Improving the Management of Chronic Heart Failure during Transitions of Care

Presented as a Live Webinar

Wednesday, September 27, 2017
12:00 - 1:00 p.m. ET

On-demand Activity
Live webinar recorded and archived to be watched at your convenience
Available after October 30, 2017

www.ashpadvantage.com/go/chfcare

Planned by ASHP
Supported by an educational grant from Novartis Pharmaceuticals Corporation
Improving the Management of Chronic Heart Failure during Transitions of Care

Activity Overview

In part one of the series faculty focus on evidence-based guidelines for chronic heart failure and the pharmacist’s role in transitions of care. Faculty also address strategies for reducing hospital readmissions and the use of standard and newer agents for chronic heart failure. This activity serves as a prelude to the clinical case workshop which applies these concepts to patient scenarios in transitions of care. The activity includes a pretest and posttest to assess changes in participants’ baseline knowledge.

Learning Objectives

At the conclusion of this knowledge-based educational activity, participants should be able to

- Review evidence-based guidelines for the pharmacologic management of patients with chronic heart failure, including the role of newer agents.
- Outline the pharmacist’s role in transitions of care, including the evidence for improving patient outcomes.
- Discuss practice pearls for reducing hospital readmissions for patients with chronic heart failure.

Continuing Education Accreditation

ASHP is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education.

This activity provides 1.0 hour (0.1 CEU – no partial credit) of continuing pharmacy education credit.
Live activity ACPE activity #: 0204-0000-17-436-L01-P
On-demand activity #: 0204-0000-17-436-H01-P

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.ashpadvantage.com/go/chfcare/webinar1 to find

- Webinar registration link
- Group viewing information and technical requirements
- CPE webinar processing information
Improving the Management of Chronic Heart Failure during Transitions of Care

Faculty

Robert J. DiDomenico, Pharm.D., BCPS-AQ Cardiology, FCCP
Clinical Professor
College of Pharmacy
University of Illinois at Chicago
Cardiovascular Clinical Pharmacist
University of Illinois Hospital
Chicago, Illinois

Robert J. DiDomenico, Pharm.D., FCCP, is Clinical Professor in the Department of Pharmacy Practice, and Faculty of the Center for Pharmacoepidemiology and Pharmacoeconomic Research at the University of Illinois at Chicago (UIC). He is also Cardiovascular Clinical Pharmacist at the University of Illinois Hospital & Health Sciences System with a practice site in inpatient cardiology. Dr. DiDomenico serves as Residency Program Director for the UIC PGY2 Cardiology Pharmacy residency. Since 2008, he has chaired the Educational Policy Committee at the UIC College of Pharmacy.

Dr. DiDomenico received his Pharm.D. and completed three years of post-doctoral training (Pharmacy Practice Residency, Cardiovascular Pharmacotherapy Fellowship) at UIC.

Dr. DiDomenico has authored more than 80 peer-reviewed articles, book chapters, and abstracts on topics related to cardiovascular pharmacotherapy and has gained national recognition as a key opinion leader in the areas of heart failure, anticoagulation, and coronary artery disease. He is also an active member of several organizations including the American College of Clinical Pharmacy, American College of Cardiology, and the Heart Failure Society of America.
Improving the Management of Chronic Heart Failure During Transitions of Care

Robert J. DiDomenico, Pharm.D., BCPS-AQ Cardiology, FCCP, FHFSA, FACC
Clinical Professor, University of Illinois at Chicago College of Pharmacy
Chicago, Illinois

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, only the individual/s below has disclosed a relevant financial relationship. No other persons associated with this presentation have disclosed any relevant financial relationships.

- Robert J. DiDomenico
  - Amgen, Inc.: drug monograph author
Learning Objectives

• Review evidence-based guidelines for the pharmacologic management of patients with chronic heart failure, including the role of newer agents.
• Outline the pharmacist’s role in transitions of care, including the evidence for improving patient outcomes.
• Discuss practice pearls for reducing hospital readmissions for patients with chronic heart failure.

Abbreviations

• CMS=Centers for Medicare & Medicaid Services
• GDMT=Guideline-directed medical therapy
• HFrEF=Heart failure with reduced ejection fraction
• ISDN=isosorbide dinitrate
• NYHA=New York Heart Association
• Important trials
  – RALES
  – EPHESUS
  – EMPHASIS
  – Paradigm-HF
  – SHIFT
Heart Failure: The Cold Hard Facts

- 5.7 million adults in U.S. have heart failure (HF) (2012)
  - Prevalence will increase 46% by 2030
  - 960,000 new cases annually
  - At 45 years-old, lifetime risk ~20–45%

- Mortality
  - ~30% at 1 year
  - ~50% at 5 years

- Hospitalizations
  - ~1 million annually

- Annual Cost
  - $30.7 billion (2012)

Pathophysiology of Heart Failure with Reduced Ejection Fraction (HFrEF)
Management of Chronic HFrEF
Treatment of HFrEF

Goals of Therapy

• Symptoms need to be controlled
• Prevent hospitalization and reduce mortality
• Provide optimal patient education
• Optimize guideline-based pharmacotherapies


---

Drug Therapy Options to Treat HFrEF

**Neurohormonal mediators**

• Anti-renin-angiotensin-aldosterone system (RAAS) drugs
  – Angiotensin converting-enzyme inhibitors (ACEIs),
  angiotensin receptor blockers (ARBs)
  – Mineralocorticoid receptor antagonists (MRAs)
  – Angiotensin receptor-neprilysin inhibitors (ARNIs)

• Beta-blockers
• Nitrates/hydralazine

**Non-neurohormonal therapies**

• Ivabradine
• Digoxin
• Diuretics

Recommendation Class and Evidence Level

<table>
<thead>
<tr>
<th>Class (Strength) of Recommendation (COR)</th>
<th>Level (Quality) of Evidence (LOE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I (Strong): BENEFIT &gt;&gt;&gt; RISK</td>
<td>Level A</td>
</tr>
<tr>
<td>Is recommended/beneficial</td>
<td>High quality evidence from &gt; 1 RCT</td>
</tr>
<tr>
<td>Class IIa (Moderate): BENEFIT &gt;&gt; RISK</td>
<td>Level B-R (RANDOMIZED)</td>
</tr>
<tr>
<td>Is reasonable; can be beneficial</td>
<td>Moderate quality evidence from &gt; 1 RCT</td>
</tr>
<tr>
<td>Class IIb (Weak): BENEFIT &gt; RISK</td>
<td>Level B-NR (NONRANDOMIZED)</td>
</tr>
<tr>
<td>May/might be reasonable; benefit is unknown/unclear/uncertain</td>
<td>Moderate quality evidence from &gt; 1 NRCT</td>
</tr>
<tr>
<td>Class III: No Benefit (Moderate): BENEFIT = RISK</td>
<td>Level C-LD (LIMITED DATA)</td>
</tr>
<tr>
<td>Is NOT recommended/beneficial</td>
<td>Randomized or nonrandomized observational or registry studies with limitations</td>
</tr>
<tr>
<td>Class III: Harm (Strong): RISK &gt; BENEFIT</td>
<td>Level C-EO (EXPERT OPINION)</td>
</tr>
<tr>
<td>Is NOT recommended; potentially harmful</td>
<td>Expert opinion based on clinical experience</td>
</tr>
</tbody>
</table>

RCT=randomized controlled trial, NRCT=nonrandomized controlled trial


Anti-RAAS Medications

AVP=arginine vasopressin, Epi=epinephrine, NE=norepinephrine, AT II=angiotensin II, Aldo=aldosterone, Na=sodium, H2O=water, ANP=A-type natriuretic peptide, BNP=B-type natriuretic peptide, NO=nitric oxide

Images courtesy of smokedsalmon (heart), Rattikankeawpun (brain), yodiyim (nervous system), dream designs (kidneys) at FreeDigitalPhotos.com.
### Efficacy of ACEIs, ARBs, & MRAs for HFrEF

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Endpoint (vs. placebo)</th>
<th>Odds Ratio (OR)</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEIs</td>
<td>All-cause mortality</td>
<td>0.77</td>
<td>0.67-0.88</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>All-cause mortality or</td>
<td>0.65</td>
<td>0.57-0.74</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>HF hospitalization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARBs</td>
<td>All-cause mortality</td>
<td>0.83</td>
<td>0.69-1.00</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>HF hospitalization</td>
<td>0.64</td>
<td>0.53-0.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MRAs (HFrEF)</td>
<td>All-cause mortality</td>
<td>0.81</td>
<td>0.75-0.87</td>
<td>No report</td>
</tr>
<tr>
<td></td>
<td>CV hospitalizations</td>
<td>0.76</td>
<td>0.64-0.90</td>
<td></td>
</tr>
</tbody>
</table>

Class I LOE: A


### Safety of MRAs for HFrEF - Serious Hyperkalemia

<table>
<thead>
<tr>
<th>Study</th>
<th>MRA</th>
<th>Placebo</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RALES</td>
<td>2%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>EPHESUS</td>
<td>6%</td>
<td>2%</td>
<td>0.002</td>
</tr>
<tr>
<td>EMPHASIS</td>
<td>6%</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

**ARNI: Sacubitril/Valsartan**

AVP=arginine vasopressin, Epi=epinephrine, NE=norepinephrine, AT II=angiotensin II, Aldo=aldosterone, Na=sodium, H$_2$O=water, ANP=A-type natriuretic peptide, BNP=B-type natriuretic peptide, NO=nitric oxide.

Images courtesy of smokedsalmon (heart), Rattikankeawpun (brain), yodiyim (nervous system), dream designs (kidneys) at FreeDigitalPhotos.com.

---

**PARADIGM-HF Efficacy**

![Graph showing PARADIGM-HF Efficacy](graph.png)

- **Enalapril**
- **Sacubitril/valsartan**

Class I: LOE: B-R

Hazard Ratio 0.80 (95% CI 0.73 – 0.87)
P<0.001

**PARADIGM-HF Adverse Effects**

<table>
<thead>
<tr>
<th>Effect</th>
<th>Sacubitril/Valsartan</th>
<th>Enalapril</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptomatic hypotension (SBP &lt;90)</td>
<td>15%</td>
<td>5%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Symptomatic hypotension (SBP &gt;110)</td>
<td>10%</td>
<td>2%</td>
<td>0.007</td>
</tr>
<tr>
<td>Increased Cr &gt;2.5 mg/dL</td>
<td>10%</td>
<td>4%</td>
<td>0.10</td>
</tr>
<tr>
<td>Increased Cr &gt;3.0 mg/dL</td>
<td>5%</td>
<td>2%</td>
<td>0.007</td>
</tr>
<tr>
<td>Increased K+ &gt;5.5 mEq/L</td>
<td>10%</td>
<td>6%</td>
<td>0.10</td>
</tr>
<tr>
<td>Increased K+ &gt;6.0 mEq/L</td>
<td>5%</td>
<td>3%</td>
<td>0.007</td>
</tr>
<tr>
<td>Cough</td>
<td>10%</td>
<td>3%</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

SBP=systolic blood pressure, Cr=creatinine


---

**Beta-blockers**

AVP=arginine vasopressin, Epi=epinephrine, NE=norepinephrine, AT II=angiotensin II, Aldo=aldosterone, Na=sodium, H₂O=water, ANP=A-type natriuretic peptide, BNP=B-type natriuretic peptide, NO=nitric oxide

Images courtesy of smokedsalmon (heart), Rattikankeawpun (brain), yodiyim (nervous system), dream designs (kidneys) at FreeDigitalPhotos.com.
AVP=arginine vasopressin, Epi=epinephrine, NE=norepinephrine, AT II=angiotensin II, Aldo=aldosterone, Na=sodium, H₂O=water, ANP=A-type natriuretic peptide, BNP=B-type natriuretic peptide, NO=nitric oxide

Images courtesy of smokedsalmon (heart), Rattikankeawpun (brain), yodiyim (nervous system), dream designs (kidneys) at FreeDigitalPhotos.com.

### Survival Effect of Beta-blockers & Nitrates/Hydralazine in HFrEF

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Control</th>
<th>Odds Ratio (OR)</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-blocker</td>
<td>All-cause mortality</td>
<td>0.71</td>
<td>0.64-0.80</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Class I LOE: A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ivabradine Mechanism of Action**

Long-lasting calcium current $I_{CaL}$

- Decreases heart rate (HR)
- No effect on contractility or blood pressure (BP)

Transient calcium current $I_{CaT}$

$I_{r}$ = hyperpolarization-activated, cyclic nucleotide-gated current, “funny” current
SA=sinoatrial
AV=atrioventricular
His-Purkinje System
Ventricular contraction


**SHIFT Clinical Outcomes**

- Efficacy
  - $P < 0.0001$
  - $P = 0.13$
- Safety
  - $P < 0.0001$
  - $P < 0.0001$
  - $P = 0.012$
  - $P < 0.0001$

HFrEF GDMT Algorithm

Stage B

**ACEI or ARB + Beta-blocker**

Stage C

- Diuretics as needed

NYHA Class I

NYHA Class II - IV

NYHA Class ≥ II

NYHA Class ≥ III

- CrCl ≥ 30
- K⁺ < 5.0
- Adequate BP on ACEI or ARB
- HR ≥ 70 on max beta-blocker
- Intolerance to ACEI or ARB
- Black ancestry

+ MRA

Δ ACEI/ARB to ARNI

+ Ivabradine

Δ ACEI/ARB to ISDN/Hyd

+ ISDN/Hyd

CrCl=creatinine clearance in mL/min, K⁺=serum potassium in mEq/L, HR=heart rate (bpm)

Use Evidence-Based Heart Failure Medications

- **Initiate at low doses**
- **Titrates to target dose not “therapeutic response”**
  - Dosing tables provided in appendix
- Renal function threshold for inclusion in “anti-RAAS” trials
  - Creatinine ~2.0 – 2.5 mg/dL
  - eGFR <30 mL/min/1.73 m²
- **Monitoring**
  - Vital signs & symptoms
  - ACEIs & ARBs
    - K⁺ & renal function (1 – 2 weeks)
  - MRAs
    - K⁺ & renal function
      - 2-3 days, then 7 days, then monthly x 3, then every 3 months
- **Education!!!**

eGFR=estimated glomerular filtration rate

Causes & Impact of Hospital Readmissions for Heart Failure

HF Readmissions Over Time

Krumholz H. *Circulation.* 2014; 130:966-75.
HF Readmissions & Transitions of Care (TOC)
What’s All the Fuss About?

• 30-day readmission & mortality (risk-standardized)
  – Added to CMS core measures & publicly reported since 2007
  • Acute myocardial infarction (AMI)
  • HF

• Affordable Care Act (2010)
  – Incentive payments to select hospitals for high-quality care
    Funded by reductions in diagnosis-related group payments for ALL hospitals
  • Fiscal Year 2017 and beyond: 2%

Causes of HF Readmission in Older Adults

- Nonadherence: meds ~33%
- Nonadherence: diet
- Inadequate discharge planning
- Inadequate follow-up
- Failed support system
- Failure to seek care ~35%


### Opportunities for Improvement?
#### Clinical Predictors of HF Readmission

- Acute coronary syndrome (ACS)/ischemia
- Increasing age
- **Anemia**
- **Arrhythmia**
- **Depression**
- **Hyponatremia**
- Left ventricular ejection fraction (LVEF)
- NYHA class IV symptoms
- **Pneumonia/respiratory process**
- **Suboptimal HF medication regimen**
- **Uncontrolled hypertension (HTN)**
- Worsening renal function


### Opportunities for Improvement?
#### Nonclinical Predictors of HF Readmission

- Socioeconomic
  - Medicaid
  - Income inadequacy
- Psychosocial
  - Poor social support
  - Low health literacy
  - *Prescription label reading score/ability*
  - Medication/dietary nonadherence
- Patient-centered & health system
  - Distressing symptoms
  - Disease progression
  - Poor self-care
  - *Low readiness for discharge*
  - Inconvenient or lack of early follow-up scheduled


Guideline-Directed Medical Therapy (GDMT) for HF at Discharge
Are Patients on Near-Optimal Regimens?

![Prescribed at Discharge (%)](image)

- Overall
- EF ≥50%
- EF 40-49%
- EF <40%
- EF <40% (Bress)

<table>
<thead>
<tr>
<th>ACEI/ARB</th>
<th>Beta-blocker</th>
<th>MRA</th>
<th>ACEI/ARB + BB</th>
<th>ACEI/ARB + BB + MRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>80%</td>
<td>60%</td>
<td>40%</td>
<td>20%</td>
<td>10%</td>
</tr>
</tbody>
</table>

p<0.0001 across groups each HF medication

EF=ejection fraction


GDMT at Discharge & Outcomes

<table>
<thead>
<tr>
<th>GDMT at Discharge</th>
<th>Risk adjusted mortality at 60 – 90 days</th>
<th>Risk-adjusted readmission at 60 – 90 days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hazard ratio (95% CI)</td>
<td>P value</td>
</tr>
<tr>
<td>ACEI or ARB</td>
<td>0.61 (0.35-1.06)</td>
<td>0.08</td>
</tr>
<tr>
<td>Beta-blocker</td>
<td>0.48 (0.30-0.79)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Evidence Supporting Pharmacist Intervention in Heart Failure Transitions of Care

Pharmacist TOC Programs in Heart Failure

<table>
<thead>
<tr>
<th>Studied Countries</th>
<th>Providers</th>
<th>Types of Interventions (may have included ≥1 of the following)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 studies</td>
<td>RPh</td>
<td>Patient education, Postdischarge call ± counseling, Identification/resolution of risk factors for readmission, Evaluation/optimization of drug therapy, Contacted community RPh &amp; physicians, Home visit at 1 week, Home-based intensive counseling</td>
<td>↑↑ Adherence, ↑ Exercise capacity, ↔/↓ Readmits, ↓ HF readmits, ↓ Clinical events, ↓↓ Mortality</td>
</tr>
<tr>
<td></td>
<td>RPh + RN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n = 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n = 2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jadad scores ≤2 for all studies, indicating potential for bias

### Key Components of Successful TOC Programs

<table>
<thead>
<tr>
<th>Study</th>
<th>Collaborative with Other Providers</th>
<th>Med History (Med Rec)</th>
<th>GDMT Intervention with Physician</th>
<th>Patient Education</th>
<th>Med Adherence</th>
<th>Phone Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varma</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Gattis</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Rainville</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gwadry-Sridhar</td>
<td>X</td>
<td></td>
<td>X (multidisciplinary)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lopez Cabezas</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Gunadi</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walker</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


### HF Clinical Pharmacists and Outcomes

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>Mortality Odds Ratio (95% CI)</th>
<th>Hospitalization Odds Ratio (95% CI)</th>
<th>Heart Failure Hospitalization Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist-directed care</td>
<td>0.92 (0.62–1.38)</td>
<td>0.77 (0.54–1.09)</td>
<td>0.89 (0.68–1.17)</td>
</tr>
<tr>
<td>Pharmacist collaborative care</td>
<td>0.69 (0.41–1.17)</td>
<td>0.60 (0.38–0.95)</td>
<td>0.42 (0.24–0.74)</td>
</tr>
<tr>
<td>Overall effect</td>
<td>0.84 (0.61–1.15)</td>
<td>0.71 (0.54–0.94)</td>
<td>0.69 (0.51–0.94)</td>
</tr>
</tbody>
</table>

### TOC Programs & Outcomes in Heart Failure

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Duration of Follow-up</th>
<th>Relative Risk of Readmission</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home visits</strong></td>
<td>30 days</td>
<td>0.54</td>
<td>0.21 – 1.37</td>
</tr>
<tr>
<td></td>
<td>3-6 months</td>
<td>0.75</td>
<td>0.66 – 0.86</td>
</tr>
<tr>
<td><strong>Structured telephone support</strong></td>
<td>30 days</td>
<td>0.80</td>
<td>0.38 – 1.65</td>
</tr>
<tr>
<td></td>
<td>3-6 months</td>
<td>0.92</td>
<td>0.77 – 1.10</td>
</tr>
<tr>
<td><strong>Telemonitoring</strong></td>
<td>30 days</td>
<td>1.02</td>
<td>0.64 – 1.63</td>
</tr>
<tr>
<td></td>
<td>3-6 months</td>
<td>1.11</td>
<td>0.87 – 1.42</td>
</tr>
<tr>
<td><strong>Nurse-led clinic-based</strong></td>
<td>3-6 months</td>
<td>0.88</td>
<td>0.57 – 1.37</td>
</tr>
<tr>
<td><strong>Multidisciplinary HF clinic</strong></td>
<td>6 months</td>
<td>0.70</td>
<td>0.55 – 0.89</td>
</tr>
<tr>
<td><strong>Primary care clinic-based</strong></td>
<td>6 months</td>
<td>1.27</td>
<td>1.05 – 1.54</td>
</tr>
</tbody>
</table>


### Improving Transitions of Care  
ACCP White Paper on Pharmacist Roles

1. Medication reconciliation during care transitions  
2. Participate in rounds  
3. Patient & caregiver education  
4. Participate in discharge  
   - Discharge patient interviews  
   - Follow up on drug-related problems  
   - Assess and address adherence issues  
   - Post-discharge follow up within 2-4 days  
5. Consultant pharmacists medication reconciliation in LTCF & assisted living  
6. Community pharmacists  
   - Clarify discrepancies & review auto refills post-discharge  
7. Ambulatory care pharmacists  
8. Collaborate with home health care (HHC) pharmacists & HHC agencies  
9. Medically underserved and homeless  
   - Services to address adherence, access, & health literacy issues  

ACCP=American College of Clinical Pharmacy,  
LTCF=long-term care facility  
Practice Pearls For Pharmacists Aimed at Reducing Heart Failure Readmissions

Strategies Associated with HF Readmissions

Lower Readmissions
- Medication reconciliation by RNs
- Partnership with physician groups
- Partnership with other hospitals
- Follow-up appt at discharge
- Discharge summary sent to primary care provider (PCP)
- Hospital staff assigned to follow up on test results available after discharge
- Pacific region of U.S.
- 200–399 hospital beds

Higher Readmissions
- Electronic linking of outpatient and inpatient Rx records
- Written emergency plan on discharge
- Alert PCP within 48 hours of discharge
- Postdischarge phone call
- Teaching hospital

PHARMACY CALL TO ACTION!

Medication History, Reconciliation, Education
Time to Get Back to the Basics

- Separate survey of 950 U.S. hospitals
  - RPh performs < 5% admission medication histories
  - RPh provides medication counseling/patient education in < 50% hospitals


Pharmacy Medication Reconciliation & Outcomes

Outcomes
- ↓ Medication discrepancies
  - 10 of 10 studies
- ↓ Potential adverse drug events (ADEs)
  - 2 of 3 studies
- ↓ Preventable ADEs
  - 1 study
- ↓ Health care resource use
  - 2 of 7 studies

Themes from Successful Programs
- Limit to older adult patients
  - ≥70 or 80 years
- Intensive staff involvement
  - Med history/reconciliation on admission, during hospitalization, and at discharge
- Communication with primary care provider
- Phone follow up after discharge

Core Clinical Pharmacy Services
The Most Value ("Bang") for Your Buck!

- Services with at least two favorable associations with health or economic outcomes
  - Admission medication histories
  - Adverse drug reaction (ADR) program/management
  - Collaborative drug management
  - Drug information
  - Participation on medical rounds


---

No Time for Medication Reconciliation?
Engage Pharmacy Trainees!

<table>
<thead>
<tr>
<th>Study</th>
<th>Setting</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lubowski et al.</td>
<td>Three hospitals Medicine &amp; surgery services Medication history &amp; med reconciliation</td>
<td>922 discrepancies 59 DRPs identified 48% recs accepted</td>
</tr>
<tr>
<td>Walker P et al.</td>
<td>Transitional care APPE Medicine services Discharge rounds, screen/interview patients, discharge med reconciliation, education, identify barriers, postdischarge phone call</td>
<td>↑ Pharmacist participation from ~35% of patients to ~73%; 97 interventions; 60 postdischarge calls</td>
</tr>
<tr>
<td>Lancaster and Grgurich</td>
<td>Medicine service Admission med reconciliation</td>
<td>68 discrepancies over 12 weeks; 28 interventions</td>
</tr>
</tbody>
</table>

APPE=advanced pharmacy practice experience,
DRP=drug related problems

Principles to Follow in Discharge Counseling Heart Failure and Post-Myocardial Infarction

- Address existing 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 transitions


Home-Hospital-Home Care Transitions
One Size Does Not Fit All

Pre-hospital
Self-Care Medications
- Medication history
- Admission med rec

In-Hospital
- Discharge med rec
- Medication education
- Prior auth? Refills? ePrescribe?
- Predischarge dispense?

Postdischarge
- Refer to pharmacy programs?
- Medication Therapy Management (MTM)
- Med Assistance
- Phone call?
- In-home visit?
- Physician follow-up within 7–10 days
- Refer to disease management team?

Identify precipitating causes
Optimize HF regimen
Identify self-care barriers
Patient and caregiver education THROUGHOUT hospital stay
Assess readiness for discharge
Key Takeaways

- Drugs that block the pathologic neurohormonal actions in patients with HFrEF improve survival
  - ACEIs, ARBs, MRAs, ARNIs, & beta-blockers
- Multidisciplinary heart failure transitions of care programs that leverage pharmacists knowledge & skills improve outcomes
- Pharmacists should tailor their transitions of care interventions to institutional and patient-specific needs
  - “Get back to the basics” of performing medication reconciliation and patient education, in addition to advanced clinical interventions

Consider these practice changes. Which will you make?

- Read the updates to heart failure treatment guidelines.
- Compare my organization’s protocols with the updates to heart failure treatment guidelines.
- Review my organization’s transitions of care initiatives to assess how pharmacists can become more involved.
- Increase the frequency of performing medication histories and discharge patient education for my patients with heart failure.
- Engage my pharmacy students and residents to assist with transition of care activities.
Selected Resources


Standardized discharge processes

- Project BOOST
  www.hospitalmedicine.org/Web/Quality_Innovation/SHM_Signature_Programs/Mentored_Implementation/Web/Quality__Innovation/Mentored_Implementation/Project_BOOST/Project_BOOST.aspx
- Project RED
  www.bu.edu/fammed/projectred/
- The Care Transitions Program
  www.caretransitions.org/
- Guided Care Mode:
  www.johnshopkinssolutions.com/solution/guided-care-2/