



# Ask the Experts: Building a Toolkit for Managing Heart Failure

## Presented as a Live Webinar

Wednesday, March 6, 2019  
2:00 - 3:00 p.m.

## On-demand Activity

Recording of live webinar  
Release date: April 27, 2019  
Expiration date: April 27, 2020

## ACCREDITATION



The American Society of Health-System Pharmacists is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

- ACPE #: 0204-0000-19-405-L01-P
- 1.0 hr, application-based

## CE Processing

Participants will process CPE credit online at <http://elearning.ashp.org/my-activities>. CPE credit will be reported directly to CPE Monitor. Per ACPE, CPE credit must be claimed no later than 60 days from the date of the live activity or completion of a home-study activity.

## WEBINAR INFORMATION

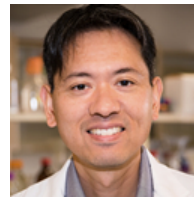
Visit [www.ashpadvantagemedia.com/chf/experts](http://www.ashpadvantagemedia.com/chf/experts) to find

- Webinar registration link
- Group viewing information and technical requirements

## FACULTY



Robert J. DiDomenico, PharmD, FCCP, FHFA, FACC  
Associate Professor  
College of Pharmacy  
University of Illinois at Chicago  
Chicago, Illinois



Tien M.H. Ng, Pharm.D., FHFA, FCCP, BCPS (AQ Cardiology), FACC  
Associate Professor  
Clinical Pharmacy  
University of Southern California  
School of Pharmacy  
Los Angeles, California

View faculty bios at  
[www.ashpadvantagemedia.com/chf/experts](http://www.ashpadvantagemedia.com/chf/experts)

## Ask the Experts

# Building a Toolkit for Managing Heart Failure



**Robert J. DiDomenico, Pharm.D., BCPS AQ Cardiology, FCCP, FHFSA, FACC**

Associate Professor, University of Illinois at Chicago  
College of Pharmacy  
Chicago, Illinois

**Tien M.H. Ng, Pharm.D., BCPS AQ Cardiology, FACC, FCCP, FHFSA**

Associate Professor, University of Southern California  
School of Pharmacy and Keck School of Medicine  
Los Angeles, California



Provided by ASHP  
Supported by an educational grant from Novartis Pharmaceuticals Corporation

## Disclosures

In accordance with ACCME and ACPE Standards for Commercial Support, ASHP policy requires that all faculty, planners, reviewers, staff, and others in a position to control the content of this presentation disclose their relevant financial relationships.

- In this activity, no persons associated with this activity have disclosed any relevant financial relationships.

## Learning Objectives

- Identify clinical controversies & barriers leading to suboptimal use of guideline-directed medical therapy (GDMT) regimens for patients with heart failure with reduced ejection fraction (HFrEF).
- Develop plans to optimize GDMT regimens for patients with HFrEF.
- Adopt strategies to overcome barriers to implementing successful transitions of care programs for patients with HFrEF hospitalized for acute heart failure.

## Abbreviations

- ACEI=angiotensin converting-enzyme inhibitor
- ADEs=adverse drug events
- ARB=angiotensin receptor blocker
- ARNI=angiotensin receptor-neprilysin inhibitor
- BID=twice daily
- BP=blood pressure
- BUN=blood urea nitrogen
- CI=confidence interval
- COR=class of recommendation
- CrCl=creatinine clearance
- CV=cardiovascular
- Non-DHP CCB=non-dihydropyridine calcium channel blocker
- ED=emergency department
- eGFR=estimated glomerular filtration rate
- EMR=electronic medical record
- GDMT=guideline-directed medical therapy
- HF=heart failure
- HFrEF=heart failure with reduced ejection fraction
- HYD=hydralazine
- HR=heart rate
- ISDN=isosorbide dinitrate
- LVEF=left ventricular ejection fraction
- MTM=medication therapy management
- MRA=mineralocorticoid receptor antagonist
- NSAIDs=non-steroidal anti-inflammatory drugs
- NSR=normal sinus rhythm
- NYHA=New York Heart Association
- OACs=oral anticoagulants
- PCPs=primary care providers
- RR=respiratory rate
- TOC=transitions of care

# Clinical Barriers and Controversies in Heart Failure

**Tien M.H. Ng, Pharm.D., BCPS AQ Cardiology, FACC, FCCP, FHFSa**

Associate Professor of Clinical Pharmacy and Medicine

Director, PGY2 Residency in Cardiology

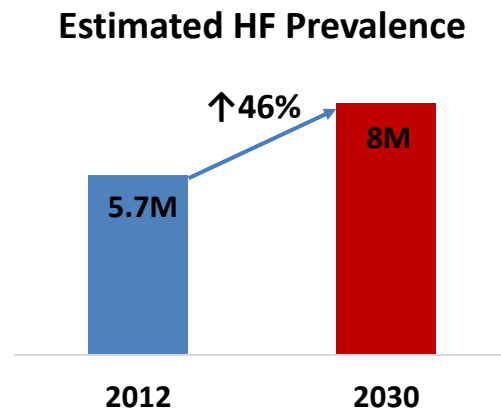
Vice Chair, Titus Family Department of Clinical Pharmacy

School of Pharmacy and Keck School of Medicine

University of Southern California, Los Angeles, California

## HF in 2019

- #big problem, #long way to go
- Prevalence: 5.7 million (U.S.)
- Annual mortality: 75,251
- Lifetime risk @ age 45 years:  
1 in 2-5

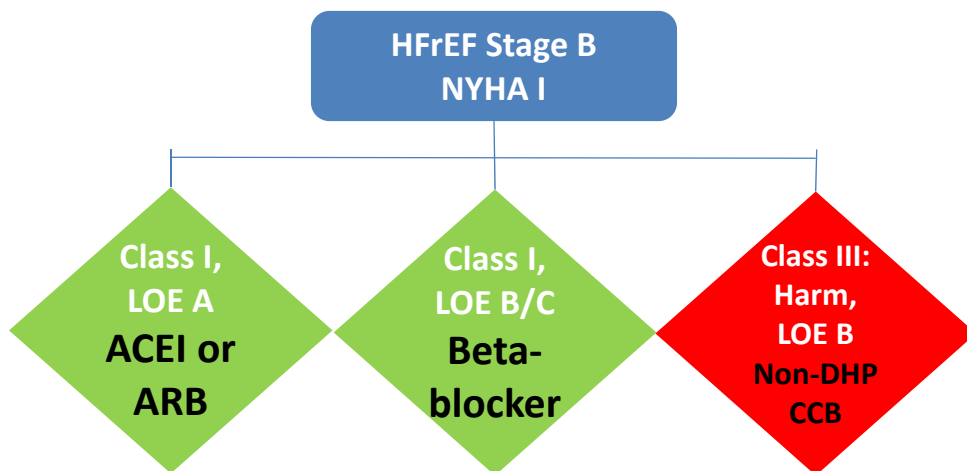


Benjamin EJ et al. *Circulation*. 2018; 137:e67-492.

# Heart Failure Stages

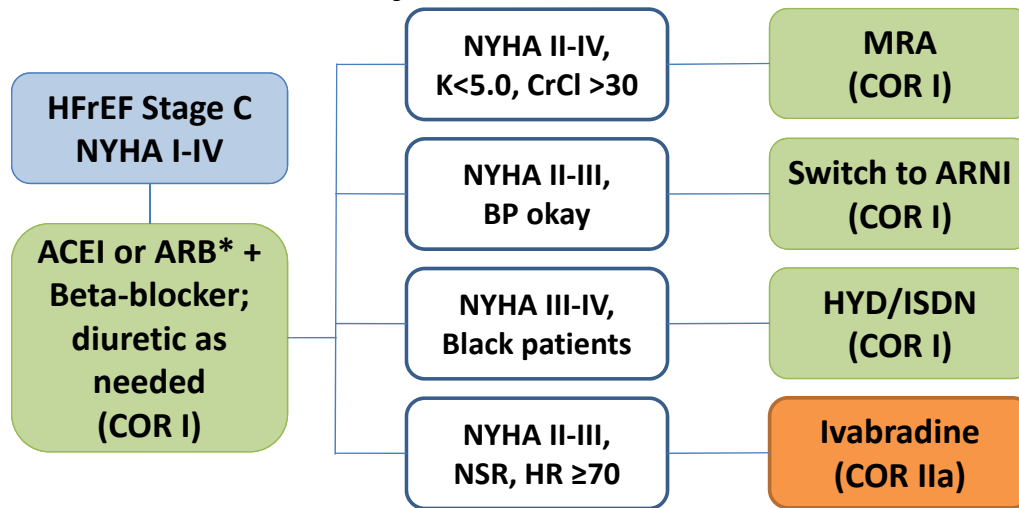
A	B	C	D
High risk for HF but without structural heart disease or symptoms of HF	Structural heart disease but without signs or symptoms of HF	Structural heart disease with prior or current symptoms of HF	Refractory HF requiring specialized interventions
<b>ACEI or ARB</b> in appropriate patients for vascular disease/diabetes mellitus Statins as appropriate	<b>ACEI or ARB</b> <b>Beta-blocker</b>	<b>Diuretic</b> <b>ACEI or ARB (or ARNI)</b> <b>Beta-blocker</b> <b>MRA</b>  Selected patients: <b>HYD/ISDN</b> <b>Digitalis</b> <b>Ivabradine</b>	Advanced measures Heart transplantation Chronic inotropes Mechanical Circulatory Support Palliative care

## Pharmacological Treatment for Stage B HFrEF



Yancy C et al. *J Am Coll Cardiol.* 2013; 62:e147-239.

## Pharmacological Treatment for **Stage C** HF With Reduced Ejection Fraction



\*HYD/ISDN for ACEI/ARB intolerant

Yancy C et al. *J Am Coll Cardiol.* 2017; 70:776-803.

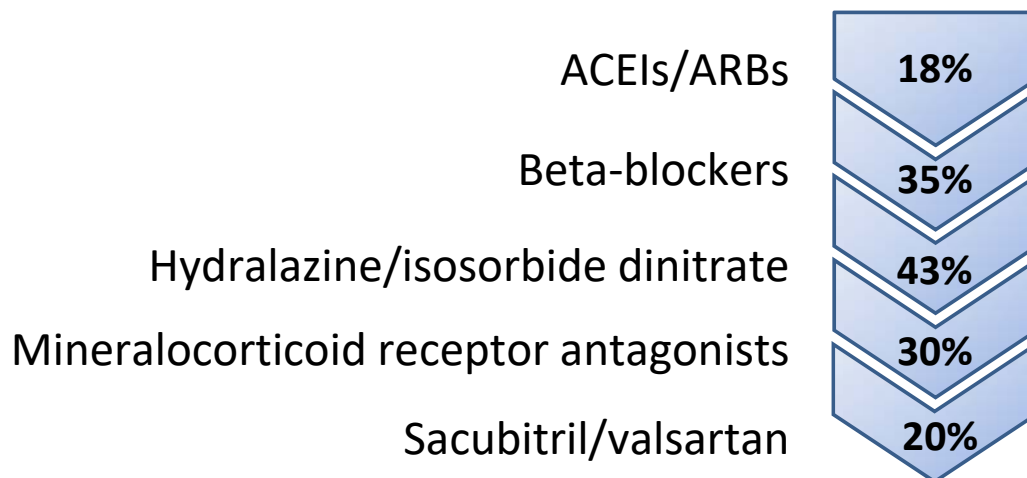
## Titrating GDMT

- Generally, consider titrating doses of GDMT every 2 weeks

	Starting Dose	Target Dose
Bisoprolol	1.25 mg daily	10 mg daily
Carvedilol	3.125 mg twice daily	25-50 mg twice daily
Metoprolol succinate	12.5-25 mg daily	200 mg daily
Sacubitril/valsartan	24/26-49/51 mg twice daily	97/103 mg twice daily
Captopril	6.25 mg three times daily	50 mg three times daily
Enalapril	2.5 mg twice daily	10-20 mg twice daily
Lisinopril	2.5-5 mg daily	20-40 mg daily
Candesartan	4-8 mg daily	32 mg daily
Losartan	25-50 mg daily	150 mg daily
Spirolactone	12.5-25 mg daily	25-50 mg daily
Eplerenone	25 mg daily	50 mg daily
Hydralazine/isosorbide dinitrate	25/20 mg three times daily	75/40 mg three times daily

Yancy CW et al. *J Am Coll Cardiol.* 2018; 71:201-30.

## Mortality Reduction in HFrEF



Yancy CW et al. *J Am Coll Cardiol.* 2018; 71:201-30.

## Clinical Controversies and Barriers to Medication Optimization

- HP is a 67-year-old female with a history of HFrEF (LVEF 18%) being seen for the first time in clinic after a recent hospitalization. She remains in NYHA functional class III.
- **Current medications:** enalapril 10 mg once daily, metoprolol tartrate 25 mg twice daily, furosemide 20 mg once daily
- **Vitals:** BP 89/67 mm Hg, HR 84 bpm, RR 18 breaths/min
- **Pertinent labs:**
  - Sodium 136 mEq/L, potassium 4.8 mEq/L, creatinine 1.22 mg/dL, BUN 23 mg/dL, eGFR 46 mL/min/m<sup>2</sup>
  - NT-proBNP 4,300 pg/mL

➤ HOW DO WE FURTHER OPTIMIZE CARE FOR THIS PATIENT?

# Which Beta-blocker?

## Beta-blocker Pharmacology Comparison

	Carvedilol	Metoprolol succinate	Metoprolol tartrate	Bisoprolol
Pharmacology	$\beta_1, \beta_2, \alpha_1$	$\beta_1$	$\beta_1$	$\beta_1$
Half-life (hours)	7-10	3-7	3-4	9-12
Duration of action (hours)	12	24	<b>8-12</b>	24
Others	<b>Antioxidant, ↓ Insulin resistance</b>			

*Hemodynamics, degree of neurohormonal blockade, cardioprotection?*

Talbert RL. *Heart Fail Rev.* 2004; 9:131-7. Leopold G. *J Cardiovasc Pharmacol.* 1986; 8 suppl 11:S16-20.



## Carvedilol Or Metoprolol European Trial (COMET)

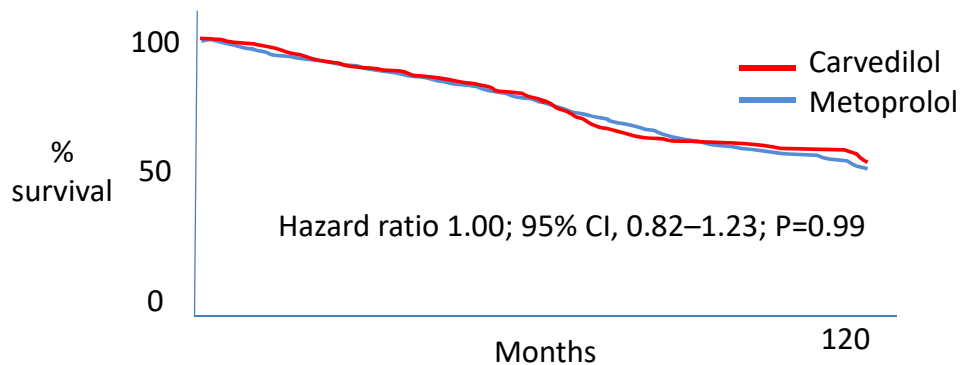
- N=1511 HFrEF, NYHA II-IV
- Carvedilol 25 mg twice daily (41.8 mg/day) vs. metoprolol tartrate 50 mg twice daily (85 mg/day)

%	Carvedilol	Metoprolol	Hazard Ratio (95% confidence interval)
All-cause mortality	34	40	<b>0.83</b> (0.74–0.93)
CV death	29	35	<b>0.80</b> (0.70–0.90)
Death or hospital admission	74	76	0.94 (0.86–1.02)

Poole-Wilson PA. *Lancet*. 2003; 362:7-13.

## Carvedilol or Metoprolol Evaluation Study

- N=14,016 Norwegian HF and German HF registries
- Selecting 740 propensity-score matched pairs, comparing carvedilol vs. metoprolol succinate (at equivalent doses)



Fröhlich H et al. *Circ Heart Fail*. 2015; 8:887-96.

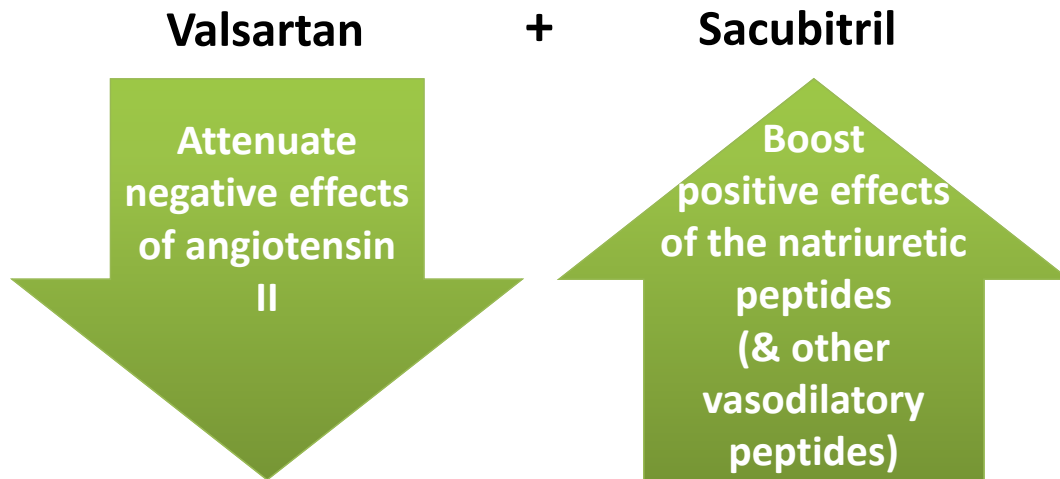
## Approach to Beta-blocker Selection

	Carvedilol immediate release	Metoprolol succinate	Bisoprolol
Adherence	Controlled release	+	+
Low BP		+	+
High BP	+		
Diabetes	+		
Evidence-based	+	+	+
Target doses	25-50 mg twice daily	200 mg once daily	10 mg once daily

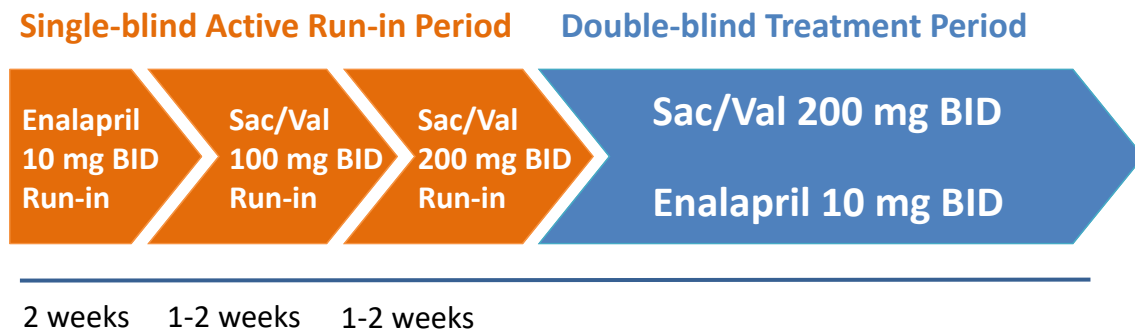
*If you must use metoprolol tartrate, use at least 75 mg twice daily*

## ARNI or not to ARNI?

## Angiotensin Receptor and Neprilysin Inhibitor (ARNI)



## PARADIGM-HF – Study Design



Sac/Val = sacubitril/valsartan

McMurray JJ et al. *Eur J Heart Fail.* 2013; 15:1062-73.

## PARADIGM-HF - Results

%	Sac/Val (n=4187)	Enalapril (n=4212)	Hazard Ratio (95% CI)	P Value
Primary endpoint	21.8	26.5	0.80 (0.73-0.87)	<0.001
Cardiovascular death	13.3	16.5	0.80 (0.71-0.89)	<0.001
Hospitalization for HF	12.8	15.6	0.79 (0.71- 0.89)	<0.001
Symptomatic Hypotension	14.0	9.2		<0.001

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

## Perceived Barriers to ARNI

- Cost, access
  - Patient assistance program:
    - Be a U.S. resident
    - Meet income requirements
    - Have limited or no private or public prescription coverage
    - <https://www.pharma.us.novartis.com/our-products/patient-assistance/patient-assistance-foundation-enrollment>
- Clinical
  - Risk of hypotension
  - Twice daily regimen
  - Risk of angioedema
  - Risk of renal dysfunction

## PARADIGM-HF Stratified

- Systolic blood pressure (*Eur Heart J.* 2017; 38:1132–43.)
  - Low systolic BP (<110 mm Hg) was associated with increased risk for primary endpoint and all-cause mortality
  - Similar tolerability and benefit compared to enalapril
- LVEF (*Circ Heart Fail.* 2016; 9:e002744.)
  - Lower LVEF was associated with increased risk of primary endpoint and all-cause mortality
  - Similar benefit compared to enalapril regardless of LVEF

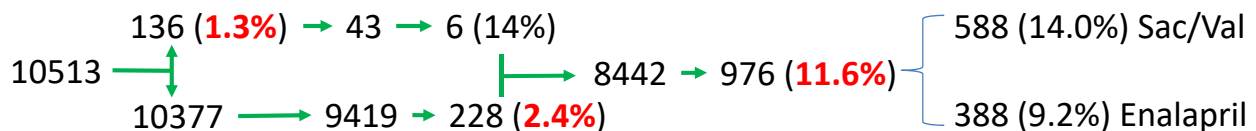
## PARADIGM-HF and Hypotension

Single-blind Active Run-in Period

Double-blind Treatment Period



2 weeks    1-2 weeks    1-2 weeks

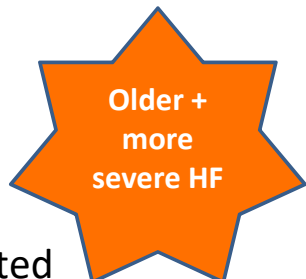


Vardeny O et al. *Circ Heart Fail.* 2018; 11:e004745.

## PARADIGM-HF and Hypotension

- Predictors:

- Lower systolic BP
- Older age
- ICD implanted
- Higher creatinine
- Atrial fibrillation history
- North America
- Diabetes



- Outcomes:

- Study drug did not affect predictors of hypotension (except diabetes – higher risk in enalapril arm)
- Similar benefit compared to enalapril in those that experienced hypotension

Vardeny O et al. *Circ Heart Fail.* 2018; 11:e004745.

## Real World vs. Clinical Trial

- PARADIGM-HF exclusion criteria:

- eGFR  $\leq 30$  mL/min/m<sup>2</sup>
- Systolic BP  $\leq 100$  mm Hg
- Potassium  $\geq 5.2$  mmol/L
- Not on ACEI (enalapril 10 mg/day or equivalent)

- Cleveland Clinic analysis

- Met FDA criteria: 71%
- Met PARADIGM-HF criteria: 26%

Perez AL et al. *JACC Heart Fail.* 2017; 5:460-3.

## PIONEER-HF

- Assess safety and efficacy of sacubitril/valsartan initiation among patients hospitalized for acute heart failure after hemodynamic stabilization
- Sacubitril–valsartan target dose 200 mg twice daily vs. enalapril target dose 10 mg twice daily

↓ NT-proBNP @ 4 and 8 weeks with sacubitril/valsartan

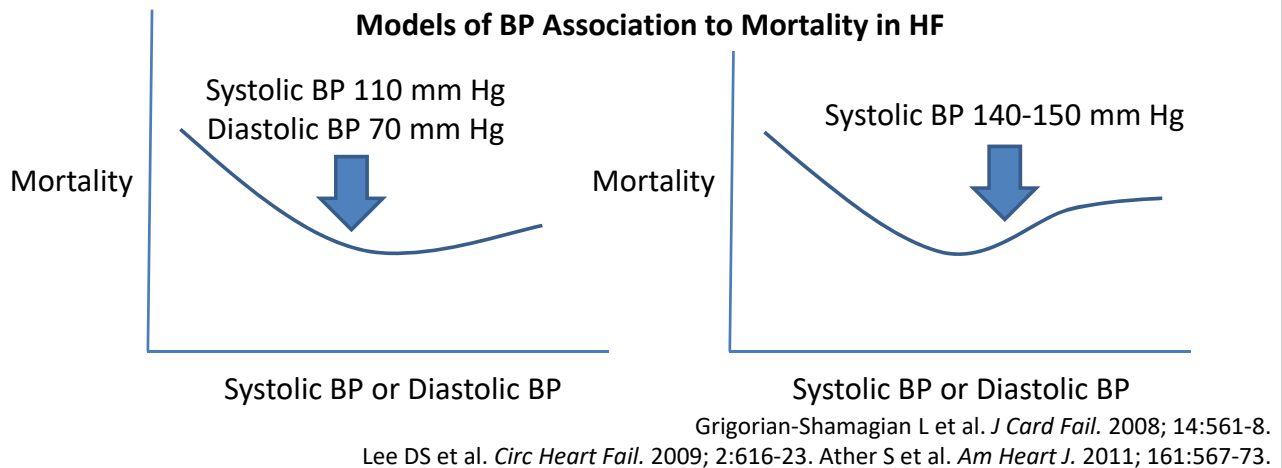
No significant differences: worsening renal function, hyperkalemia, symptomatic hypotension, angioedema, or clinical events

Velazquez EJ et al. *N Engl J Med.* 2019; 380:539-48.

## Low Blood Pressure?

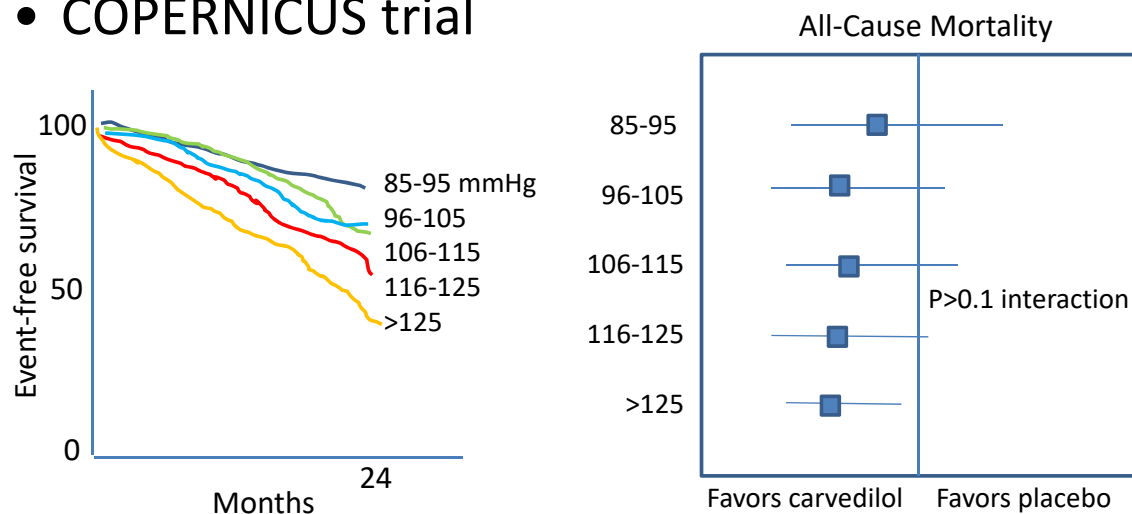
## BP and HF Outcomes

- Low BP has been associated with lower survival in ambulatory patients with HF, but changes in BP with therapy have not



## GDMT, BP, and Outcomes

- COPENICUS trial



Rouleau JL et al. *J Am Coll Cardiol.* 2004; 43:1423-9.



## Potential Benefits of Lower Blood Pressure in HF

Reduced afterload  
Reduced ventricular wall tension  
Improved vascular vasoreactivity



Improved diastolic function  
Increased stroke volume  
Reduced myocardial oxygen consumption

## Approach to Assessment of Low BP

- Symptomatic?
- Perfusing?
- Volume status?
- Separate dose administration times?
- Unnecessary polypharmacy?

## Circling Back on Loops

### Loop Diuretic Comparison

	Furosemide	Bumetanide	Torsemide	Ethacrynic Acid
Relative Potency	40	0.5-1	20	50
<b>Bioavailability (%)</b>	≈50 (10-90)	<b>&gt;90</b>	<b>&gt;90</b>	100
Half-life (hours)	2-3	1-1.5	3-6	0.25-2
<b>Duration of Action (hours)</b>	6-8	4-6	<b>18-24</b>	2-4
Notes	Absorption reduced by meals		Absorption not reduced in HF; antifibrotic	No sulfur group

DiNicolantonio JJ. *Future Cardiol.* 2012; 8:707-28. Brater DC et al. *Kidney Int.* 1984; 26:183-9. Vargo DL et al. *Clin Pharm Ther.* 1995; 57:601-9. Molnar J, Somberg JC. *Am J Ther.* 2009; 16:86-92.

## Torsemide vs. Furosemide in HF: Meta-Analysis of RCTs

HF READMISSIONS	Sample Size	OR
Mueller et al. (2003)	237	0.62 (0.10, 3.79)
Murray et al. (2001)	234	0.25 (0.14, 0.45)
Stroupe et al. (2000)	193	0.43 (0.22, 0.85)
<b>Overall</b>	<b>664</b>	<b>0.33 (0.22, 0.50)</b>

MORTALITY	Sample Size	OR
Mueller et al. (2003)	237	1.27 (0.43, 3.79)
Murray et al. (2001)	234	0.73 (0.37, 1.42)
Stroupe et al. (2000)	193	0.77 (0.37, 1.61)
<b>Overall</b>	<b>664</b>	<b>0.82 (0.52, 1.28)</b>

Shah P et al. *Eur J Heart Fail.* 2018; 57:e38-e40.

## Torsemide vs. Furosemide in HF: Duke Experience

- N=4,580 admitted with HF to Duke Hospital (2000–2010), then discharged on either torsemide (14%) or furosemide (86%)

Adjusted Model	Odds Ratio or Hazard Ratio	P-value
30-day mortality or hospitalization	1.22	0.1789
30-day hospitalization	1.29	0.1607
5-year mortality	1.09	0.2279

Mentz RJ et al. *J Cardiovasc Pharmacol.* 2015; 65:438-43.

## Approach to Selection of Loop in HFrEF

	Furosemide	Bumetanide	Torsemide
Dosing for persistent volume overload	Twice daily	Two to three times daily	Once daily
Absorption issues		+	++
Adherence issues			++
Higher doses needed		++	

*Ethacrynic Acid for true sulfonamide intolerance*

## Tools to Address Barriers for Optimizing Heart Failure Transitions of Care



**Robert J. DiDomenico, Pharm.D., BCPS AQ Cardiology, FACC, FCCP, FHFSa**

Associate Professor

Director, PGY2 Residency in Cardiology

University of Illinois at Chicago College of Pharmacy

Chicago, Illinois

## How Do We Further Optimize Care for This Patient Prior to Discharge?

- HP is a 67-year-old African-American female with HFrEF (LVEF 18%) **hospitalized for the first time for acute heart failure**. Poor historian, lives with her daughter who assists with her care
- **Current medications:** enalapril 10 mg once daily, metoprolol tartrate 25 mg twice daily, furosemide 20 mg once daily, metformin 500 mg twice daily, atorvastatin 40 mg daily, levothyroxine 0.1 mg daily, enteric-coated aspirin 81 mg daily
- **Vitals:** BP **109/67** mm Hg, HR 84 bpm, RR 18 breaths/min
- **Pertinent labs:**
  - Sodium 136 mEq/L, **potassium 4.8 mEq/L, creatinine 1.22 mg/dl**, BUN 23 mg/dl, eGFR 46 mL/min/m<sup>2</sup>

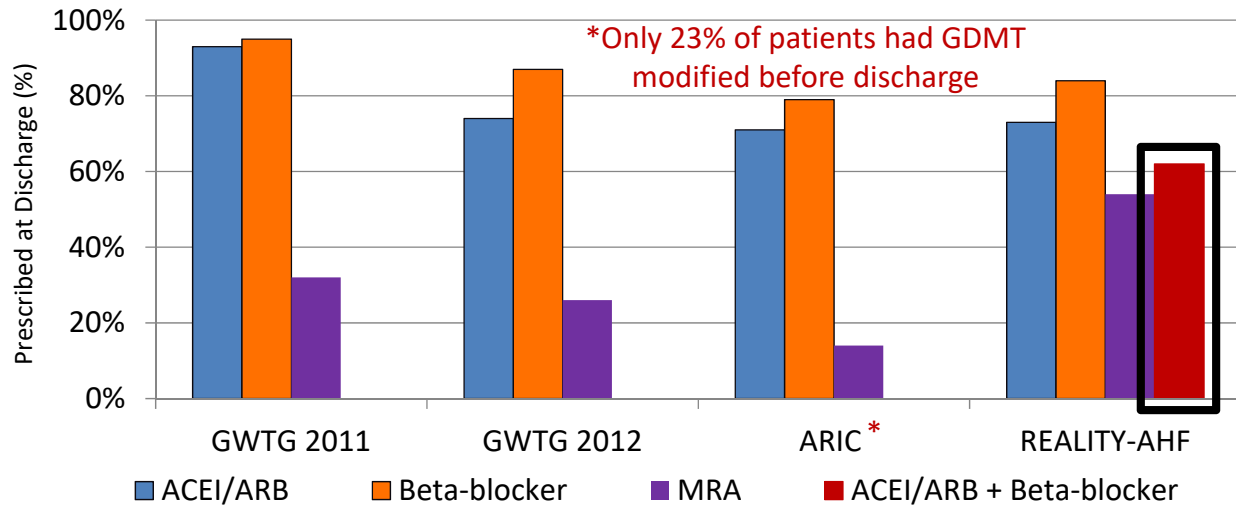
## Clinical Predictors of HF Readmission Opportunities for Improvement?

- Acute coronary syndrome, ischemia
- Increasing age
- Anemia
- Arrhythmia
- Depression
- Hyponatremia
- Low LVEF
- NYHA class IV symptoms
- Pneumonia/respiratory pathology
- **Suboptimal HF medication regimen**
- Uncontrolled hypertension
- Worsening renal function

Fonarow G. *Arch Intern Med.* 2008; 168:847-54.

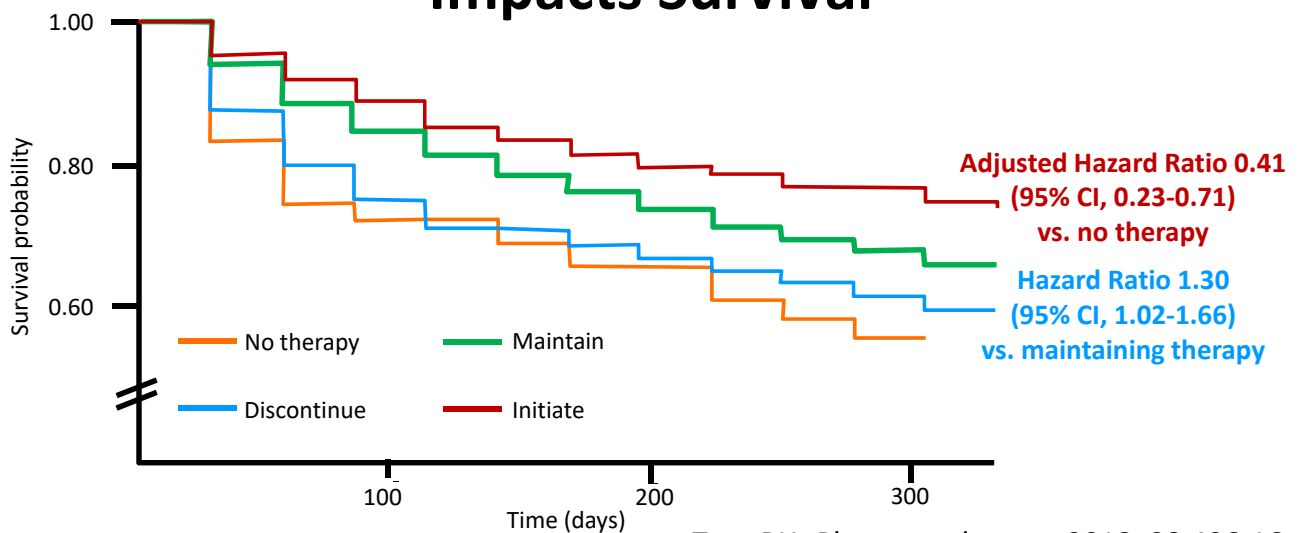
Murray M. *Clin Pharmacol Ther.* 2009; 85:651-8. Annema C. *Heart Lung.* 2009; 38:427-34.

## GDMT for Patients with HFrEF at Discharge Are we optimizing regimens?



Krantz MJ. *Am J Cardiol.* 2011; 107:1818-23. Steinberg B. *Circulation.* 2012; 126:65-75.  
Tran RH. *Pharmacotherapy.* 2018; 38:406-16. Yamaguchi T. *Am J Cardiol.* 2018; 122:1:969-74.

## GDMT Modification During Hospitalization Impacts Survival



Tran RH. *Pharmacotherapy.* 2018; 38:406-16.

## Consider Additional GDMT for HFrEF

- ✓ ACEI or ARB
- ✓ Beta-blocker
- ✓ Diuretic
- Aldosterone antagonist
- Hydralazine/nitrate
- Sacubitril/valsartan
- Ivabradine
- Digoxin



## Hospitalization = Opportunity to Titrate Dose!

- Generally, consider titrating doses of GDMT every 2 weeks

	Starting Dose	Target Dose
Bisoprolol	1.25 mg daily	10 mg daily
Carvedilol	3.125 mg twice daily	25-50 mg twice daily
Metoprolol succinate	12.5-25 mg daily	200 mg daily
Sacubitril/valsartan	24/26-49/51 mg twice daily	97/103 mg twice daily
Captopril	6.25 mg three times daily	50 mg three times daily
Enalapril	2.5 mg twice daily	10-20 mg twice daily
Lisinopril	2.5-5 mg daily	20-40 mg daily
Candesartan	4-8 mg daily	32 mg daily
Losartan	25-50 mg daily	150 mg daily
Spirolactone	12.5-25 mg daily	25-50 mg daily
Eplerenone	25 mg daily	50 mg daily
Hydralazine/isosorbide dinitrate	25/20 mg three times daily	75/40 mg three times daily

Yancy CW et al. *J Am Coll Cardiol.* 2018; 71:201-30.

# GDMT Dose Matters!

## Dose-dependent Effect on Left Ventricle

- MOCHA
  - Dose-related increase in LVEF with carvedilol
- REVERT
  - Dose-dependent improvement in left ventricular remodeling

Bristow MR. *Circulation*. 1996; 94:2807-16. Colucci WS. *Circulation*. 2007; 116:49-56.

## GDMT Dose-dependent Effect on Outcomes

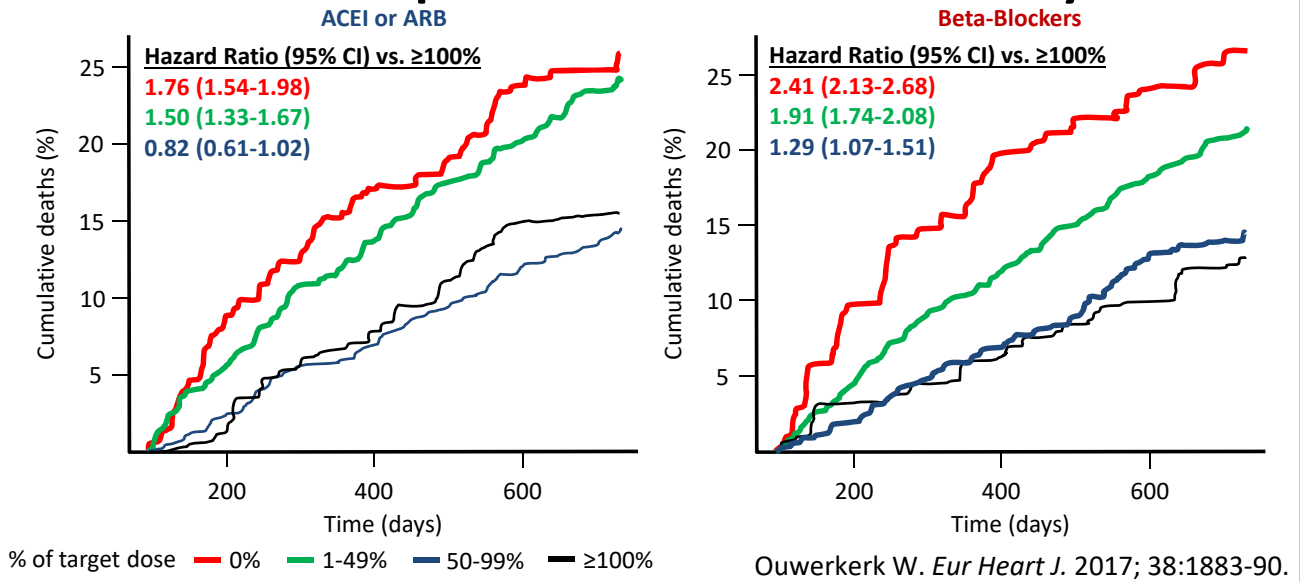
Trial	Hazard Ratio for death or HF hospitalization	95% Confidence Interval
<b>ACEI or ARBs</b>		
ATLAS (lisinopril)	0.85	0.78-0.93
HEAAL (losartan)	0.90	0.82-0.99
Egiziano et al.	ACEI: 0.91 ARB: 0.85	0.87-0.95 0.77-0.95
<b>Beta-blockers</b>		
HF-ACTION	0.96 per 10-mg dose increase	0.93-0.99
McAlister et al.	No dose-response relationship	

Packer M. *Circulation*. 1999; 100:2312-8. Konstam MA. *Lancet*. 2009; 374:1840-8. Egiziano G. *Arch Intern Med*. 2012; 172:1263-5. Fiuzat M. *J Am Coll Cardiol*. 2012; 60:208-15. McAlister FA. *Ann Intern Med*. 2009; 150:784-94.



# GDMT Dose Matters!

## Dose-dependent Effect on Mortality



# GDMT Dosing: Room For Improvement!

## CHAMP-HF (U.S.)

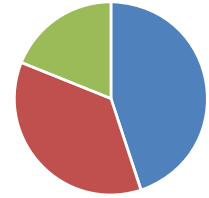
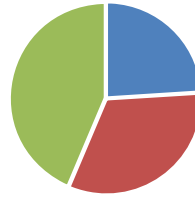
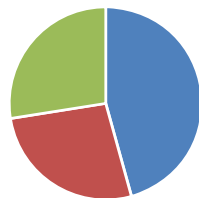
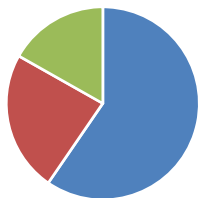
## CHECK-HF (Dutch)

ACEI/ARB/ARNI

Beta-blockers

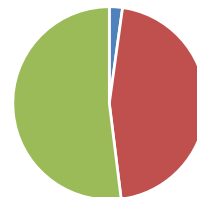
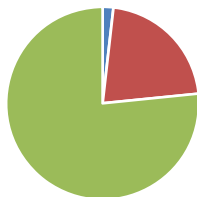
ACEI/ARB

Beta-blockers



MRA

MRA

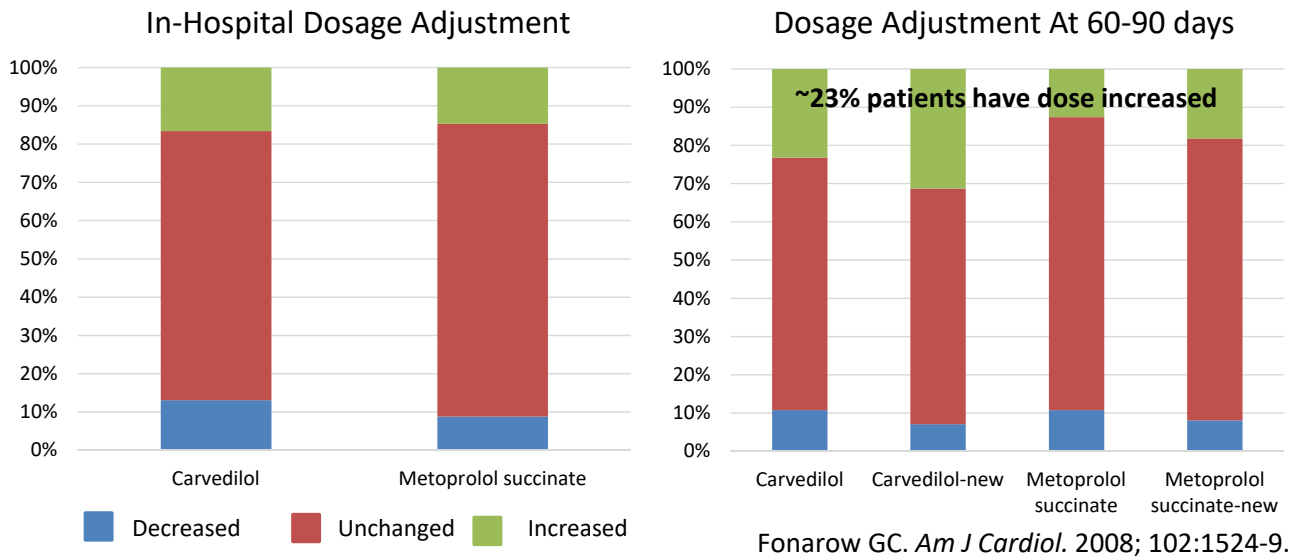


Legend:

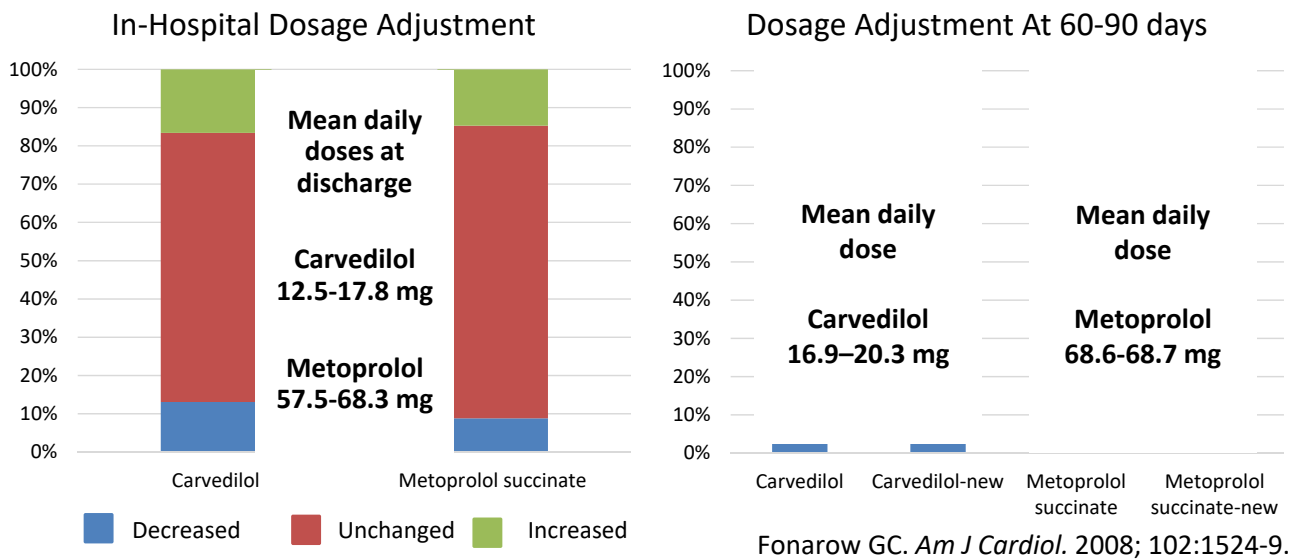
- < 50% target dose (blue)
- 50-100% target dose (red)
- $\geq 100\%$  target dose (green)

Greene SJ. *J Am Coll Cardiol.* 2018; 72:351-6. Brunner-LaRocca HP. *J Am Coll Cardiol.* 2019; 7:13-21.

## Beta-Blocker Dosage Adjustments During & After Hospitalization



## Beta-Blocker Dosage Adjustments During & After Hospitalization



# Effective Care Transitions to Optimize Post-Discharge Outcomes

## Patient Education & Discharge Counseling Heart Failure and Post-Myocardial Infarction

- Address barriers
- **Perform thorough review of medications**
- **Use inpatient and outpatient settings**
- Assess readiness to learn
- Vary teaching methods
- **Engage caregivers**
- **Engage other team members**
- Optimize written materials
- Emphasize self-care
- Employ teach-back method
- **Assess patient resources**
- Refer to disease management programs
- Focus on smooth care transitions

Wiggins B. *Pharmacotherapy*. 2013; 33:558-80.

## Inpatient Medication Histories & Reconciliation Clinical & Economic Outcomes

### Medication Histories

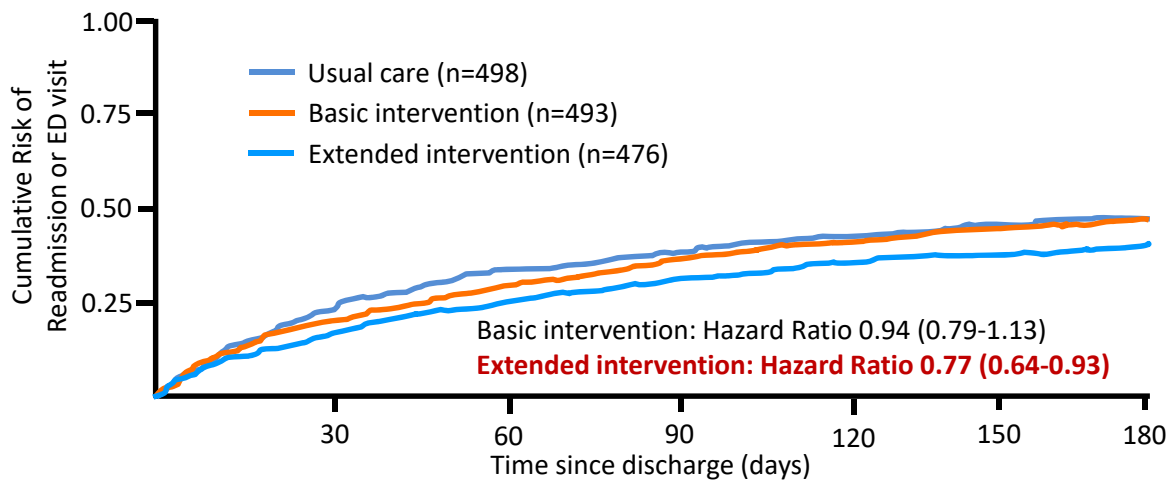
- ↓↓ Adverse drug events (ADEs)
- ↓↓ Drug costs
- ↓↓ Total costs
- ↓↓ Inpatient mortality

### Medication Reconciliation

- ↓↓ Medication discrepancies
- ↓↓ Potential ADEs
- ↓↓ Preventable ADEs
- ↓↓ Health care resource use

Bond CA et al. *Pharmacotherapy*. 1999; 19:1354-62. Bond CA et al. *Pharmacotherapy*. 2000; 20:609-21.  
 Bond CA et al. *Pharmacotherapy*. 2004; 24:427-40. Bond CA et al. *Pharmacotherapy*. 2006; 26:735-47.  
 Bond CA et al. *Pharmacotherapy*. 2007; 27:481-93. Mueller S. *Arch Intern Med*. 2012; 172:1057-69.

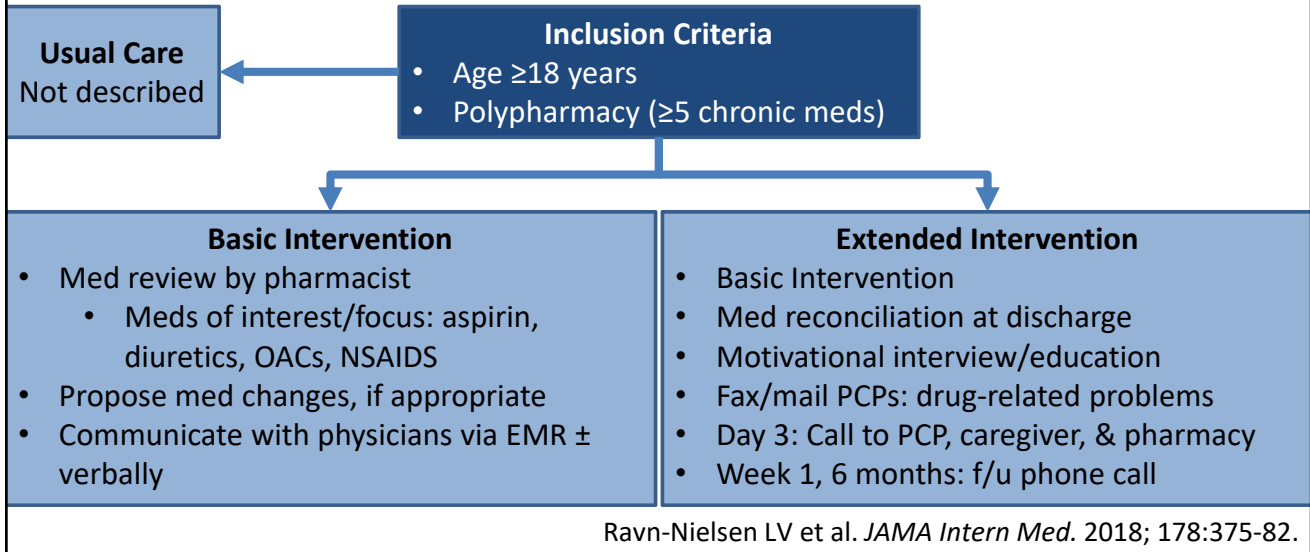
## Pharmacist Involvement in TOC Improves Outcomes! OPTIMIST Study



Ravn-Nielsen LV et al. *JAMA Intern Med*. 2018; 178:375-82.

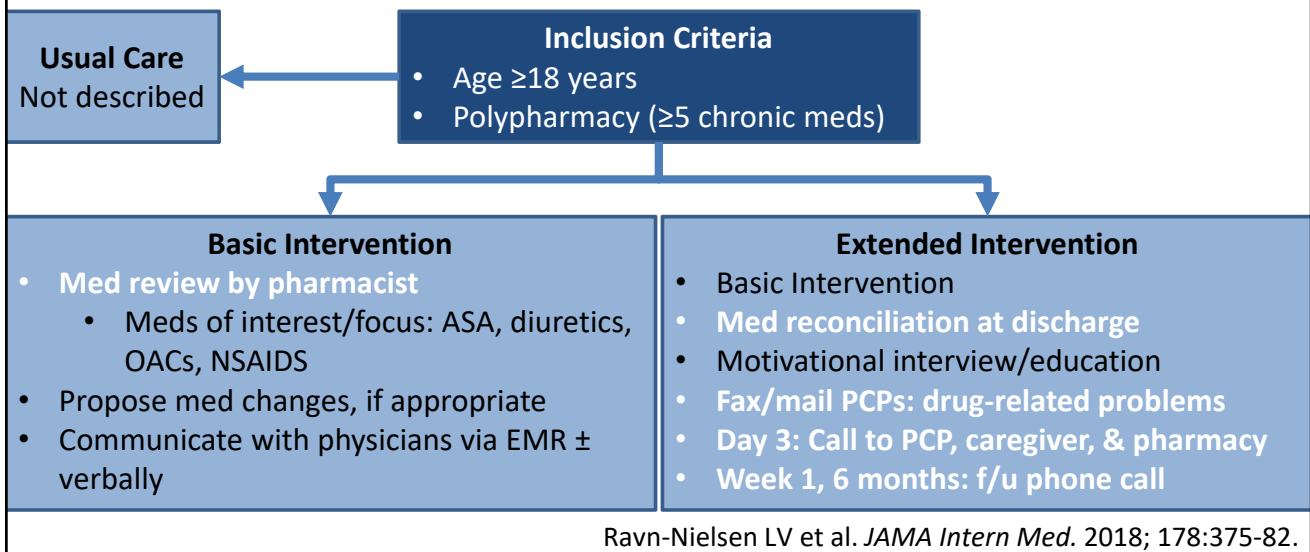
# OPTIMIST Study Design

## Transition of Care Interventions



# OPTIMIST Study Design

## Transition of Care Interventions



# Heart Failure Transitions of Care Programs

## Barriers & Potential Solutions

### Barriers

- Lack of time/resources
- Patient out-of-pocket costs/insurance issues
- Lack of administration/leadership support

### Potential Solutions

- Utilize technicians ± students
- Focus intervention(s) on "high-risk" patients
- Partner with outpatient pharmacy
- Bill for MTM services?

## Pharmacy Student Medication Reconciliation

### Student-managed services

- Pharmacist "reach" ↑ more than 2-fold
- Clinical interventions
- Post-discharge calls

### RXCARES

Reconciliation  
**X**-Drug Interaction  
**C**oordination & **C**ommunication  
**A**ccess & **A**dherence  
**R**isk reduction  
**E**vidence-Based Medicine review / **E**limination of meds  
**S**avings

### MoPhE

**M**obile  
**P**harmacy  
**E**ducation



Lubowski TJ. *Am J Pharm Educ.* 2007; 71:94.  
 Walker PC. *Am J Pharm Educ.* 2010; 74:20.  
 Lancaster JW. *Am J Pharm Educ.* 2014; 78:34.

Bursua A, Thambi M.  
 University of Illinois Hospital.

## Focus Efforts on “High-Risk” Patients

- Targeted patients (e.g., elderly, polypharmacy)
  - OPTIMIST: ≥5 meds
  - RXCARES
    - ≥10 meds
    - Age ≥65 AND ≥5 meds OR ≥2 admissions in last 1 year
- Targeted medications/disease states
  - MoPhE: anticoagulants, diabetes, inhaler technique
- Utilize EMR/Clinical Decision Support?

## Reimbursement for Transitions of Care?

- Several inpatient clinical pharmacy services eligible under evaluation & management inpatient procedural codes
  - History-taking, physical exam, medical decision-making
  - Categorized by complexity
- Medicare/Medicaid ineligible

### Steps to Consider

1. Review payer mix
2. Review state laws governing MTM criteria
3. Establish billing values with finance department
4. Pharmacist must conduct face-to-face visit & document
5. Establish reporting system

Traynor K. *Am J Health-Syst Pharm.* 2014; 71:774-6.  
Sanchez D. *Pharmacy Purchasing & Products.* 2014; 11:30.

Wild D. *Pharmacy Practice News.* <http://www.pharmacypracticenews.com/Operations-Management/Article/02-15/An-Inside-Job-Hospital-Adds-1-6-Million-in-Billables-Via-MTM/29415/ses=ogst>. (Accessed 2018 Oct 29.)

# Optimizing GDMT for Patients with HFrEF

## What Should Be in Your Toolkit?

- Knowledge to identify & resolve clinical barriers for optimization of GDMT
- Skills for medication histories, reconciliation, & patient education for appropriate patients
- Post-discharge follow-up
- Human resource management
  - More efficient use of technicians ± students
- Reimbursement capabilities (MTM billing?)



## Selected Resources

### Guidelines & Consensus Statements

- Yancy C et al. 2013 ACCF/AHA guideline for management of heart failure. *J Am Coll Cardiol.* 2013; 62:e147-239.
- Yancy C et al. 2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure. *J Am Coll Cardiol.* 2017; 70:776-803.
- Yancy CW et al. 2017 ACC Expert Consensus Decision Pathway for Optimization of Heart Failure Treatment. *J Am Coll Cardiol.* 2018; 71:201-30.

### Other Selected Resources

- Tran RH et al. *Pharmacotherapy.* 2018; 38:406-16.
- Ouwerkerk W et al. *Eur Heart J.* 2017; 38:1883-90.
- Fonarow GC et al. *Am J Cardiol.* 2008; 102:1524-9.
- Ravn-Nielsen LV et al. *JAMA Intern Med.* 2018; 178:375-82.
- Traynor K. *Am J Health-Syst Pharm.* 2014; 71:774-6.
- Sanchez D et al. *Pharmacy Purchasing & Products.* 2014; 11:30.  
[https://www.pppmag.com/article\\_print.php?id=1534](https://www.pppmag.com/article_print.php?id=1534).



## **Consider these practice changes. Which will you make?**

- Read the 2017 ACC Expert Consensus Pathway.
- Compare my organization's protocols with the most up to date heart failure treatment guidelines.
- Evaluate my organization's utilization & escalation of GDMT for HFrEF prior to discharge.
- Assess my pharmacy department's participation in care transitions (e.g., frequency of medication histories upon admission & medication reconciliation upon discharge, participation in patient education).
- Engage both patients & caregivers in educational encounters.
- Determine the feasibility of post-discharge pharmacist involvement (e.g., post-discharge telephone contact, multidisciplinary clinic).