State of GWTG-Heart Failure 2018

Tuesday February 13, 2018

Presenters:

Clyde Yancy, MD, MSc, MACC, FAHA, MACP, FHFSA

Gregg C. Fonarow, MD, FACC, FAHA, FHFSA

Adam DeVore, MD, MHS

Pamela Peterson, MD, MPH, MSPH

Larry Allen, MD, MHS

Nancy Albert, PhD, CCNS, CHFN, CCRN, NE-BC, FAHA, FCCM, FAAN

Our Presenters

Clyde Yancy, MD, MSc

Professor of Medicine,
Professor, Medical Social Science
Chief, Cardiology
Associate Director, Bluhm CV Institute
Vice-Dean, Diversity & Inclusion
Northwestern University, FSM
Deputy Editor, JAMA Cardiology

Gregg C. Fonarow, MD

Elliot Corday Professor of Cardiovascular Medicine
UCLA Division of Cardiology
Director, Ahmanson–UCLA Cardiomyopathy Center
Co-Chief, UCLA Division of Cardiology

Adam DeVore, MD, MHS

Assistant Professor of Medicine
Duke University Medical Center and the
Duke Clinical Research Institute

Pamela Peterson, MD, MPH

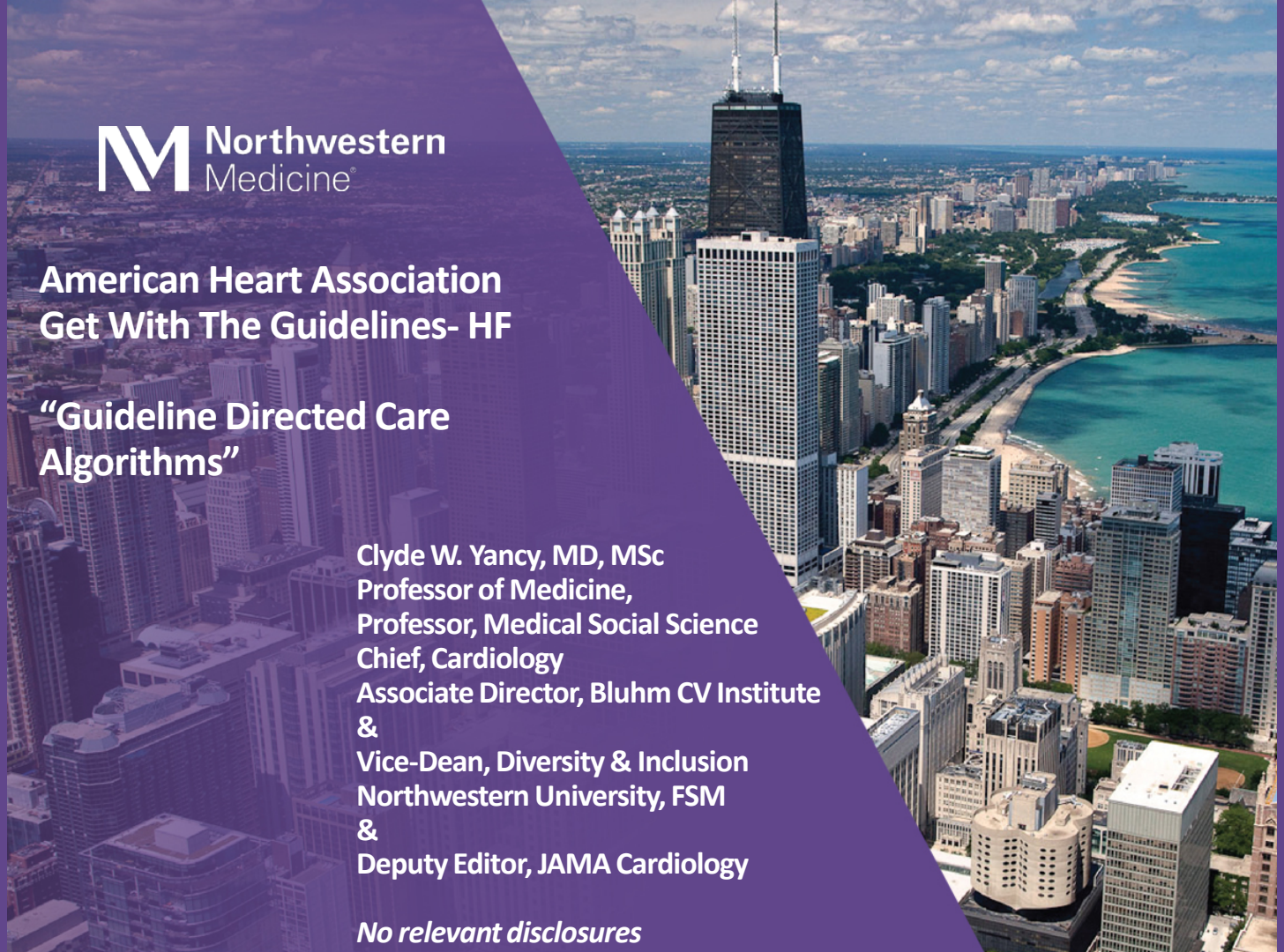
Associate Professor of Medicine-Cardiology
University of Colorado

Larry Allen, MD, MHS

Associate Professor of Medicine, Medical Director of Advanced Heart Failure
University of Colorado School of Medicine

Nancy Albert, PhD, CCNS, CHFN

Associate Chief Nursing Officer, Office of Nursing Research and Innovation
Cleveland Clinic Health System
Clinical Nurse Specialist
Kaufman Center for Heart Failure
Cleveland Clinic Main Campus



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American Heart Association Get With The Guidelines- HF

"Guideline Directed Care Algorithms"

Clyde W. Yancy, MD, MSc
Professor of Medicine,
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Associate Director, Bluhm CV Institute
&
Vice-Dean, Diversity & Inclusion
Northwestern University, FSM
&
Deputy Editor, JAMA Cardiology

No relevant disclosures

Heart Failure Awareness Week 2018

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New ACC/AHA/HFSA Guidelines

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

WRITING GROUP MEMBERS*

Clyde W. Yancy, MD, MSc, MACC, FAHA, FHFSA, *Chair*
Mariell Jessup, MD, FACC, FAHA, *Vice Chair*
Biykem Bozkurt, MD, PhD, FACC, FAHA*†
Javed Butler, MD, MBA, MPH, FACC, FAHA*‡
Donald E. Casey, Jr, MD, MPH, MBA, FACC§
Monica M. Colvin, MD, FAHA‖
Mark H. Drazner, MD, MSc, FACC, FAHA, FHFSA‡
Gerasimos S. Filippatos, MD*
Gregg C. Fonarow, MD, FACC, FAHA, FHFSA*‡
Michael M. Givertz, MD, FACC, FHFSA*¶
Steven M. Hollenberg, MD, FACC#
JoAnn Lindenfeld, MD, FACC, FAHA, FHFSA*¶
Frederick A. Masoudi, MD, MSPH, FACC**
Patrick E. McBride, MD, MPH, FACC††
Pamela N. Peterson, MD, FACC, FAHA‡‡
Lynne Warner Stevenson, MD, FACC*‡
Cheryl Westlake, PhD, RN, ACNS-BC, FAHA, FHFSA¶

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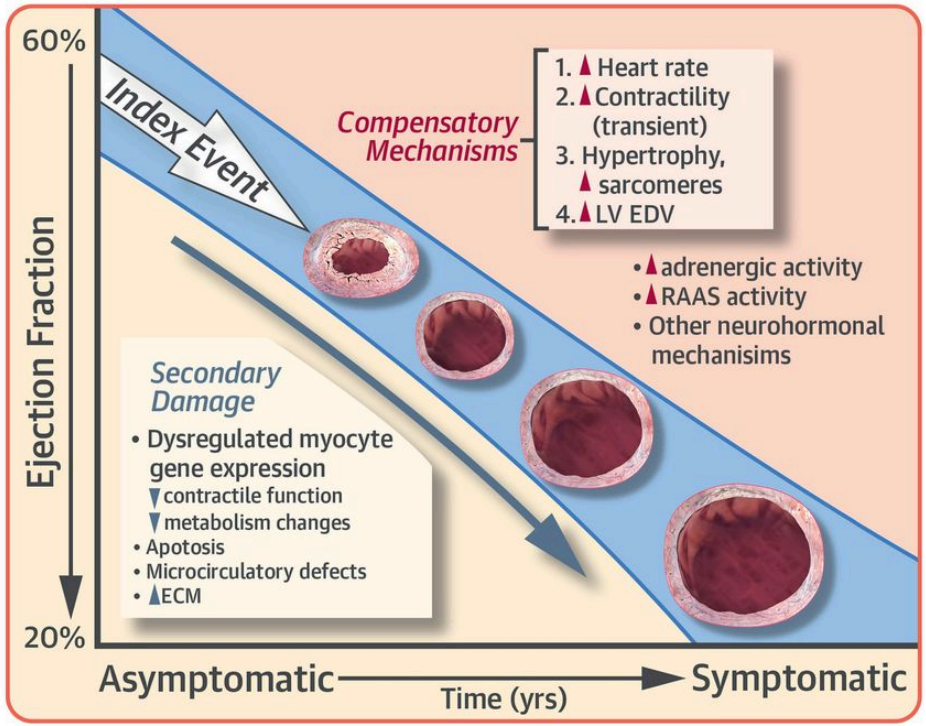
CENTRAL ILLUSTRATION: Natural History of HFrEF Phenotype



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

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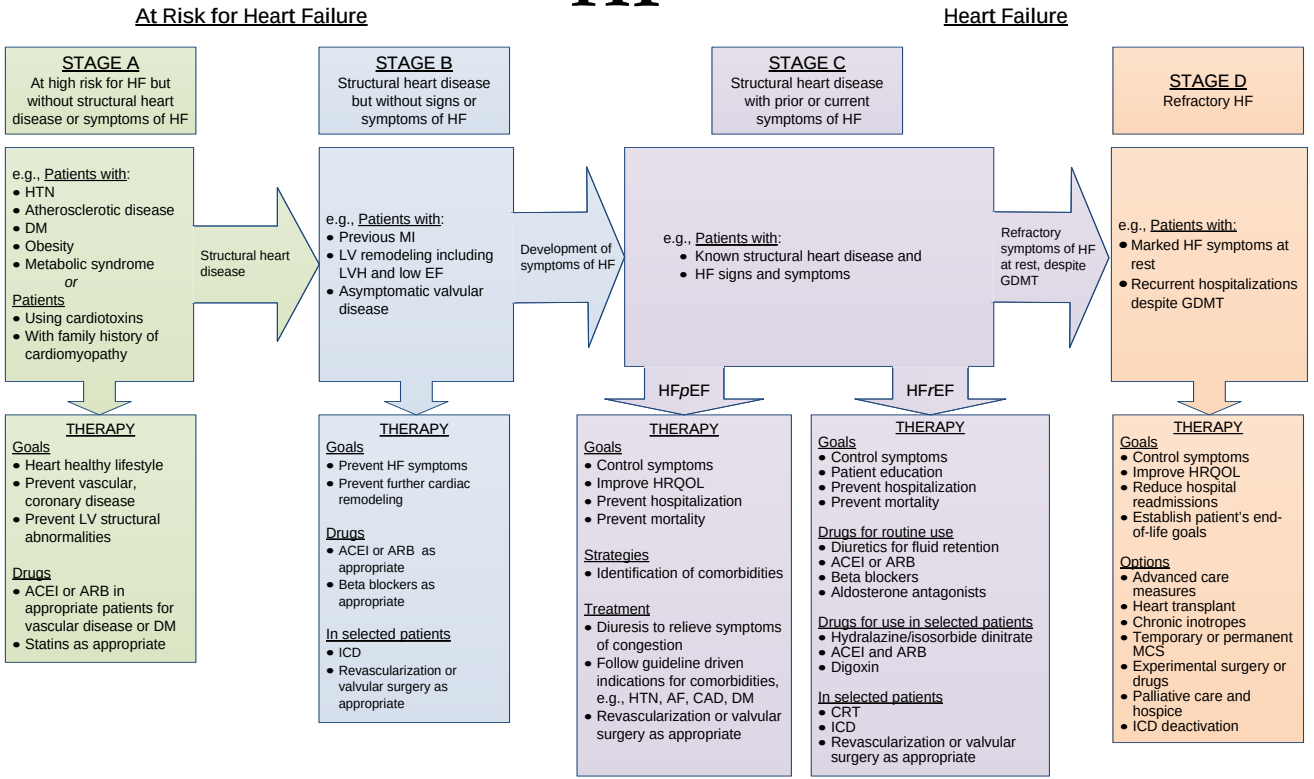
2017 American College of Cardiology Foundation

Stages, Phenotypes and Treatment of HF



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Yancy C, et al. JACC, 2013

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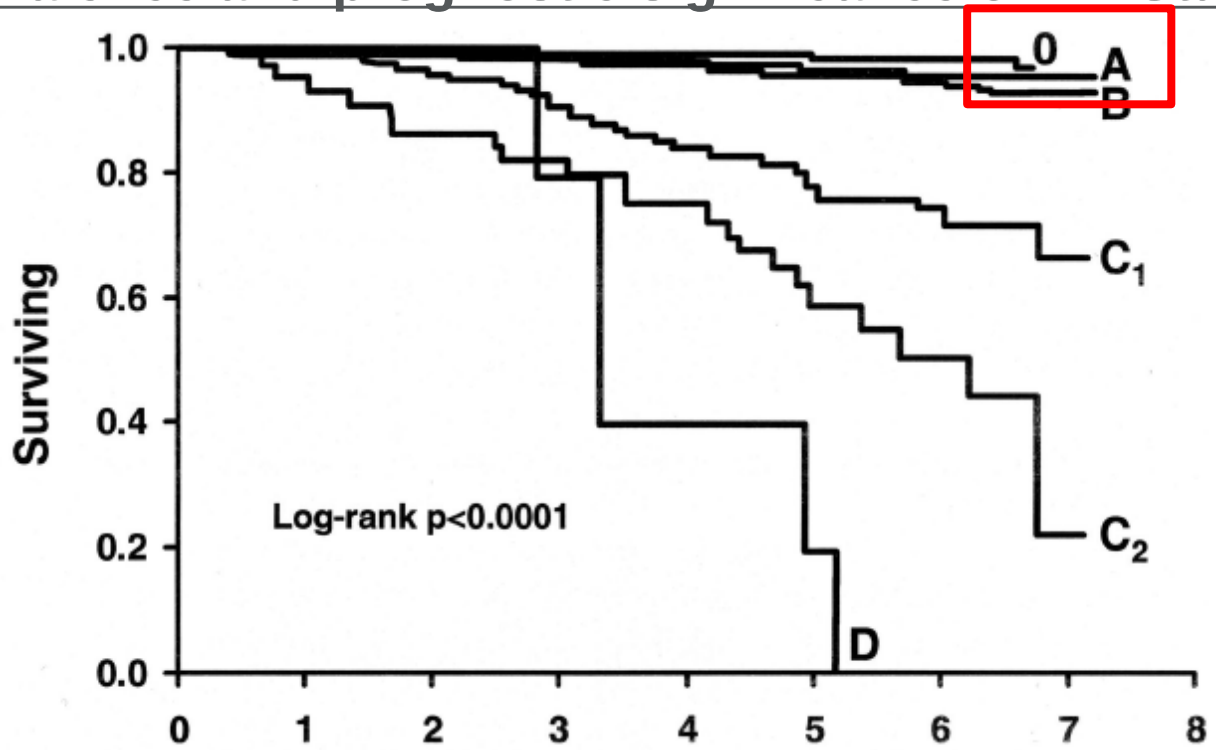
Prevalence and prognostic significance of HF Stages



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

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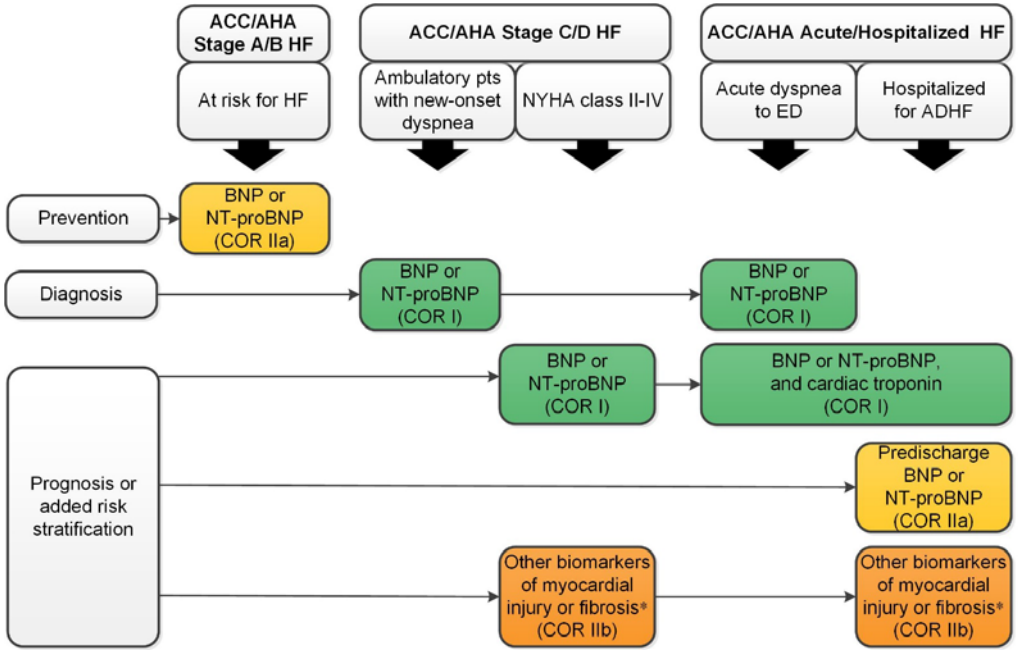
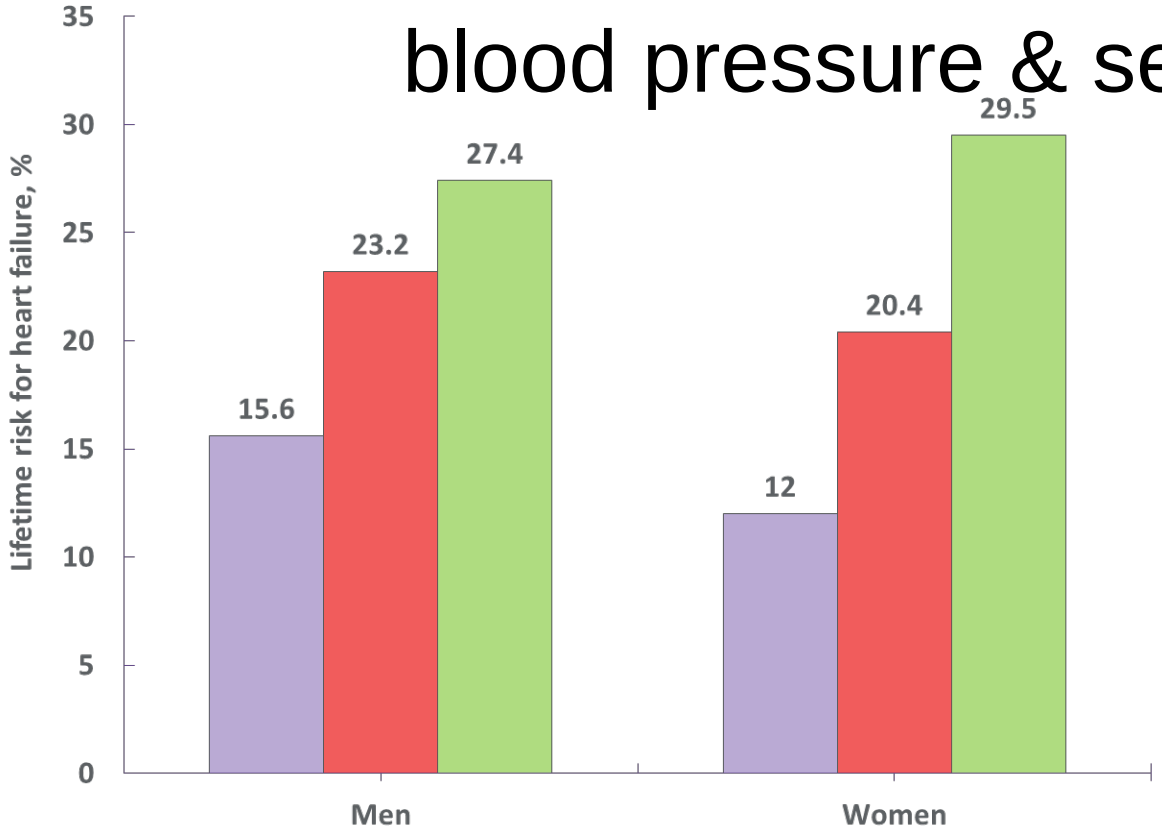
Biomarkers Indications for Use



*Other biomarkers of injury or fibrosis include soluble ST2 receptor, galectin-3, and high-sensitivity troponin.
ACC indicates American College of Cardiology; AHA, American Heart Association; ADHF, acute decompensated heart failure; BNP, B-type natriuretic peptide; COR, Class of Recommendation; ED, emergency department; HF, heart failure; NT-proBNP, N-terminal pro-B-type natriuretic peptide; NYHA, New York Heart Association; and pts, patients.

Lifetime risk for HF; indexed to blood pressure & sex



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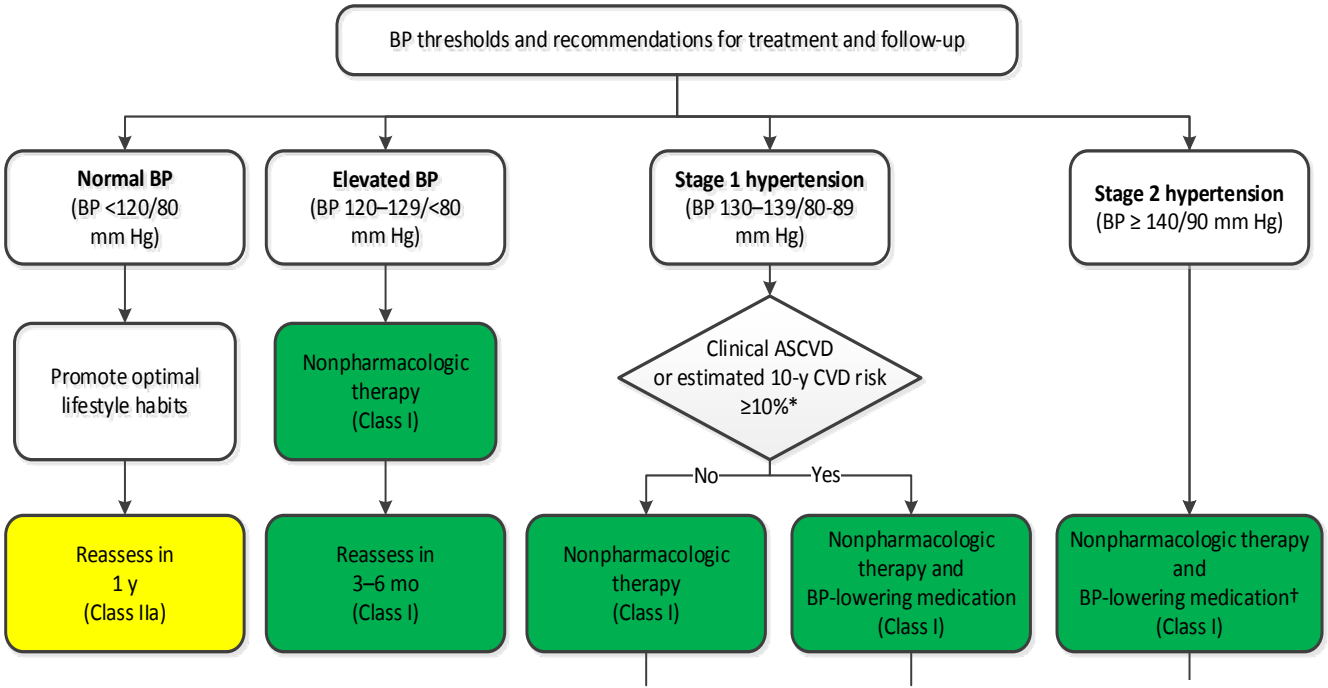
Blood Pressure (BP) Thresholds and Recommendations for Treatment and Follow-Up (continued on next slide)



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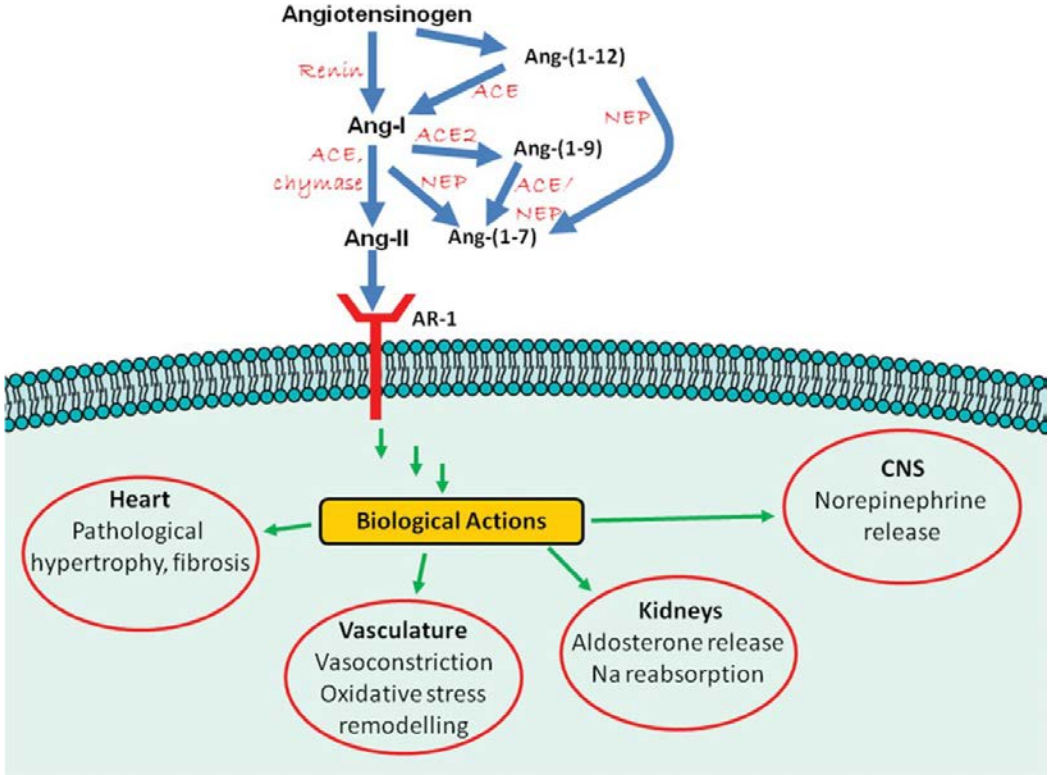
Hypertension

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.

Simplified Schematic of the Renin–Angiotensin–Aldosterone System



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

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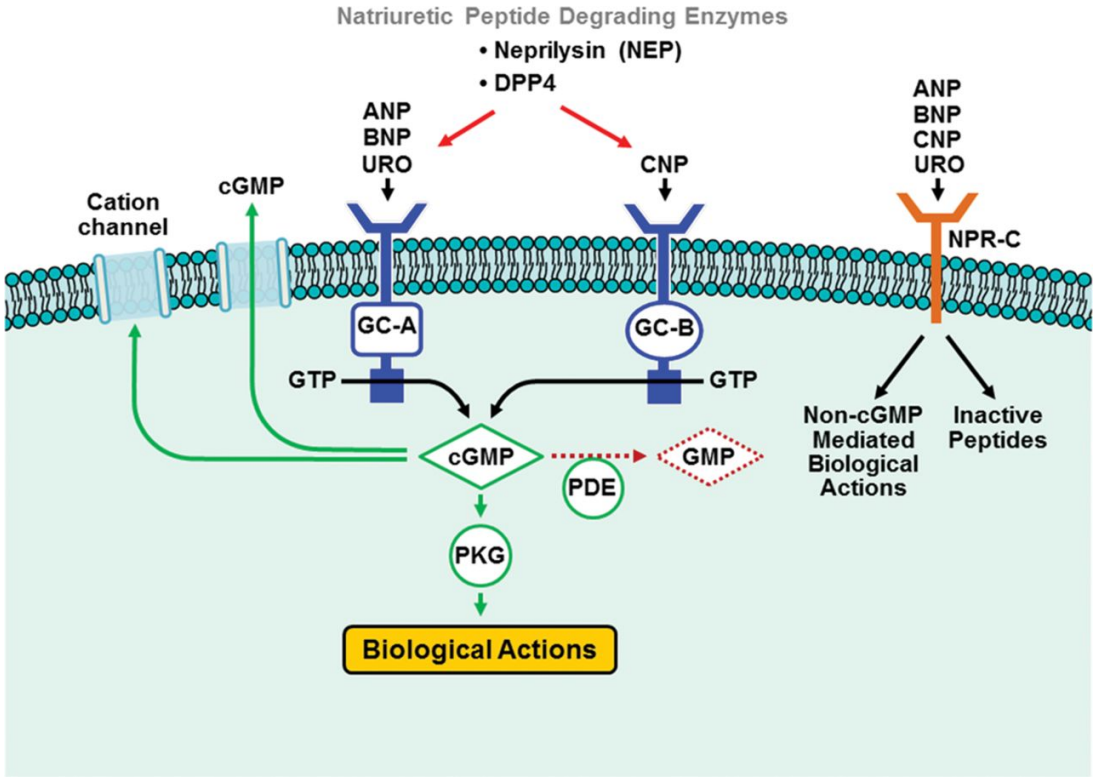
Simplified Schematic of the Natriuretic Peptide System (NPS)



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

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.

Pharmacological Treatment for Stage C HF With Reduced EF

Ivabradine

COR	LOE	Recommendations	Comment/ Rationale
IIa	B-R	Ivabradine can be beneficial to reduce HF hospitalization for patients with symptomatic (NYHA class II-III) stable chronic HF*r*EF (LVEF ≤35%) who are receiving GDEM*, including a beta blocker at maximum tolerated dose, and who are in sinus rhythm with a heart rate of 70 bpm or greater at rest.	NEW: New clinical trial data.

*In other parts of the document, the term “GDMT” has been used to denote guideline-directed management and therapy. In this recommendation, however, the term “GDEM” has been used to denote this same concept in order to reflect the original wording of the recommendation that initially appeared in the “2016 ACC/AHA/HFSA Focused Update on New Pharmacological Therapy for Heart Failure: An Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure”.

From: Thera... Inhibitor

JAMA

Table. Demonstrated Benefits of Evidence-Based Therapies for Patients With Heart Failure and Reduced Ejection Fraction

Evidence-Based Therapy	Relative Risk Reduction in All-Cause Mortality in Pivotal Randomized Clinical Trial(s), %	NNT to Prevent All-Cause Mortality Over Time	NNT for All-Cause Mortality[a]
ACEI/ARB	17	22 over 42 mo	77
ARNI[b]	16	36 over 27 mo	80
β-Blocker	34	28 over 12 mo	28
Aldosterone antagonist	30	9 over 24 mo	18
Hydralazine/ nitrate	43	25 over 10 mo	21
CRT	36	12 over 24 mo	24
ICD	23	14 over 60 mo	70

Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor neprilysin inhibitor; CRT cardiac resynchronization therapy; ICD, implantable cardioverter defibrillator, NNT, number needed to treat.

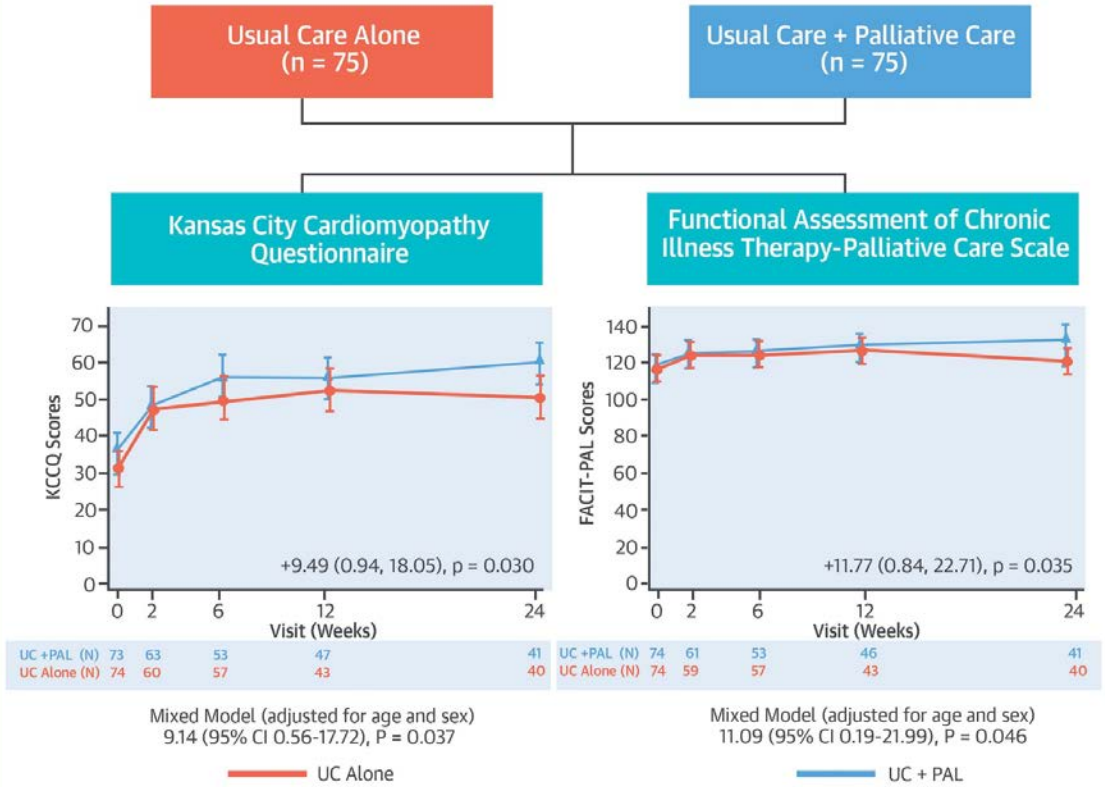
[a] Standardized to 12 months.

[b] Benefit of ARNI therapy incremental to that achieved with ACEI therapy. For the other medications shown, the benefits are based on comparisons to placebo control.

Demo...

Da...

CENTRAL ILLUSTRATION: The PAL-HF Study Randomized 150 Patients With Advanced Heart Failure to Usual Care or Usual Care + a Multidimensional Palliative Care Intervention



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

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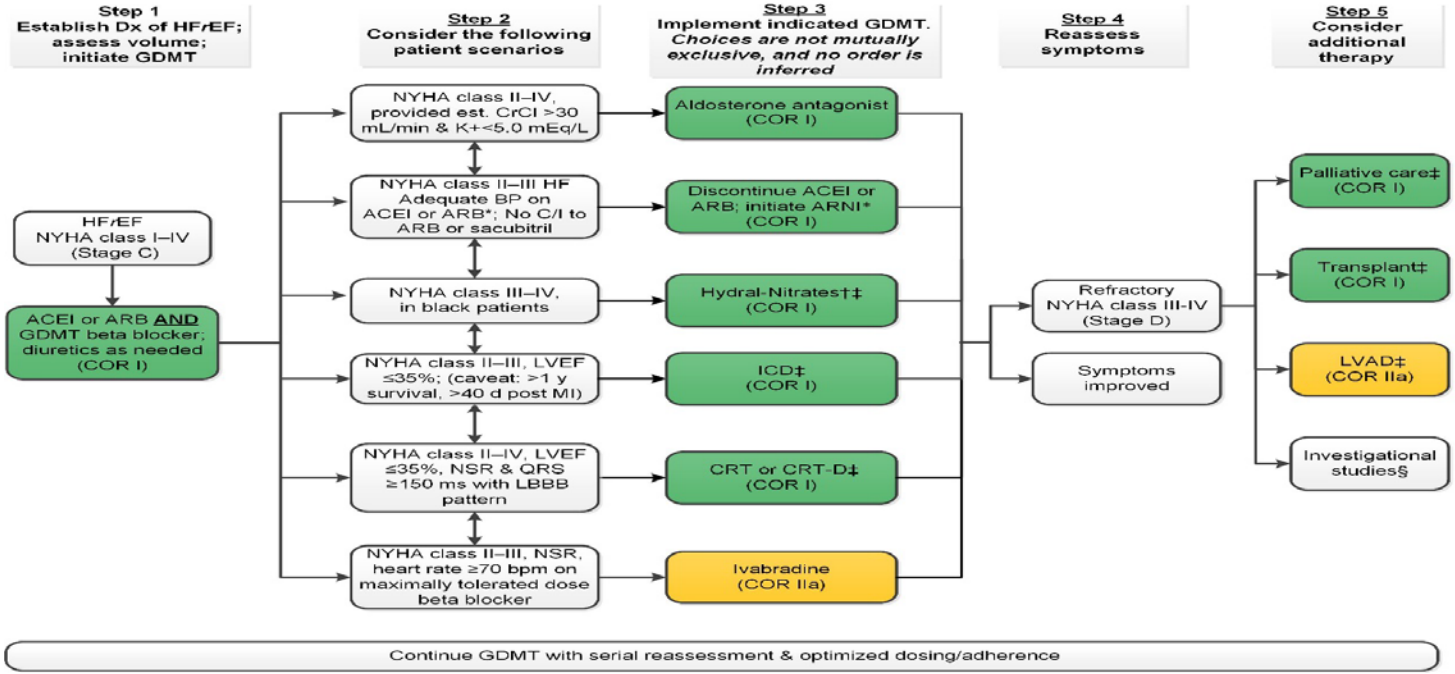
Treatment of HFrEF Stage C and D



†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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Journal of the American College of Cardiology

Volume 71, Issue 2, January 2018
DOI: 10.1016/j.jacc.2017.11.025

PDF Article

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 Task Force on Expert Consensus Decision Pathways

Clyde W. Yancy, James L. Januzzi Jr., Larry A. Allen, Javed Butler, Leslie L. Davis, Gregg C. Fonarow, Nasrien E. Ibrahim, Mariell Jessup, JoAnn Lindenfeld, Thomas M. Maddox, Frederick A. Masoudi, Shweta R. Motiwala, J. Herbert Patterson, Mary Norine Walsh and Alan Wasserman

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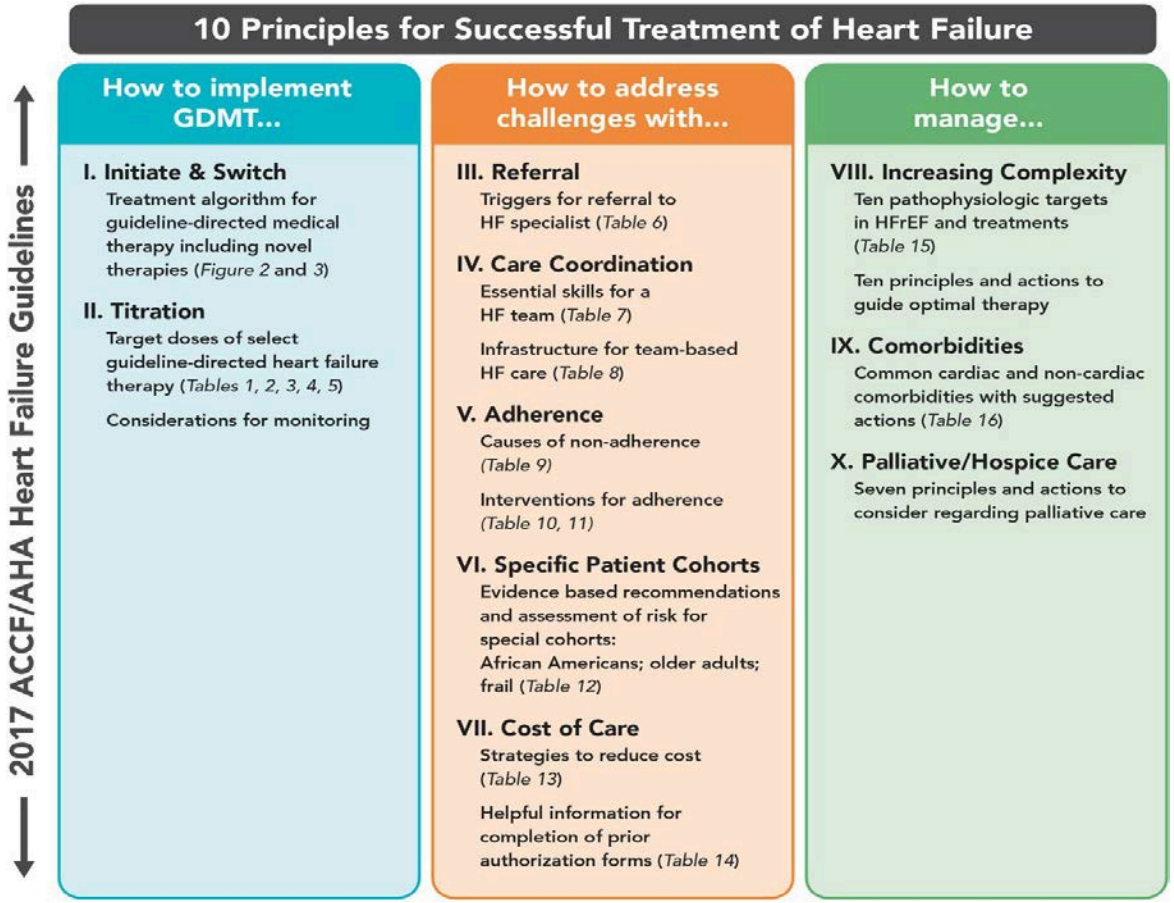

Clyde W. Yancy et al. JACC 2018;71:201-230

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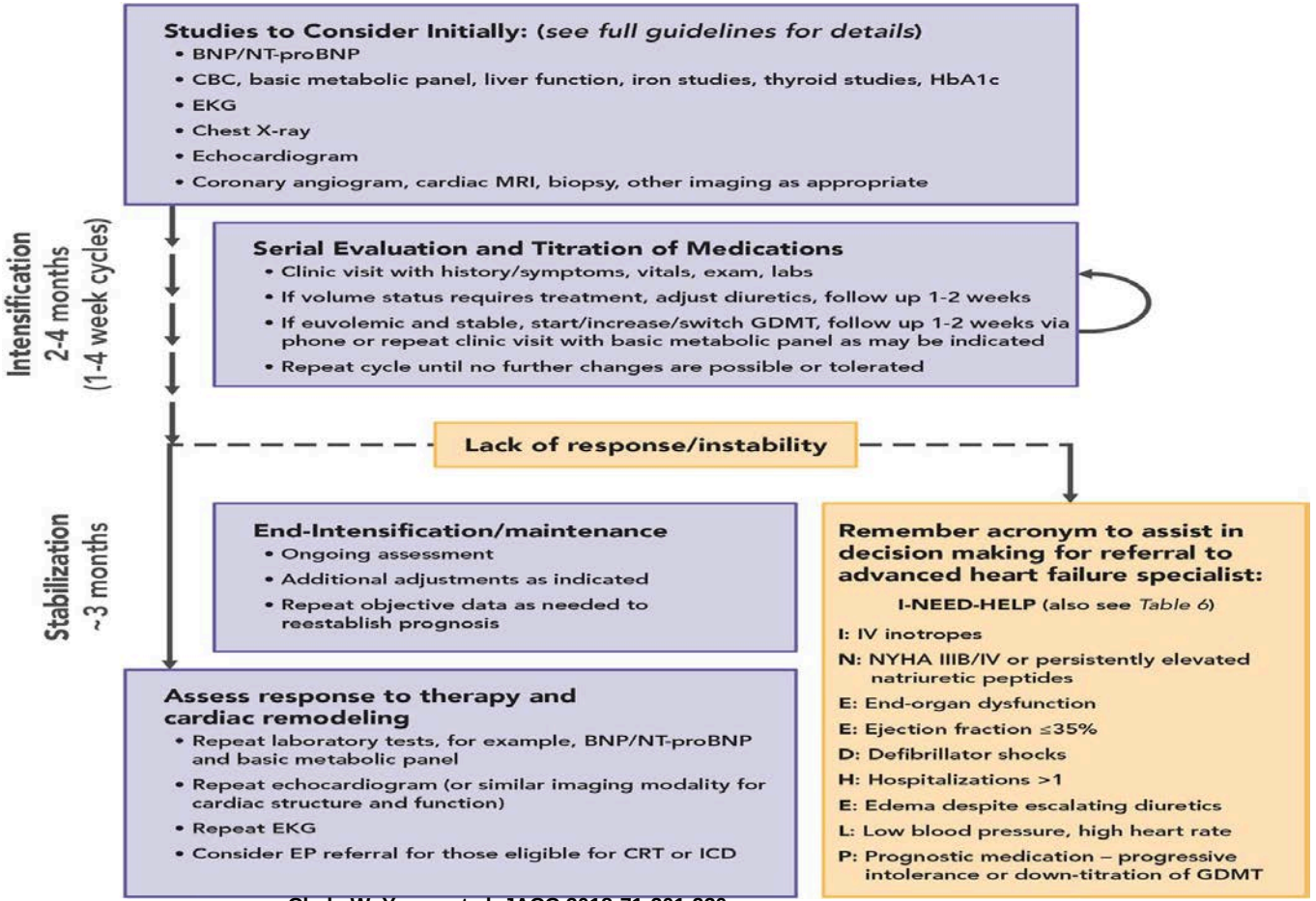

Clyde W. Yancy et al. JACC 2018;71:201-230

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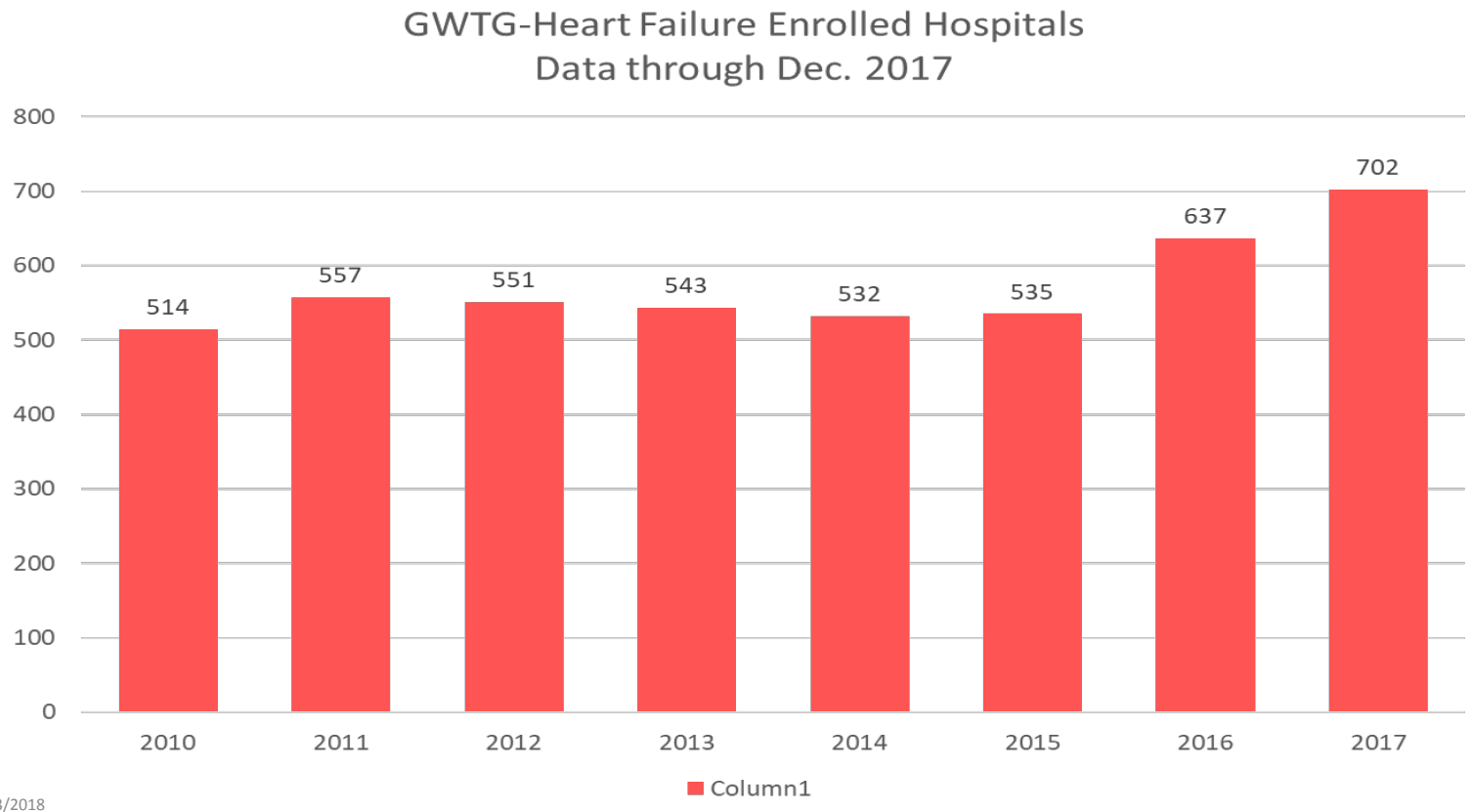
New Guideline Takeaway messages:

- New effective medical therapies have now been fully incorporated in evidence based guideline directed treatment algorithms
- There is an increasing complexity in the treatment of HFrEF; this will require careful assessment of the clinical context/scenario
- Powerful new data should drive the PREVENTION of heart failure
- Avoiding entry into the “HF Club” is the best therapeutic approach

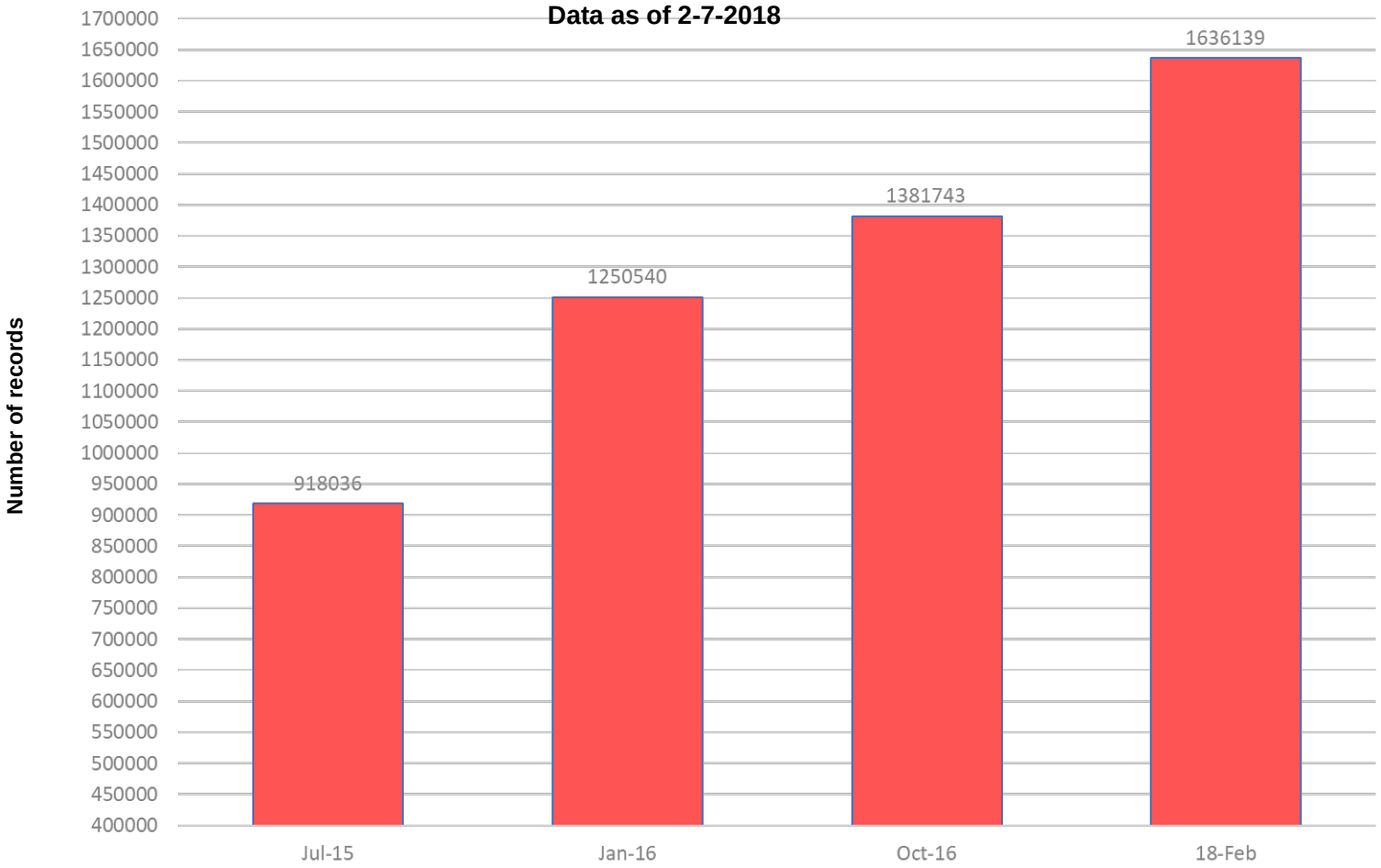
GWTG-HF Update and Reducing Readmissions Safely

Gregg C. Fonarow, MD FACC, FAHA, FHFSA
Eliot Corday Chair of Cardiovascular Medicine and Science
Co-Chief UCLA Division of Cardiology
Director, Ahmanson-UCLA Cardiomyopathy Center, Los Angeles, CA

GWTG-HF Hospital Participation



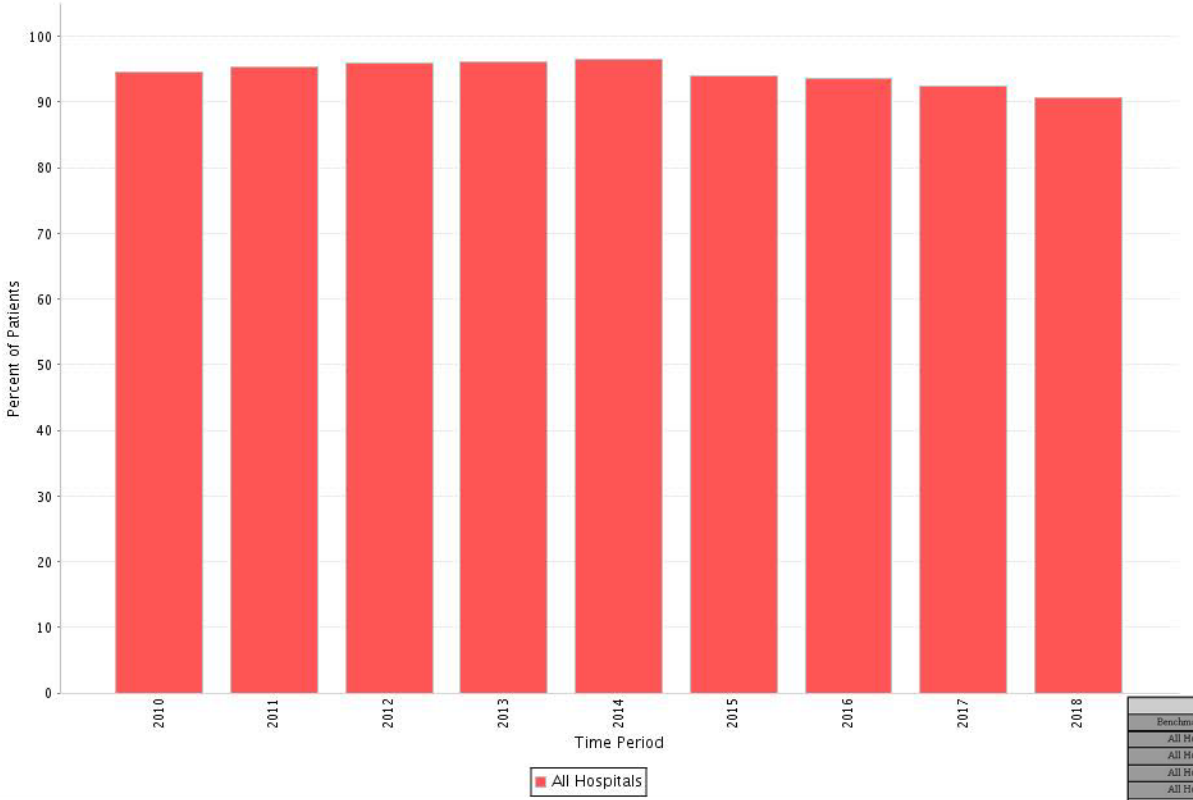
GWTG-HF: Hospitalization Episodes Entered



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 - 12/2018



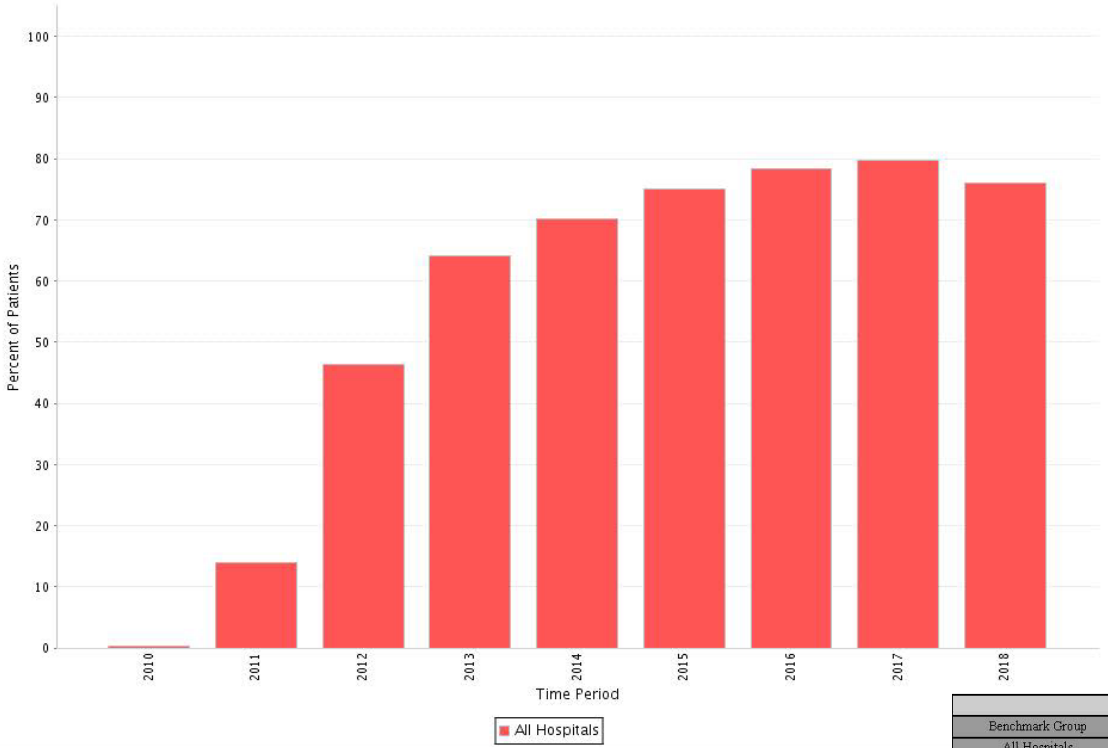
Data For: ACEI/ARB or ARNI at Discharge*

Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	35872	37898	94.7%
All Hospitals	2011	36964	38801	95.3%
All Hospitals	2012	35837	37352	95.9%
All Hospitals	2013	35671	37075	96.2%
All Hospitals	2014	35848	37180	96.4%
All Hospitals	2015	36780	39128	94.0%
All Hospitals	2016	38290	40900	93.6%
All Hospitals	2017	35533	38466	92.4%
All Hospitals	2018	588	648	90.7%

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 - 12/2018

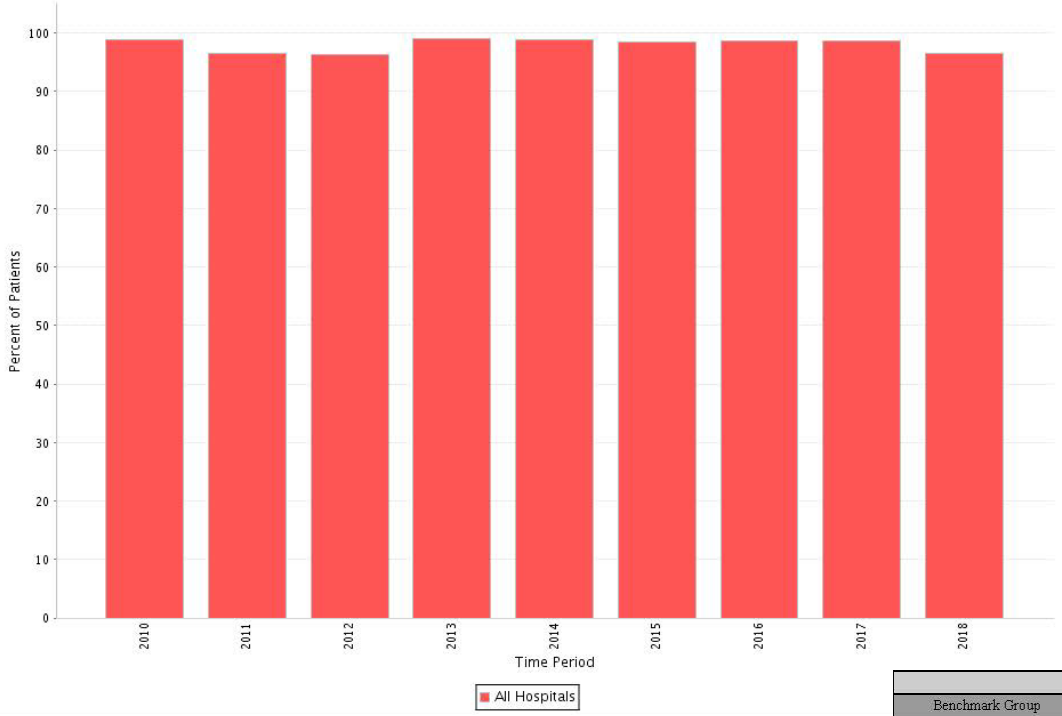


Data For: Post Discharge Appointment for Heart Failure Patients				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	323	96637	0.3%
All Hospitals	2011	14502	103989	13.9%
All Hospitals	2012	45670	98353	46.4%
All Hospitals	2013	61635	96032	64.2%
All Hospitals	2014	69578	99138	70.2%
All Hospitals	2015	77999	104070	74.9%
All Hospitals	2016	89868	114796	78.3%
All Hospitals	2017	90172	113236	79.6%
All Hospitals	2018	1501	1974	76.0%

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 - 12/2018

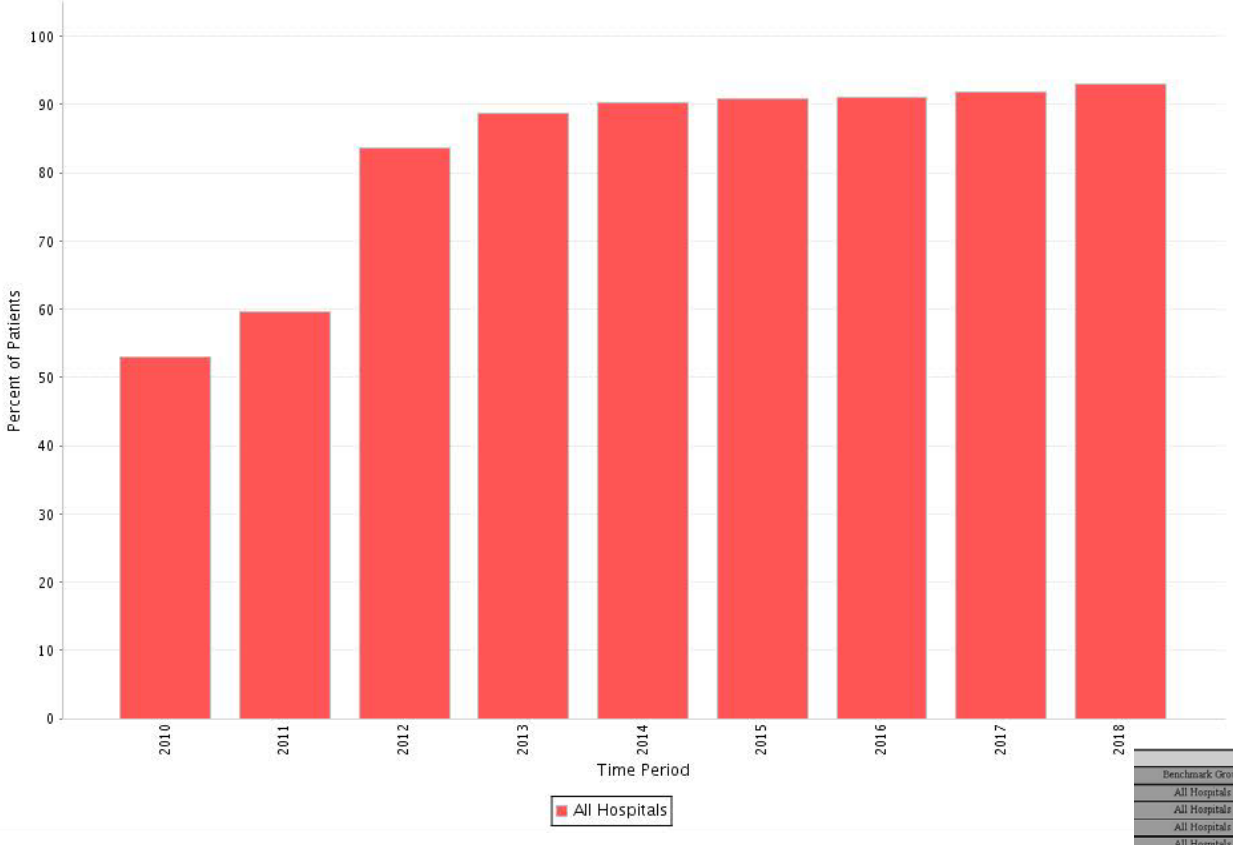


Data For: Measure LV Function*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	113920	115315	98.8%
All Hospitals	2011	121799	126173	96.5%
All Hospitals	2012	117686	122109	96.4%
All Hospitals	2013	119209	120417	99.0%
All Hospitals	2014	123850	125221	98.9%
All Hospitals	2015	129739	131656	98.5%
All Hospitals	2016	143365	145452	98.6%
All Hospitals	2017	141378	143303	98.7%
All Hospitals	2018	2411	2496	96.6%

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 - 12/2018



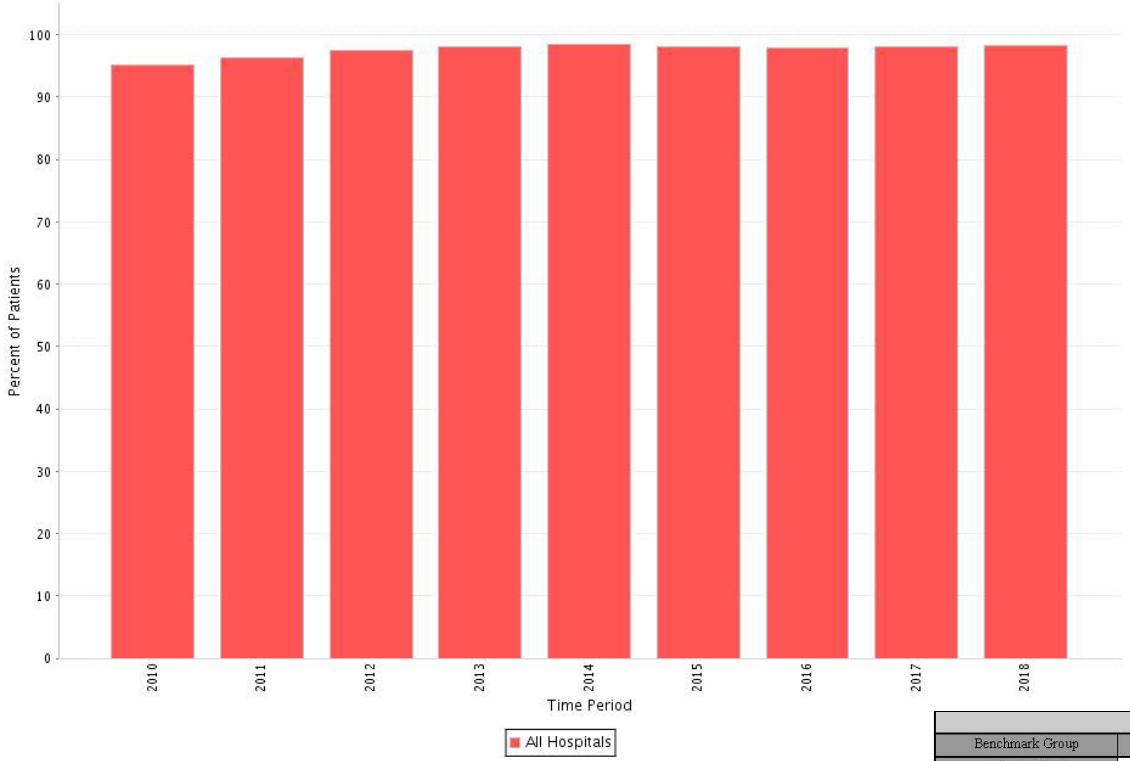
Data For: Evidence-Based Specific Beta Blockers*

Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	24745	46684	53.0%
All Hospitals	2011	29183	48921	59.7%
All Hospitals	2012	39599	47349	83.6%
All Hospitals	2013	42096	47411	88.8%
All Hospitals	2014	43588	48270	90.3%
All Hospitals	2015	46667	51330	90.9%
All Hospitals	2016	49529	54363	91.1%
All Hospitals	2017	47965	52233	91.8%
All Hospitals	2018	822	884	93.0%

Beta Blocker at Discharge

Percent of patients on Beta blockers at discharge

Time Period: 01/2010 - 12/2018

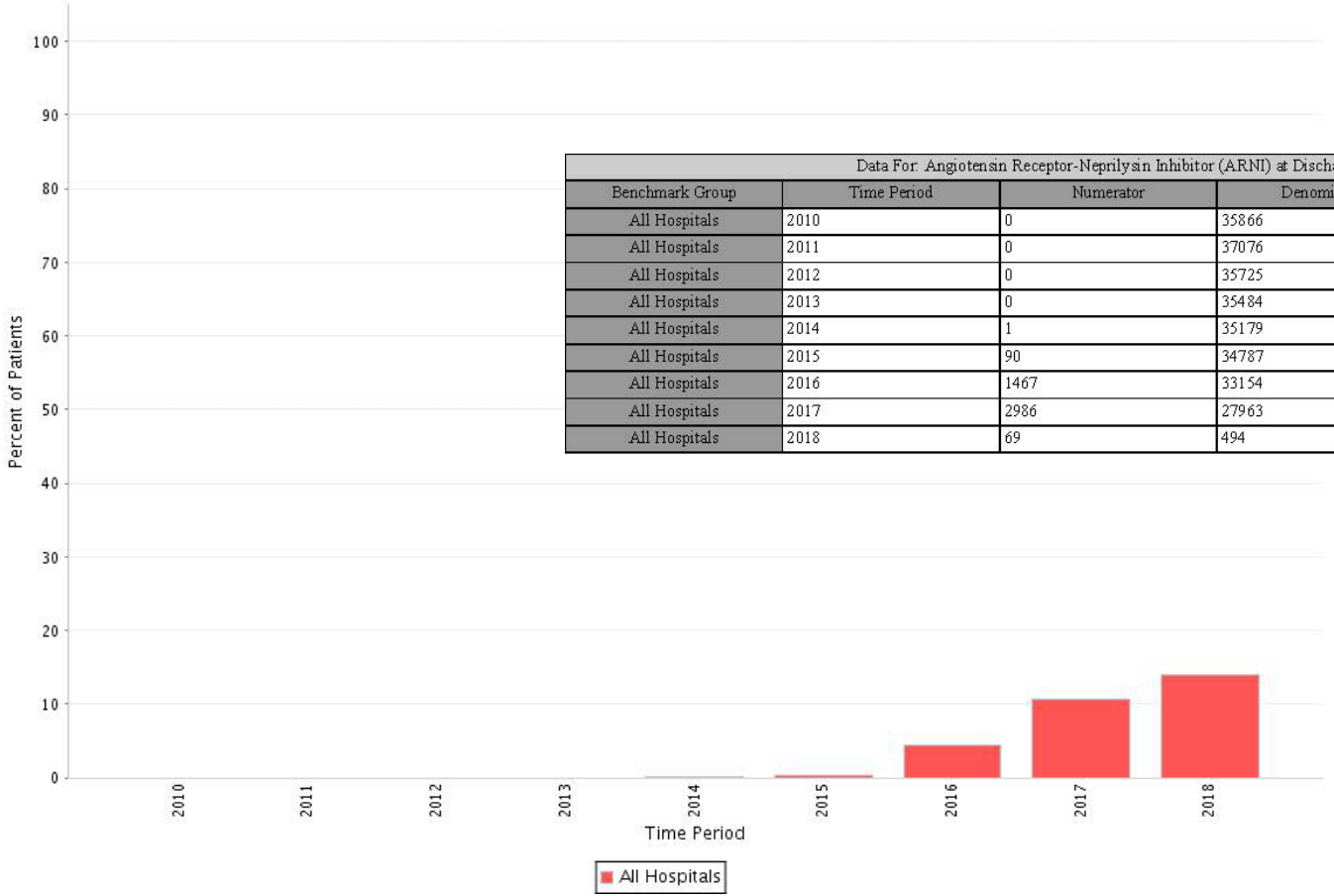


Data For: Beta Blocker at Discharge				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	44441	46684	95.2%
All Hospitals	2011	47119	48921	96.3%
All Hospitals	2012	46176	47349	97.5%
All Hospitals	2013	46484	47411	98.0%
All Hospitals	2014	47487	48270	98.4%
All Hospitals	2015	50357	51330	98.1%
All Hospitals	2016	53220	54363	97.9%
All Hospitals	2017	51291	52292	98.1%
All Hospitals	2018	895	910	98.4%

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 - 12/2018

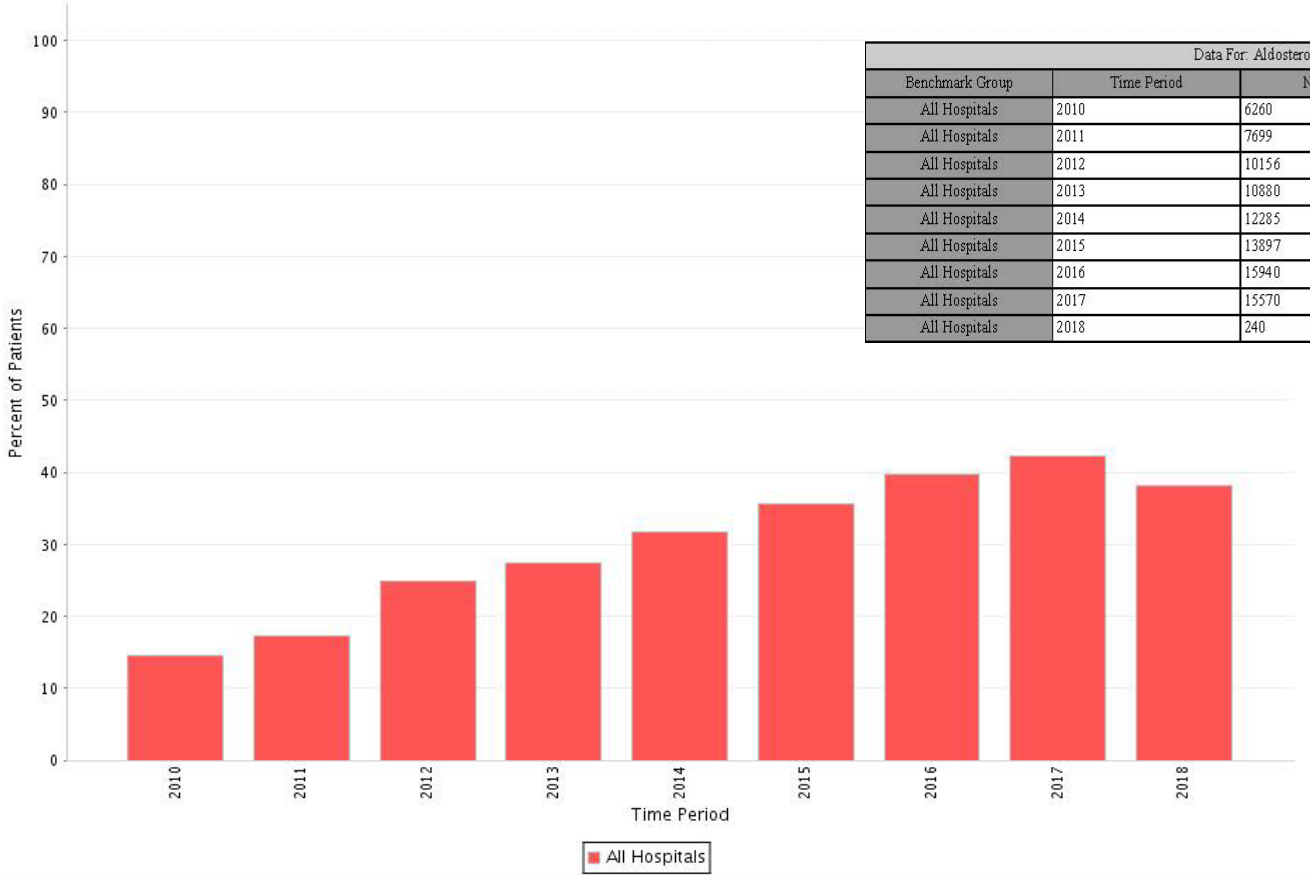


Data For: Angiotensin Receptor-Neprilysin Inhibitor (ARNI) at Discharge				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	0	35866	0.0%
All Hospitals	2011	0	37076	0.0%
All Hospitals	2012	0	35725	0.0%
All Hospitals	2013	0	35484	0.0%
All Hospitals	2014	1	35179	0.0%
All Hospitals	2015	90	34787	0.3%
All Hospitals	2016	1467	33154	4.4%
All Hospitals	2017	2986	27963	10.7%
All Hospitals	2018	69	494	14.0%

Aldosterone Antagonist at discharge*

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 - 12/2018

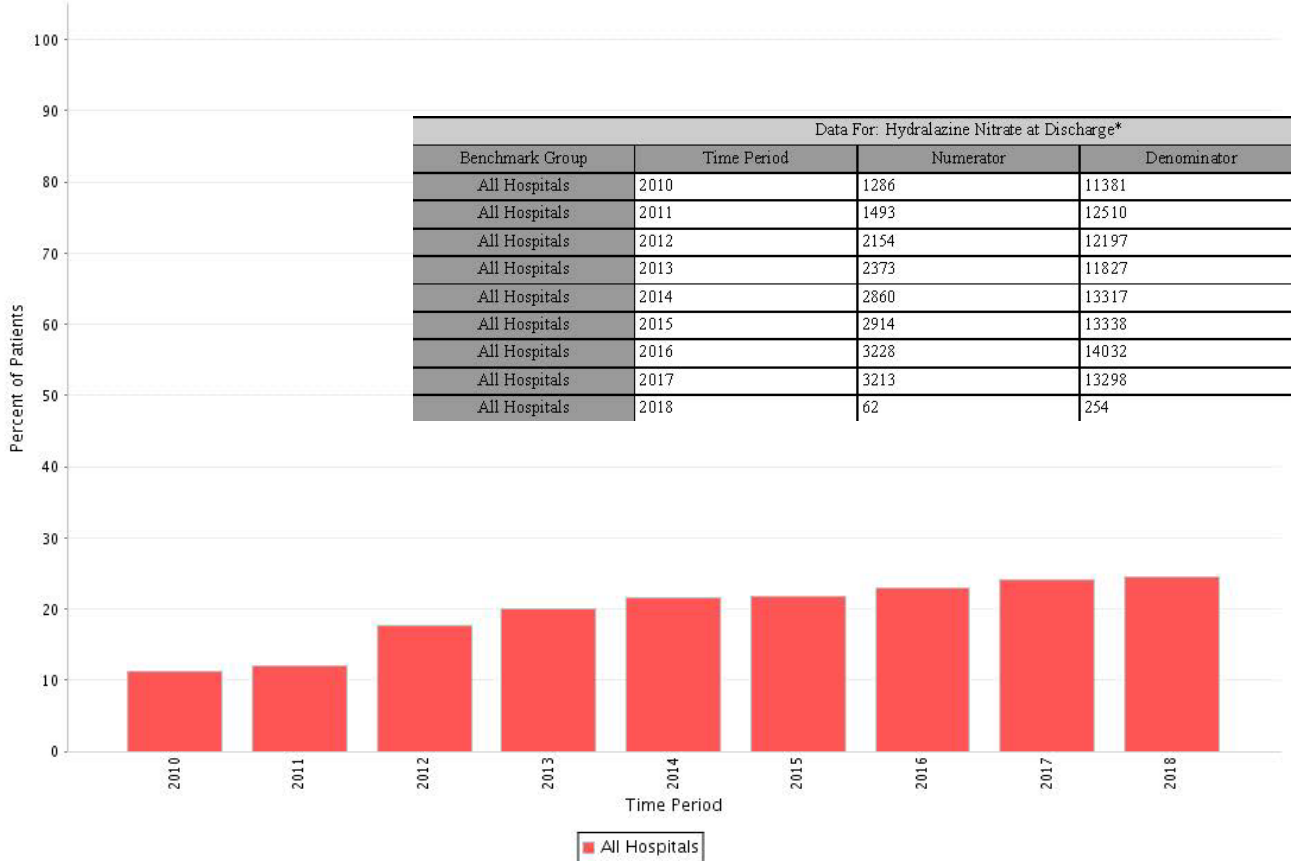


Data For: Aldosterone Antagonist at discharge*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	6260	42873	14.6%
All Hospitals	2011	7699	44405	17.3%
All Hospitals	2012	10156	40669	25.0%
All Hospitals	2013	10880	39687	27.4%
All Hospitals	2014	12285	38627	31.8%
All Hospitals	2015	13897	39098	35.5%
All Hospitals	2016	15940	40048	39.8%
All Hospitals	2017	15570	36851	42.3%
All Hospitals	2018	240	630	38.1%

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 - 12/2018

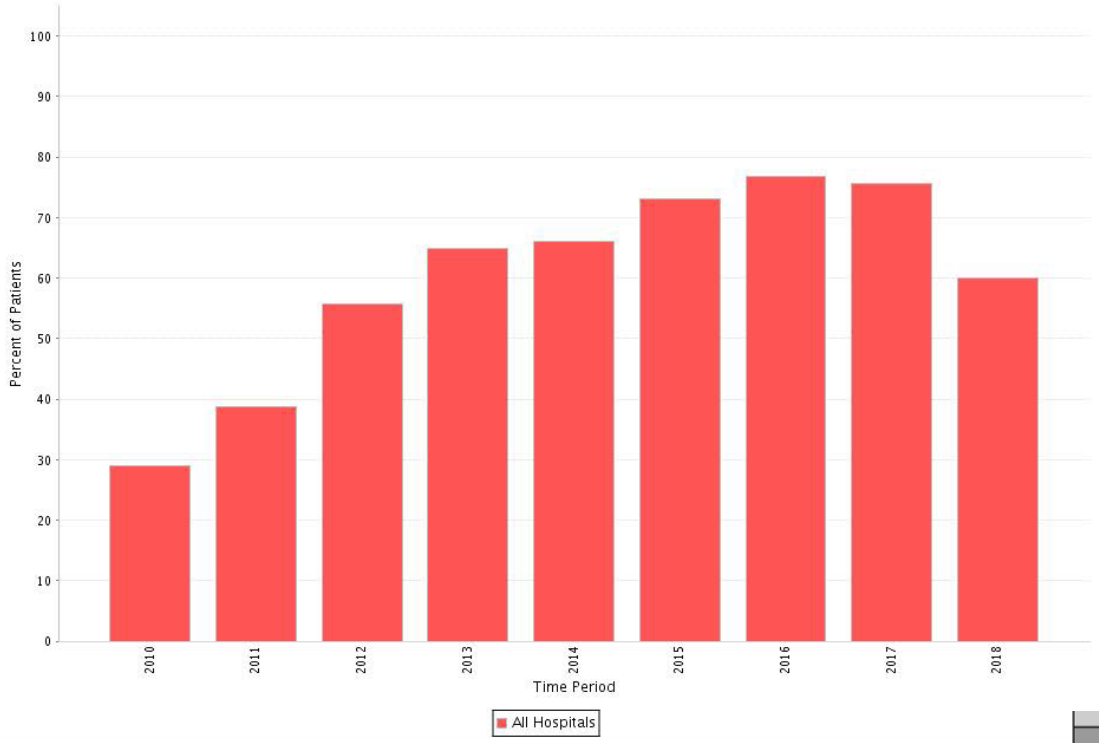


Data For: Hydralazine Nitrate at Discharge*				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	1286	11381	11.3%
All Hospitals	2011	1493	12510	11.9%
All Hospitals	2012	2154	12197	17.7%
All Hospitals	2013	2373	11827	20.1%
All Hospitals	2014	2860	13317	21.5%
All Hospitals	2015	2914	13338	21.8%
All Hospitals	2016	3228	14032	23.0%
All Hospitals	2017	3213	13298	24.2%
All Hospitals	2018	62	254	24.4%

Influenza Vaccination During Flu Season

Percent of patients that received an influenza vaccination prior to discharge during flu season

Time Period: 01/2010 - 12/2018



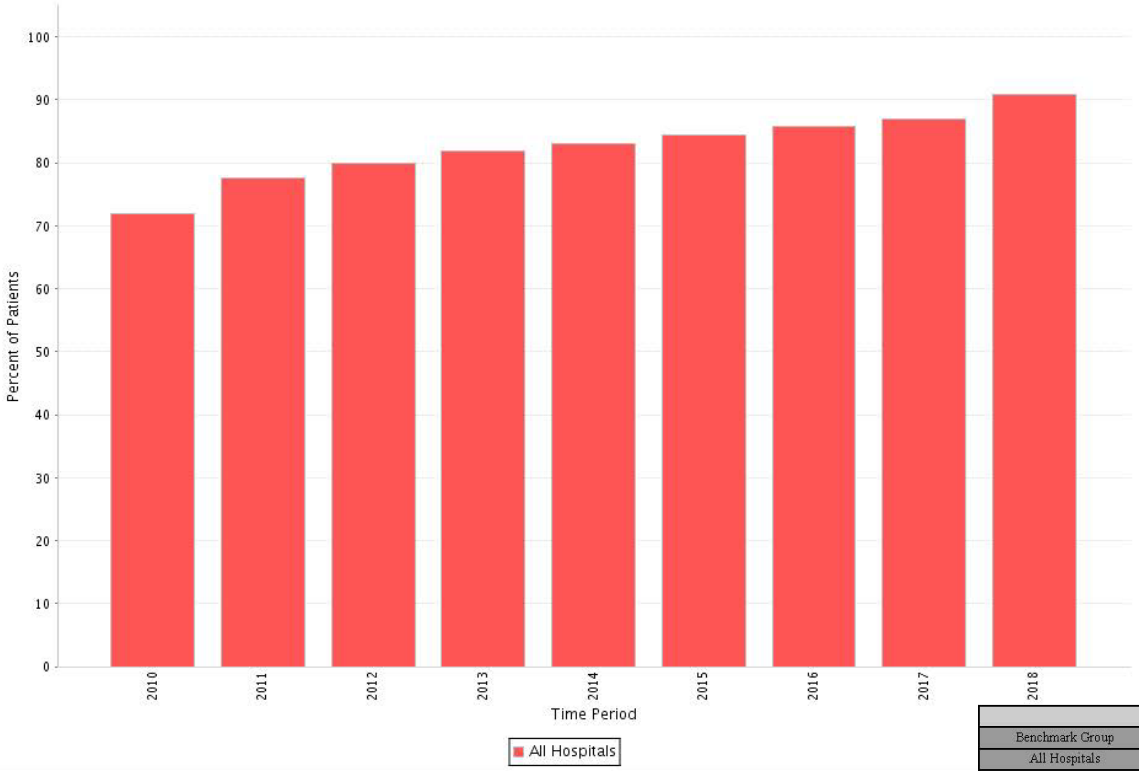
Data For: Influenza Vaccination During Flu Season

Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	16900	58193	29.0%
All Hospitals	2011	23095	59573	38.8%
All Hospitals	2012	30710	55181	55.7%
All Hospitals	2013	34258	52781	64.9%
All Hospitals	2014	36688	55519	66.1%
All Hospitals	2015	40711	55645	73.2%
All Hospitals	2016	45562	59355	76.8%
All Hospitals	2017	42497	56131	75.7%
All Hospitals	2018	1390	2319	59.9%

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 - 12/2018



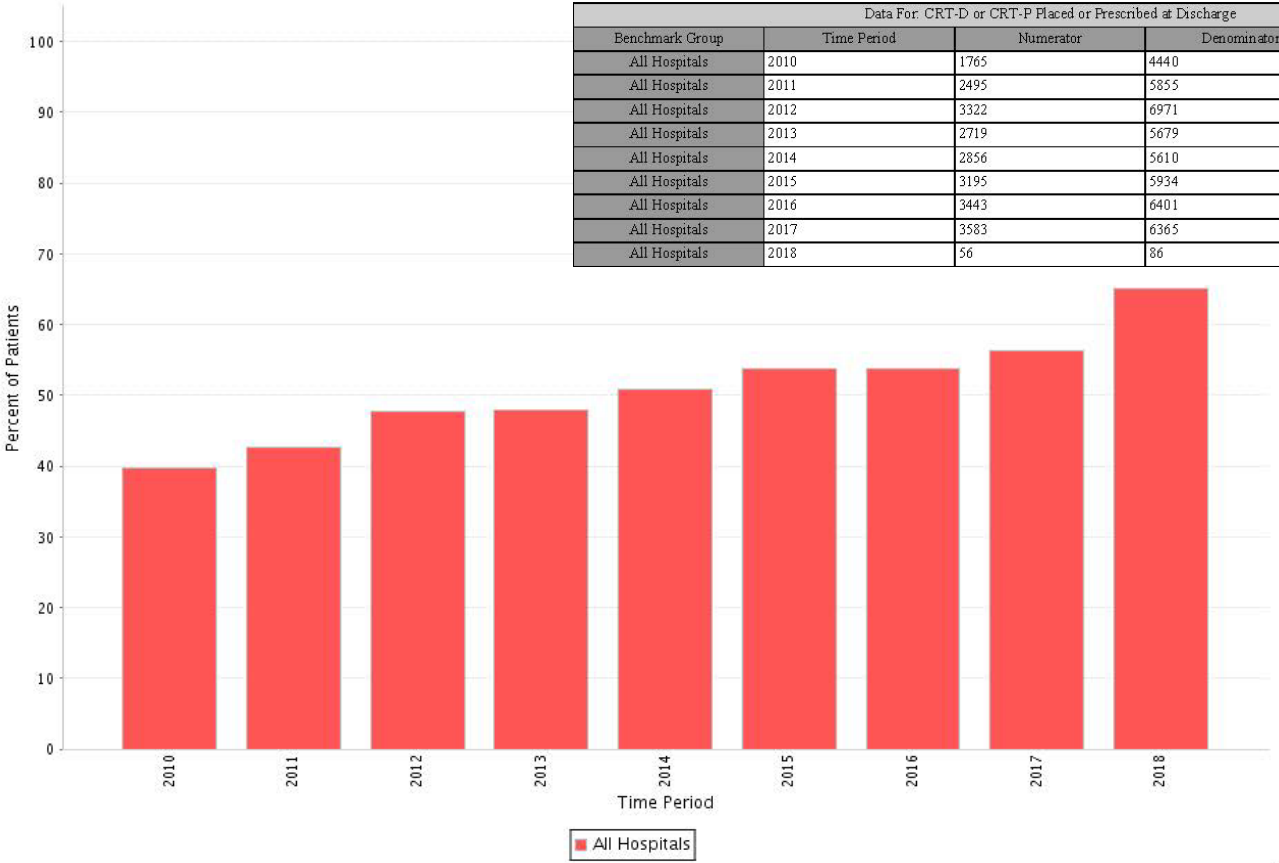
Data For: Anticoagulation for Atrial Fibrillation or Atrial Flutter				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	12076	16806	71.9%
All Hospitals	2011	15021	19367	77.6%
All Hospitals	2012	21317	26697	79.8%
All Hospitals	2013	24686	30147	81.9%
All Hospitals	2014	25241	30383	83.1%
All Hospitals	2015	30247	35821	84.4%
All Hospitals	2016	36405	42450	85.8%
All Hospitals	2017	38409	44201	86.9%
All Hospitals	2018	687	757	90.8%

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 - 12/2018

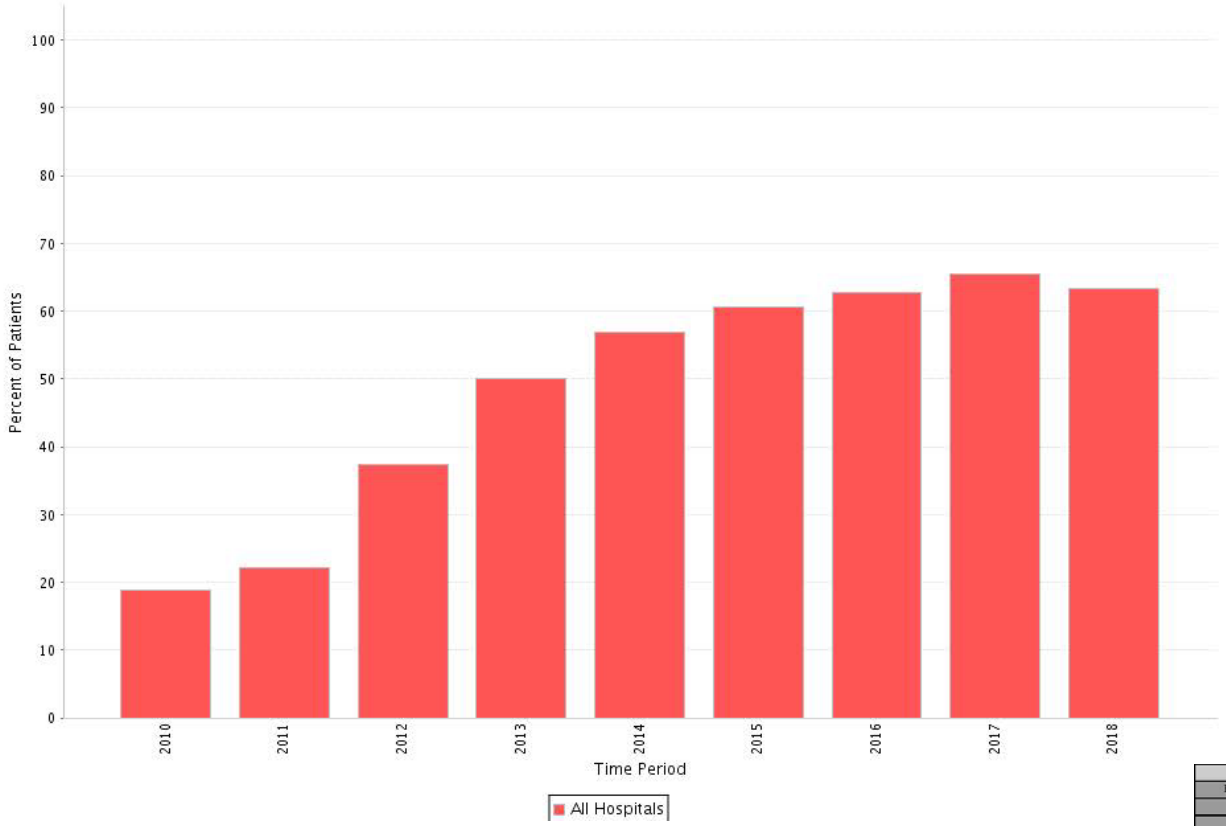
Data For: CRT-D or CRT-P Placed or Prescribed at Discharge				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	1765	4440	39.8%
All Hospitals	2011	2495	5855	42.6%
All Hospitals	2012	3322	6971	47.7%
All Hospitals	2013	2719	5679	47.9%
All Hospitals	2014	2856	5610	50.9%
All Hospitals	2015	3195	5934	53.8%
All Hospitals	2016	3443	6401	53.8%
All Hospitals	2017	3583	6365	56.3%
All Hospitals	2018	56	86	65.1%



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 - 12/2018



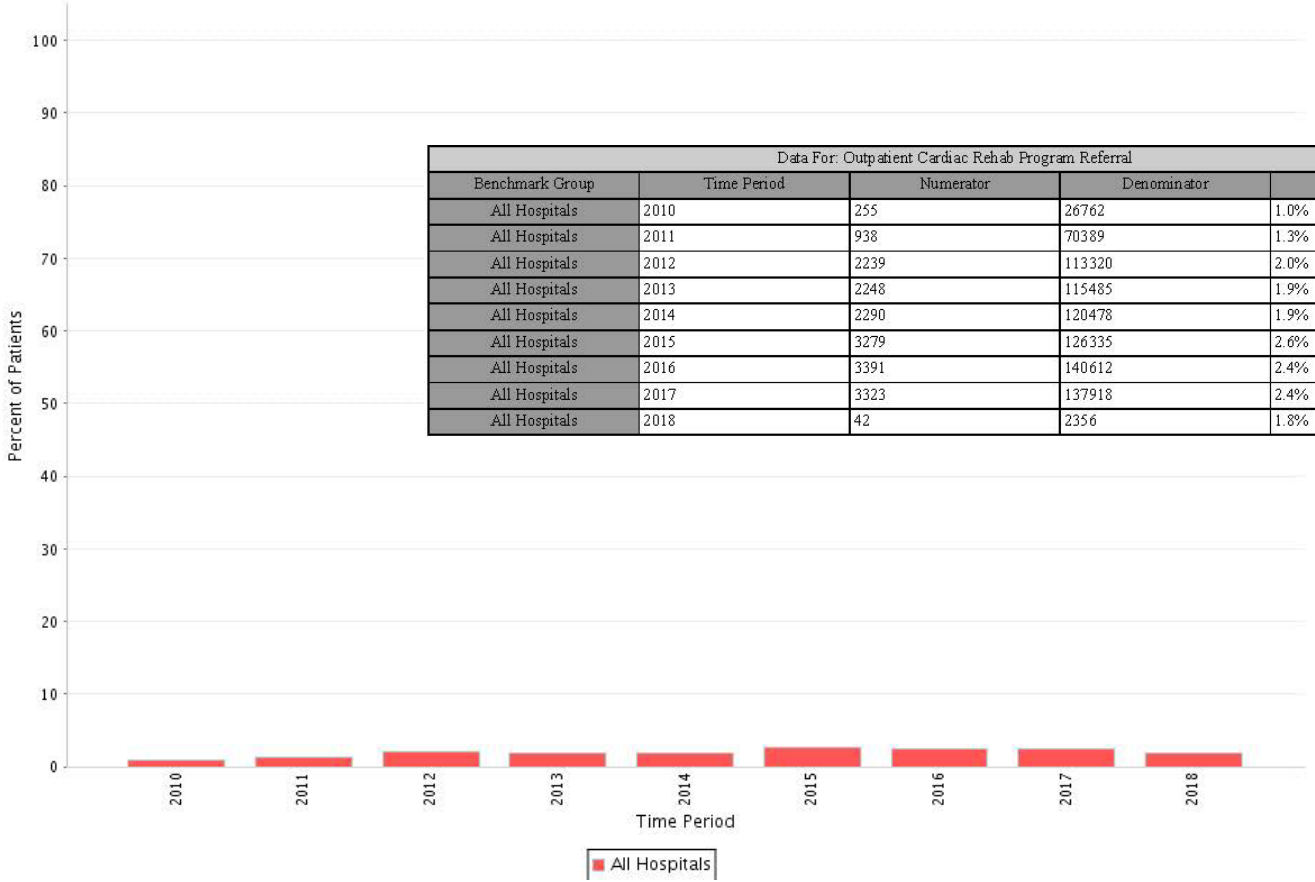
Data For: Follow-up Visit Within 7 Days or Less

Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	12201	64547	18.9%
All Hospitals	2011	18063	81895	22.1%
All Hospitals	2012	34691	92622	37.5%
All Hospitals	2013	46600	92964	50.1%
All Hospitals	2014	53839	94779	56.8%
All Hospitals	2015	60614	100154	60.5%
All Hospitals	2016	70170	111873	62.7%
All Hospitals	2017	72548	110652	65.6%
All Hospitals	2018	1247	1966	63.4%

Outpatient Cardiac Rehab Program Referral

Percent of heart failure patients referred to outpatient cardiac rehab program.

Time Period: 01/2010 - 12/2018



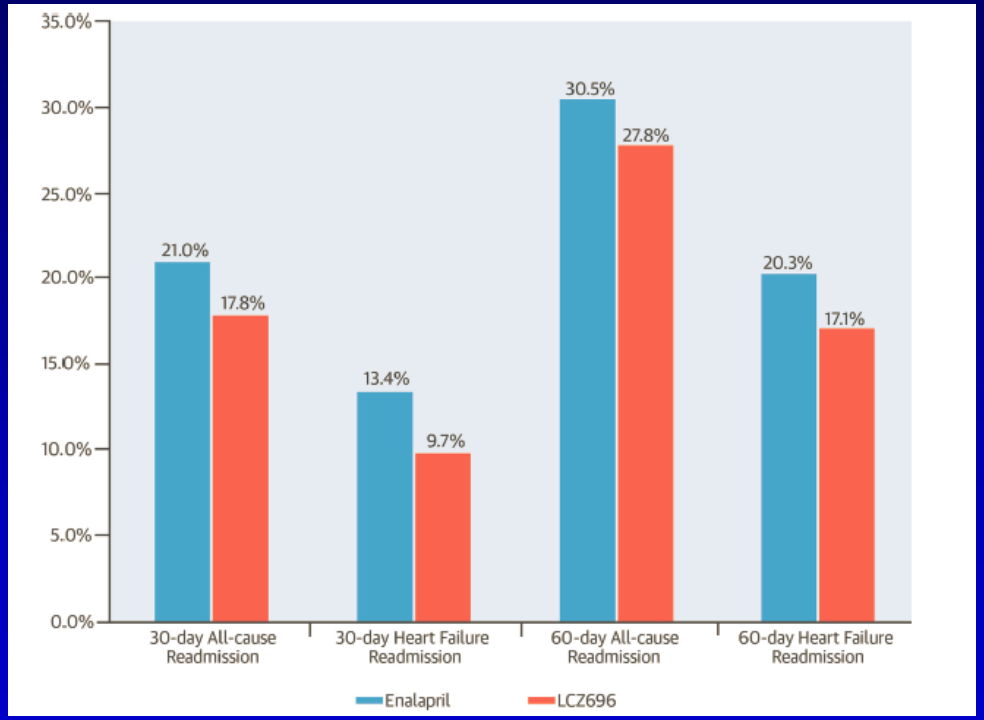
Data For: Outpatient Cardiac Rehab Program Referral				
Benchmark Group	Time Period	Numerator	Denominator	% of Patients
All Hospitals	2010	255	26762	1.0%
All Hospitals	2011	938	70389	1.3%
All Hospitals	2012	2239	113320	2.0%
All Hospitals	2013	2248	115485	1.9%
All Hospitals	2014	2290	120478	1.9%
All Hospitals	2015	3279	126335	2.6%
All Hospitals	2016	3391	140612	2.4%
All Hospitals	2017	3323	137918	2.4%
All Hospitals	2018	42	2356	1.8%

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.

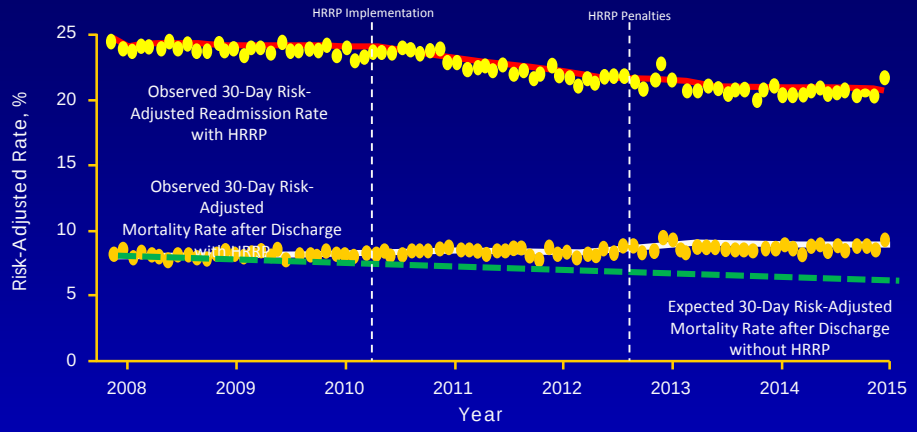
Desai, A.S. et al. J Am Coll Cardiol. 2016;68(3):241–8.

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.

Author Affiliations: Author affiliations are listed at the end of this article.

Corresponding Author: Gregg C. Fonarow, MD, Division of Cardiology, Ahmanson-UCLA Cardiomyopathy Center, Ronald Reagan-UCLA Medical Center, 10833 LeConte Ave, Room 47-123 CHS, Los Angeles, CA 90095-1679 (gfonarow@mednet.ucla.edu).

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

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 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.

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.

Conclusions

- GWTG-HF is focused on improving on meaningful processes of care and patient-centered 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 for both clinicians, in their care, and for CMS in its attempt at adjudication and penalty assignment to hospitals
- 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.*

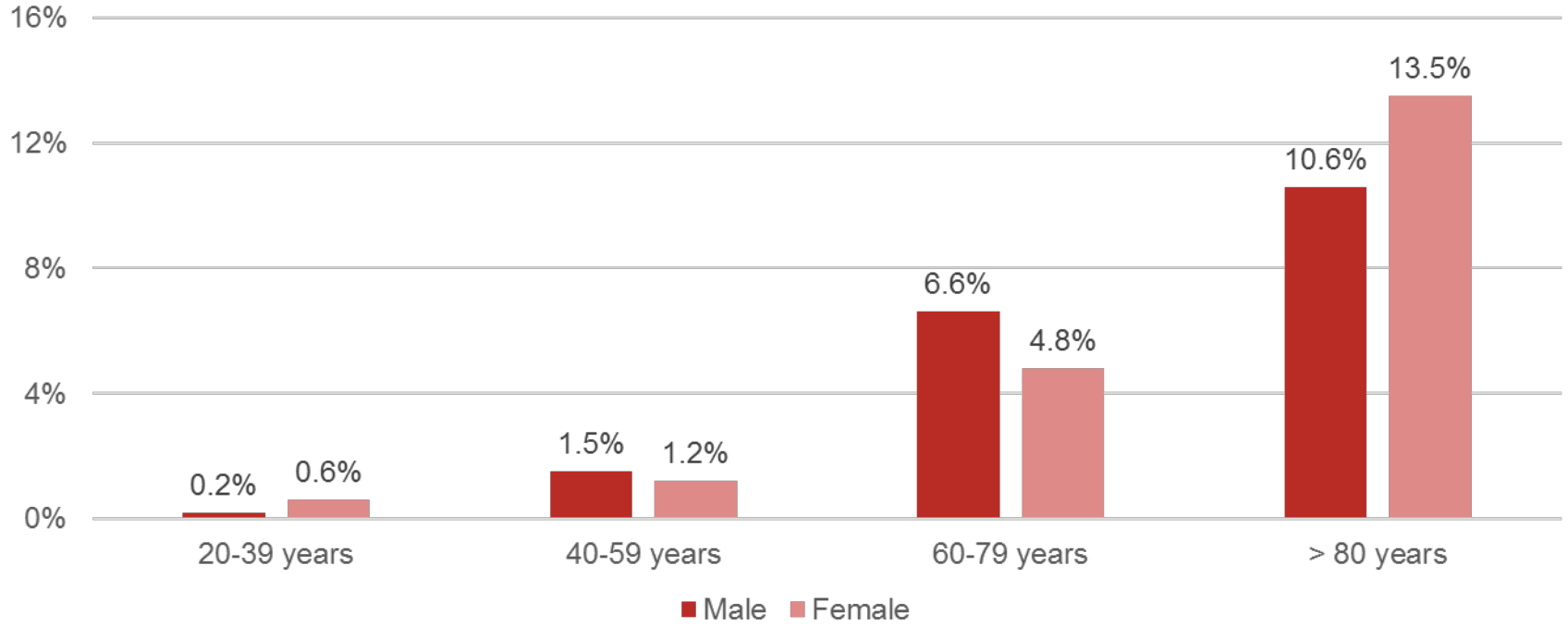
Characteristic	LCZ696 (N=4187)	Enalapril (N=4212)
Age — yr	63.8±11.5	63.8±11.3
Female sex — no. (%)	879 (21.0)	953 (22.6)
Race or ethnic group — no. (%)†		
White	2763 (66.0)	2781 (66.0)
Black	213 (5.1)	215 (5.1)
Asian	759 (18.1)	750 (17.8)
Other	452 (10.8)	466 (11.1)
Region — no. (%)		
North America	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)

McMurray JJ et al. *N Engl J Med* 2014;371:993-1004.

Populations of Interest

- Elderly
- Females
- Racial and ethnic minorities
- Specific cardiomyopathies
- Comorbid conditions

Heart Failure Care in the Elderly

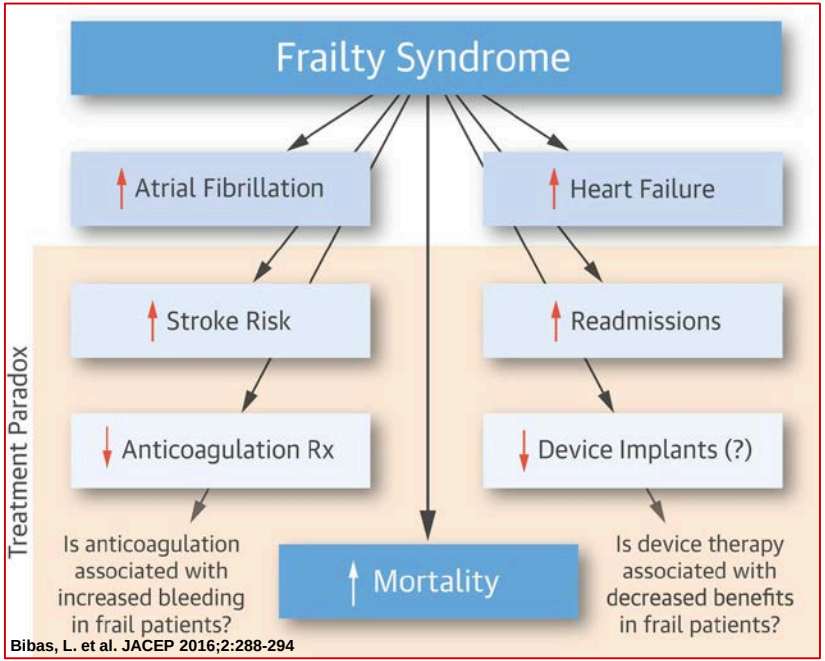


Mozaffarian D. et al. *Circulation*. 2015 Jan 27;131(4):e29-322

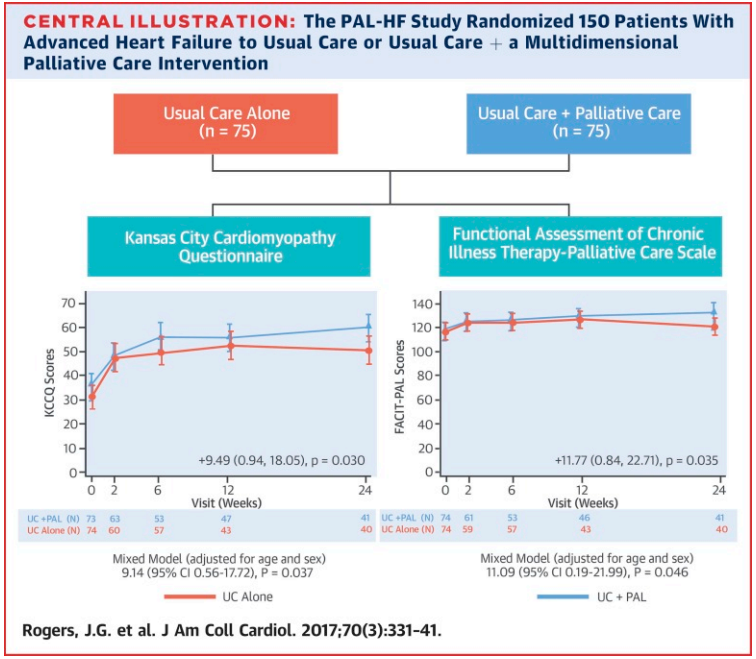
Heart Failure Care in the Elderly

- 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)
- 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

Heart Failure Care in the Elderly in 2018



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



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

Race/Ethnic Differences in Outcomes Among Hospitalized Medicare Patients With Heart Failure and Preserved Ejection Fraction

Boback Ziaeian, MD, PhD,[a,b] Paul A. Heidenreich, MD, MS,[c] Haolin Xu, MS,[d] Adam D. DeVore, MD, MHS,[d,e] Roland A. Matsouaka, PhD,[d,f] Adrian F. Hernandez, MD, MHS,[d,e] Deepak L. Bhatt, MD, MPH,[g] Clyde W. Yancy, MD,[h] Gregg C. Fonarow, MD[i]

ABSTRACT

OBJECTIVES This study analyzed HFpEF patient characteristics and clinical outcomes according to race/ethnicity and adjusted for patient and hospital characteristics along with socioeconomic status (SES).

BACKGROUND The proportion of hospitalizations for heart failure with preserved ejection fraction (HFpEF) has increased over the last decade. Whether the short- and long-term outcomes differ between racial/ethnic groups is not well described.

METHODS The Get With The Guidelines-Heart Failure registry was linked to Medicare administrative data to identify

Precision Medicine in Heart Failure?

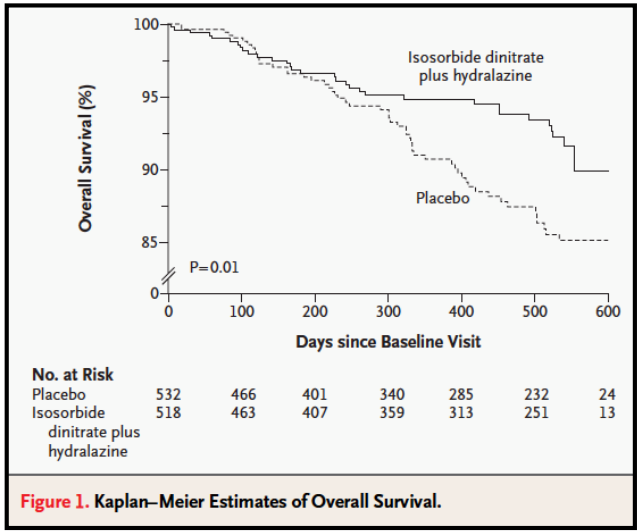


Figure 1. Kaplan–Meier Estimates of Overall Survival.

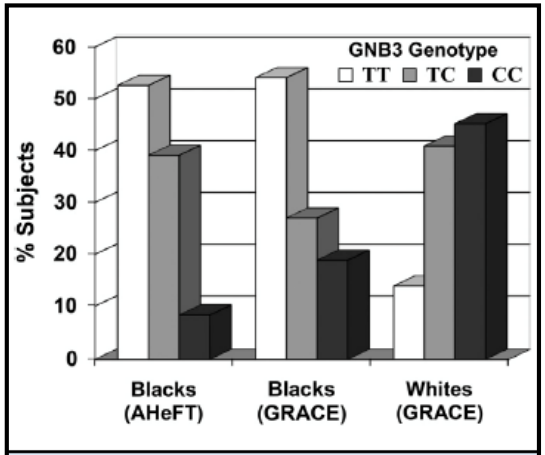


FIGURE 1 GNB3 Genotype Frequencies in GRAHF (A-HeFT) and the Black and White Subsets From GRACE

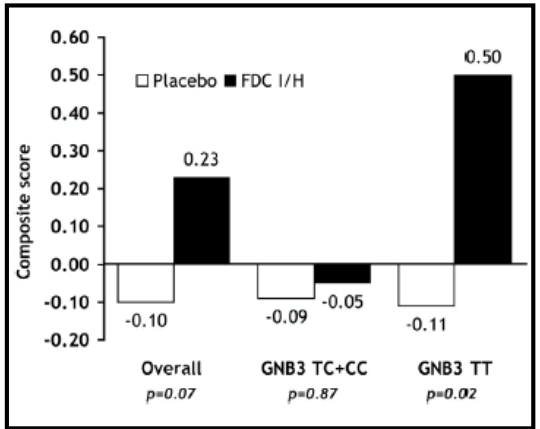


FIGURE 2 Composite Score in GRAHF by Treatment With FDC I/H Versus Placebo overall and in GNB3 Genotype Subsets GNB3 C (CT+CC) and GNB3 TT

Taylor et al. *N Engl J Med* 2004;351:2049-57
McNamara et al. *J Am Coll Cardiol HF* 2014;2:551–7)

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,

Important Comorbidites in Heart Failure


Renal dysfunction


COPD


Diabetes

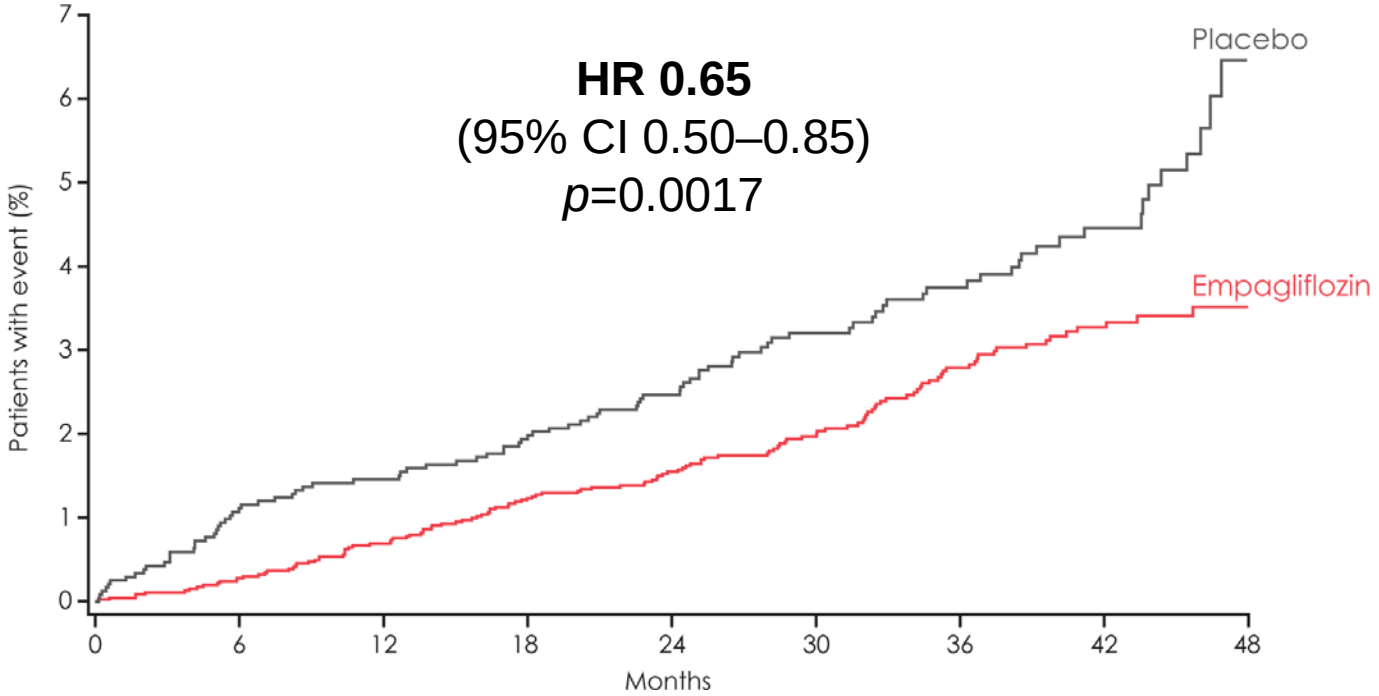

Sleep apnea


Fe Deficiency +/- anemia


Depression


Frailty

EMPA-REG: Hospitalizations for Heart Failure



Zinman B et al. *N Engl J Med* 2015
Fitchett D et al. *Eur Heart J* 2016

Conclusions

- HF care in the elderly deserves special consideration to improve outcomes and decrease risk of adverse effects
- Opportunities for precision medicine exist in HF through the study of differences in biology by race/ethnicity and specific cardiomyopathies
- Comorbid conditions in HF are common and may offer opportunities to improve care
- Pam Peterson will speak next on 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

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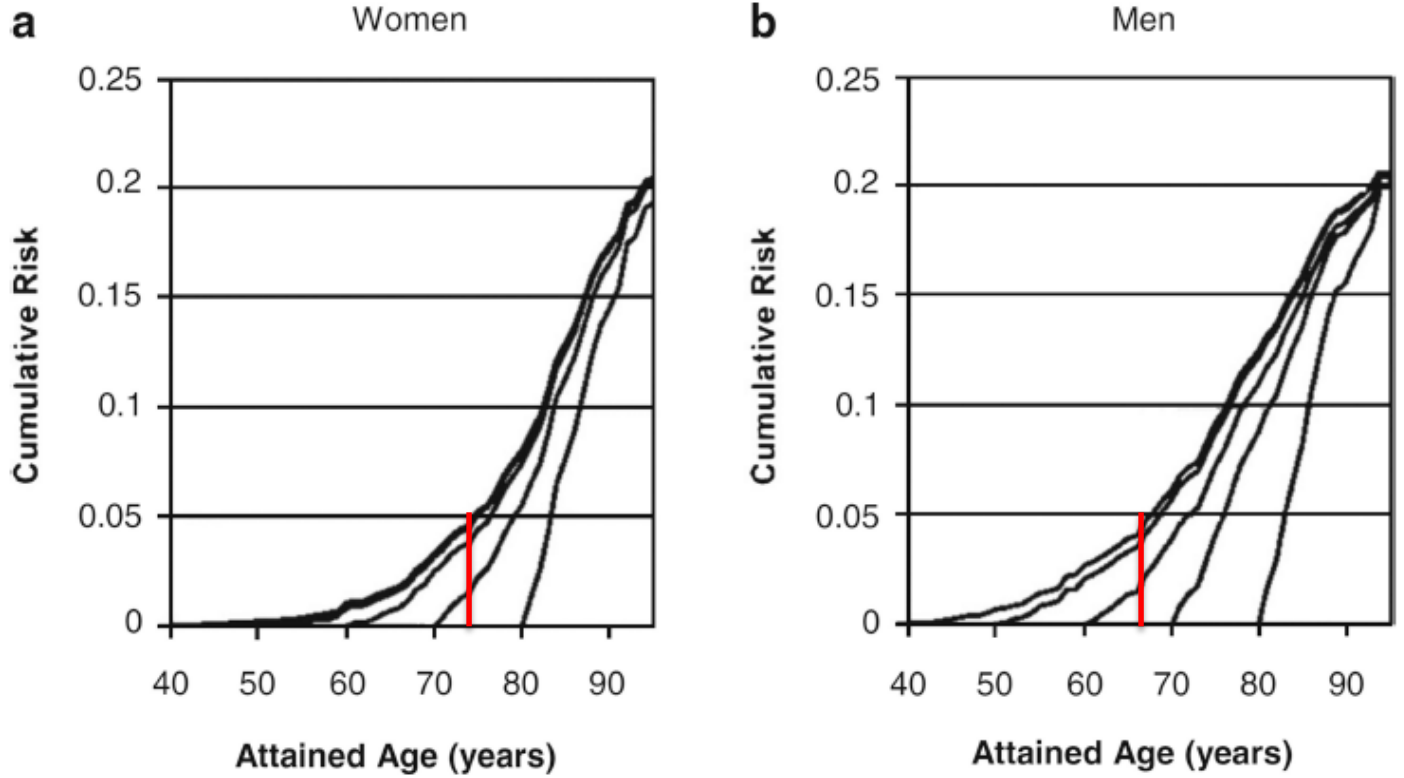
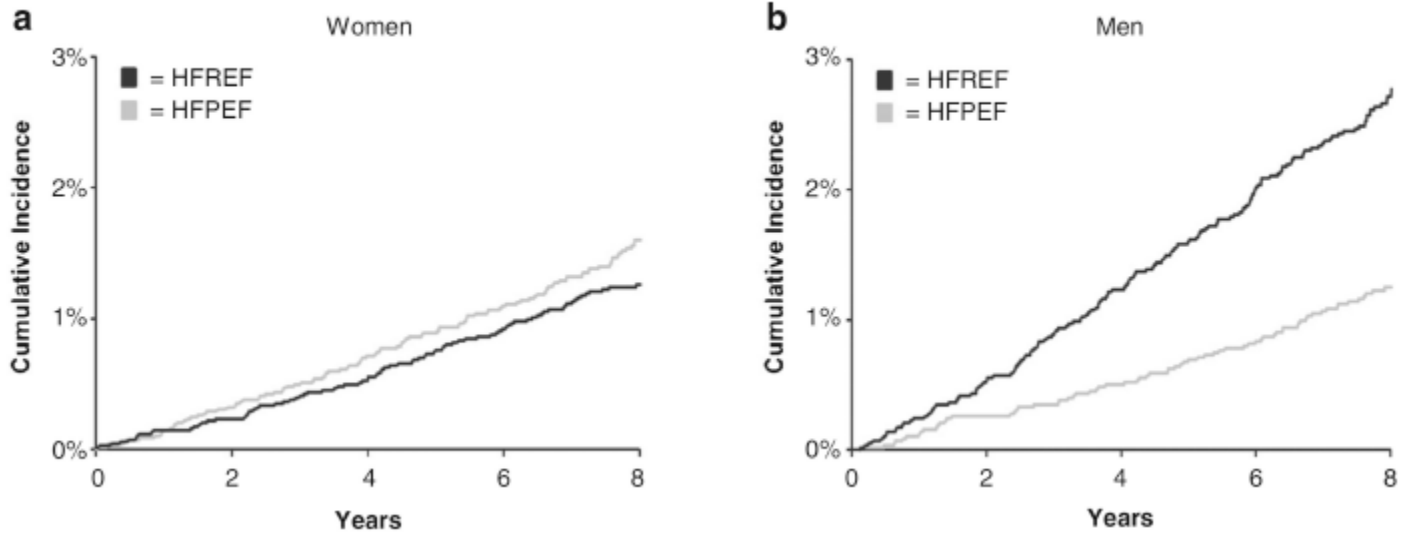
Lifetime Risk of Heart Failure



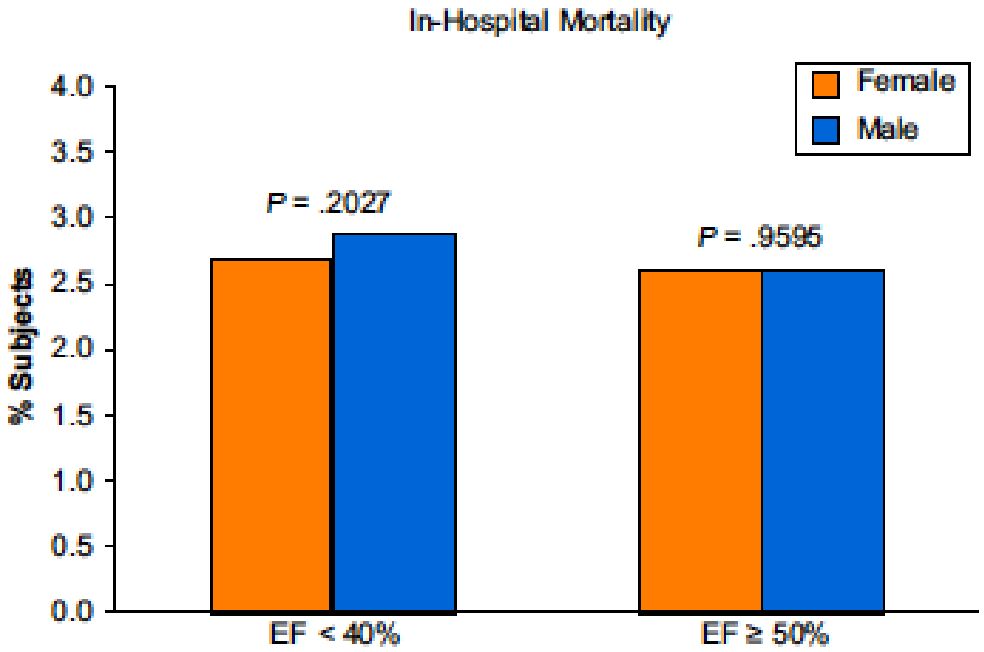
Loyd-Jones DM et al. Circulation 2002; 106:3068

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

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 Treatment of HF

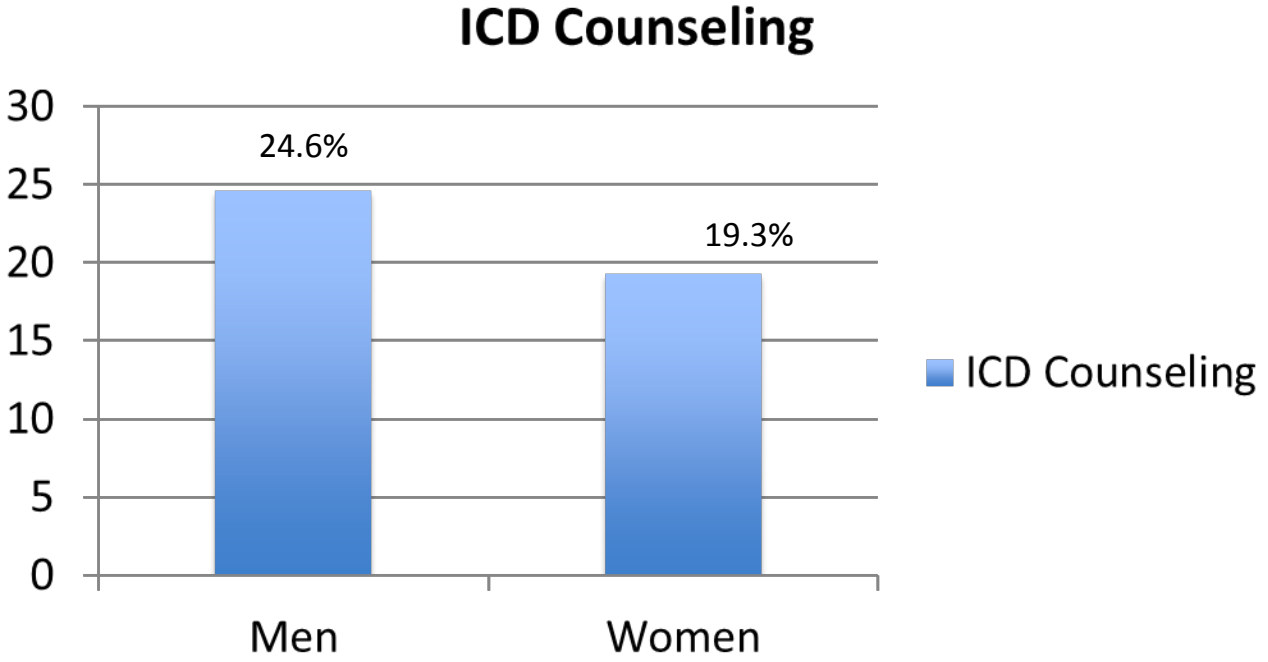
- Women are under-represented in RCTs
- However, available data:
  - Stratified analyses of RCTs
  - Pooled data/ meta-analyses
  - Observational data
- Guidelines do not differ based on sex
- All quality metrics apply equally to men and women

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

Klein L et al. Circ Heart Fail 2011

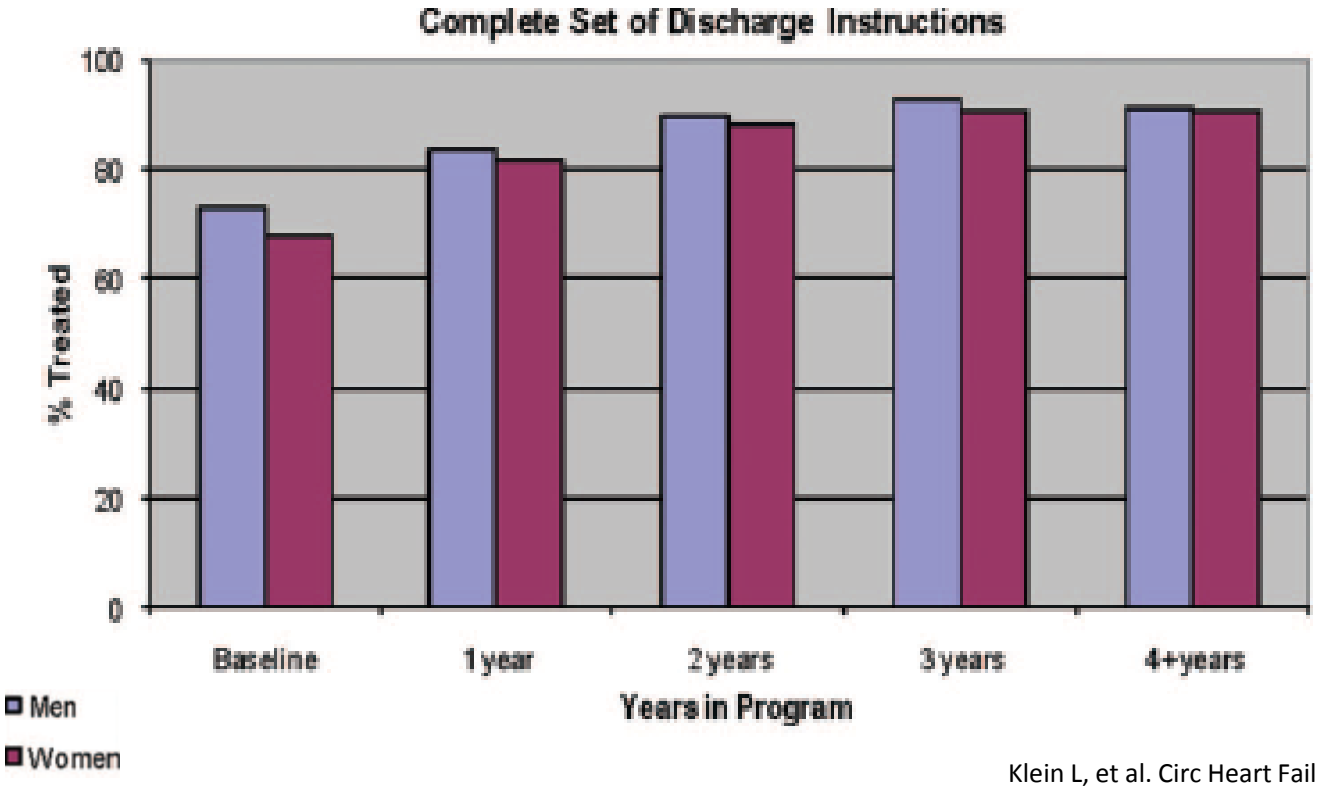
Sex differences in ICD Counseling 2011-2014



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

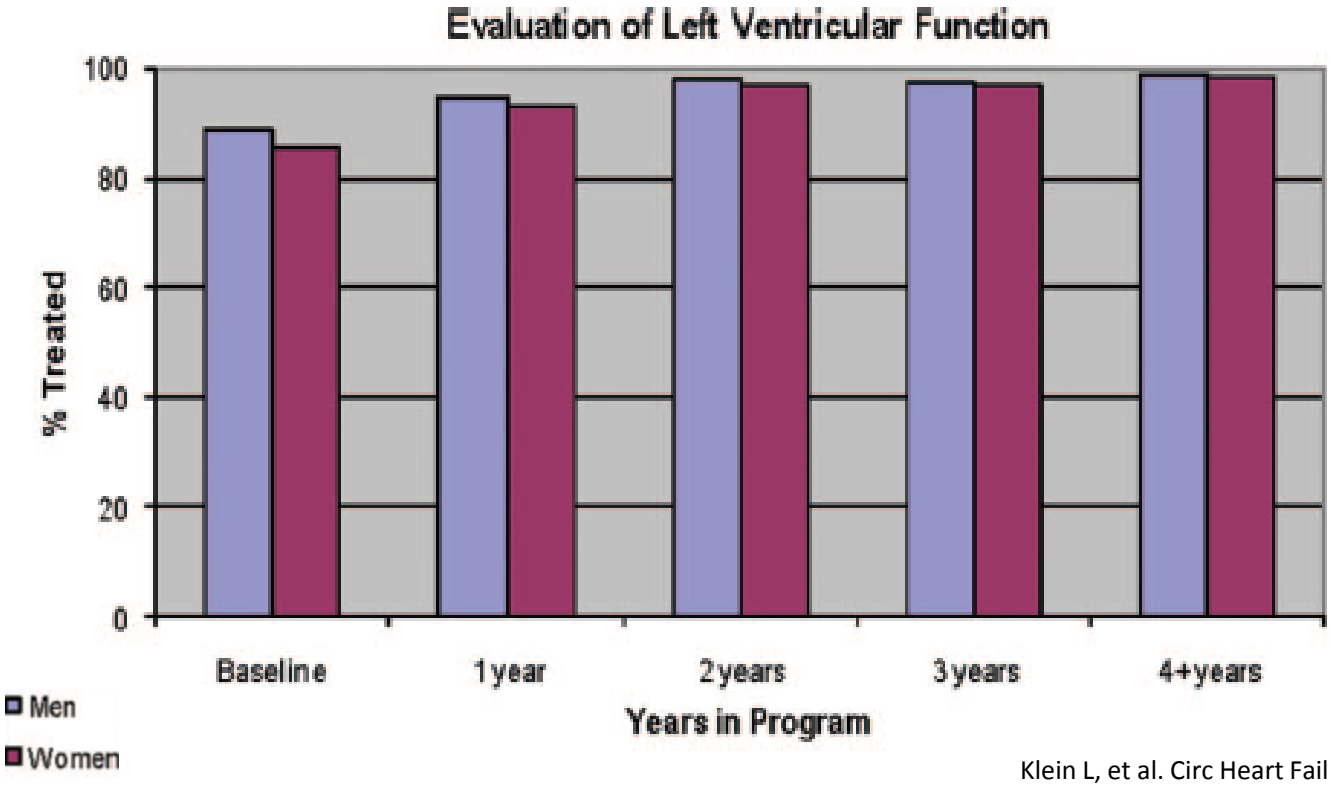
Hess PL, et al. Circulation 2016

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

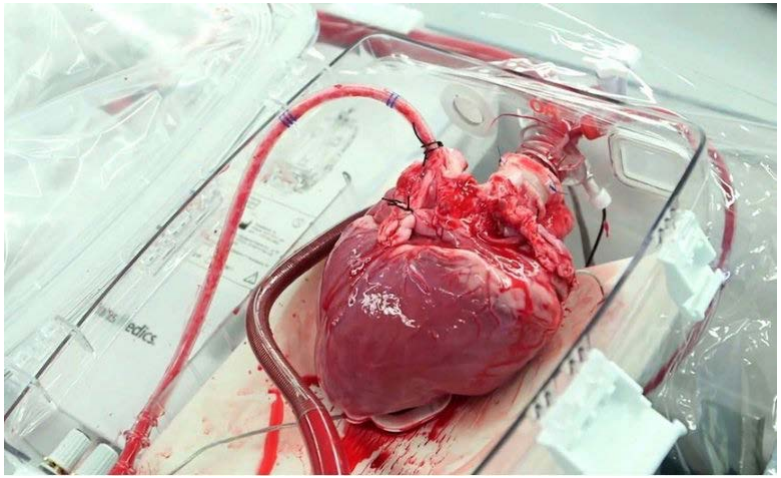


Klein L, et al. Circ Heart Fail 2011


Rx


A RISING TIDE
LIFTS ALL BOATS.

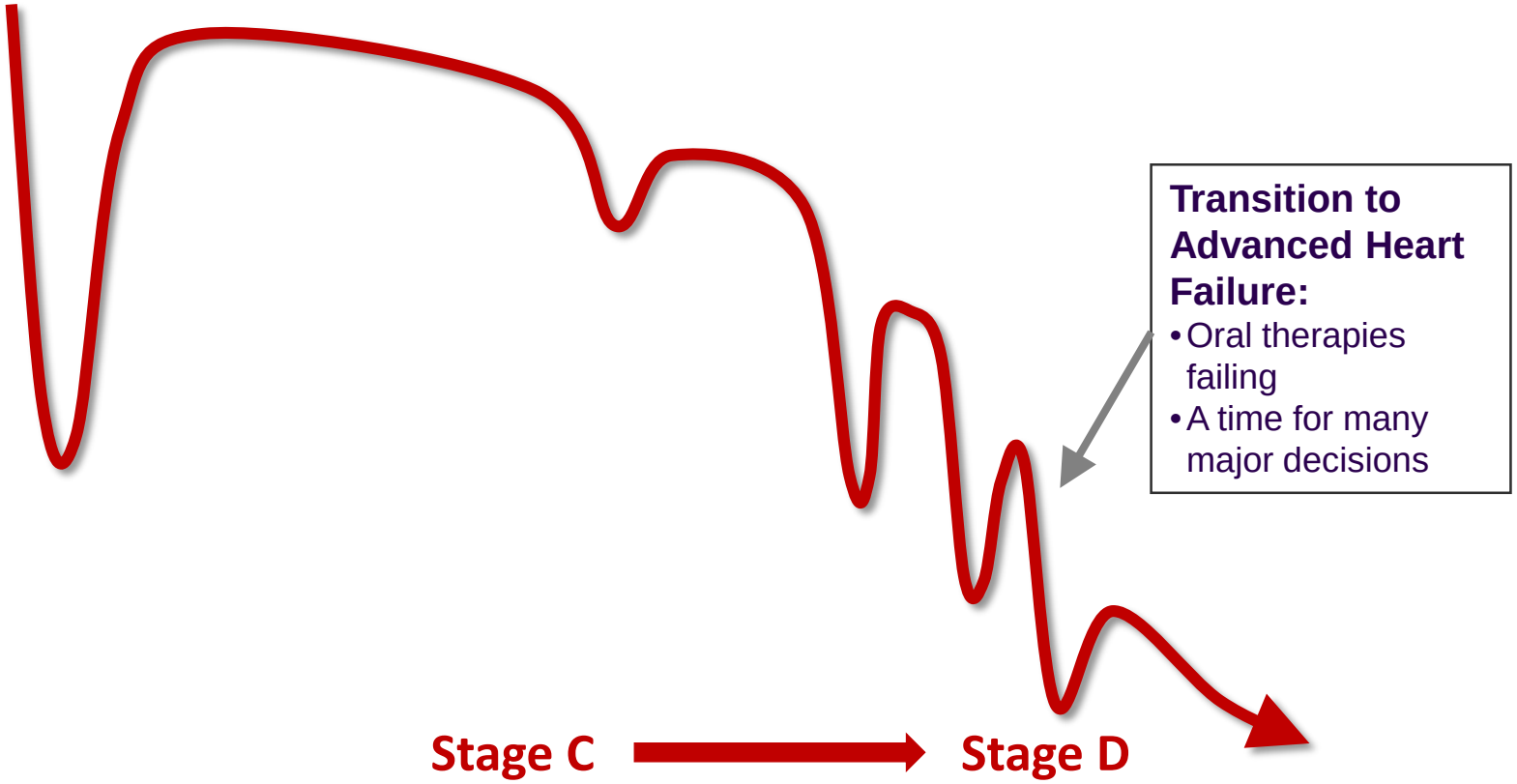
Advanced Heart Failure: Marking a Difference



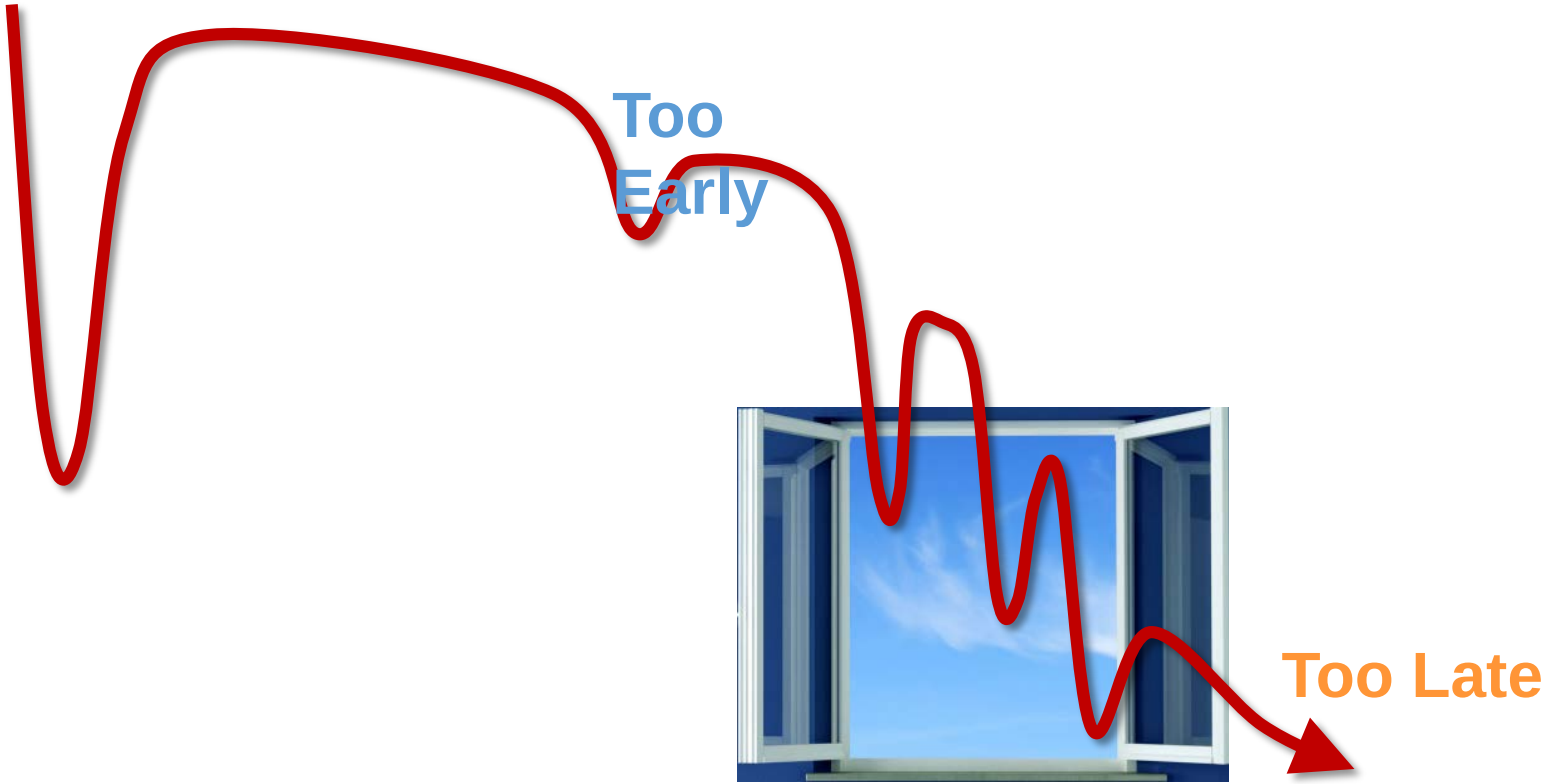
Larry A. Allen, MD, MHS
GWTG-HF Webinar

uchealth | School of Medicine

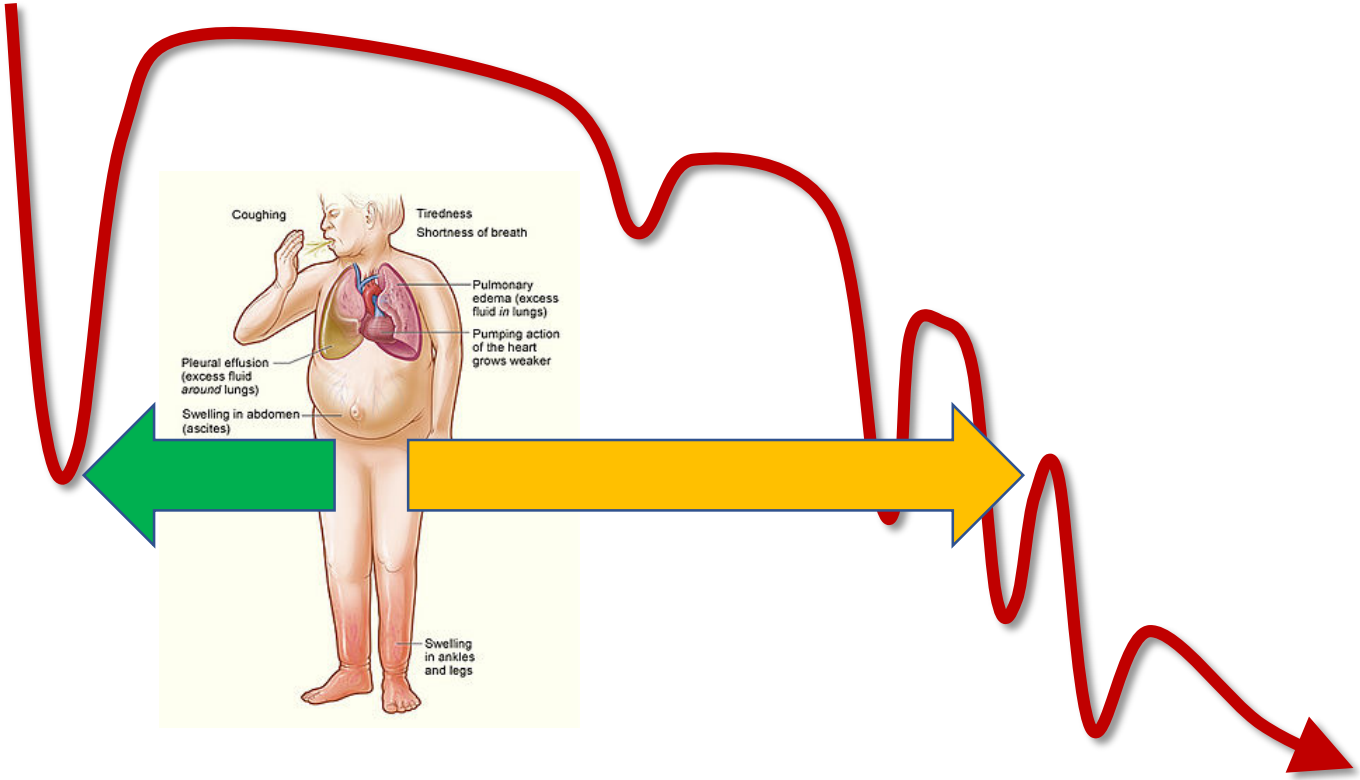
Clinical course of heart failure



Timing of transplant, LVAD, hospice



Difficult to know where a patient is …

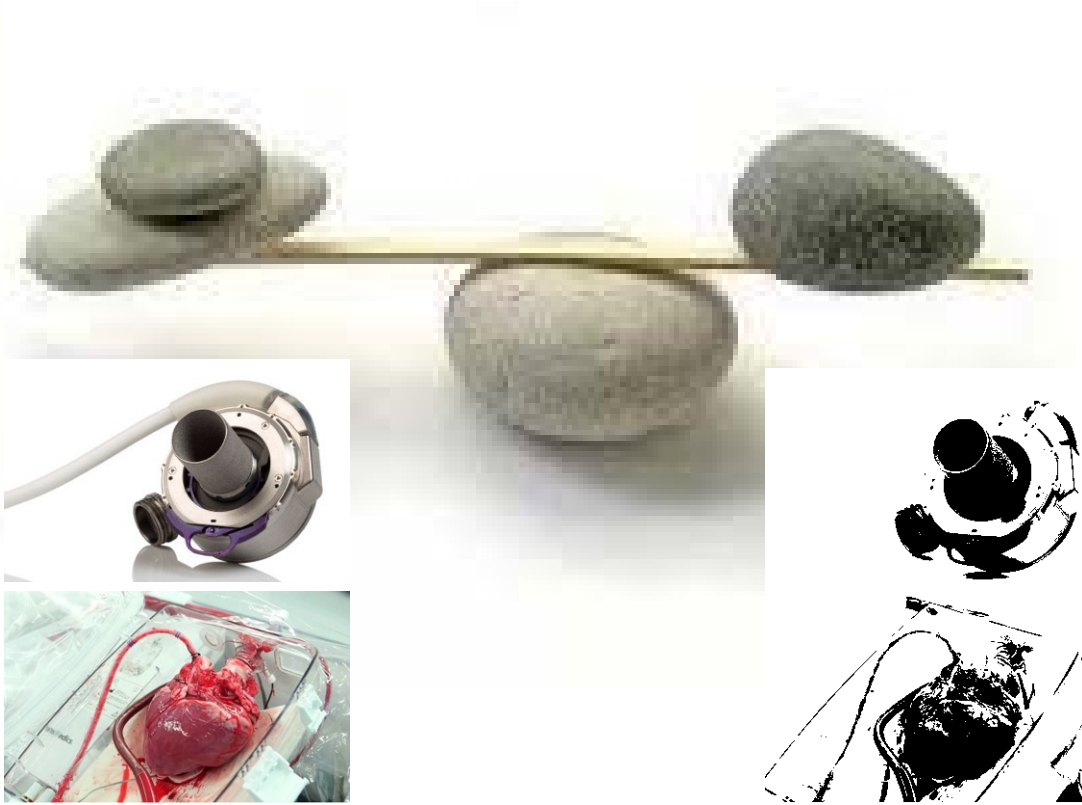


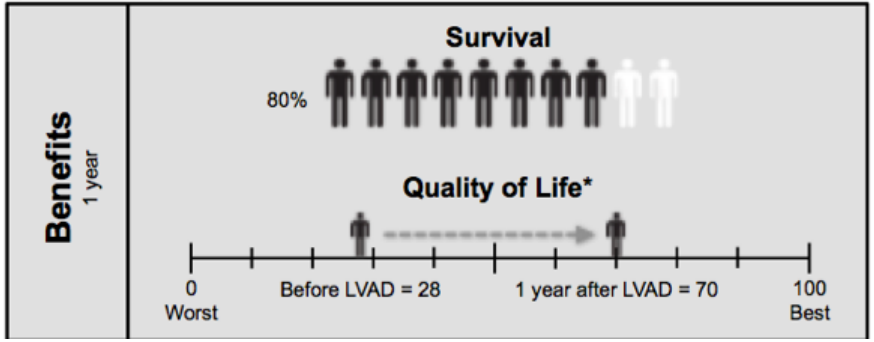
I-NEED-HELP

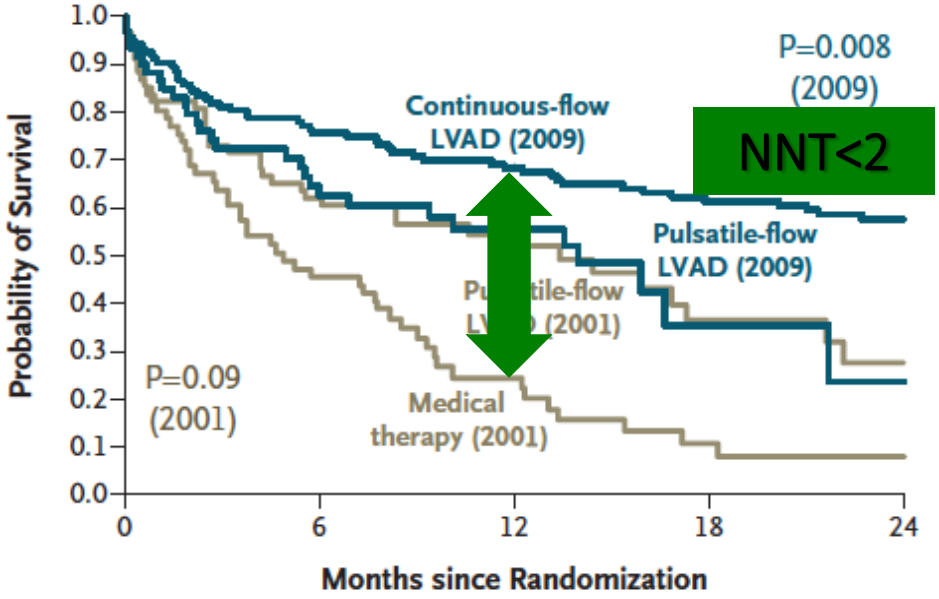
I: IV inotropes
N: NYHA IIIB/IV
Natriuretic peptides persistently elevated
E: End-organ dysfunction
E: Ejection fraction <25%
D: Defibrillator shocks
H: Hospitalizations >1
E: Edema, escalating diuretics
L: Low blood pressure, high heart rate
P: Prognostic medication – progressive intolerance or down-titration of GDMT

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

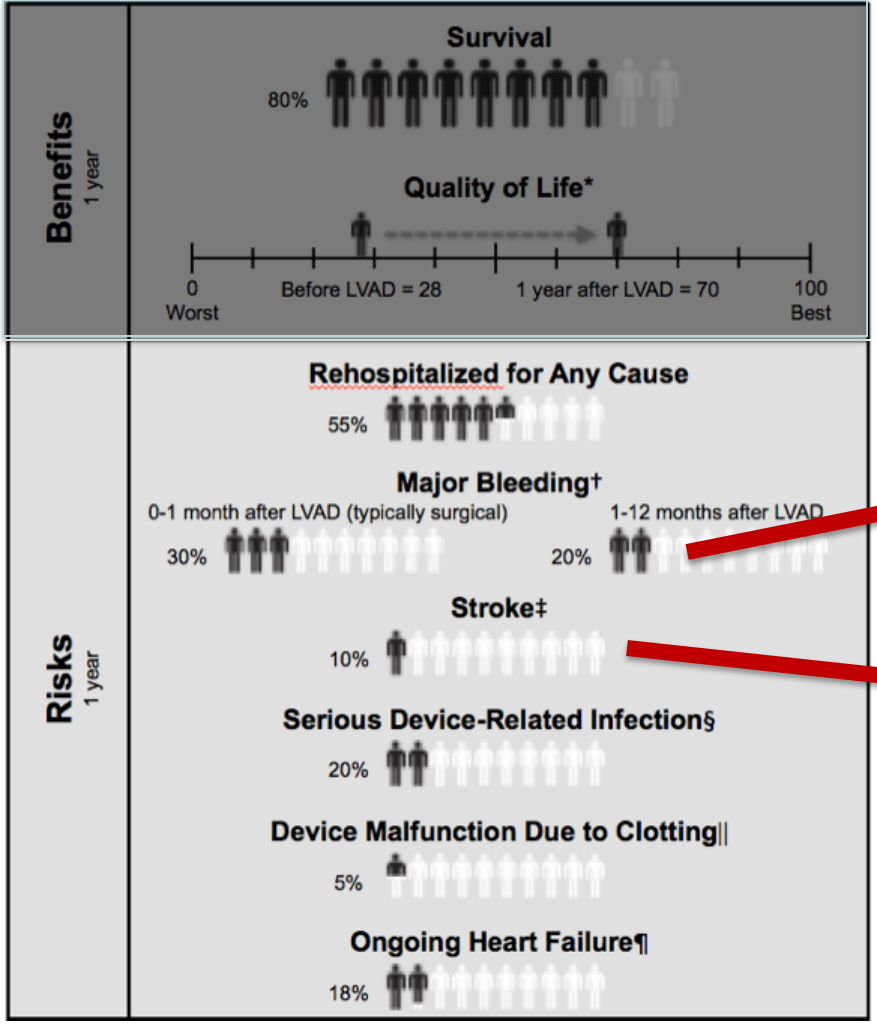
Not for Everyone: Complex Trade-Offs

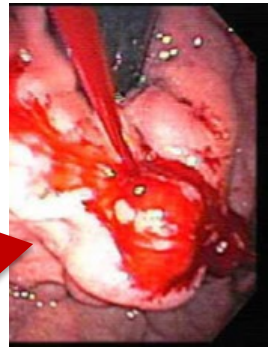






McIlvennan, et al. Circ Heart Fail. 2014





McIlvennan, et al. Circ Heart Fail. 2014

- MagLev: no bearings, less friction/heat
- Large rotor gaps: less shear, hemolysis
- Artificial pulse: flush clot, angiodysplasia
- Smaller size: easier implant

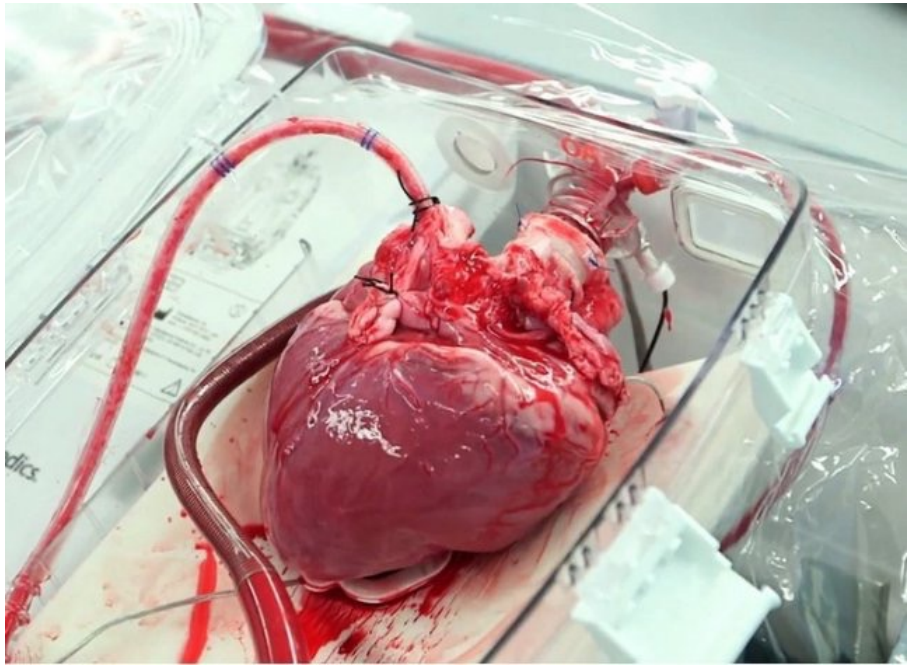
MOMENTUM HM3 Endpoints

Table 2. Noninferiority and Superiority Analyses in the Intention-to-Treat Population.*

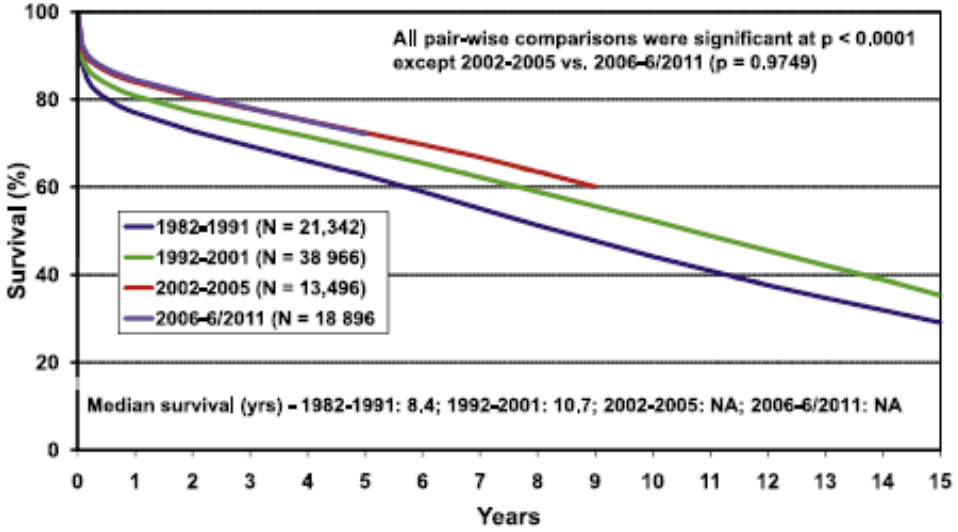
Variable	Centrifugal-Flow Pump Group (N=152)		Axial-Flow Pump Group (N=142)	
	no. of patients	*% (95% CI)*	*no. of patients*	*% (95% CI)*
Noninferiority analysis				
Primary end point	131	86.2 (79.7–91.2)	109	76.8 (68.9–83.4
Superiority analyses				
Primary end point	131	86.2 (79.7–91.2)	109	76.8 (68.9–83.4)
First event that resulted in failure to reach the primary end point				
Did not receive the assigned implant	1	0.7 (0–3.6)	4	2.8 (0.8–7.1)
Had disabling stroke	6	3.9 (1.5–8.4)	4	2.8 (0.8–7.1)
Underwent reoperation to replace or remove pump‡	1	0.7 (0–3.6)	11	7.7 (3.9–13.4)
Died within 6 months after implantation	13	8.6 (4.6–14.2)	14	9.9 (5.5–16.0)

Mehra M, et al. NEJM. 2016

Transplant remains the Gold Standard



Heart transplant outcomes

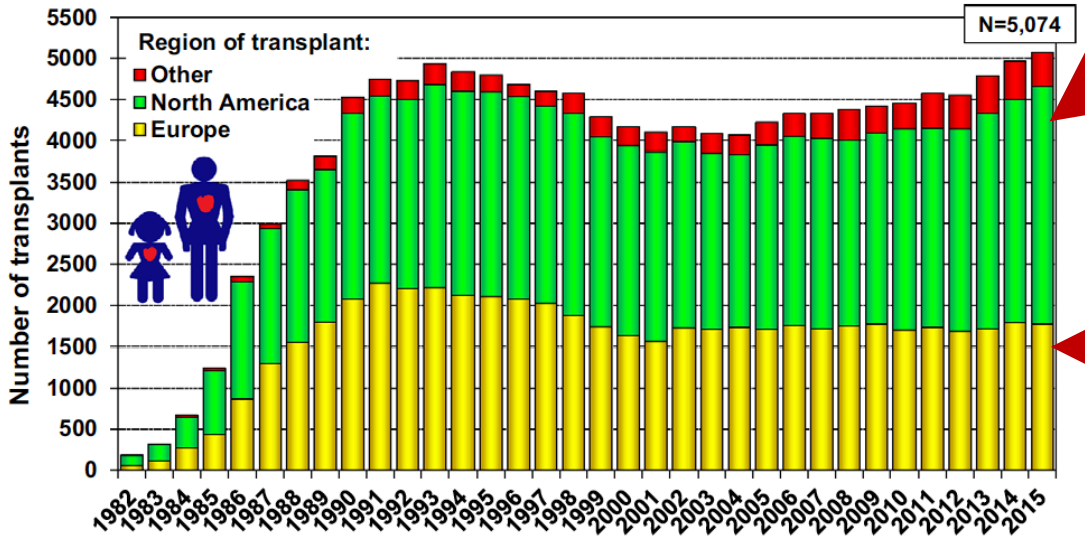


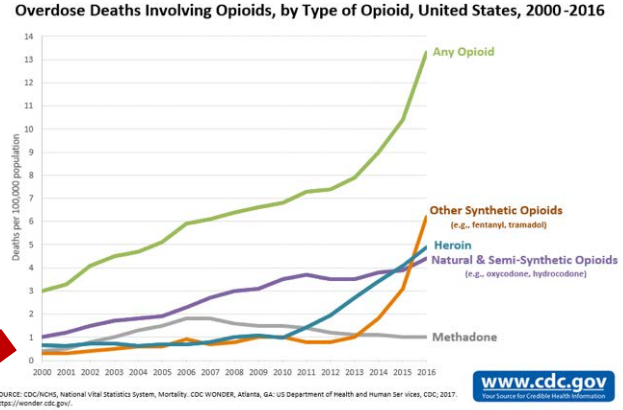
- Average Age of Recipient: **54 years old**
- **Median Survival 10.7 years** 1992-2001 cohort
  - Better in post 2002 cohorts
- **93% 1 year survival**

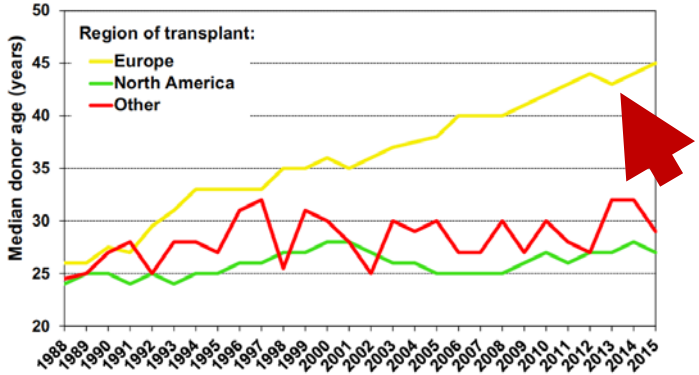
ISHLT 2013 Report. *J Heart Lung Txplt. 2013; 32: 952*.

Limited supply of donors

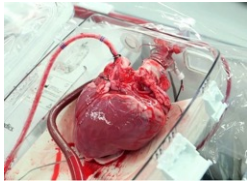
Lund et al. ISHLT 34th Adult Heart Transplantation Report







Which option?



Factor	LVAD	Transplant
Survival, median	4-5 yr	**10-13 yr**
Quality of life (and swimming)	++	**+++**
RV failure and ventricular tachycardia	Maybe	**Yes**
Complications	!!!!	**!!!**
Stroke, infection, bleeding, HF		
Rejection, infection, cancer, CKD, DM		
Availability of therapy	**Unlimited**	Limited
Cost	$$$$	**$$$**

Option B

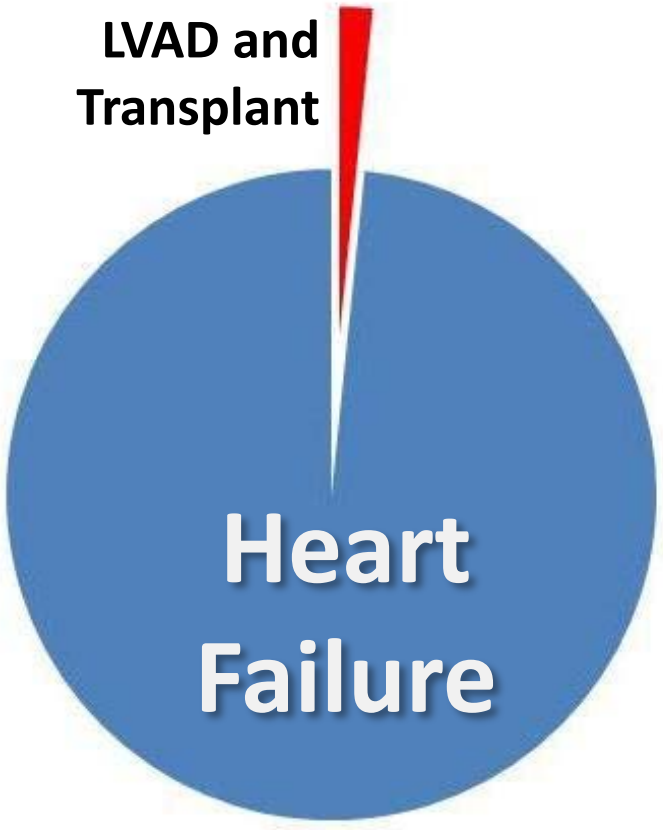
1) Advanced age (median HF hosp **78 years**)
2) Comborbidity (**50% have 5+ diagnoses**)

Final Perspective

- 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

Nancy M. Albert PhD, CCNS, CHFN, NE-BC, FAHA, FHFSA, FAAN

February 2018

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

Objective:

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

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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.

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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 were highly related; *rho*, 0.815
  - Factors associated with worse QoL:
    - Older age, female
    - Worse functional class
    - Higher Charlson comorbidity index
    - Recent hospitalization for HF
- 1136 (MLHFQ)[2] & 52 (KCCQ)[3] *hospitalized* adults
  - QoL improved during hospitalization[3] and after discharge in all patients;[2,3] despite intervention vs. control group[2]

1. Comı´n-Colet J et al. *Rev Esp Cardiol*. 2016;69(3):256-271.
2. Riegel B et al. *Nurs Res*. 2002;51(4):209-18.
3. Sauser K, et al. *J Card Fail*. 2014;20(5):378.e11-5.

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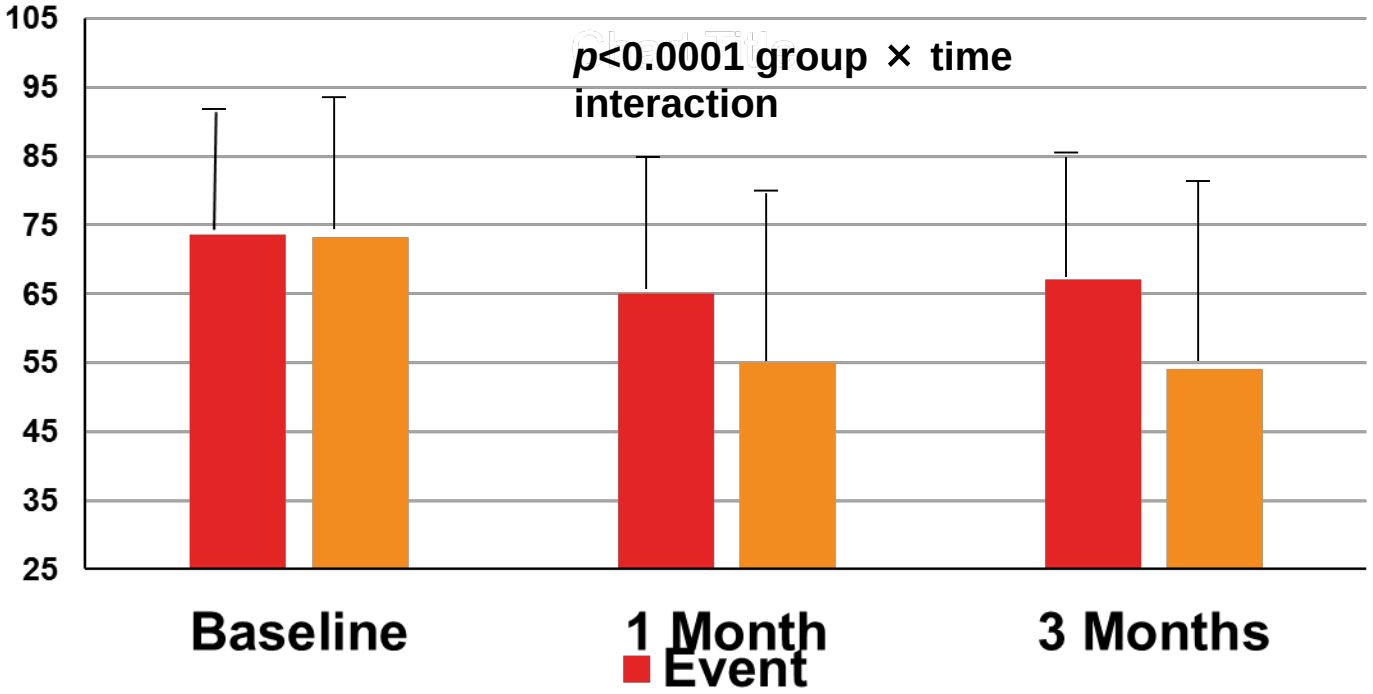
Quality of Life in HF

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.

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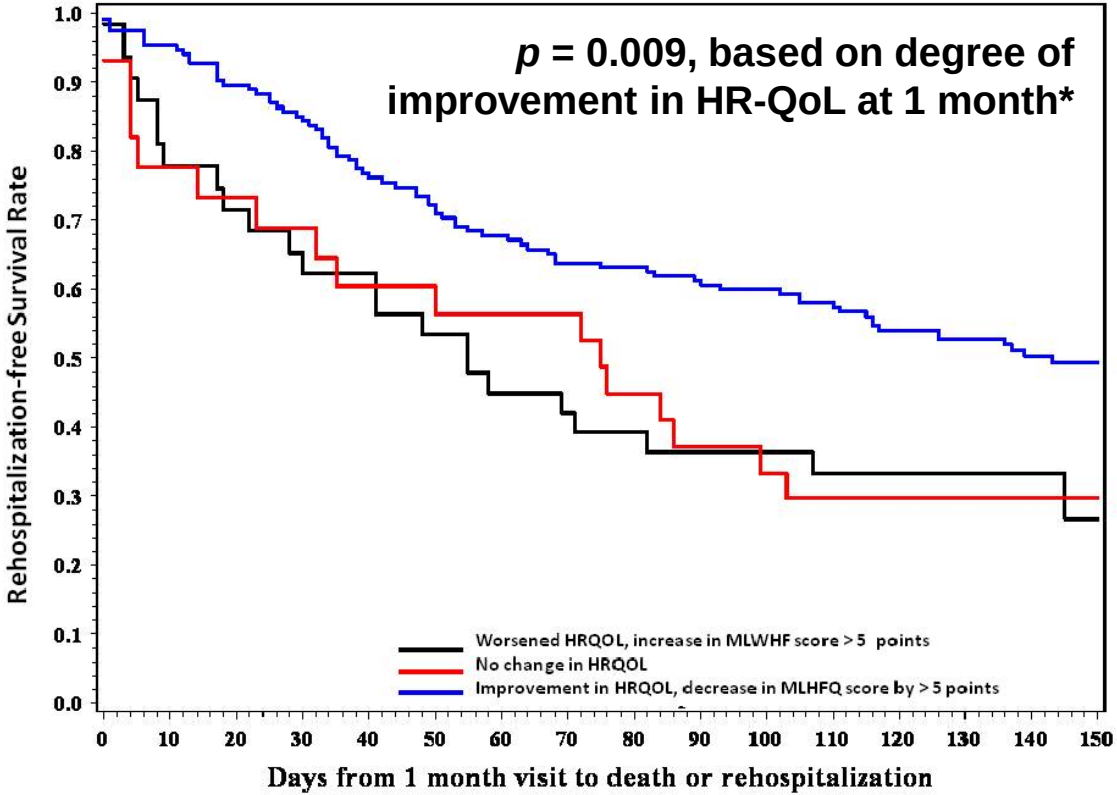
Quality of Life in HF

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 gp. assignment



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

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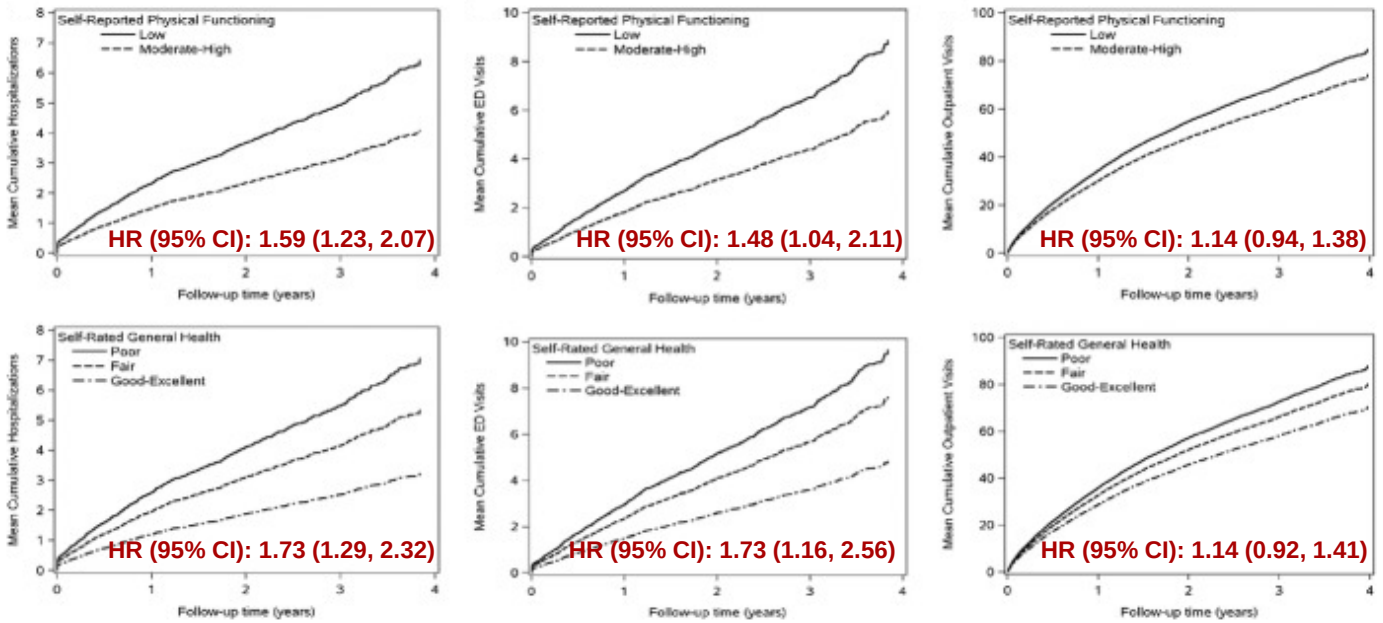
Quality of Life in HF

1x Self-Rated Health (SF-12)* Score Predicts Healthcare Utilization

417 community pts. in MN; followed over mean of 2.1 yrs.



1033 Hospitalizations	1407 ED visits	19,780 OPD visits

*, *Low* physical functioning, score ≤ 25; hazard ratios for SRH are for "*poor*"

Chamberlain AM, et al. *J Am. Heart Assoc.* 2014;28(3):e000931.

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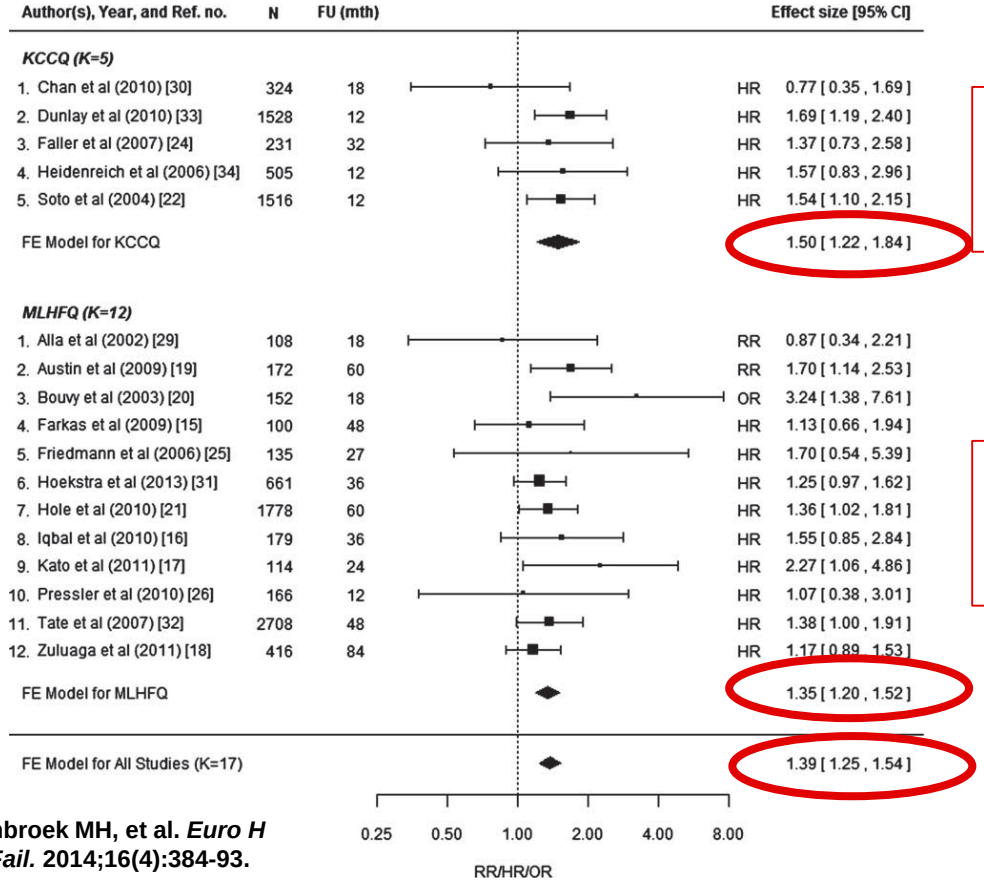
Quality of Life in HF

Mortality Meta-Analysis (x17 papers w >100 pts ea)



N= 10,793

KCCQ < 50 = poor health status

MLHFQ > 45 = poor health status

Mastenbroek MH, et al. *Euro H Heart Fail.* 2014;16(4):384-93.

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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; ePub Jan 3.
2. Lee S, Reigel B. *J Cardiovasc Nurs* 2017; ePub Aug 30

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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**

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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**

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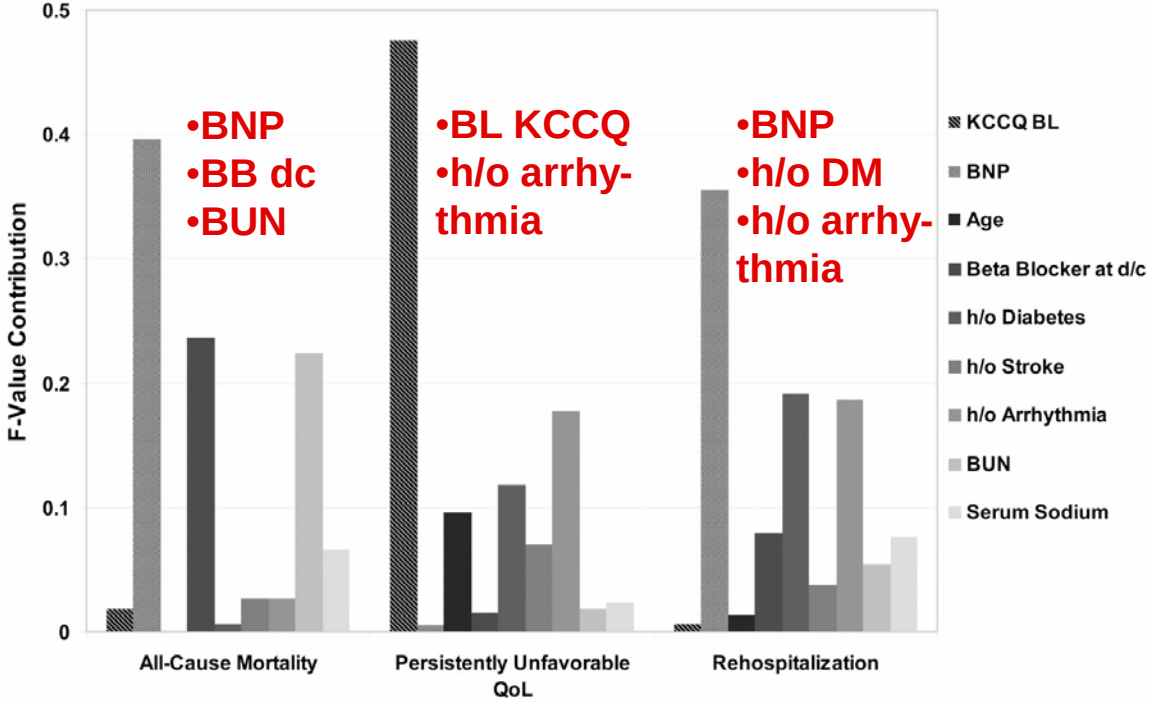
Quality of Life in HF

Predictors of *Future Health Status*

1458 pts. from EVEREST study; 6 Month Outcomes



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

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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 administer/score/share results, communication with patient

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Contact Us to Learn More

Tanya Lane Truitt, RN MS

Senior Manager QSI Programs & Operations: Resuscitation & HF

Get With The Guidelines®

tanya.truitt@heart.org

Liz Olson, CVA

Program Manager, *Get With The Guidelines – Heart Failure*

liz.olson@heart.org

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