

The Acute Decompensated Heart Failure National Registry (ADHERE™): Opportunities to Improve Care of Patients Hospitalized With Acute Decompensated Heart Failure

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Heart failure is a leading cause of hospitalization for adults in the United States. Patients hospitalized with acute decompensated heart failure (ADHF) face a substantial risk of in-hospital mortality and rehospitalization. Despite the large number of patients hospitalized and this substantial risk, data on these patients have been limited and there has been little effort to improve the quality of care for patients hospitalized with ADHF. The Acute Decompensated HEart Failure National REgistry (ADHERE™) was designed to bridge this gap in knowledge and care by prospectively studying characteristics, management, and outcomes in a broad sample of patients hospitalized with ADHF. Participating community and university hospitals identified patients with a primary or secondary discharge diagnosis of heart failure and collected medical history, management, treatments, and health outcomes via secure web browser technology. As of July 2003, 65,180 patients have been enrolled from 263 hospitals. Initial data have provided important insights into the clinical characteristics, patterns of care, and outcomes of these patients. ADHERE documents significant delays in diagnosis and initiation of ADHF therapies as well as substantial under-use of evidence-based, guideline-recommended chronic heart failure therapies at hospital discharge. As such, there are substantial opportunities to improve the quality of care for ADHF patients in the nation's hospitals. The ADHERE Hospital Toolkit has been designed to provide hospital teams with effective proactive instruments to improve the quality of care for patients with ADHF. If successfully implemented, the improvements in short- and long-term clinical outcomes for ADHF patients are expected to be substantial.

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Hear t failure is a chronic progressive disease accounting for substantial morbidity and mortality.¹ There are 5 million Americans with chronic heart failure and these patients are at significant risk for decompensa-

tion and resulting hospitalization.² Hospitalizations for acute decompensated heart failure (ADHF) in the United States have increased from 377,000 in 1979 to 999,000 in 2000.² ADHF has emerged as a major public health problem and heart

hospitals from across the United States including large and small, academic and community sites were invited to participate. Individual sites require hospital and Institutional Review Board approval for their data to be entered into the Registry. As of

ADHERE site. Timing of therapy is captured, as well as clinical status at discharge and the occurrence of significant morbidities. Information related to the 4 specific core performance measures mandated by the Joint Commission for Accreditation of Healthcare Organization (JCAHO) is collected.

Detailed benchmark reports are provided quarterly to all hospitals that participate in ADHERE, to facilitate quality improvement efforts. The reports present key data regarding patient characteristics, treatments, quality measures, and clinical outcomes from the participant's own institution for each quarter. Changes over time in patient characteristics, treatments, and clinical outcomes can be monitored. The individual hospital data is also compared to aggregate national data, data from other academic or community hospitals, and data sorted by broad geographical region, ie, Northeast, South, Midwest, West, and Mid-Atlantic.

Characteristics of Patients Hospitalized With Heart Failure

The first patient was enrolled in the ADHERE Registry in October 2001. As of July 2003, 65,180 patients have been enrolled through 263 participating academic and community hospitals. Data reported here include enrollments from April 1, 2002 through March 31, 2003 as reported in the ADHERE 1st Quarter 2003 National Benchmark Report.⁷

Demographic characteristics and medical history of Registry patients (n = 52,047) are presented in Table 1. The median age of patients was 75.2 years and more than half (52%) were female. Most patients were either white (73%) or black (19%), and most (78%) were covered by Medicare or Medicaid. The majority of Registry patients (75%) have a

High readmission rates for heart failure highlight potential deficiencies in care and opportunities to implement meaningful interventions and patient education.

failure has become the leading cause of hospitalization in persons over 65 years of age.¹ The major expenditure for heart failure care is on hospitalizations; an estimated 12.7 billion dollars will be spent on the inpatient management of ADHF this year.² Patients hospitalized with ADHF face a substantial risk of readmission, as high as 50% by 6 months after discharge.³ High readmission rates for heart failure highlight potential deficiencies in care and opportunities to implement meaningful interventions and patient education.

ADHERE

The characteristics, management, and outcomes of patients hospitalized with ADHF are poorly defined despite the high prevalence and public health importance of this syndrome.¹ Several registries in outpatient settings for heart failure have been implemented, however, similar studies have not been undertaken in patients hospitalized with ADHF.^{4,5} The Acute Decompensated HearT Failure National Registry (ADHERE™) was developed as a large, observational, national, multicenter study of characteristics, patterns of care, and outcomes of patients hospitalized with ADHF in order to better define and improve care of these patients.⁶ Representative

July 2003, 263 sites have enrolled patients. Patients are eligible for enrollment if admitted to the acute care hospital with a discharge diagnosis of heart failure. As an observational database, there is no preselection of patients or predetermined treatment in the Registry. ADHERE documents current practice and treatment patterns in hospitals across the United States. The large database also allows subgroup analysis, which typical clinical trials cannot accurately assess due to limited study size and population. The subgroup analyses permit assessment outcomes based on differences in geographical regions, types of hospitals, demographic characteristics or clinical patient features, and patients who received specific types of treatments or procedures.

Information on patient characteristics, treatments, and outcomes from initial presentation, throughout the hospitalization, and at discharge are collected by chart review. The data are then entered into the ADHERE database, using a web-based electronic data capture (EDC) system via an electronic case report form. Because personal identifiers (such as social security numbers) are not entered into the database, it is possible that individual patients may be enrolled in the registry more than once, if they are readmitted to an

history of heart failure, and 23% of patients had been hospitalized for this diagnosis within the prior 6 months. Three percent of patients had 3 or more heart failure-related hospitalizations in that period.

The combination of medical history, hospitalization history, and clinical presentation reveals that this population of heart failure patients is quite ill.⁷ Seventy-two percent of patients had a history of hypertension and 50% of Registry patients had a systolic blood pressure greater than 140 mm Hg at hospital admission. Several other conditions were common in the medical history of these patients. These include coronary artery disease (58%), diabetes (44%), atrial fibrillation (31%), and obstructive pulmonary disease or asthma (31%). Moreover, renal dysfunction is emerging as a critical feature of patients hospitalized with heart failure, as 29% of Registry patients have a history of chronic renal insufficiency. Upon hospitalization, 20% have a serum creatinine greater than 2 mg/dL and 14% of Registry patients have an admitting diagnosis of renal insufficiency or failure (Tables 1 and 2). Upon admission, most patients presented with dyspnea (89%; dyspnea at rest in 36%), rales (67%), or peripheral edema (66%).⁷

Treatment of Patients Hospitalized With Heart Failure

The emergency department (ED) is clearly the treatment location to which most heart failure patients initially present. In the ADHERE program, 77% of all patients who get admitted for an acute episode of congestive heart failure initially present to the ED, while 21% go directly to an inpatient unit. An additional 2% are admitted to an inpatient unit on observation and

Table 1
Demographic Characteristics and Medical History of ADHERE Enrollees Discharged Between April 1, 2002 and March 31, 2003 (n = 52,047)

Median Age (y)	75.2
Gender	Male 48%
	Female 52%
Race/Ethnicity	Asian < 1%
	Black 19%
	Hispanic 2%
	White 73%
	Other 1%
Primary Insurance	Medicare 72%
	Medicaid 6%
	Commercial FFS/PPO 8%
	HMO 8%
	None/Self-pay 3%
	VA/Champus 1%
	Other 2%
	In Experimental Trial 1%
Heart Failure History	Prior Heart Failure 75%
	Prehospital LVEF Assessed 44% (n = 22,857)
	< 40% or Moderate/Severe Impairment 59%
	Prior Cardiac Transplant < 1
	Listed for Cardiac Transplant 1%
Hospitalized for Heart Failure in Past 6 Months	
	None 9%
	One Hospitalization 15%
	Two Hospitalizations 5%
	Three or More Hospitalizations 3%
	No Mention of Hospitalizations 44%
	Not Applicable, No History of HF 25%
NYHA Class Assessed	7% (n = 3,849)
	Baseline NYHA CLASS II 21%
	Baseline NYHA CLASS III 42%
	Baseline NYHA CLASS IV 34%
Medical History	Coronary Artery Disease 58%
	Myocardial Infarction 32%
	Hypertension 72%
	Hyperlipidemia/Dyslipidemia 34%
	Cardiac Valvular Disease 23%
	Stroke or TIA 17%
	Atrial Fibrillation 31%
	Ventricular Tachycardia 8%
	Ventricular Fibrillation 1%
	Pacemaker or ICD 20%
	LVAD < 1%
	IABP < 1%
	Peripheral Vascular Disease 18%
	Chronic Renal Insufficiency 29%
	Chronic Dialysis 5%
	Diabetes 44%
	Insulin-Dependent Diabetes 18%
	Liver Disease 3%
	Thyroid Disease 17%
	COPD or Asthma 31%
	Active Malignancy 5%
	Ever Smoked 48%
	Current Smoker 13%

CD = implantable cardioverter defibrillator, LVAD = left ventricular assist device, IABP = intra-aortic balloon, COPD = chronic obstructive pulmonary disease.

less than 1% of patients are seen in an observation unit as their first point of care. Once hospitalized, only 14% patients are admitted directly to an intensive care unit (ICU) setting. The vast majority of hospital care for heart failure is provided in telemetry (66%) and step-down units (7%).⁷

There are striking differences in the timing of the initiation of treatment between EDs and inpatient units. When diuretics are started in the ED, the mean door-to-needle time is 2 hours. However, the mean time-to-initiation of treatment is 7.7 hours for all patients (ED and inpatient), demonstrating that door-to-needle time is prolonged in the inpatient setting. In either case, there is an opportunity to improve the efficiency of care. Among ADHERE participants, 64% of patients received intravenous (IV) diuretic therapy alone and 27% of all admissions received IV vasoactive therapy. If IV vasoactive therapy is not started until after admission to an inpatient unit, the door-to-needle time is more than 23 hours, whereas, if started in the ED, the time-to-treatment is 2 hours. When IV vasoactive therapy is initiated, the duration of therapy is approximately 3 days.⁷

The difference in time-to-initiation of treatment in the ED compared to that in inpatient settings has a significant impact on patient outcome. It has previously been reported that the length of hospital stay was 3 full days shorter when patients had vasoactive therapy initiated in the ED compared with initiating vasoactive treatment after admission.⁸ If early heart failure care and time-to-treatment are to be improved, quality improvement efforts will need to involve the ED. Application of streamlined diagnostic guidelines, initiation of appropriate treatment strategies, and triage

Table 2
Clinical Presentation and Admitting Diagnosis of ADHERE Enrollees Discharged Between April 1, 2002 and March 31, 2003 (n = 52,047)

Any Dyspnea	89%
Dyspnea at Rest	36%
Fatigue	33%
Rales	67%
Peripheral Edema	66%
NYHA Class Assessed	10% (n = 5,003)
NYHA Class II	9%
NYHA Class III	40%
NYHA Class IV	50%
Systolic Blood Pressure Assessed	100% (n = 51,812)
SBP < 90 mm Hg	3%
SBP 90 to 140 mm Hg	47%
SBP > 140 mm Hg	50%
Initial ECG Assessed	94% (n = 49,091)
Atrial Fibrillation	20%
Other Abnormal Rhythm	26%
Initial CXR Assessed	90% (n = 47,072)
Pulmonary Congestion	76%
Initial Serum Sodium Assessed	98% (n = 51,109)
Sodium < 130 mmol/L	5%
Mean Serum Sodium (mmol/L)	138
Initial Serum Creatinine Assessed	98% (n = 51,134)
Creatinine > 2.0 mg/dL	20%
Initial BNP Assessed	30% (n = 15,850)
Median BNP (pcg/mL)	839
LVEF Assessed	56% (n = 29,371)
< 40% or Moderate/Severe Impairment	47%
Admitting Diagnoses	
Heart Failure	93%
MI or Unstable Angina	4%
Arrhythmia	3%
Respiratory Infection	5%
COPD/Asthma	12%
Renal Insufficiency or Failure	14%

NYHA = New York Heart Association, ECG = electrocardiogram, CXR = chest radiograph, BNP = B-type natriuretic peptide, LVEF = left ventricular ejection fraction, COPD = chronic obstructive pulmonary disease.

based on reasonable prognostic indicators should be aggressively pursued in this setting.

ADHERE data show that during the course of hospitalization, there is some improvement in the utiliza-

tion of key chronic heart failure treatment regimens prior to discharge. Pre-hospitalization use of angiotensin-converting enzyme (ACE) inhibitor (41%) or β -blocker (47%) increased to 55% and 58%, respectively, upon discharge from the hospital. Confining the analysis to the 12,754 patients with documented left ventricular ejection fraction (LVEF) less than 0.40, β -blockers were newly started in 27% of patients during the hospitalization, ACE inhibitors in 28%, and angiotensin-receptor blockers in 4%.⁷

In ADHF patients with documented measurement of left ventricular function, fully 51% of patients had preserved systolic function (LVEF \geq 0.40). These patients were older (76.3 years), more likely to be female (62%), and more likely to have a history of hypertension (77%) or diabetes (45%) than patients with reduced systolic function.⁷ Clinical trials often exclude ADHF patients with these conditions. However, the high prevalence of preserved systolic function and the even higher prevalence of hypertension in this cross section of typical ADHF hospital admissions demonstrates that much more focus is needed regarding optimal treatment strategies and guidelines for this common patient.

Clinical Outcomes of Patients Hospitalized With Heart Failure

Hospital Course and Symptomatic Status

Twenty percent of patients received care in the ICU or cardiac care unit and the median length of stay was 2.5 days. The median length of stay in the hospital for all hospitalized patients was 4.3 days. Upon discharge, 44% of patients were asymptomatic; 30% were improved but still symptomatic. Less than 1% was worse or had no change, and

11% had no mention of status at discharge.⁷

Hospital Discharge and Mortality Outcomes

Patient outcomes varied tremendously. Sixty-three percent of patients were discharged home and an additional 12% went home with additional care. Other patients were transferred to other hospitals (2%) to outpatient care (1%) or had unknown status (2%), and 16% went to hospice care. The in-hospital mortality rate was 4%.⁷ This mortality rate is well above that reported in heart failure clinical trials. In OPTIME CHF (Outcomes of a Prospective Trial of Intravenous

improve the outcome of ADHF should be identified and implemented in a very aggressive pattern to address this striking risk of death observed in ADHERE.

Performance Measures in Hospitalized Heart Failure Patients

Registry data on the Joint Commission on Accreditation of Healthcare Organizations' (JCAHO) Quality of Care Indicators show that only 30% of patients were receiving patient instructions on diet, weight monitoring, activity level, worsening symptoms, follow-up appointments, and medication management at discharge (JCAHO indicator

The use of nesiritide or other vasodilators is associated with better outcomes than the use of inotropic agents, even after extensive adjustments for co-variables and treatment propensity matching.

Milrinone for Exacerbations of Chronic Heart Failure), the inpatient mortality rate was 2.3% in the standard care group.⁸

Preliminary analysis of ADHERE suggests that outcomes such as mortality may vary by treatment. The use of nesiritide or other vasodilators is associated with better outcomes than the use of inotropic agents, even after extensive adjustments for co-variables and treatment propensity matching.¹⁰ Ongoing analysis of the database will build predictive models to help better understand the clinical factors that predispose to death and complications, and determine length of stay.

Outcome data on patients enrolled in the ADHERE database demonstrate that admission for heart failure is a high-risk event for patients, with death or significant adverse consequences a common occurrence. Treatment strategies that

HF-1). Assessment of left ventricular systolic function (HF-2) was either documented or scheduled in 83% of patients. Only 73% of eligible patients with left ventricular systolic dysfunction received an ACE inhibitor at discharge (HF-3). Counseling on smoking cessation for current smokers (HF-4) was given to only 40% of eligible patients (Figure 1). These data suggest that there are substantial opportunities to improve the quality of care for patients hospitalized with ADHF.

The combined findings of ADHERE regarding compliance with JCAHO heart failure care indicators, in-hospital mortality rate, significant morbidity, less than optimal treatment patterns and the impact of early, appropriate treatment on outcomes, demonstrates the need for quality care improvements and interventions. With prospective

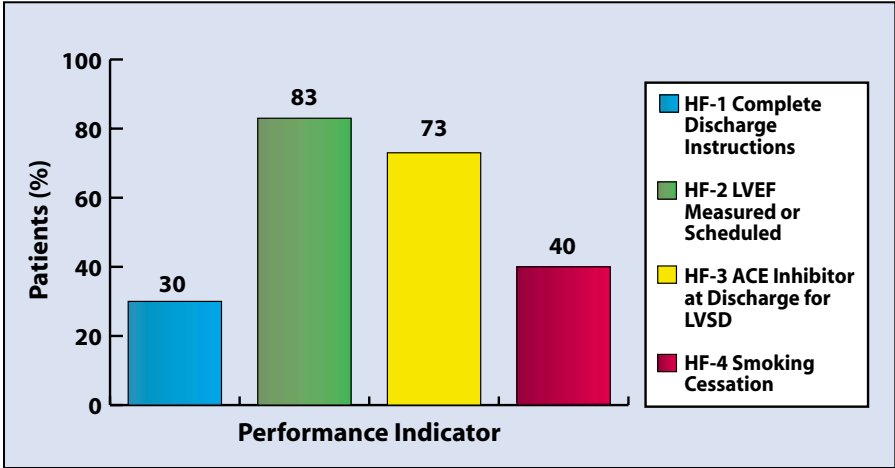


Figure 1. JCAHO Quality of Care Indicators for Heart Failure. Heart Failure-1: Discharge instructions documented; Heart Failure-2: Assessment of left ventricular function documented or scheduled; Heart Failure-3: ACE inhibitor at discharge for left ventricular dysfunction and no recorded clinical contraindication; Heart Failure-4: Smoking cessation counseling for current smokers. These data represent all enrolled discharges from April 1, 2002 to March 31, 2003 with a principal diagnosis of heart failure (based on ADHERE Benchmark 2003 first quarter national data).

ongoing data collection in ADHERE, participating hospitals are able to evaluate and closely study any effects of interventions to improve short- and long-term care and outcomes. Studies in other areas of cardiovascular care have demonstrated that this strategy improves the delivery of care and is very likely to have a beneficial effect on the outcomes of patients admitted with ADHF.^{11,12} The ADHERE database can also provide information about trends and changes in care and outcomes over time, throughout geographical regions, and even within a single hospital. Determining actual practice patterns can help identify gaps in treatment, resulting in the development of improved treatment strategies and standards of care. This will ultimately help improve treatment, management, and clinical outcomes in ADHF.

**ADHERE Hospital Toolkit
Rationale**

It has been demonstrated that hospital-based systems improve quality of care and clinical outcomes for

patients hospitalized with coronary artery disease and heart failure.¹¹⁻¹² Hospital-based heart failure management programs designed to improve the use of ACE inhibitors through in-hospital initiation have resulted in higher utilization rates, reduced rates of rehospitalization, and reduced mortality.^{13,14} An analysis was performed in more than 19,000 heart failure patients in 10 institutions with discharge medica-

tion programs. It resulted in an increase in the administration of ACE inhibitors from 65% to 95% and a decrease in readmission and death rates at 1 year from 46.5% to 38.4% ($P < .001$), and from 22.7% to 17.8% ($P < .0001$), respectively.¹² These studies strongly indicate that implementing comprehensive heart failure management programs with lifesaving medications prescribed before hospital discharge can be instrumental in significantly increasing the use of evidence-based therapy for heart failure and in reducing hospital readmission and mortality.

ADHERE data show that there are a large number of eligible ADHF patients that are not receiving evidence-based, guideline-recommended diagnostic tests, patient education, and medications. Structured programs can help physicians, nurses, and hospitals address deficiencies in ADHF care. Hospitals are well suited to initiate and maintain such programs because of their ability to provide a variety of resources. The ADHERE program seeks to improve the quality of care of patients hospitalized with heart failure. The ADHERE Hospital Toolkit program

**Table 3
ADHERE Hospital Toolkit**

- Emergency medical center diagnosis and treatment algorithms
- Critical pathway
- Preprinted order sets (emergency medical center and hospital admission)
- Admission checklist
- Discharge checklist
- Patient education materials
- Patient medication fact sheets
- Wall charts
- Pocket cards
- Patient compliance contract

aims to foster rapid diagnosis and treatment of ADHF, accelerate adoption of evidence-based, guideline-recommended therapies in eligible patients without contraindications, and, as a result, improves short- and long-term clinical outcomes.

ADHERE Heart Failure Toolkit Instruments

As part of an enhanced treatment and discharge plan, the ADHERE Hospital Toolkit provides evidence-based best practices algorithms, critical pathways, standardized orders, discharge checklists, pocket cards, chart stickers, and a variety of other elements to assist hospitals in improving ADHF management (Figures 2 and 3). These aids are provided in an electronic format for the hospitals to modify at their choosing. The ADHERE Toolkit also provides algorithms and dosing guides to facilitate the initiation and titration of guideline-recommended heart failure therapy. The materials are based on the current American College of Cardiology/American Heart Association (ACC/AHA) heart failure guidelines,¹ recent clinical trials, and the collective expertise of the ADHERE Scientific Advisory Committee members. These tools are designed to help health care providers rapidly diagnose ADHF and provide therapies that will achieve compensation efficiently and cost-effectively. The ADHERE Toolkit also provides instruments for health care providers to identify and initiate guideline-recommended treatments in appropriate heart failure patients without contraindications.

The tools also aim to facilitate physician and nursing identification of patients with contraindications or who are not yet clinically stabilized for treatment. Therapies that are under Class III in the ACC/AHA heart failure clinical practice guide-



Figure 2. ADHERE Hospital Toolkit Heart Failure Critical Pathway Treatment Algorithm

lines (conditions for which there is evidence and/or general agreement that a procedure/therapy is not useful/effective and in some cases may be harmful) are targeted for discontinuation (type 1 anti-arrhythmic agents, nonsteroidal anti-inflammatory drugs (NSAIDs), and calcium-channel blockers), unless the poten-

tial benefits are viewed to outweigh the documented risks.¹ The tools also provide guidance on identifying and managing factors that may exacerbate heart failure, major comorbidities, and concomitant risk factors (sudden death risk, lipids, diabetes, chronic obstructive lung disease, anemia, and depression).

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1. DATE AND TIME ORDERS
2. CHECK ALL APPROPRIATE ORDERS

EMERGENCY MEDICINE HEART FAILURE ORDERS

Emergency Medicine Physician: _____ Page: _____
Primary Physician/Cardiologist: _____ Page: _____
Nurse: _____ LVEF Class: _____ LVEF (Fraction): _____

DATE: _____ TIME: _____

Admit to: ☐ EIC ☐ EIC Observation Unit

MONITORING

☐ Cardiac monitoring
☐ Pulse oximetry
☐ Invasive blood pressure

VITAL SIGNS

☐ Per and routine ☐ Other: _____
☐ Call trending M/F for BP, HR, SBP, DBP, HR, RR, SpO2, JVP, & ECG

CHARTING

☐ Obtain vital records (chart, lab, etc.)

ALLERGIES

☐ N/A ☐ Allergy: _____

ACTIVITY

☐ Bed rest
☐ Out of bed with assistance

FOLEY

☐ If patient is unable to void, place Foley catheter

IN

☐ Intake _____ per liter/hrs with _____ and other blood
☐ Repeat with 3cc normal saline flush q 12 hours
☐ Other: _____

IC and WEIGHT

☐ Serial recording of Ix and Oax with running totals of urine output
☐ Weight (chart, scale)

DIET

☐ NPO
☐ 2 gram sodium diet

RESPIRATORY

☐ Oxygen: 1 via nasal cannula (for CP, SOB, SaO2 <92%)
☐ Oxygen: _____ % via face mask (for CP, SOB, SaO2 <92%)
☐ CPAP at 5-12 cm H2O, oxygen level in 5-10% ☐ _____ %
☐ BiPAP at 10/5, oxygen level in 5-10% ☐ _____ %
☐ Ventilator settings (if indicated)

LABORATORIES

☐ CBC with differential and platelets
☐ Electrolytes, BUN, creatinine, glucose
☐ CPK-MB and (if needed) and q 8 hours x 3 or ☐ at _____
☐ Cardiac troponin (TNT) and 8 hours or ☐ at _____
☐ BNP and ☐ PTT (if indicated)
☐ BNP (if indicated)
☐ Liver function tests (if indicated)
☐ Cardiac troponin (if indicated)
☐ Digoxin level (if patient receiving digoxin)
☐ RUA
☐ Others: _____

TESTING

☐ CXR
☐ Chest X-ray (PA and lateral)
☐ Arterial blood gas
☐ Echocardiogram (portable)
☐ Others: _____

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This sample template form is provided only as an example. You are solely responsible for determining the appropriateness of its use and the content of any form which you develop from it.

HEART FAILURE DISCHARGE CHECKLIST

Patient Name: _____
Admit Date: _____ Discharge Date: _____
Attending Physician: _____

Discharge Medication	Y	N	Q	Specific Medication	Comments or Reason for Not Prescribing
ACE Inhibitor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Angiotensin receptor antagonist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
B-blocker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Spironolactone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Loop diuretic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Thiazide diuretic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Potassium supplementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Magnesium supplementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Digoxin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Hydralazine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Nitroglycerin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Warfarin (specify INR in summary)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Aspirin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Clonidine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Statins or other lipid-lowering agents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Counseling, Other Interventions, Follow-up	Y	N	Date	Comments
Two gram sodium diet	<input type="checkbox"/>	<input type="checkbox"/>		
Physical activity level counseling	<input type="checkbox"/>	<input type="checkbox"/>		
Monitoring of daily weights	<input type="checkbox"/>	<input type="checkbox"/>		
What to do if symptoms worsen	<input type="checkbox"/>	<input type="checkbox"/>		
Smoking cessation recommended	<input type="checkbox"/>	<input type="checkbox"/>		
Follow-up appointment	<input type="checkbox"/>	<input type="checkbox"/>		
Review of medications	<input type="checkbox"/>	<input type="checkbox"/>		
Cardiac rehabilitation referral	<input type="checkbox"/>	<input type="checkbox"/>		
Electrophysiology follow-up (if indicated)	<input type="checkbox"/>	<input type="checkbox"/>		
Lipid profile follow-up (if indicated)	<input type="checkbox"/>	<input type="checkbox"/>		
Anticoagulation clinic follow-up (if indicated)	<input type="checkbox"/>	<input type="checkbox"/>		
Stress test as outpatient (if indicated)	<input type="checkbox"/>	<input type="checkbox"/>		
LV function measurement as outpatient (planned during admission, documentation, prior measurement, or as outpatient)	<input type="checkbox"/>	<input type="checkbox"/>		
Clinical summary and patient education record sent to appropriate physicians	<input type="checkbox"/>	<input type="checkbox"/>		

Heart Failure Discharge Checklist
Adapted by The ADHERE Registry Scientific Advisory Committee and based on UCLA Medical Center's Heart Failure Discharge Checklist.

adhere

REMINDER:
Always maintain a low salt diet

adhere
Heart Failure Management Program

- Increase in shortness of breath
- Swelling in the legs or ankles
- Weight gain >3 lbs within a few days
- Difficulty breathing when lying down
- Worsening tiredness
- Stomach bloating/fullness and loss of appetite
- Dry cough, especially when lying down

Appointments

DATE	TIME

PATIENT REMINDER CARD

Patient name: _____

CALL

Dr. _____
or () _____

If you have signs or symptoms of worsening CHF

Medications

MEDICATION	STRENGTH	DOSE	MEDICATION	STRENGTH	DOSE

From The ADHERE Registry Scientific Advisory Committee

The critical pathways also aim to enhance provision of patient education, assessment of social support, discharge planning, follow-up, and outpatient monitoring.

The ADHERE Toolkit contains a comprehensive spectrum of patient education materials and resources to encourage patients to become actively involved in their heart failure management process. There are patient education materials on relevant medical topics and fact sheets on medications that may be used in the patient's treatment. There is a template for a patient compliance contract. There is a patient pocket card that can be used to list all medications, follow-up appointments, and the warning signs of worsened heart failure. The patient educational materials are available to the hospital teams in printed version or modifiable electronic versions by CD.

Hospitals are encouraged to create collaborative teams to review ADHERE data as well as design and implement plans of action to implement the ADHERE Hospital Toolkit and improve care. It is recommended that these hospital teams include cardiologists; hospitalists; primary care physicians; emergency medicine physicians; emergency medicine, cardiac and general medicine nursing; pharmacists, nutritionists,

medical social workers, physical therapists; case managers; hospital administration; and other health care personnel. Interactive educational programs, which highlight data on heart failure treatment gaps, evidence-based care, and hospital best practices, are provided on an ongoing basis. These take the form of teleconferences, webcasts, national and regional ADHERE investigator meetings, and newsletters. The characteristics of hospitals that succeed with improving treatment rates over time are well

described, and ADHERE hospitals are encouraged to adopt strategies that have proven effective in improving cardiovascular care.¹⁵ The impact of the ADHERE Hospital Toolkit on improving treatment will be tracked over time and this data will be used to guide future versions of the tool kit and other strategies to improve care of patients hospitalized with heart failure.

Conclusions

As the largest registry of its type, ADHERE is providing premier data

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Main Points

- If early heart failure care and time-to-treatment are to be improved, quality improvement efforts will need to involve the ED.
- The Acute Decompensated Heart Failure National Registry, or ADHERE™, was developed as a large, observational, national, multicenter study of characteristics, patterns of care, and outcomes of patients hospitalized with ADHF, in order to better define and improve care of these patients.
- Starting diuretics and vasoactive therapy in the emergency department appears to decrease the time-to-treatment.
- These studies strongly indicate that implementing comprehensive heart failure management programs with lifesaving medications prescribed before hospital discharge can be instrumental in significantly increasing the use of evidence-based therapy for heart failure and in reducing hospital readmission and mortality.
- The combined findings of ADHERE demonstrate the need for quality care improvements and interventions.

on clinical and demographic characteristics of patients, heart failure management patterns, and patient outcomes in a nationally representative sample of hospitalized ADHF patients. These data indicate that there are substantial, multifaceted opportunities to improve the efficiency and quality of care for patients hospitalized with ADHF. The ADHERE Hospital Toolkit has been designed to proactively help healthcare providers and hospitals rapidly improve care for these patients. Continued participation in the Registry allows hospitals to assess changes in care and outcomes over time, in order to facilitate their performance improvement efforts. By helping to identify gaps in care as well as the best practices for patients with this syndrome, ADHERE is setting the stage for quality improvement efforts for heart failure at the national level, and ultimately holds promise for improving public health. ■

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