MS; Adrian F. Hernandez, MD, MHS; Eric D. Peterson, MD, MPH; Roland A. Matsouaka, PhD; Clyde W. Yancy, MD, MSc; Gregg C. Fonarow, MD

Supplemental content

IMPORTANCE Public reporting of hospitals' 30-day risk-standardized readmission rates following heart failure hospitalization and the financial penalization of hospitals with higher rates have been associated with a reduction in 30-day readmissions but have raised concerns regarding the potential for unintended consequences.

OBJECTIVE To examine the association of the Hospital Readmissions Reduction Program (HRRP) with readmission and mortality outcomes among patients hospitalized with heart failure within a prospective clinical registry that allows for detailed risk adjustment.

DESIGN, SETTING, AND PARTICIPANTS Interrupted time-series and survival analyses of index heart failure hospitalizations were conducted from January 1, 2006, to December 31, 2014. This study included 115 245 fee-for-service Medicare beneficiaries across 416 US hospital sites participating in the American Heart Association Get With The Guidelines-Heart Failure registry. Data analysis took place from January 1, 2017, to June 8, 2017.

EXPOSURES Time intervals related to the HRRP were before the HRRP implementation (January 1, 2006, to March 31, 2010), during the HRRP implementation (April 1, 2010, to September 30, 2012), and after the HRRP penalties went into effect (October 1, 2012, to December 31, 2014).

MAIN OUTCOMES AND MEASURES Risk-adjusted 30-day and 1-year all-cause readmission and mortality rates.

RESULTS The mean (SD) age of the study population (n = 115 245) was 80.5 (8.4) years, 62 927 (54.6%) were women, and 91 996 (81.3%) were white and 11 037 (9.7%) were black. The 30-day risk-adjusted readmission rate declined from 20.0% before the HRRP implementation to 18.4% in the HRRP penalties phase (hazard ratio (HR) after vs before the HRRP implementation, 0.91; 95% CI, 0.87-0.95; $P < .001$). In contrast, the 30-day risk-adjusted mortality rate increased from 7.2% before the HRRP implementation to 8.6% in the HRRP penalties phase (HR after vs before the HRRP implementation, 1.18; 95% CI, 1.10-1.27; $P < .001$). The 1-year risk-adjusted readmission and mortality rates followed a similar pattern as the 30-day outcomes. The 1-year risk-adjusted readmission rate declined from 57.2% to 56.3% (HR, 0.92; 95% CI, 0.89-0.96; $P < .001$), and the 1-year risk-adjusted mortality rate increased from 31.3% to 36.3% (HR, 1.10; 95% CI, 1.06-1.14; $P < .001$) after vs before the HRRP implementation.

CONCLUSIONS AND RELEVANCE Among fee-for-service Medicare beneficiaries discharged after heart failure hospitalizations, implementation of the HRRP was temporally associated with a reduction in 30-day and 1-year readmissions but an increase in 30-day and 1-year mortality. If confirmed, this finding may require reconsideration of the HRRP in heart failure.

JAMA Cardiol. 2018;3(1):44-53. doi:10.1001/jamacardio.2017.4265
Published online November 12, 2017.

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The 30-day risk-adjusted readmission rate declined from 20.0% before the HRRP implementation to 18.4% in the HRRP penalties phase (hazard ratio (HR) after vs before the HRRP implementation, 0.91; 95%CI, 0.87-0.95; $P < .001$).

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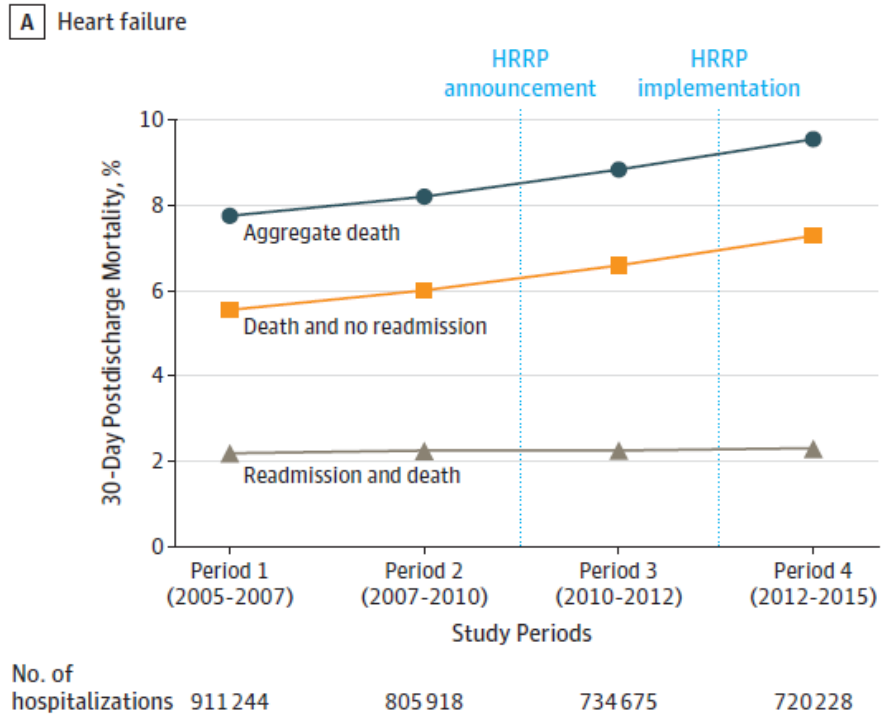
The 1-year risk-adjusted mortality rate increased from 31.3% to 36.3% (HR, 1.10; 95%CI, 1.06-1.14; $P < .001$) after vs before the HRRP implementation.



The overall increase in mortality among patients with HF was mainly related to outcomes among patients who were not readmitted but died within 30 days of discharge.

Gupta et al. JAMA Cardiol 2017; doi:10.1001/jamacardio.2017.4265

Wadhera RK et al JAMA. 2018;320(24):2542-2552

American Heart Association.

INCREASE IN RISK-ADJUSTED MORTALITY AFTER THE HRRP IMPLEMENTATION AMONG FFS MEDICARE BENEFICIARIES HOSPITALIZED FOR HF

Study	GWTG-HF Registry linked to FFS Medicare Data[1]	100% Sample of FFS Medicare Data[2]	5% Random Sample of FFS Medicare Data[3]
Risk Adjustment	Clinical	Administrative	Administrative
Time Period	Pre-HRRP (2006-2010) vs Post-HRRP (2012-2014)	2008 to 2014	2010 to 2012
30-Day Mortality	1.4% ↑	1.3% ↑	-
90-Day Mortality	-	2.2% ↑	-
1-Year Mortality	5.0% ↑	-	3.3% ↑

1. Gupta et al. JAMA Cardiol 2017; doi:10.1001/jamacardio.2017.4265.
2. Dharmarajan et al. JAMA 2017;318:270-278.
3. Khera et al. Circ Heart Fail 2017; 10:e004402.

American Heart Association.

CONCLUSIONS

- GWTG-HF is focused on improving on meaningful processes of care and patient-centered outcomes
- In-hospital initiation of ARNI and other GDMT improves outcomes
- The CMS 30 day readmission metric is fundamentally flawed in measuring quality and driving patient benefit
- The CMS HRRP has created a perfect storm for suboptimal care, both by side-stepping the best interests of the patient and by thwarting assessment of risk
- It is critical to move entirely away from artificial metrics and penalties and toward greater direct responsibility of health care systems for quality, safety, and value, with any potential rewards linked to long-term patient-centered benefit, through innovative approaches to care

Fonarow GC et al JACC 2017 Oct 10;70(15):1931-1934 and Konstam M et al. JACC: Heart Failure, Volume 4, Issue 1, January 2016, Pages 12-20

HEART FAILURE TREATMENTS IN SPECIAL POPULATIONS

Adam DeVore, MD, MHS
Assistant Professor of Medicine
Duke University School of Medicine

PARADIGM-HF BASELINE CHARACTERISTICS

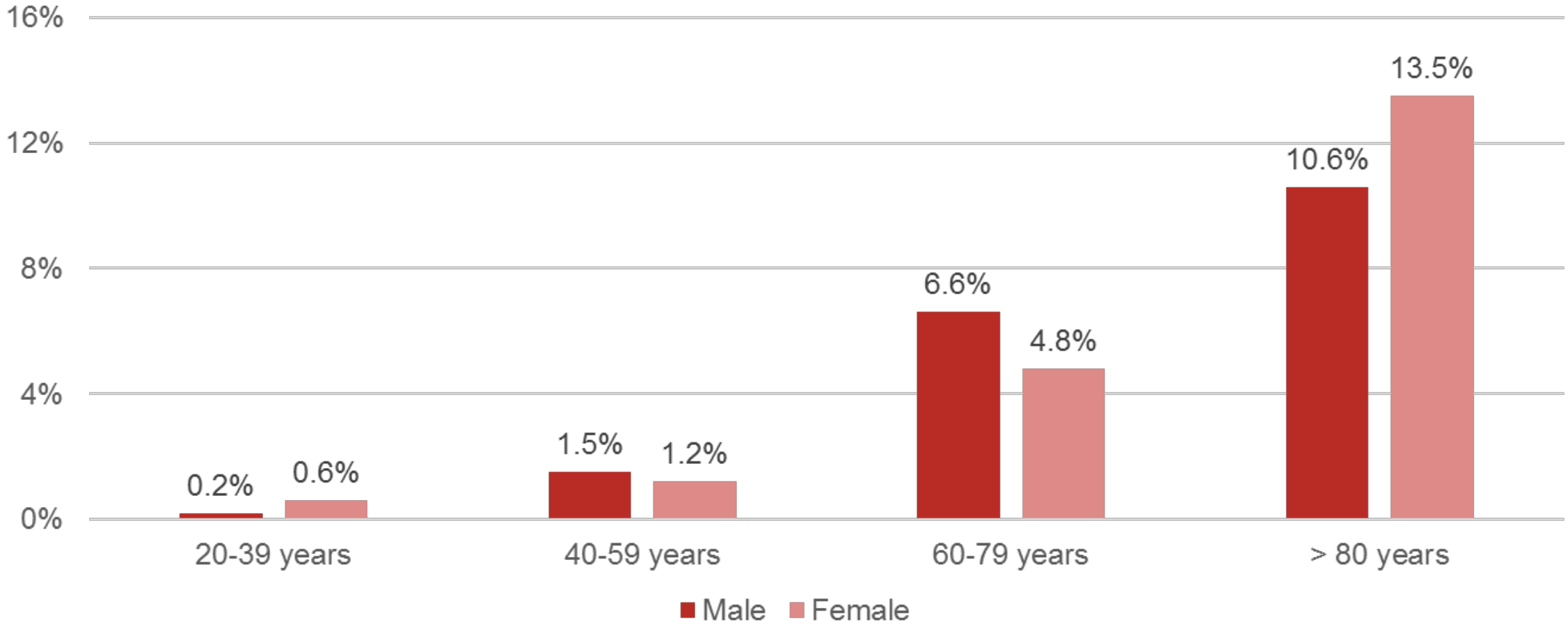
Table 1. Characteristics of the Patients at Baseline.*

Characteristic	LCZ696 (N=4187)	Enalapril (N=4212)
Age — yr	63.8±11.5	63.8±11.3
Female sex — no. (%)	879 (21.0)	953 (22.6)
Race or ethnic group — no. (%)†		
White	2763 (66.0)	2781 (66.0)
Black	213 (5.1)	215 (5.1)
Asian	759 (18.1)	750 (17.8)
Other	452 (10.8)	466 (11.1)
Region — no. (%)		
North America	310 (7.4)	292 (6.9)
Latin America	713 (17.0)	720 (17.1)
Western Europe and other‡	1026 (24.5)	1025 (24.3)
Central Europe	1393 (33.3)	1433 (34.0)

POPULATIONS OF INTEREST

- ELDERLY
- RACIAL AND ETHNIC MINORITIES
- PATIENTS WITH COMORBID CONDITIONS
- FEMALES

HEART FAILURE CARE IN THE ELDERLY



Mozaffarian D. et al. *Circulation*. 2015 Jan 27;131(4):e29-322

American Heart Association.

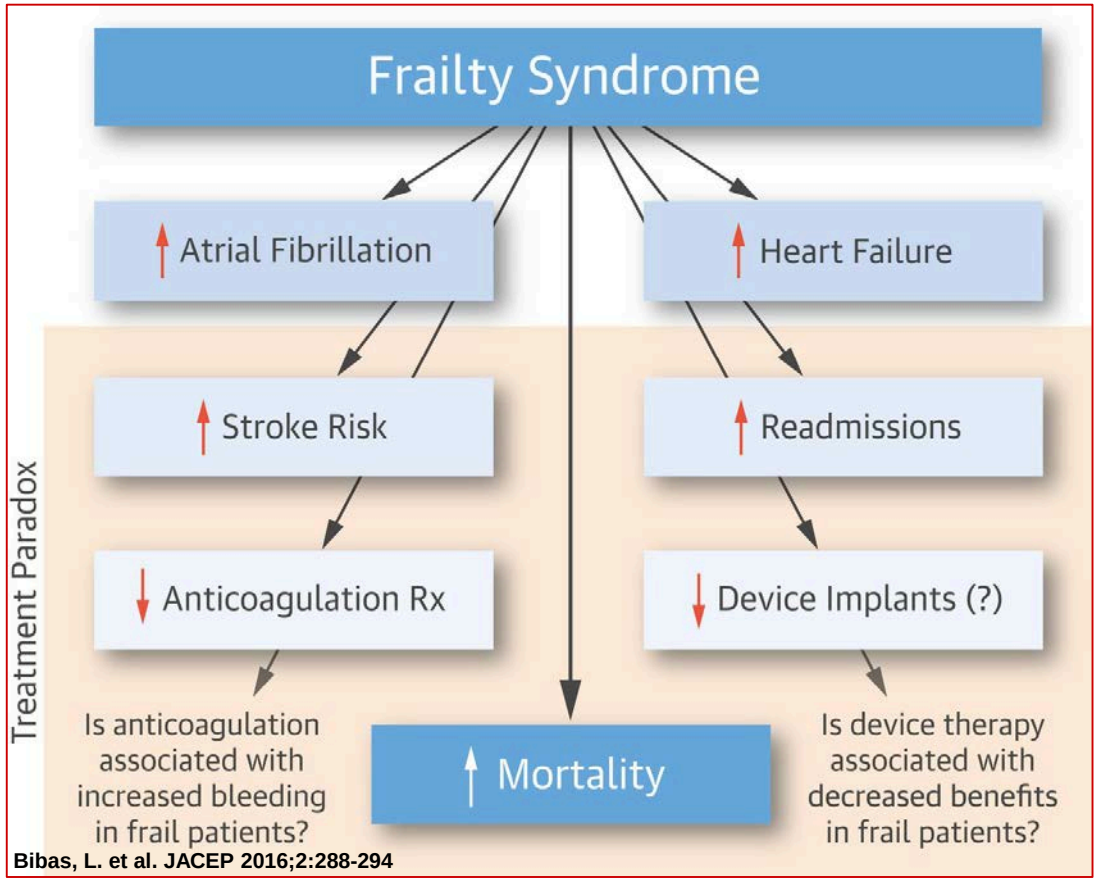
HEART FAILURE CARE IN THE ELDERLY

- High prevalence and poor outcomes
- Different presentations (e.g., Different causes of peripheral edema)
- More likely to have non-CV causes of symptoms and more likely to have comorbid conditions (e.g., Hypertension, Atrial Fibrillation)
- More likely to have HFpEF than HFrEF

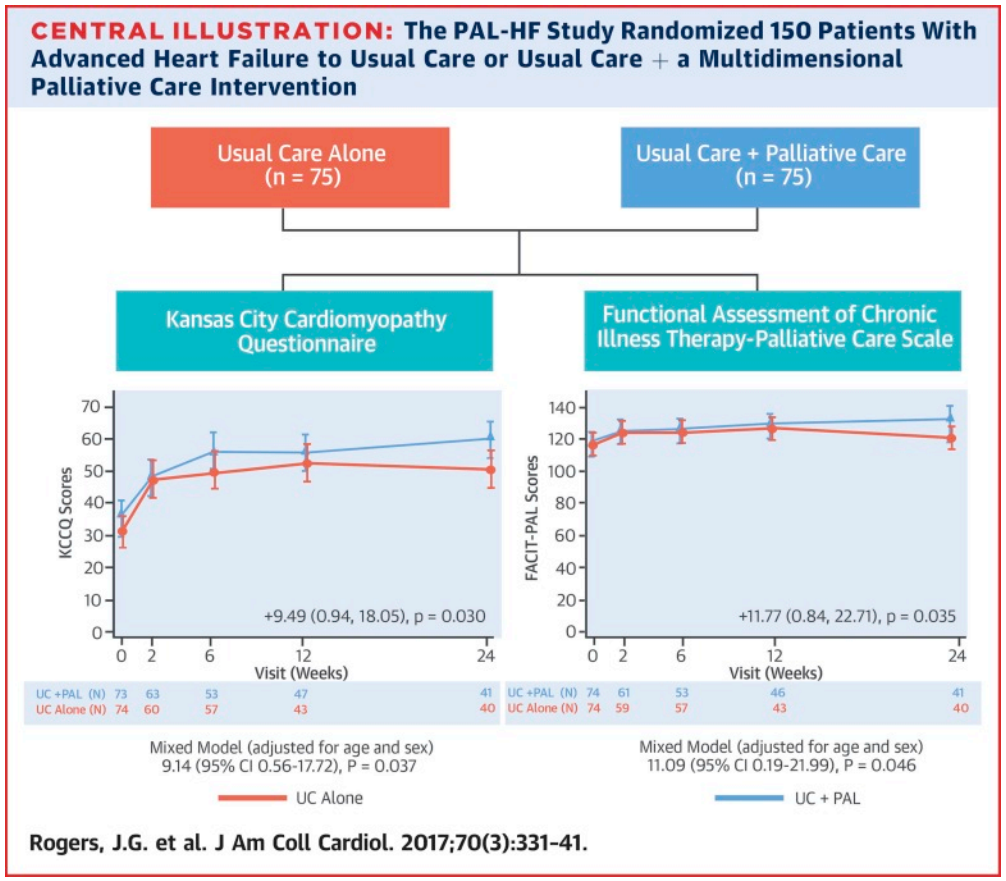
HEART FAILURE CARE IN THE ELDERLY

- Low lean body mass and impaired renal function may increase adverse effects from medical therapy (e.g., Hyperkalemia with MRAs or increased risk of digoxin toxicity)
- Increased risk of polypharmacy
- May require more frequent visits and laboratory monitoring
- No reason to withhold neurohormonal antagonists (COPERNICUS, MERIT-HF, PARADIGM-HF and PIONEER-HF)

HEART FAILURE CARE IN THE ELDERLY



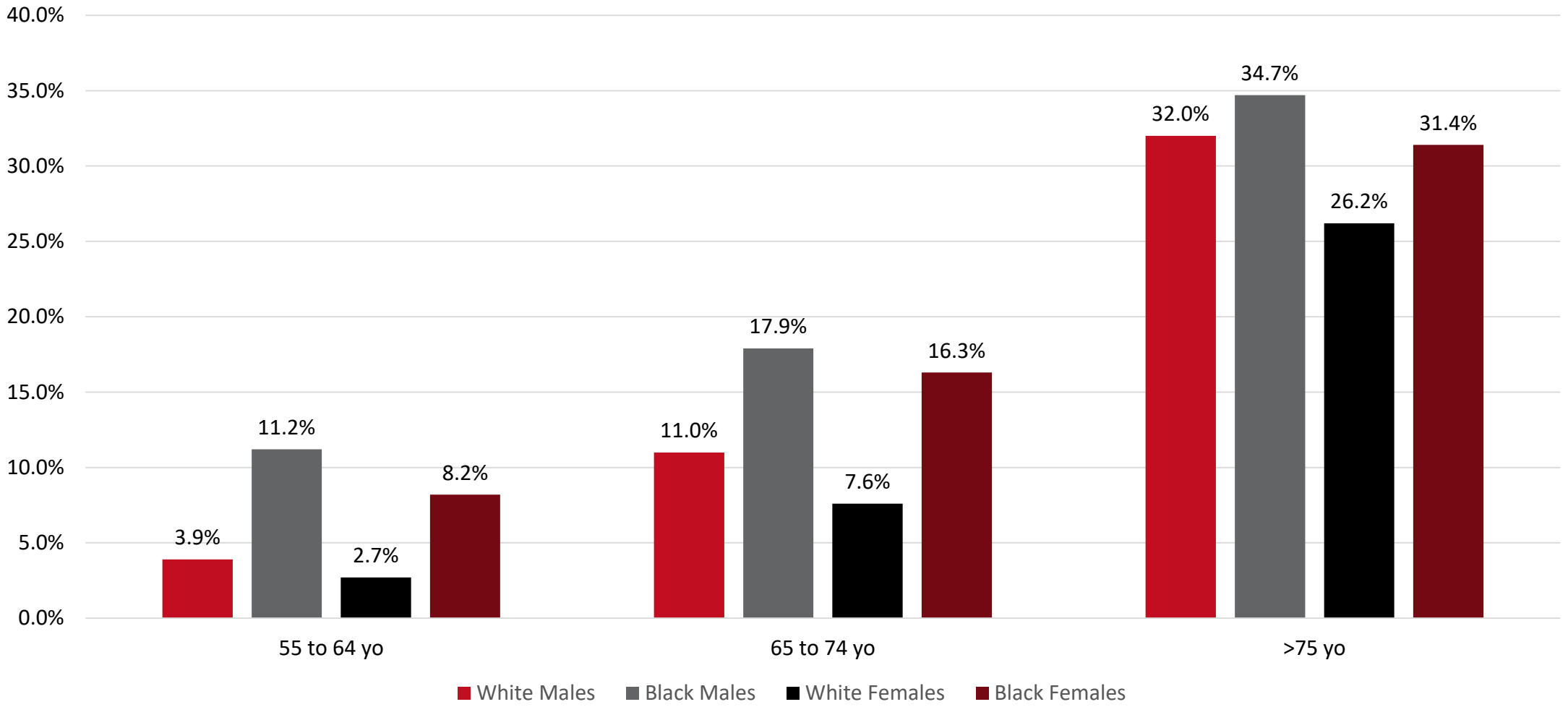
Bibas, L. et al. JACEP 2016;2:288-294



Rogers, J.G. et al. J Am Coll Cardiol. 2017;70(3):331-41.

American Heart Association.

FIRST EPISODE OF ADHF FROM THE ARIC STUDY



Benjamin, EJ et al. *Circulation*. 2018;137:e67–e492

American Heart Association.

REAL-WORLD DATA ON HYDRALAZINE AND ISDN

Original Article

Clinical Effectiveness of Hydralazine–Isosorbide Dinitrate Therapy in Patients With Heart Failure and Reduced Ejection Fraction: Findings From the Get With The Guidelines-Heart Failure Registry

Prateeti Khazanie, MD, MPH; Li Liang, PhD; Lesley H. Curtis, PhD; Javed Butler, MD, MPH; Zubin J. Eapen, MD; Paul A. Heidenreich, MD; Deepak L. Bhatt, MD, MPH; Eric D. Peterson, MD, MPH; Clyde W. Yancy, MD; Gregg C. Fonarow, MD; Adrian F. Hernandez, MD, MHS

Background—In clinical trials, hydralazine–isosorbide dinitrate (H-ISDN) for heart failure with reduced ejection fraction reduced morbidity and mortality among black patients and patients with intolerance to angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers. The effectiveness of H-ISDN in clinical practice is unknown.

Methods and Results—Using data from a clinical registry linked with Medicare claims, we examined the use and outcomes of H-ISDN between 2005 and 2011 among older patients hospitalized with heart failure and reduced ejection fraction. We adjusted for demographic and clinical characteristics using Cox proportional hazards models and inverse probability weighting. Among 4663 eligible patients, 22.7% of black patients and 18.2% of patients not on an angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker were newly prescribed H-ISDN therapy at discharge. By 3 years, the cumulative incidence rates of mortality and readmission were similar between treated and untreated patients. After multivariable adjustment, 3-year outcomes remained similar for mortality [black patients: hazard ratio (HR), 0.92; 95% confidence interval (CI), 0.75–1.13; other patients: HR, 0.93; 95% CI, 0.79–1.09], all-cause readmission (black patients: HR, 0.98; 95% CI, 0.84–1.13; other patients: HR, 1.02; 95% CI, 0.90–1.17), and cardiovascular readmission (black patients: HR, 0.99; 95% CI, 0.82–1.19; other patients: HR, 0.94; 95% CI, 0.81–1.09). A post hoc analysis of Medicare Part D data revealed low postdischarge adherence to therapy.

Conclusions—Guideline-recommended initiation of H-ISDN therapy at hospital discharge was uncommon, and adherence was low. For both black patients and patients of other races, there were no differences in outcomes between those treated and untreated at discharge. (***Circ Heart Fail.* 2016;9:e002444. DOI: 10.1161/CIRCHEARTFAILURE.115.002444.**)

Key Words: cardiomyopathies ■ heart failure ■ mortality ■ pharmacology ■ registries ■ survival

DATA FROM GWTG–HF LINKED TO CMS CLAIMS:

- USE OF H-ISDN AMONG ELIGIBLE PATIENTS REMAINS LOW
- >50% DISCHARGED ON H-ISDN DID NOT FILL A PRESCRIPTION WITHIN 90 DAYS
- NO DIFFERENCES IN OUTCOMES BETWEEN THOSE TREATED WITH H-ISDN VS UNTREATED AT DISCHARGE

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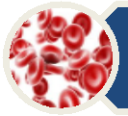
IMPORTANT COMORBIDITIES IN HEART FAILURE


Renal dysfunction


COPD


Diabetes


Sleep apnea


Fe Deficiency +/- anemia


Depression


Frailty

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IMPLEMENTING SGLT2 INHIBITORS INTO PRACTICE

CENTRAL ILLUSTRATION Stepwise Approach to Prescription of SGLT2 inhibitors by Cardiologists

Patients with T2DM with or at High Risk for CV Disease, Already on Metformin

Below Individualized HbA1c Target:

Switch non-metformin oral therapies (e.g. sulfonylureas) to a SGLT2i

Above Individualized HbA1c Target:

Consider SGLT2i initiation

Drug Type

Canagliflozin, dapagliflozin, & empagliflozin with similar efficacy profile in reducing HF events

Starting Dose (once daily in AM)

- Canagliflozin (100mg)
- Dapagliflozin (5mg)
- Empagliflozin (10mg)
- Ertugliflozin (5mg)

Metformin+SGLT2i Combination Therapies

Consider to limit non-adherence and pill burden

Stable Hemodynamic and Clinical Status

Pre-Initiation eGFR must be above:

- 60 mL/min/1.73 m^2 (dapagliflozin, ertugliflozin)
- 45 mL/min/1.73 m^2 (canagliflozin, empagliflozin)

Anticipatory Guidance

Consider diuretic dose reduction

Patient Counseling

- Genital/perineal hygiene
- Orthostatic hypotension
- Regular foot exams
- Symptoms of DKA
- Avoid excessive alcohol

Multidisciplinary Care

Close communication with other providers, including PCPs and endocrinologists

Follow-up and Monitoring

- Serial assessment of renal function, body weights, blood pressure, and symptoms
- Dose uptitration guided by need for glycemic control
- Ensure adherence to SGLT2i, other therapies, and therapeutic lifestyle
- Multidisciplinary care team follow-up

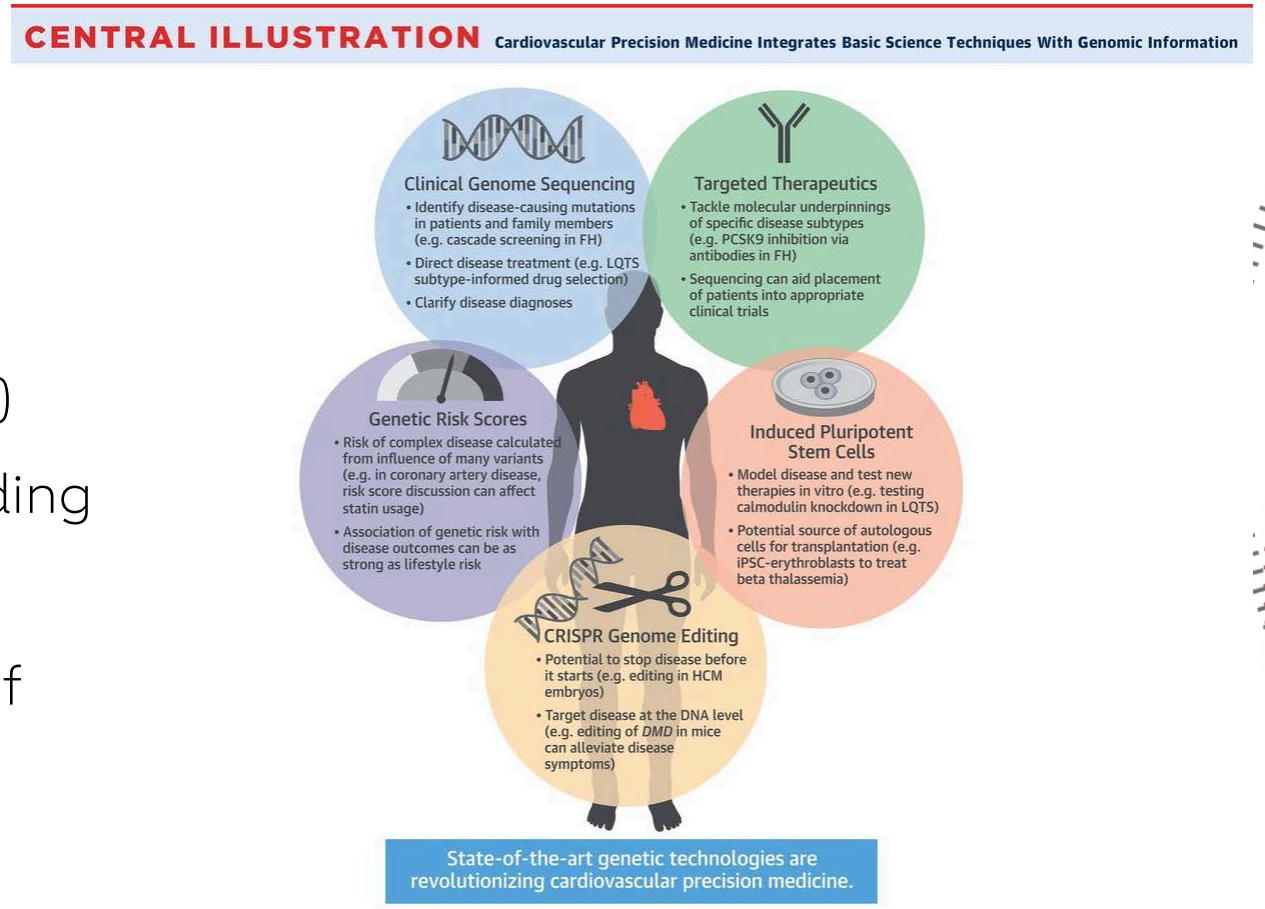
Vardeny, O. et al. J Am Coll Cardiol HF. 2019;7(2):169-72.

American Heart Association.

PRECISION MEDICINE IN HEART FAILURE?

Precision Medicine Movement:

1. Define disease at the patient level (genomics, digital health metrics, etc)
2. Identify causative mechanisms including molecular underpinnings
3. Develop precision therapies instead of one-size-fits-all approaches



Dainis AM and Ashley EA. *JACC Basic Transl Sci.* 2018 Apr; 3(2): 313–326.

American Heart Association.

AHA SCIENTIFIC STATEMENT

Current Diagnostic and Treatment Strategies for Specific Dilated Cardiomyopathies

A Scientific Statement From the American Heart Association

The intent of this American Heart Association (AHA) scientific statement is to summarize our current understanding of dilated cardiomyopathies. There is special emphasis on recent developments in diagnostic approaches and therapies for specific cardiomyopathies. Recommendations in this document are based on published studies, published practice guidelines from the American College of Cardiology (ACC)/AHA[1] and other organizations,[2,3] and the multidisciplinary expertise of the writing group. Existing evidence in epidemiology, classification, diagnosis, and management of specific cardiomyopathies is usually

Biykem Bozkurt, MD, PhD, FAHA, Chair
Monica Colvin, MD, FAHA
Jennifer Cook, MD, FAHA
Leslie T. Cooper, MD, FAHA
Anita Deswal, MD, MPH, FAHA
Gregg C. Fonarow, MD,

American Heart Association.

CONCLUSIONS

- Heart failure care in special populations deserves additional consideration to improve outcomes
- Comorbid conditions in heart failure are common and may offer opportunities to improve care
- Opportunities for precision medicine exist in heart failure through the study of differences in biology including through specific cardiomyopathies
- Dr. Pam Peterson will speak next on the care of women with heart failure

WOMEN WITH HEART FAILURE

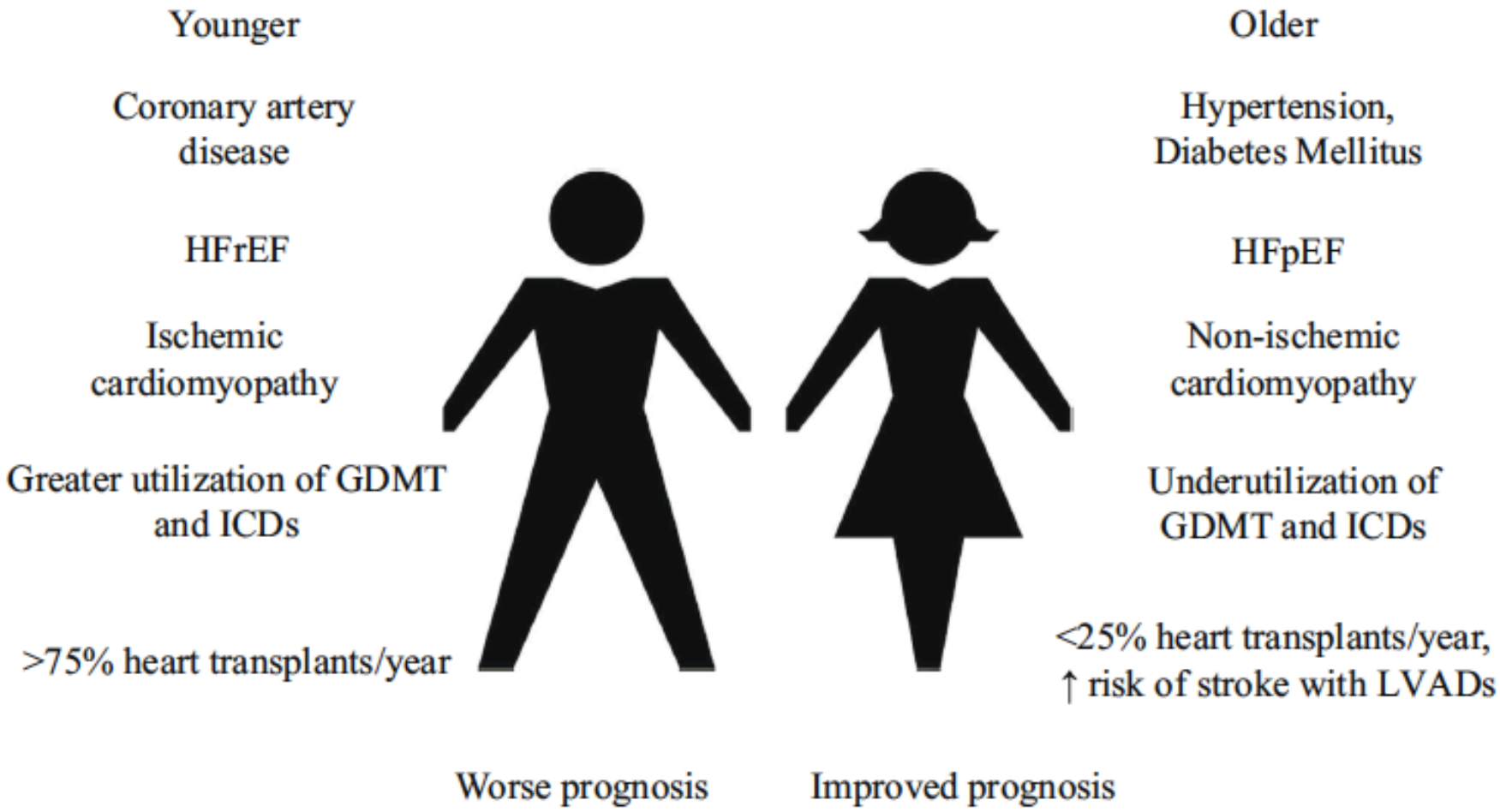
Pamela N Peterson, MD MSPH

Associate Professor of Medicine

University of Colorado Anschutz Medical Center

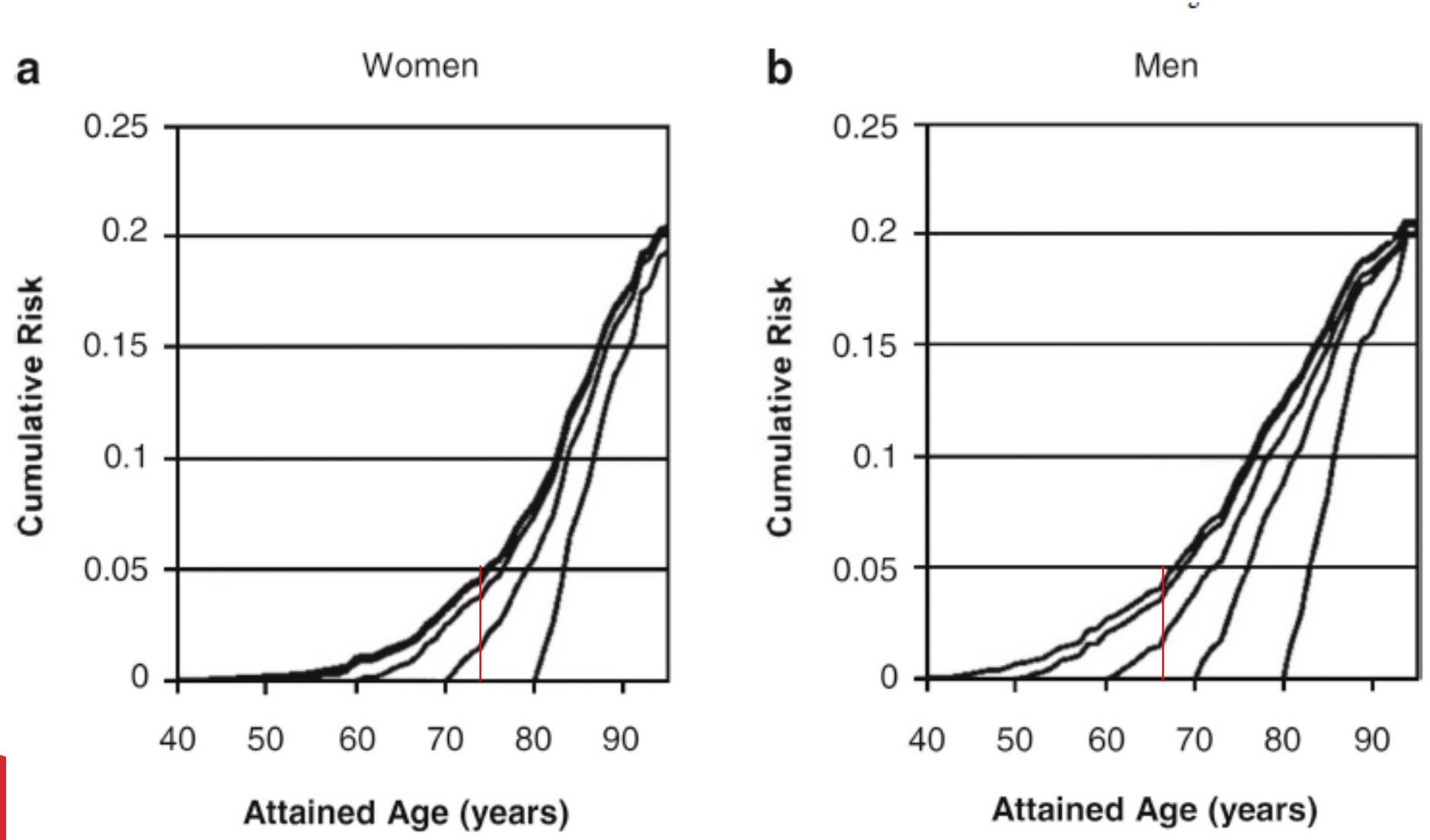
Denver Health Medical Center

SEX DIFFERENCES IN HEART FAILURE



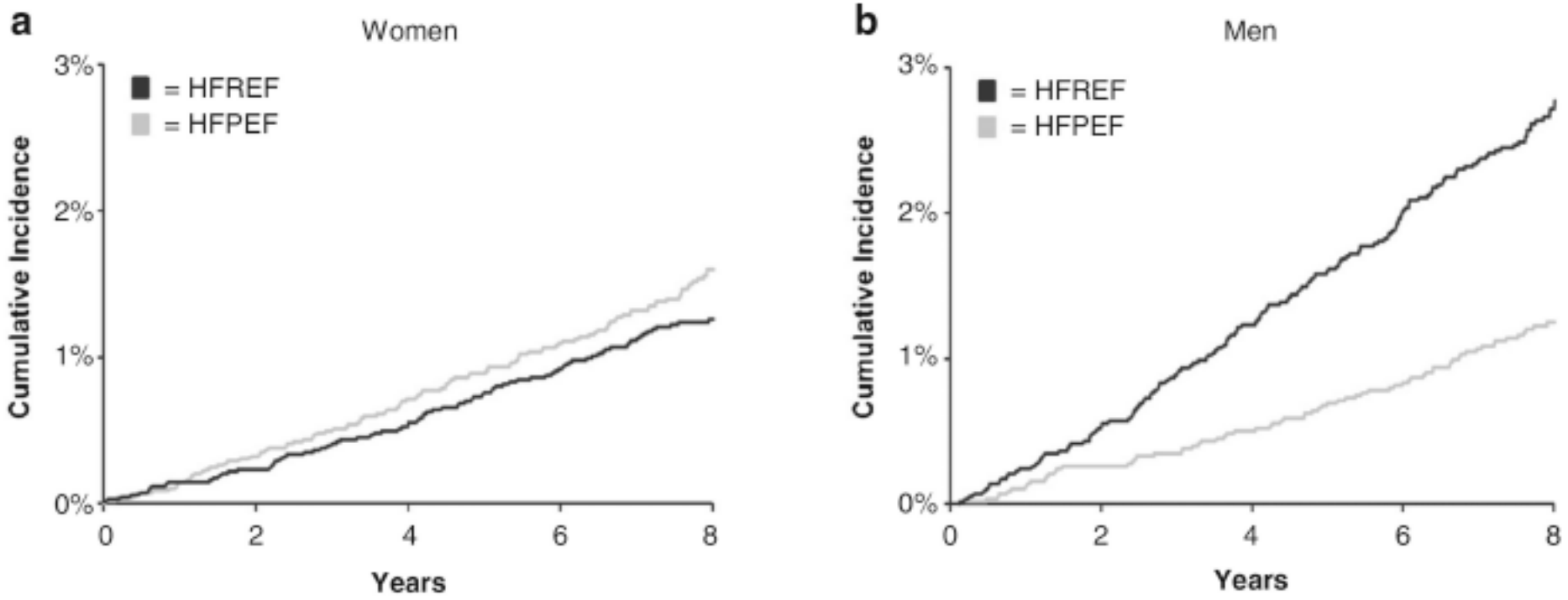
Crousillat DR et al. Curr Treat Options Cardio Med 2018; 20:88

LIFETIME RISK OF HEART FAILURE



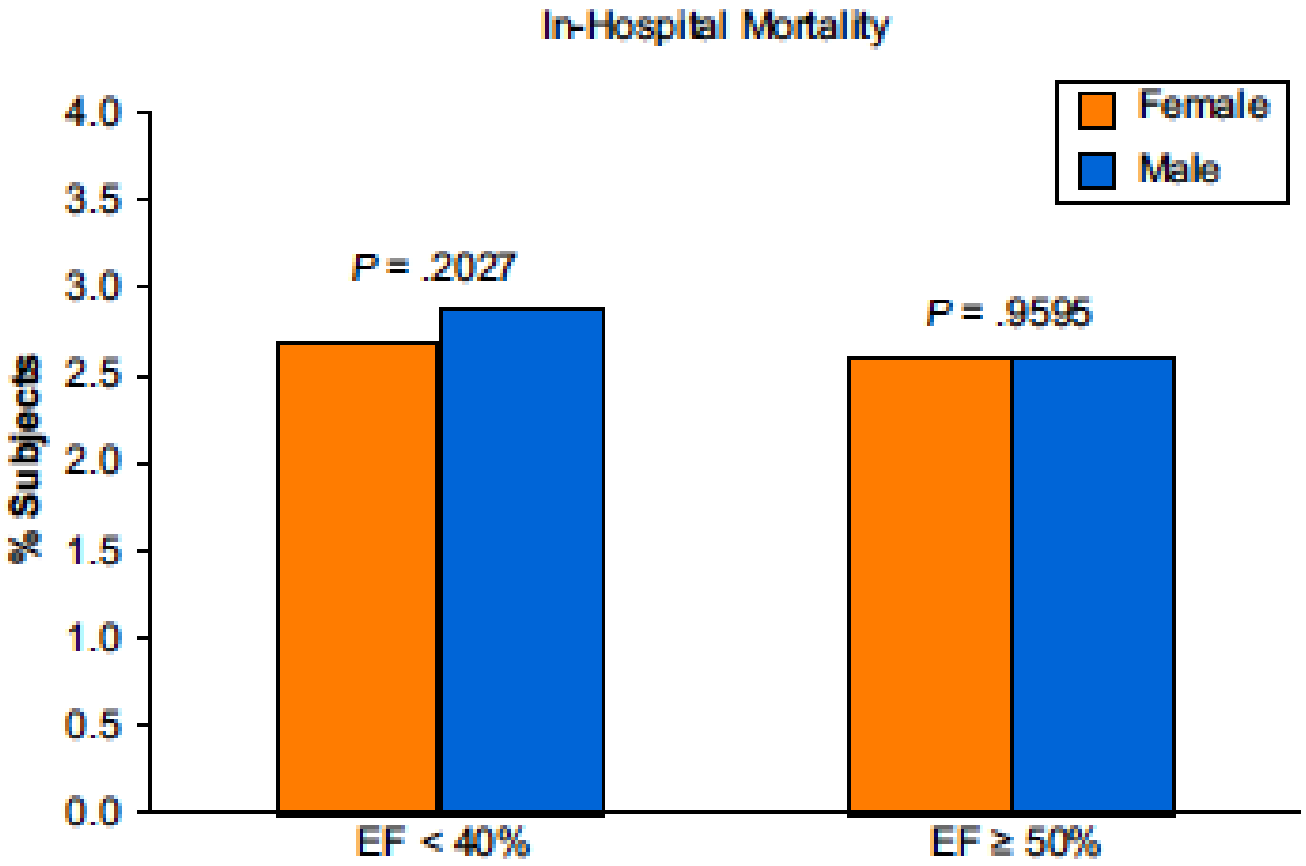
Loyd-Jones DM et al. Circulation 2002; 106:3068

INCIDENCE OF HF WITH PRESERVED VS. REDUCED EF IN MEN AND WOMEN



Ho JE et al. Circ Heart Fail 2013

NO DIFFERENCES IN IN-HOSPITAL MORTALITY BY GENDER OR LVEF



Hsich EM et al. Am Heart J 2012

CHARACTERISTICS BY SEX AMONG THOSE WITH LVEF <40%

	Female	Male
Age	74	69
Hypertension	74	71
Diabetes	42	40
CAD	48	55
Anemia	17	13
Valvular Disease	12	10
Atrial Fibrillation	26	30
Depression	11	7

American Heart Association.

Hsich EM et al. Am Heart J 2012

CHARACTERISTICS BY SEX AMONG THOSE WITH LVEF ≥50%

	Female	Male
Age	79	74
Hypertension	81	78
Diabetes	45	48
CAD	41	50
Anemia	24	20
Valve Disease	14	11
Atrial Fibrillation	34	35
Depression	13	9

Hsich EM et al. Am Heart J 2012

NO SEX DIFFERENCES IN RECOMMENDED TREATMENT OF HF

WOMEN ARE UNDER-REPRESENTED IN RCTS

HOWEVER, AVAILABLE DATA:

- Stratified analyses of RCTs
- Pooled data/ meta-analyses
- Observational data

GUIDELINES DO NOT DIFFER BASED ON SEX

ALL QUALITY METRICS APPLY EQUALLY TO MEN AND WOMEN

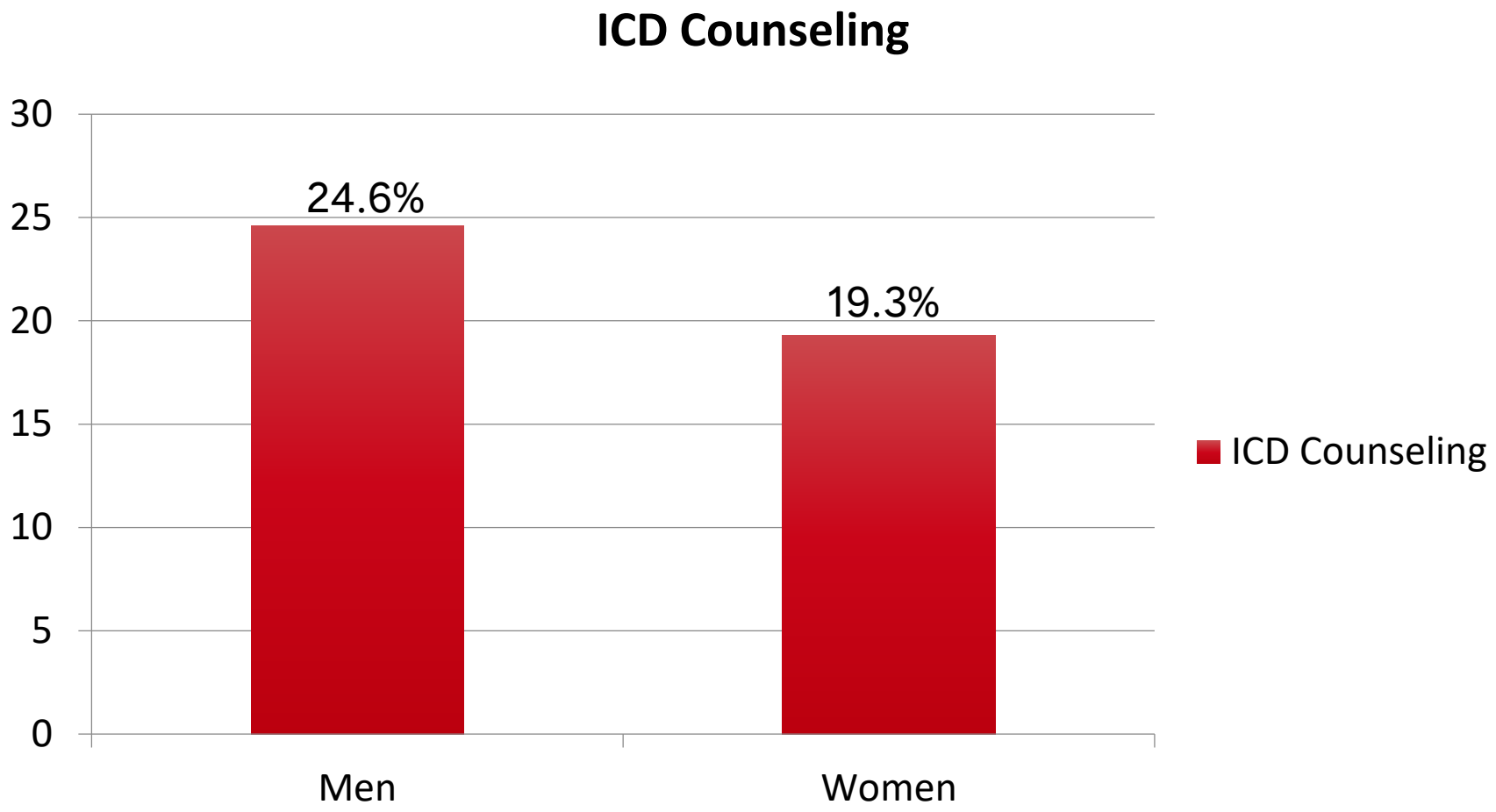
QUALITY METRICS IN WOMEN VS. MEN

Characteristic	Unadjusted OR	95% CI	Multivariable Adjusted OR*	95% CI
Complete set of written instructions at time of discharge	0.95	0.92–0.97	0.97	0.94–1.01
Documentation of evaluation of LV function	0.91	0.88–0.94	0.81	0.76–0.86
ACEI/ARB prescription for LVSD	1.01	0.94–1.07	1.03	0.96–1.11
Adult smoking cessation counseling	1.01	0.94–1.09	1.06	0.95–1.19
β-blocker prescription for LVSD	0.89	0.84–0.95	0.94	0.87–1.03
Defect-free measure (100% compliance with all 5 primary measures)	1.13	1.1–1.16	0.98	0.95–1.01
Composite quality measure	0.97	0.95–0.99	0.96	0.94–0.99
Warfarin at discharge for patients with atrial fibrillation	0.85	0.81–0.89	0.91	0.86–0.96
Evidence based β-blockers prescription for LVSD	0.93	0.89–0.98	1.02	0.97–1.08
Aldosterone antagonists prescription for LVSD	0.95	0.89–1.02	1.06	0.99–1.13
Black patients with LVSD prescribed hydralazine/isosorbide dinitrate	0.82	0.67–1.01	0.80	0.66–0.96
ICD in patients with LVEF ≤35% (before admission or placed during admission)	0.61	0.56–0.67	0.70	0.65–0.75

American Heart Association.

Klein L et al. Circ Heart Fail 2011

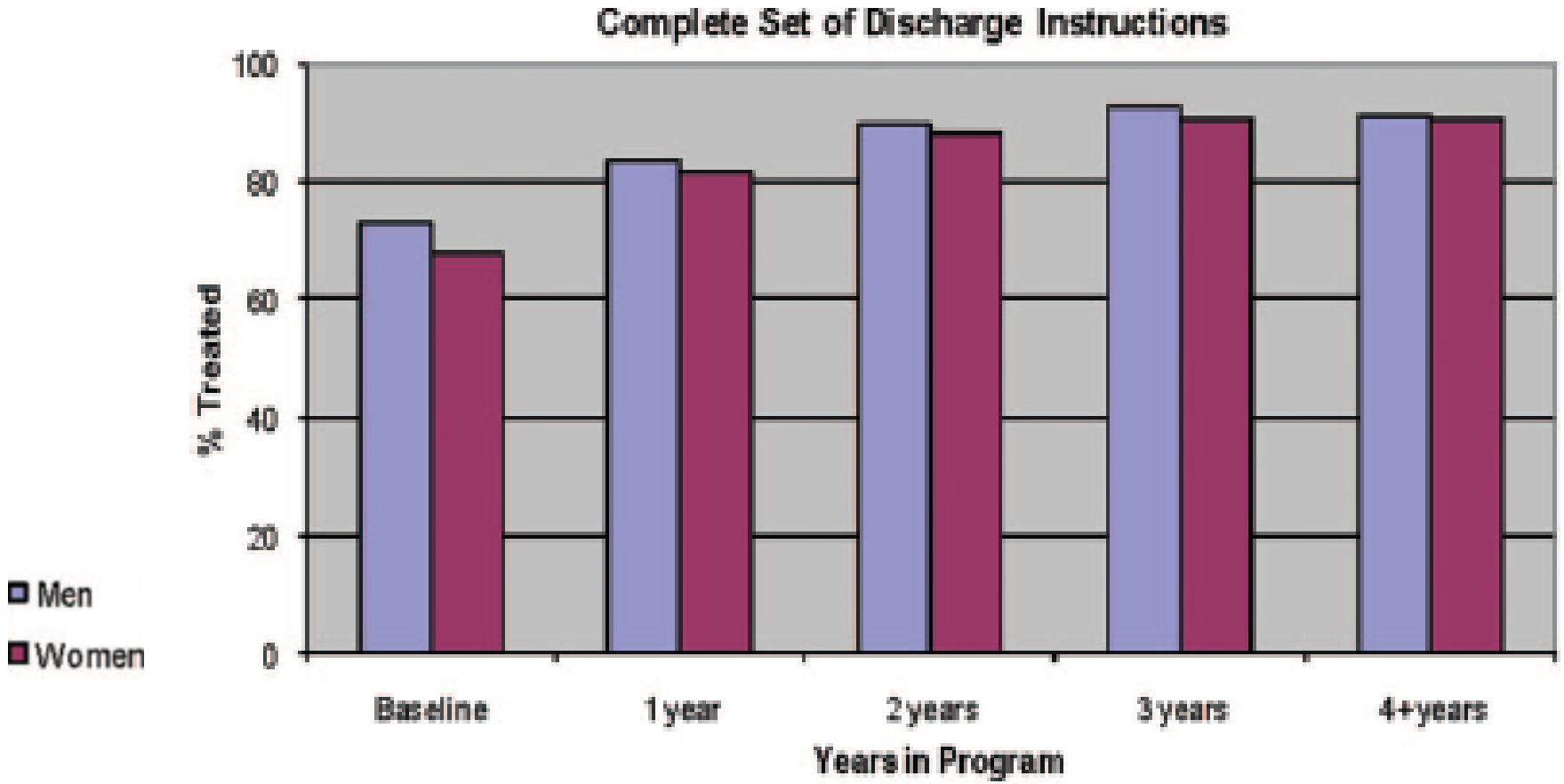
SEX DIFFERENCES IN ICD COUNSELING 2011-2014



Among those counseled, women and men were similarly likely to receive an ICD (OR 1.13; 0.99-1.29)

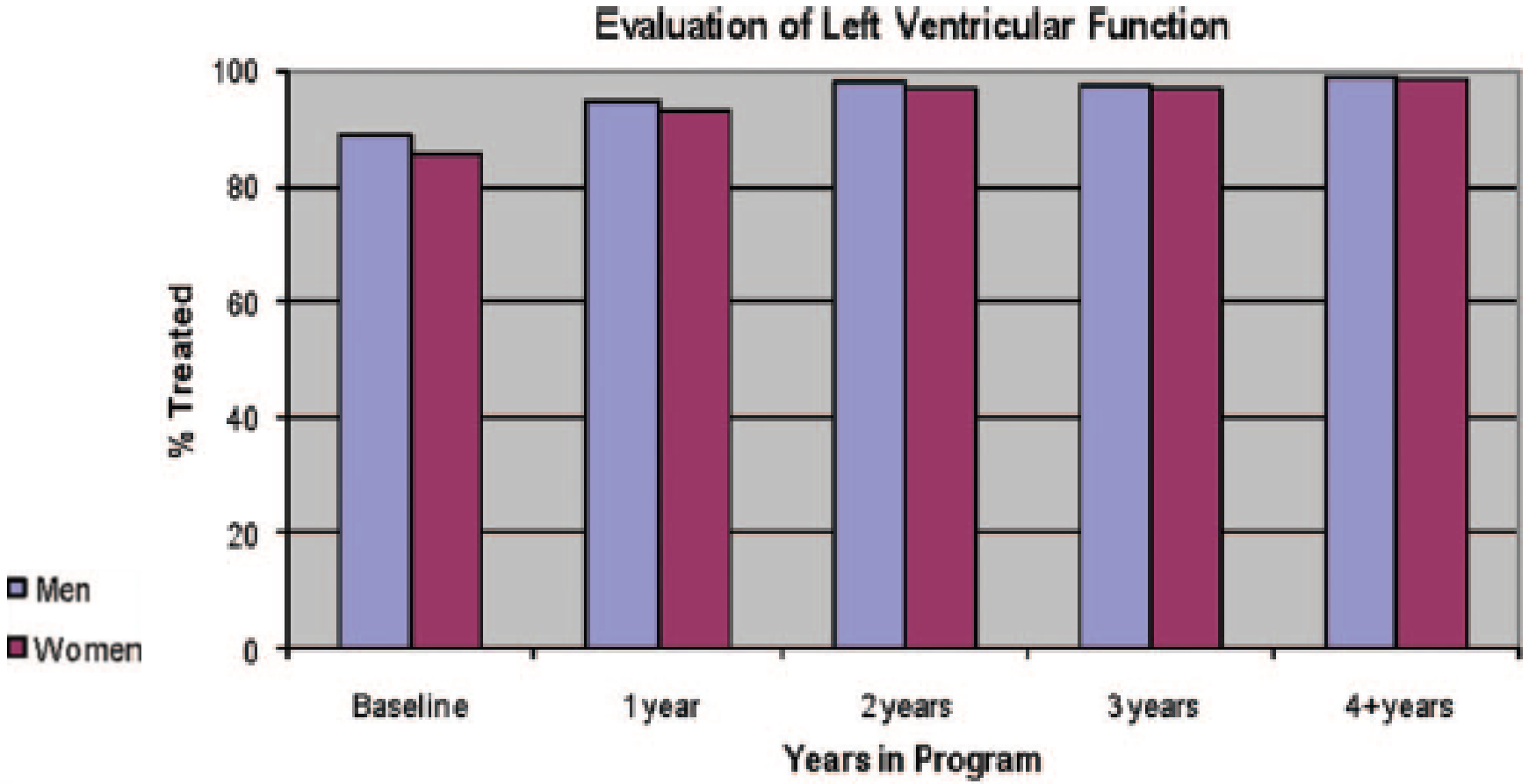
Hess PL, et al. Circulation 2016

IMPROVEMENT IN CARE AND REDUCTION IN SEX DIFFERENCES WITH GWTG PARTICIPATION



Klein L, et al. Circ Heart Fail 2011

IMPROVEMENT IN CARE AND REDUCTION IN SEX DIFFERENCES WITH GWTG PARTICIPATION



Klein L, et al. Circ Heart Fail 2011

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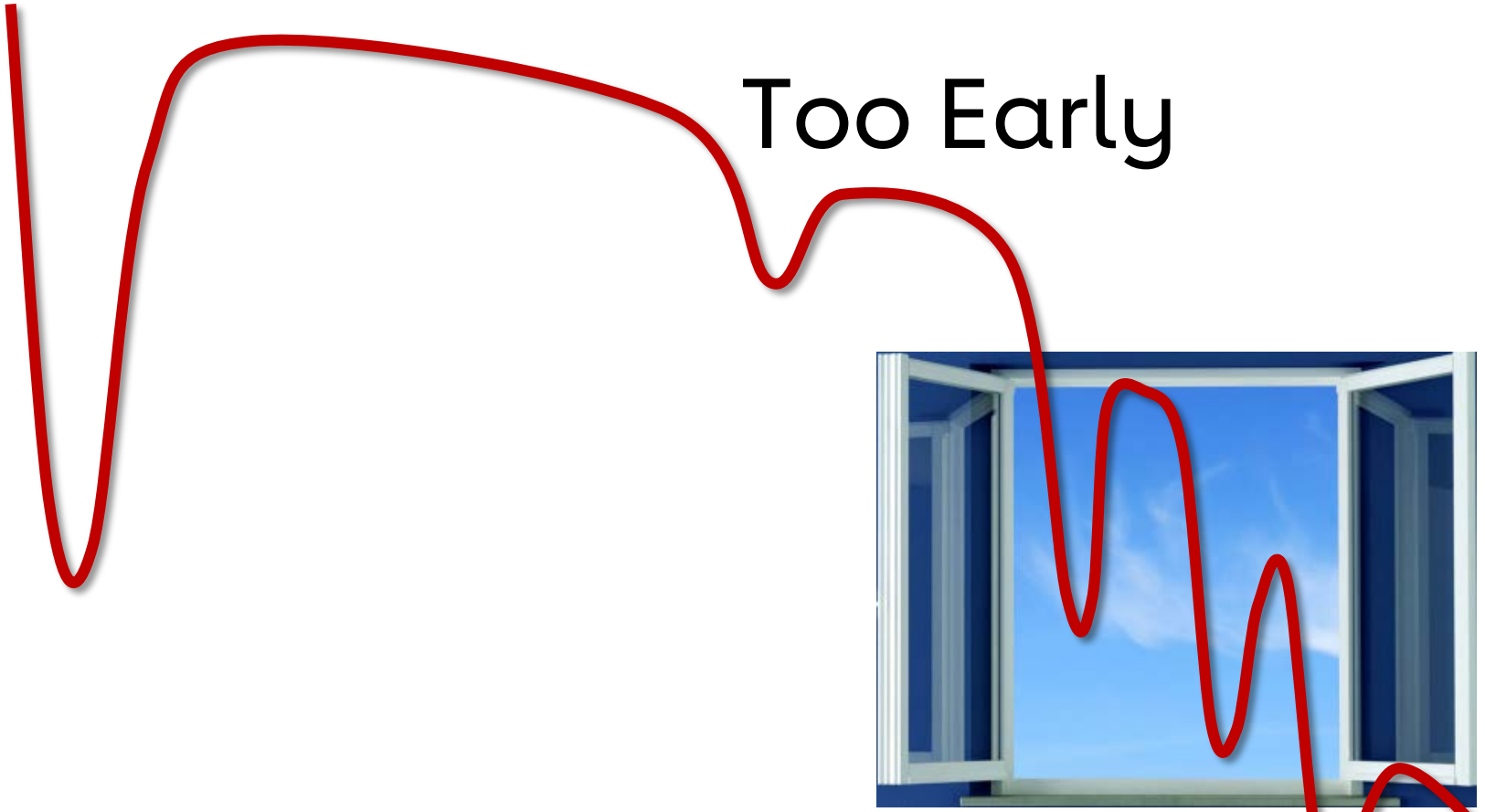
Advanced Heart Failure: Making a Difference

Larry Allen, MD, MHS
Professor of Medicine
Medical Director of Advanced Heart Failure
University of Colorado School of Medicine

uchealth | School of Medicine

TIMING OF ADVANCED THERAPIES: TRANSPLANT, LVAD, HOSPICE



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A MNEUMONIC TO HELP WITH TIMELY REFERRAL

I: IV **inotropes**
N: NYHA IIIB/IV
Natriuretic peptides (**BNP**) persistently elevated
E: End-organ dysfunction (**Cr, LFTs**)
E: Ejection fraction (**LVEF**) <25%
D: Defibrillator (**ICD**) **shocks**
H: **Hosp**italizations >1
E: Edema, escalating **diuretics**
L: Low blood pressure (**HoTN**), high heart rate
P: Prognostic medication – progressive **intolerance** of GDMT

- Right heart cath? Palliative care?
- Referral to Advanced HF Center?

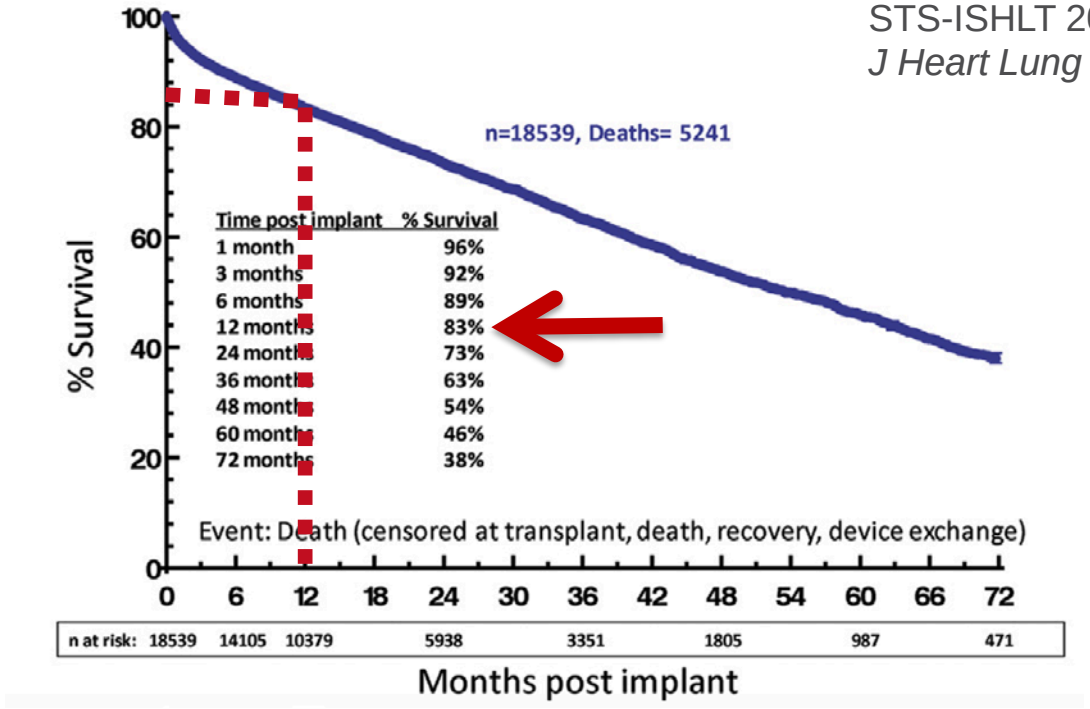
Baumwol J. "I Need Help"-A mnemonic to aid timely referral in advanced heart failure. *J Heart Lung Transplant*. 2017;36:593-594

DURABLE LVAD IS AN OPTION FOR MANY

American Heart Association.

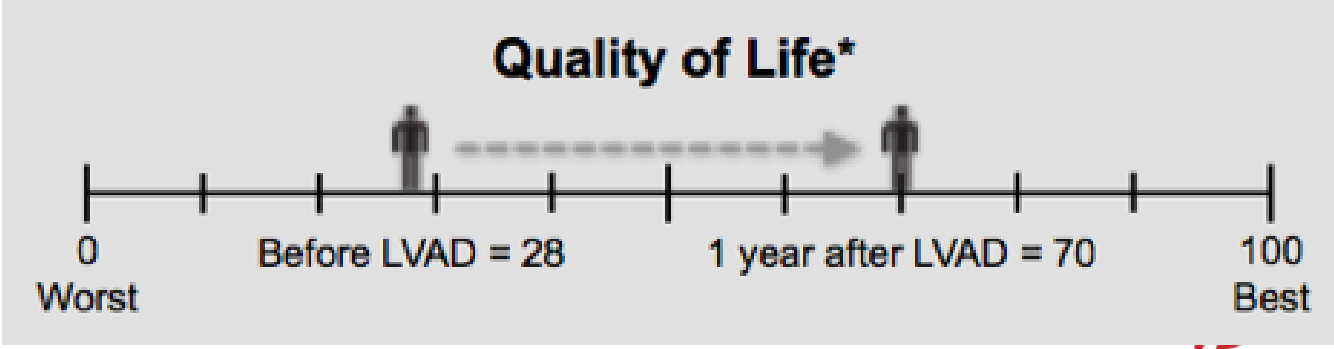
LVAD outcomes

Quantity of life

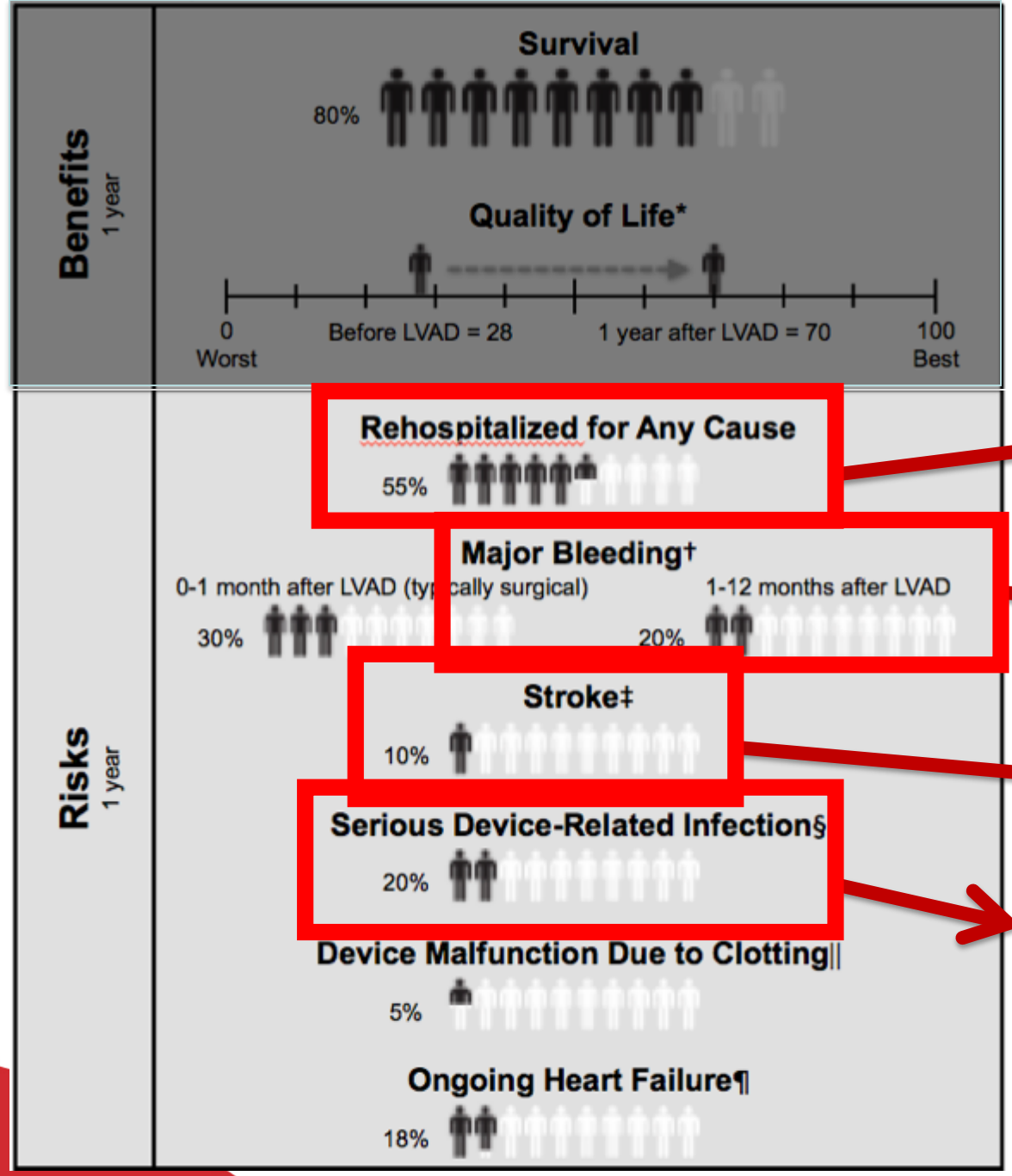


STS-ISHLT 2018 Report.
J Heart Lung Txplt.

Quality of life



McIlvennan, et al. Circ Heart Fail. 2014



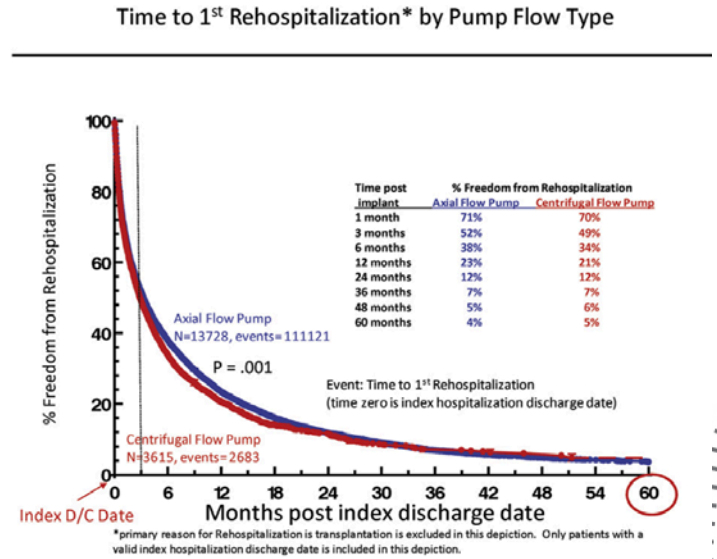
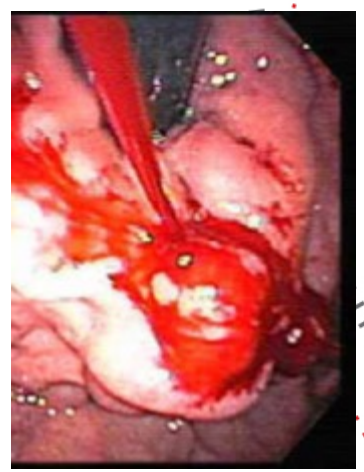
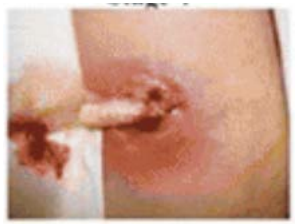
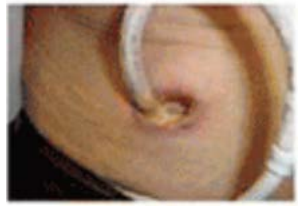


Figure 10 Freedom from rehospitalization after discharge



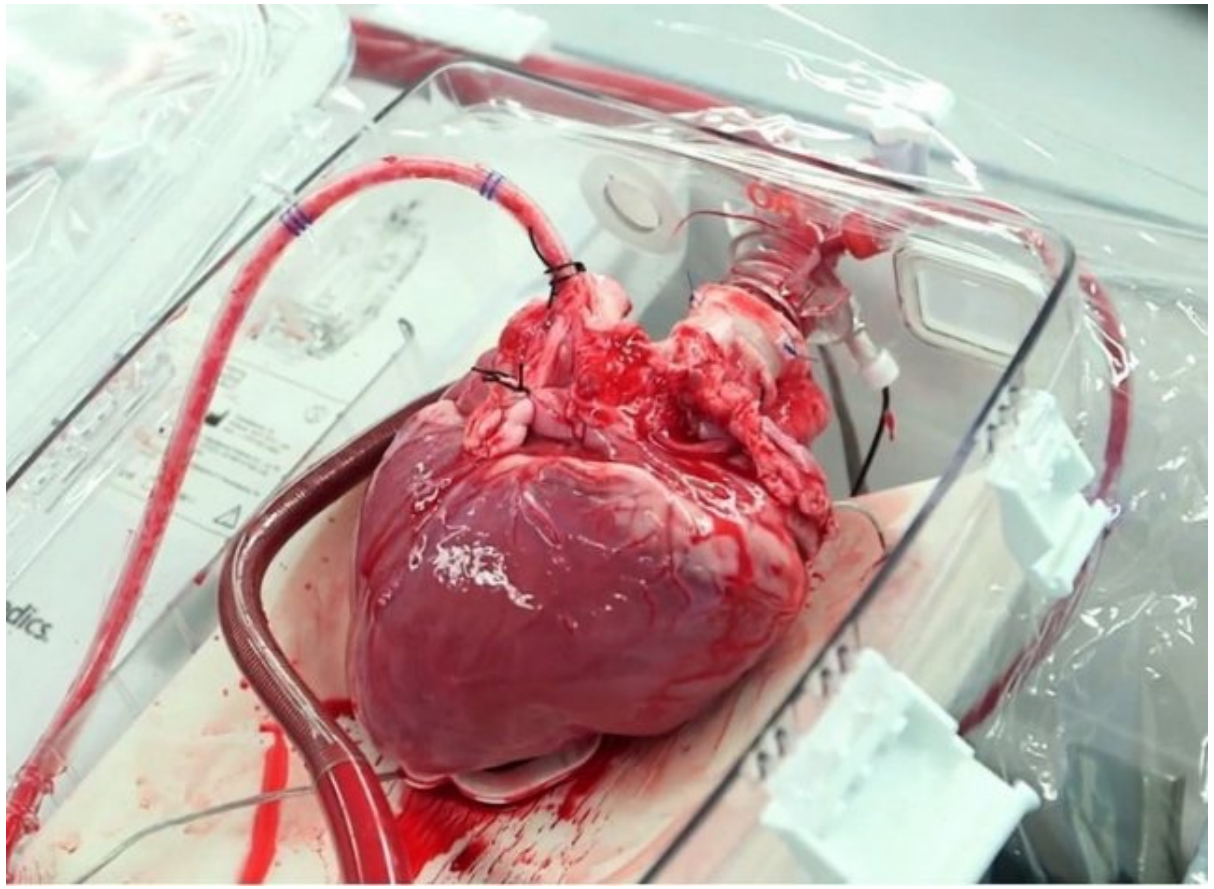




McIlvennan, et al. Circ Heart Fail. 2014

American Heart Association.

TRANSPLANT REMAINS THE GOLD STANDARD



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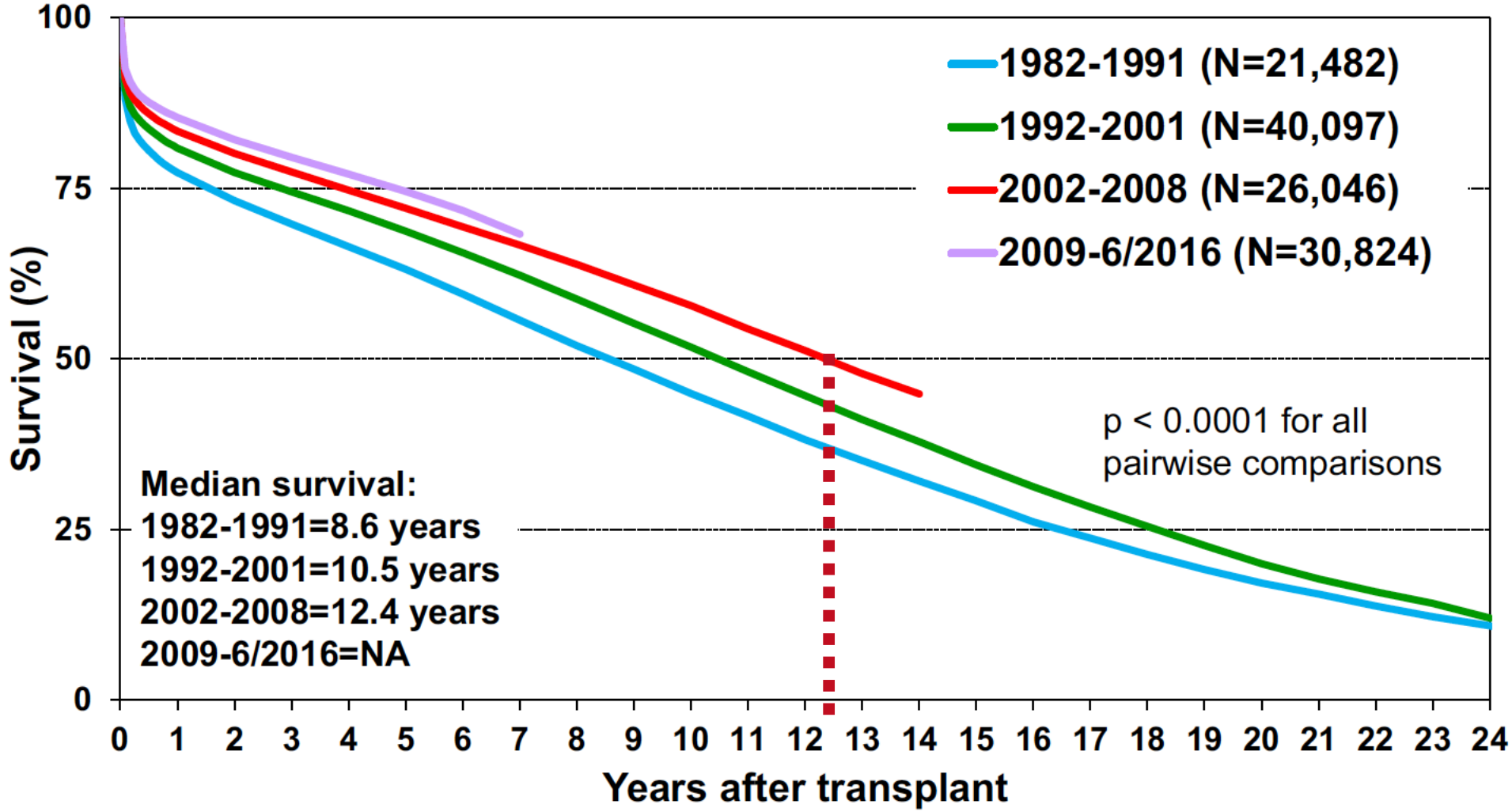
CARDIAC TRANSPLANT OUTCOMES

AVERAGE AGE OF RECIPIENT: 54 YEARS OLD

93% 1 YEAR SURVIVAL

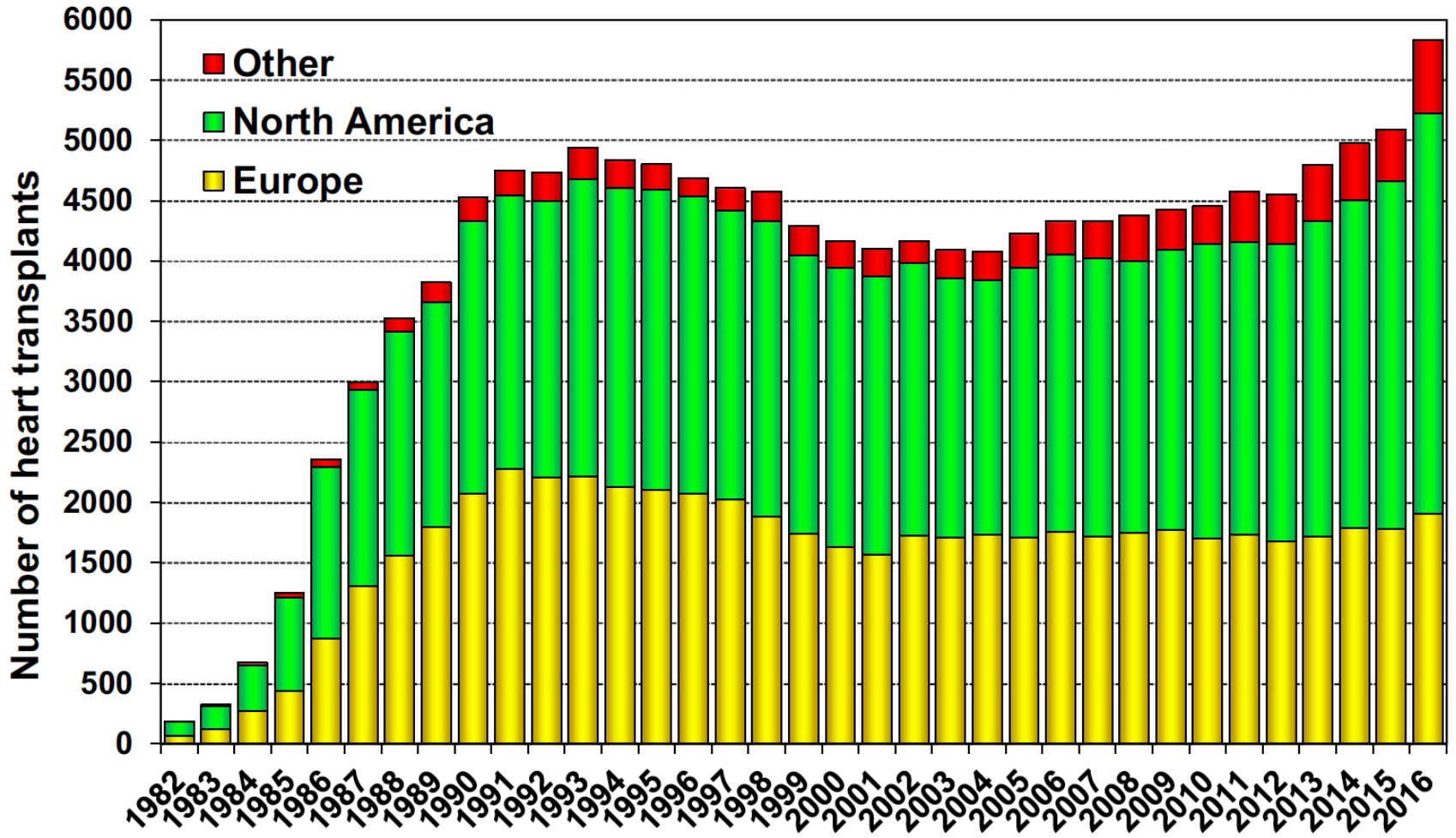
MEDIAN SURVIVAL >12 YEARS



ISHLT 2018 Report. *J Heart Lung Txplt.*

LIMITED DONOR ORGANS

ISHLT 35th Adult Heart Transplant Report



Drug overdoses

HCV donors

Donation after cardiac death (DCD)

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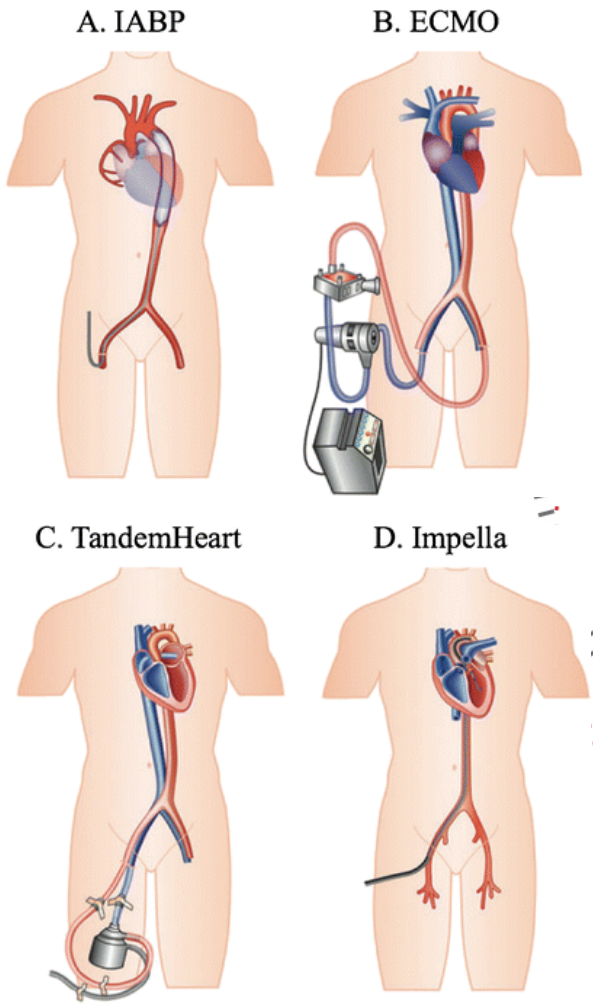
DONOR ALLOCATION SYSTEM: CHANGED 10/2018

Status	Criteria
1A	a) Mechanical Circulatory Support (MCS) with acute hemodynamic decompensation I. Extracorporeal Membrane Oxygenation (ECMO) II. Intra-Aortic Balloon Pump (IABP) III. Total Artificial Heart (TAH) IV. Ventricular Assist Device (VAD)
	b) MCS with objective evidence of device related complications
	c) Continuous Mechanical Ventilation
	d) Continuous Infusion of single or multiple IV inotropes in addition to hemodynamic monitoring
1B	aa) Continuous IV inotropes
	bb)Stable LVAD/RVAD in place
2	All other candidates

Status	Criteria
1	• VA-ECMO* • Non-dischargeable Bi-VADs • MCSD with life threatening arrhythmias
2	• Dischargeable TAH, RVAD, BiVAD • "Non-Dischargeable" LVAD • IABP or Percutaneous Endovascular MCS* • MCSD with Malfunction • Sustained VT or VF
3	• Continuous Infusion of single or multiple IV inotropes in addition to hemodynamic monitoring* • 30-days of exception time for LVADs • MCSD with complication
4	• Continuous IV inotropes* • Stable LVAD • Congenital Heart Disease, Restrictive CM, Re-Transplant
5	Combined Organ Transplant
6	All other Candidates



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Abnousi, F., Yong, C.M., Fearon, W.F. et al. Curr Cardiol Rep (2015) 17: 40.

NOT EVERYONE IS A CANDIDATE

1) Advanced age (median age at HF hosp. 78 years)

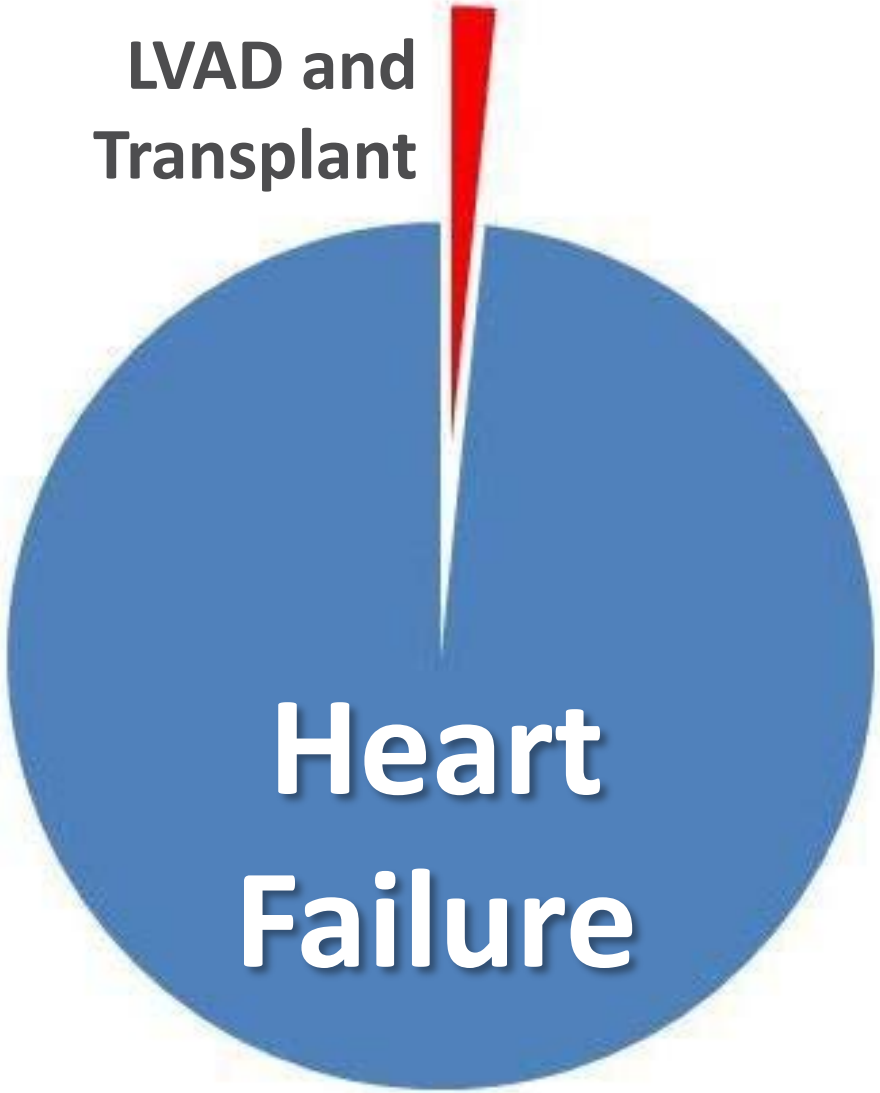
2) Comorbidity (50% have 5+ diagnoses)

Option B

National Hospice and Palliative Care Organization

Final Perspective on Stage D

- 6,000,000 WITH HF
- 2,400,000 (40%) HFREF
- 240,000 (10%) WITH STAGE D
- 60,000 (25%) MAY BENEFIT FROM ADVANCED RX (LVAD/TX)
- 2,800 TRANSPLANTS
- 4,000 LVADS
- … BUT LARGE BENEFIT IN CAREFULLY SELECTED PATIENTS



GWTG-HF - STATE OF THE ART

Quality of Life in Heart Failure - A Goal Not to be Missed

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February 2019

Objective:

- Discuss the value of understanding quality of life data in patients with heart failure

Quality of Life in HF

Perspectives

Efficacy of Treatments from Health Care Providers

- Based on parameters
  - Clinical status
  - Hemodynamics
  - Neurohormonal status
  - Echo/MRI indices

Efficacy of Treatments from Patients

- Based on:
  - Functional capacity
  - Exercise performance
  - Psychological status
  - Frequency of rehospitalization

1) Under represented in clinical trials
2) No universal definition of quality of life endpoints
3) Difficult to standardize data collection

Nieminen MS et al. Int J Cardiol. 2015;191:256-64.

Quality of Life Tools in HF

25 tools discussed in the literature

Instrument Name	Description
Minnesota Living w HF Q	21 items; lifestyle limitations; ⇩ score = ⇧ QoL
Kansas City Cardiomyopathy Q	12/23 items; physical, symptoms, QoL, social impact and self-efficacy; ⇧ score = ⇧ QoL
Euro HF QoL Q	40 items; functional status, etc.; ⇧ score = ⇧ QoL
EuroQ-5D (generic; assesses problems)	VAS; mobility, self-care, usual activities, pain & anxiety/depression domains; ⇩ score = ⇧ QoL
Chronic HF Q	20 items; dyspnea, fatigue, emotional function domains; ⇧ score = ⇧ QoL
Qual of Life in Severe HF	26 items; physical activity + VAS of life satisfaction-social/emotional; ⇩ score = ⇧ QoL (less impairment)
Medical Outcomes Study 36-item Short Form	36 items; 8 subscales; assesses negative health aspects; ⇧ score = ⇧ QoL
Nottingham Health Profile	38 items based on WHO classification of disabilities; ⇧ score = ⇧ QoL
Sickness Impact Profile	136 Y/N items; 12 areas of pts. life; ⇩ score = ⇧ QoL

Quality of Life in HF

Correlates of QoL

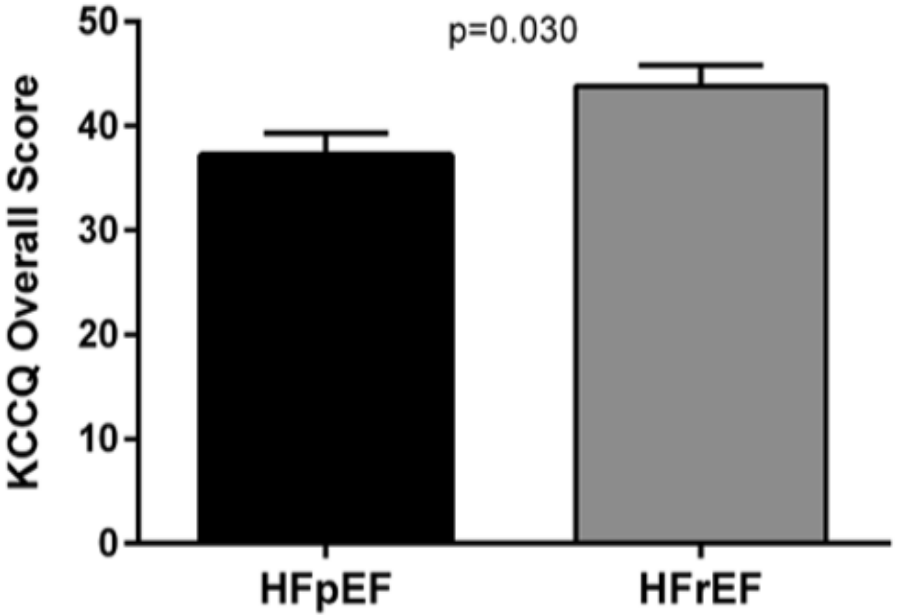
- 1037 older ambulatory adults, (KCCQ & EQ-5D)[1]
  - Tools rho, 0.815; Factors associated with worse QoL:
    - Older age, female
    - Worse functional class
    - Higher Charlson comorbidity index
    - Recent hospitalization for HF
- 180 pts w chronic HF: Poor medication adherence assoc. w worse QoL (MLHFQ)[2]
- 1136 (MLHFQ)[3] & 52 (KCCQ)[4] hospitalized adults
  - QoL improved during hospitalization[3] and after discharge in all patients;[3,4] despite intervention vs. control group[3]

1. Comı´n-Colet J et al. Rev Esp Cardiol. 2016;69(3):256-271. 2. Silavanich et al. Heart Lung. 2018; Oct 29 ePub ahead of print
3. Riegel B et al. Nurs Res. 2002;51(4):209-18. 4. Sauser K, et al. J Card Fail. 2014;20(5):378.e11-5.

Physical Function and QoL in ADHF

Correlation of Depression Scale Score with QoL Scale Scores

202 consecutive patients ≥ 60 yrs. old; ADHF-hospital



Depression usually unrecognized

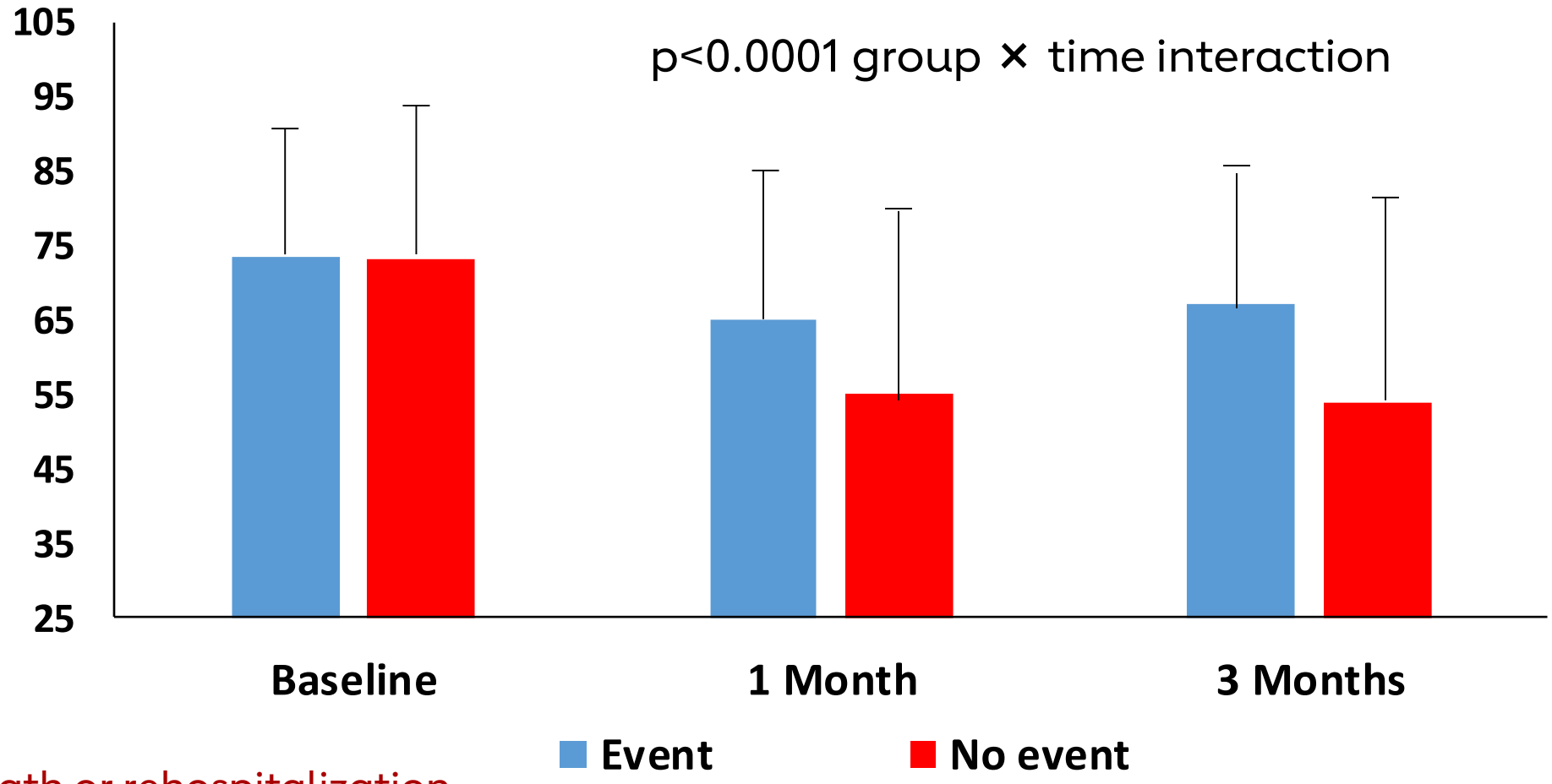
Depression and QoL	*r*	*p* value
KCCQ Overall Sc [⇧ score = ⇧ QoL]	−0.58	<0.001
KCCQ Physical Limitation Sc	−0.38	<0.001
KCCQ SF Physical Composite Sc	−0.63	<0.001
KCCQ SF Mental Composite Sc	−0.26	<0.001
EQ-5D-5L components [⇩ score = ⇧ QoL]		
Walking	0.31	<0.001
Self care	0.41	<0.001
Usual activities	0.46	<0.001
Pain / discomfort	0.29	<0.001
Depression / anxiety	0.48	<0.001
Overall health VAS [0-100]	-.038	<0.001

Warraich HJ et al. Circ Heart Fail. 2018;11: e005254

Quality of Life in HF

Event-Free Survival; by MLHFQ

425 pts. from ESCAPE study; 3 Month Event*



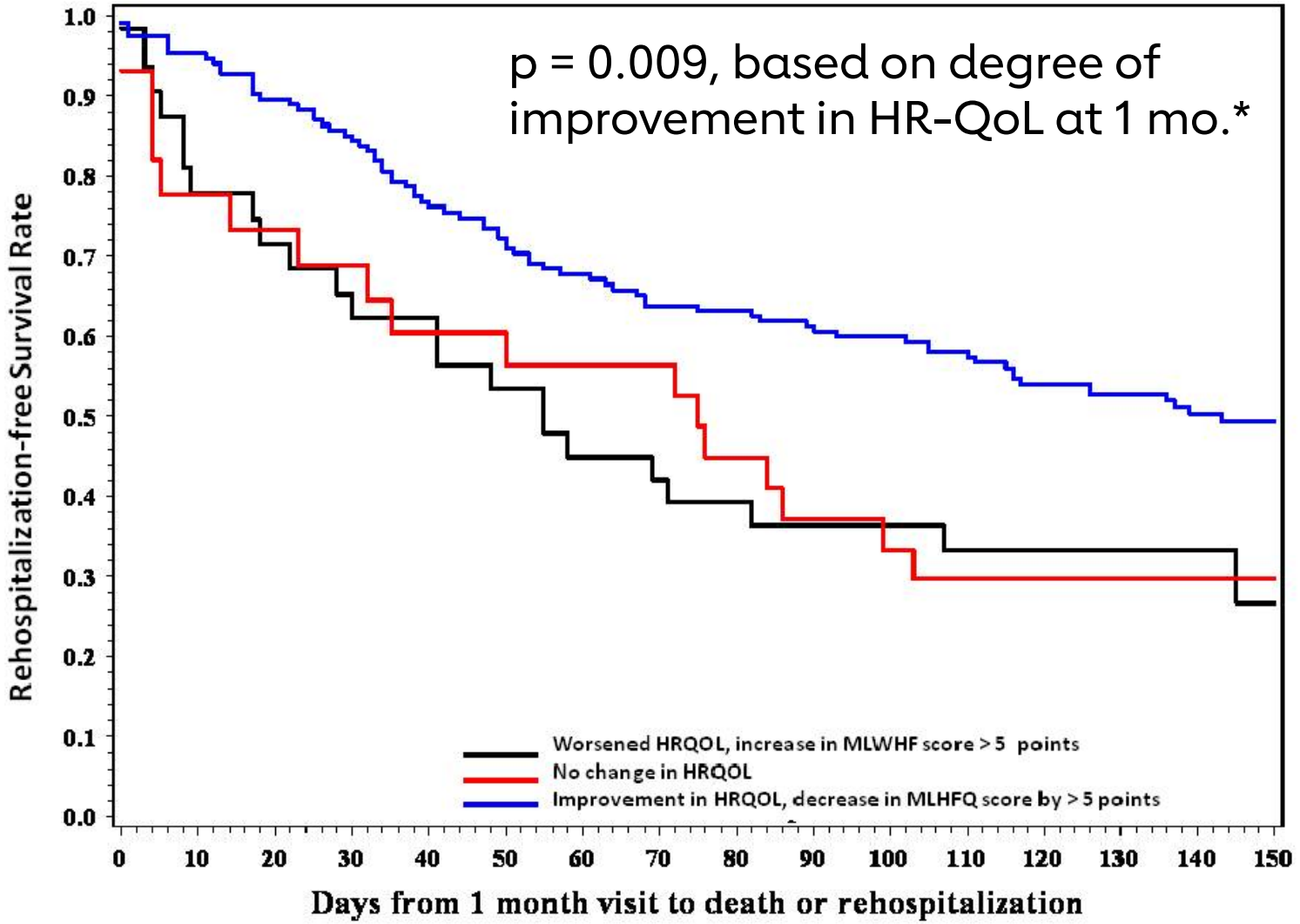
*, event = death or rehospitalization

Moser DK, et al. J Cardiac Fail. 2009;15(9):763-769.

Quality of Life in HF

Event-Free Survival by Change in MLHFQ

425 pts. from ESCAPE study; 6 Month Event



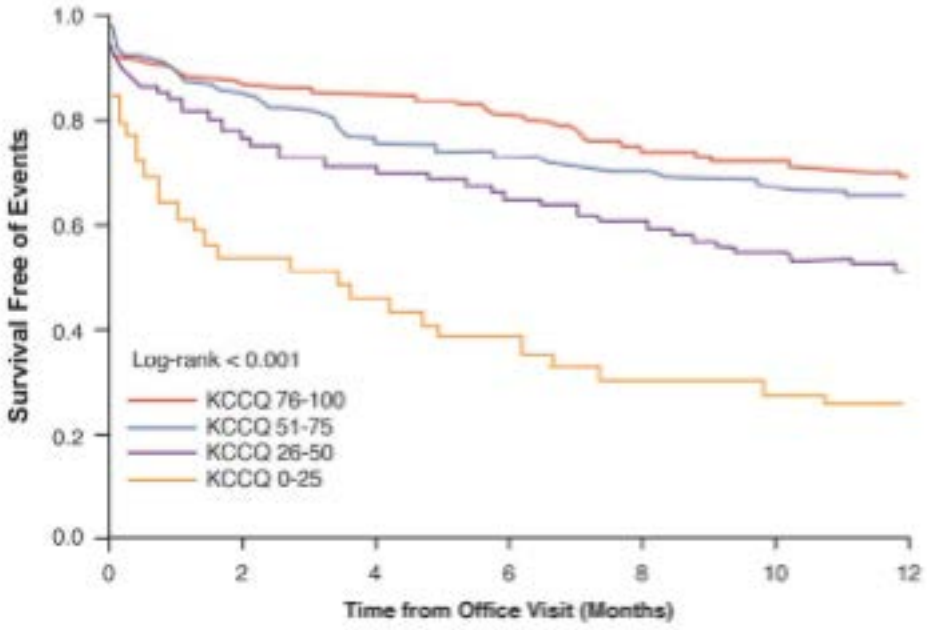
*, adjusted for:

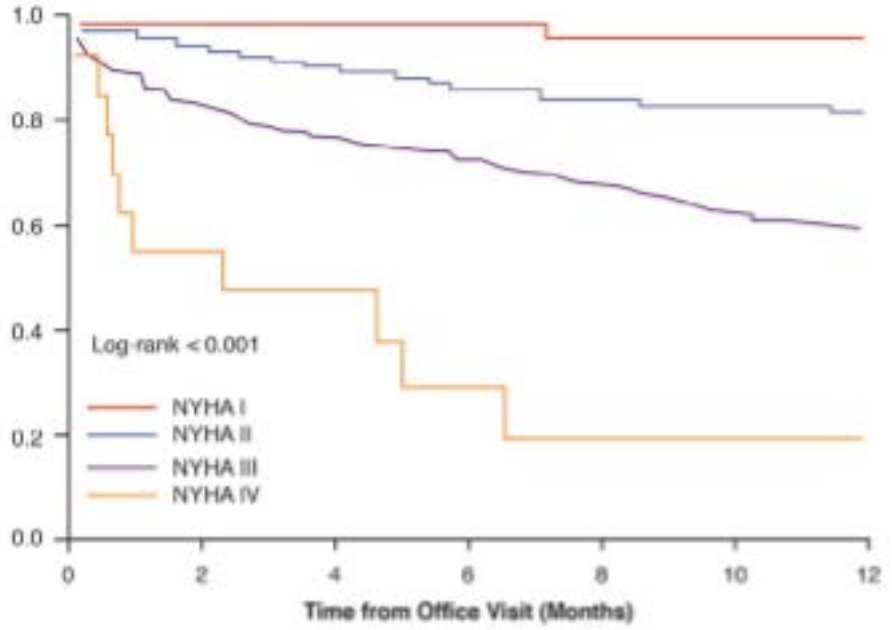
- LVEF
- Na+
- BUN
- 6MWD
- Ability to obtain 6MWD
- Age
- SBP
- Pt. group assignment

Moser DK, et al. J Cardiac Fail. 2009;15(9):763-769.

Quality of Life in HF

Advantage of POMS over NYHA-FC; N = 432 patients





KCCQ: had incremental predictive ability when added to a model that included NYHA – Net reclassification index, 76.1% (p <.001)

Adjusted for age, sex, BMI, EF, CAD, eGFR & Serum NA+

Predictor 1 yr Mortality, HF Hosp, Tx or VAD	HR* (95% CI)	*P* value
KCCQ overall score	0.75 (0.69 – 0.82)	< .001
NYHA IV compared w NYHA FC III	3.28 (1.90 – 5.66)	< .001
NYHA III compared w NYHA II	1.76 (1.09 – 2.83)	.020
NYHA II compared w NYHA I	3.29 (0.61 -17.77)	.167

Hawwa N et al. J Cardiac Fail. 2017;23(4):280-285.

Quality of Life in HF-
A Goal NOT to Be Missed

When it comes to HF, ~ 44% of patients do not recognize early HF symptoms,[1] & most patients do not recognize HF exacerbation[2]

Assessment of physical functioning / symptoms via a HR-QoL tool may optimize assessment & treatment ⇨ optimize QoL

1. Riegel B, et al. Heart Lung 2018; 47:107-114.
2. Lee S, Reigel B. J Cardiovasc Nurs 2018;33:204-210.

Value of Assessing QoL

- If physical health impairments lead to hospitalization or mortality, and change in QoL score 1 month post hospitalization can predict early (60 day to 6 month) event free survival
  - QoL score should be assessed at hospitalization and 1 month after discharge
    - To provide future hospitalization/survival risk
    - To help patients understand rationale for implementing interventions known to improve QoL

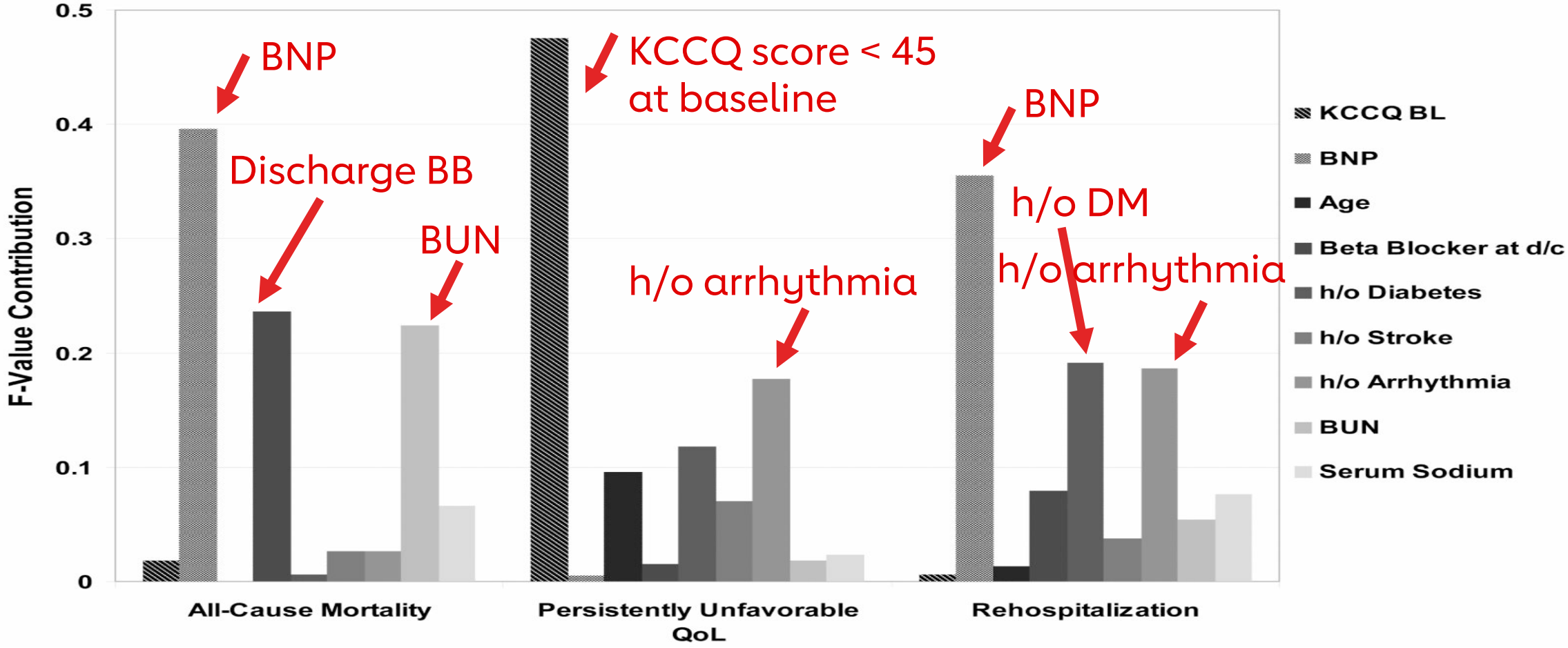
QoL Goals

- If we help patients understand QOL goals as part of usual care education (based on score improvements known to be associated with improved health status)
- We might enhance patient engagement and empowerment in HF self care
- Optimal self-care medication and non-pharmacologic management, including better HF monitoring might ⇩ cost of care

Quality of Life in HF

Predictors of Future (6 Month) Health Status

1458 pts. from EVEREST study



Allen LA, et al. Circ. Cardiovasc Qual Outcomes. 2011;4(4):389-398.

QoL Goals

- More research is needed to determine if:
  - A standard HF-related QoL tool should be systematically used
  - Tool administration should be standardized in the OPD (every ? months) and hospital at admission/post-discharge (? 30 days)
    - To determine CHANGE in scores
  - Tool administration and FU burden is feasible (time to administer ~ 7 minutes)
  - ? resources needed to score, share results, & communicate with patient

American Heart Association.

CONTACT US TO LEARN MORE

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- Promote a culture of excellence to boost retention and recruitment of talent
- As of January 1, 2019, all AHF certified organizations will be required to participate in the AHA GWTG-HF registry

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Thank You For Your Active Participation And Contributions To GWTG-Heart Failure!