

APPENDIX A DEFINITIONS FOR Acute CHF and Stages (Ref 40)
 (BNP based definitions not used, as it is not available in the NT for acute use)

Clinical Presentation	Incidence*	Signs and Symptoms	Characteristics
1. Elevated systolic blood pressure	>50%	Usually develop abruptly	Predominantly pulmonary (radiographic/clinical) rather than systemic congestion due to rapid fluid redistribution from systemic to pulmonary circulation; many patients have preserved EF
2. Normal systolic blood pressure	>40%	Develop gradually (days or weeks) and are associated with significant systemic congestion	Despite high ventricular filling pressure, radiographic pulmonary congestion may be minimal because of pulmonary vasculature/lymphatics adaptation due to chronic elevated left atrial pressures
3. Low systolic blood pressure (90 mm Hg)	<8%	Usually have a low cardiac output with signs of organ hypoperfusion	Many of those patients have advanced or end-stage HF
4. Cardiogenic shock	<1%	Rapid onset	Primarily complicating acute MI, fulminant myocarditis
5. Pulmonary edema	<3%	Rapid or gradual onset	Clinical: severe dyspnea, tachypnea, tachycardia, and hypoxemia, requiring immediate airway intervention Radiographic: present in up to 80% of patients; often not associated with clinical pulmonary edema
6. "Flash" pulmonary edema	?	Abrupt onset	Precipitated by severe systemic hypertension. Uncorrected, respiratory failure and death ensue. Patients are easily treated with vasodilators and diuretics. After blood pressure normalization and reinstatement of routine medications, patients can be discharged within 24 h
7. Isolated right HF	?	Rapid or gradual onset	Not well characterized; there are no epidemiological data (eg, acute cor pulmonale, right ventricular infarct)
8. Acute coronary syndromes (25% of patients have signs/ symptoms of HF)	?	Rapid or gradual onset	Many such patients may have signs and symptoms of HF that resolve after initial therapy or resolution of ischemia
9. Post-cardiac surgery HF	?	Rapid or gradual onset	Occurring in patients with or without previous ventricular dysfunction, often related to worsening diastolic function and volume overload immediately after surgery.

STAGE	Description
A	Patients at high risk for HF but without structural heart disease or symptoms of HF (e.g., patients with hypertension, atherosclerotic disease, diabetes, obesity, and metabolic syndrome or patients using cardiotoxins or with a family history of cardiomyopathy). Such patients have no identified structural or functional abnormalities of the pericardium, myocardium, or cardiac valves and have never shown signs or symptoms of HF.
B	Patients who have developed structural heart disease that is strongly associated with the development of HF (e.g., previous myocardial infarction, LV remodeling including LVH and low EF, or asymptomatic valvular disease) but without signs or symptoms of HF.
C	Patients with structural disease who have current or prior symptoms of HF (e.g., known structural heart disease and shortness of breath and fatigue, reduced exercise tolerance).
D	Patients with refractory HF requiring specialized interventions (e.g., marked symptoms of HF at rest despite maximal medical therapy—those who are recurrently hospitalized or cannot be safely discharged from the hospital without specialized interventions).

APPENDIX B Attributes of Performance Indicators (Ref 32)

Choosing Performance Measures	
Selection Factors	Considerations
Adherence to the potential performance measure results in meaningful improvements in clinically important outcomes	Evidence-based trials, strong clinical practice guideline recommendations for (Class I, Level of Evidence: A) or against (Class III, Level of Evidence: A) the measure
Broad sampling from multiple domains associated with the process of medical care (see Figure 1)	Measures should be distributed across the domains of diagnosis, patient education, treatment, patient self-management, and serial monitoring of success of treatment
Attributes of Selected Measures	
Measure Characteristics	Relevant Attributes
Useful in improving patient outcomes	Interpretable Actionable
Measure design	Denominator precisely defined Numerator precisely defined Established types of validity <ul style="list-style-type: none"> ● Face ● Content ● Construct
Measure implementation	Established reliability Feasibility <ul style="list-style-type: none"> ● Reasonable effort ● Reasonable cost ● Reasonable time period for collection
Overall assessment by Performance Measures Writing Group	Overall assessment of measure by explicit, predefined criteria for inclusion in measurement set
Adapted from Normand SL et al. ²	

APPENDIX C Choosing Performance Indicators (Ref 32)

Choosing Performance Measures	
Selection Factors	New Considerations
Confidence that adherence to a potential performance measure would result in meaningful improvements in clinically important outcomes	The methodology and logic by which a performance measure was selected, with a clear description of anticipated benefits on meaningful clinical outcomes, should be disclosed by the writing committee.
Costs of measure	Explicit demonstration that application of the performance measure to patients is associated with an acceptable ICER. An estimate of the societal burden of more complete adherence to the performance measure.
Outcomes measures	The outcomes to be considered must be clinically relevant, including mortality, irreversible morbidity, and health status (symptoms, function, and quality of life), and surrogate outcomes should be avoided. Previously published recommendations for publicly reported outcomes should be followed. ²² Risk adjustment, with carefully selected clinical variables and explicit consideration of demographic characteristics, must be available to render observations interpretable. Where possible the population should represent a disease state rather than a procedure applied to a subset of that population.
Measure Characteristics	New Considerations
Use of exceptions	Exclusions of patients from the denominator of a performance measure are reasonable and should be broadly grouped into <ul style="list-style-type: none"> ● medical ● patient ● system-based reasons for why the patient was not eligible
No. of measures	To minimize the number of measures, efforts at creating a national consensus, involving all stakeholders, on measures to be used for a specified period of time for accountability, pay for performance, and quality-improvement efforts should be developed. Although performance measure writing committees should create a full complement of measures for a disease, the NQF should select only a subset of these for use at any particular time. The subset should include measures from multiple dimensions of care to facilitate a more complete assessment of quality. Measures should be retired when new evidence questions the association of those measures with clinically meaningful outcomes or performance is so high that there is little room for future improvement. Retired measures should be considered for reassessment in future years.
Feasibility of data collection	Data collection should occur prospectively through routine transactions of medical care because retrospective collection of data is not sustainable. EMR companies need to create and support export of data using standardized formats so that a greater number of providers can participate in national quality-assessment programs. Measures need to be developed in a way that recognizes the longitudinal patient care experience and creates “windows” for capturing performance that are practical and clinically interpretable.
Composite measures	The psychometric properties of these measures, including reliability, accuracy, and predictive validity, should be demonstrated. The purpose, intended audience, and scope of a composite measure should be explicitly stated. The individual measures used to create a composite measure should be evidence-based and reliable. The methodology used for weighting and combining individual measures into a composite performance measure should be transparent and empirically tested. Composite performance measure reporting by providers should include a measure of the degree of uncertainty surrounding composite estimates.
Attribution	Accountability is an important opportunity to improve practice. It is essential that those held accountable have the processes of care being assessed under their locus of control. More methodological work is needed for promotion of the concept of shared accountability for evaluating transitions in care.

EMR indicates electronic medical record; ICER, incremental cost-effectiveness ratio; and NQF, National Quality Forum.

Appendix D Heart Failure Disease Management Scoring System (Ref 33)

Table. Heart Failure Disease Management Scoring Instrument

Intervention Category	Points to be Assigned	Comment/Rationale
Recipient	1=Provider alone 2=Patient alone 3=Patient with some inclusion of caregiver 4=Patient with a caregiver who is central to the intervention	Most interventions focus on the patient, yet, coding scheme recognizes that some interventions are aimed at improving provider behavior (eg, system intervention aimed at evidence-based care). Most points are given to interventions that focus on the patient but also include caregivers because an engaged family member act as 2nd set of eyes and memory support, which can deter hospitalization. Thus: 2 points assigned if focus was on patient alone; 3 points if there is some inclusion of the caregiver, 4 points if inclusion of the caregiver was a major component of the intervention.
Intervention content		
Education and counseling aimed at supporting self-care	0=No mention of education 1=Focus solely on importance of treatment adherence 2=Focus on treatment adherence including some creative methods of improving adherence 3=Focus on surveillance but no mention of actions to be taken in response to symptoms (eg, no flexible diuretic management) 4=Emphasis on surveillance, management, and evaluation of symptoms in addition to treatment adherence	Interventions are derived from Krumholz et al, ⁵ with point allocations assigned to reflect current literature that suggests these interventions are not comparable in efficacy. Individualized patient education and counseling is essential because patients must be engaged in the process of self-care and helped to learn how to make decision about managing their HF. However, true self-care is more than treatment adherence.
Medication management	0=No mention of medication regimen 1=Some mention of medications (eg, importance of medication compliance) but not an active part of the intervention. No attempt to intervene with provider to get patients on an evidence-based medication regimen 2=Evidence-based medication regimen advocated but no follow-up with patient or provider to monitor the suggestion 3=Medication regimen monitored, attempt made to get the patient on evidence-based medications, with follow-up monitoring done with patient or provider	Patients on optimal, evidence-based therapies are significantly less likely to have acute exacerbations and hospital admissions.
Social support Peer support	0=No mention of a peer support intervention 1=Peer support mentioned but not integral to intervention 2=Peer support integral component of intervention	Peer support interventions not used commonly but when used they appear to improve perceived support rather than self-care. Support has been conceptualized as a moderator of the relationship between intervention and outcome.
Surveillance by provider: Remote monitoring	0=No use of remote monitoring or telehealth 1=Remote monitoring is used in conjunction with other interventions that form the main intervention used 2=Telehealth is essential component of intervention	Remote monitoring is distinguished from other methods of communication. Video monitoring may become a common method of communication. For now, remote monitoring is conceptualized as method of engaging patients in process of learning self-care by active engagement.
Delivery personnel	1=Single generalist provider (eg, physician, nurse, pharmacist) 2=Single HF expert provider (eg, physician, nurse, pharmacist) 3=Multidisciplinary intervention 4=Multidisciplinary intervention provided in an integrated, choreographed manner	Generalist: Provider specifically noted to not have training in heart failure. Multidisciplinary interventions: Multidisciplinary team involved with all or most patients. Integrated/choreographed multidisciplinary intervention: Provided by multiple disciplines in collaboration; provided in an HF clinic with policies/protocols specified for HF care. Optimal mix of program delivery personnel is not known, thus assigned points are hypothesized in this study.
Method of communication	1=Mechanized via internet or telephone 2=Person-to-person by telephone 3=Face-to-face, individual, or in a group 4=Combined: Face-to-face at least once alone or in a group with individual telephone calls in between meetings	Most interventions involve combined individual approach with telephone/face-to-face contact. Points should be assigned based on predominant method of communication. The method of communication varies widely within individual HF disease management programs, making it difficult to judge how the method influences outcomes. Thus, assigned points are hypothesized in this study.

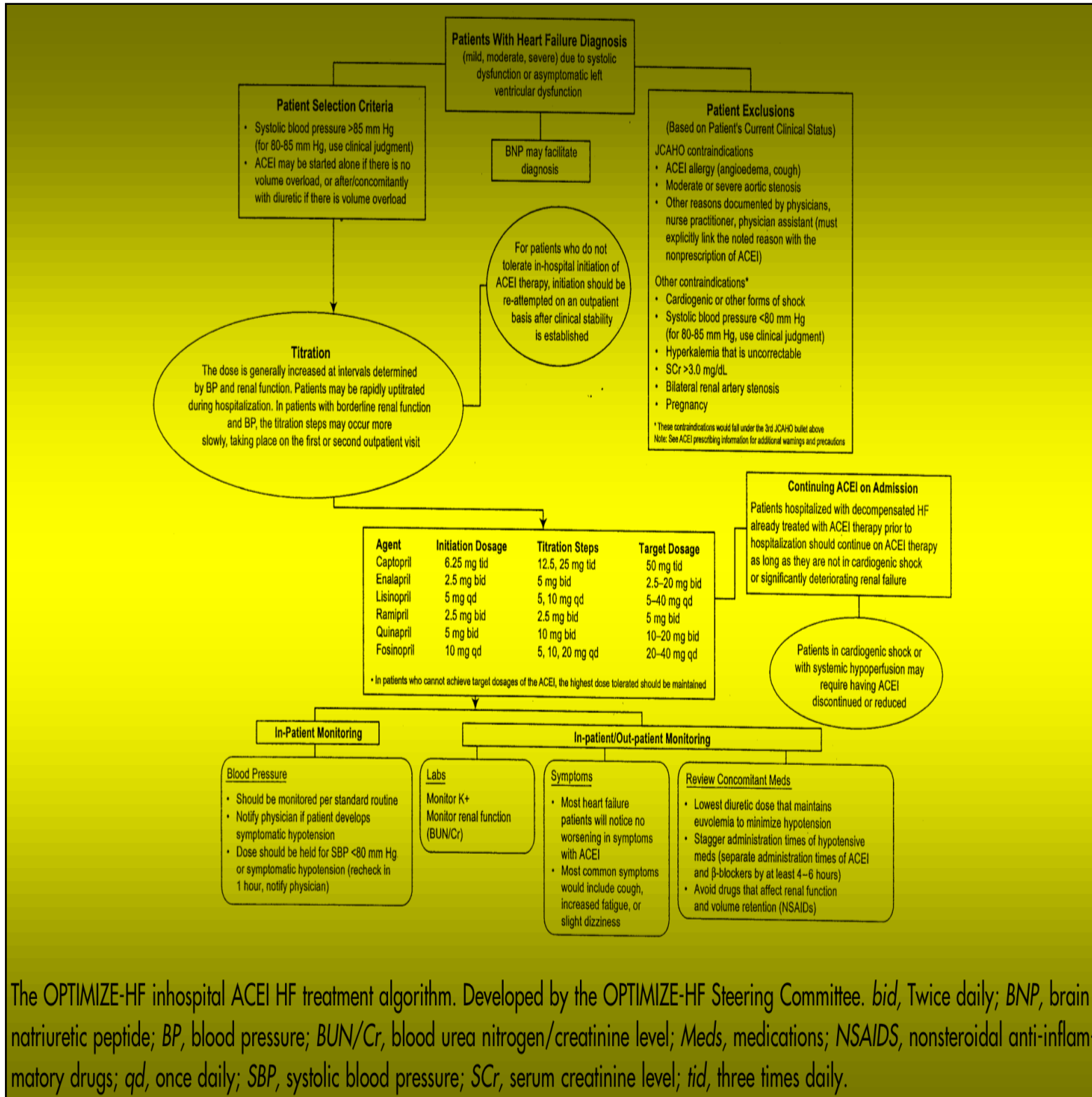
Table. Continued

	Points to be Assigned	Comment/Rationale
Intensity and complexity		Some literature suggests that more intense, complex, and lengthy interventions are associated with better outcomes, though simple interventions have also been effective. Two categories were created to capture this item: Duration and complexity.
Duration	1= \leq 1 mo 2= \leq 3 mo 3= \leq 6 mo 4= $>$ 6 mo	
Complexity	1=Low: single contact with little or no follow-up 2=Moderate: $>$ 1 but $<$ 4 and/or infrequent contact or contacts of short duration 3=High: multiple contacts of significant duration	Complexity is judged on frequency of content and duration of visits/calls. Assigned points are hypothesized in this study.
Environment	1=Hospital: Inpatient only 2=Clinic/outpatient setting 3=Home-based 4=Combination of settings	Krumholz et al ⁵ note that it is not yet clear which environmental factors are associated with success. Thus assigned points are hypothesized in this study. Many interventions are provided in a more than 1 setting, and scoring endeavors to capture these combinations.

Note: All available sources describing the intervention should be used to ascribe scores.

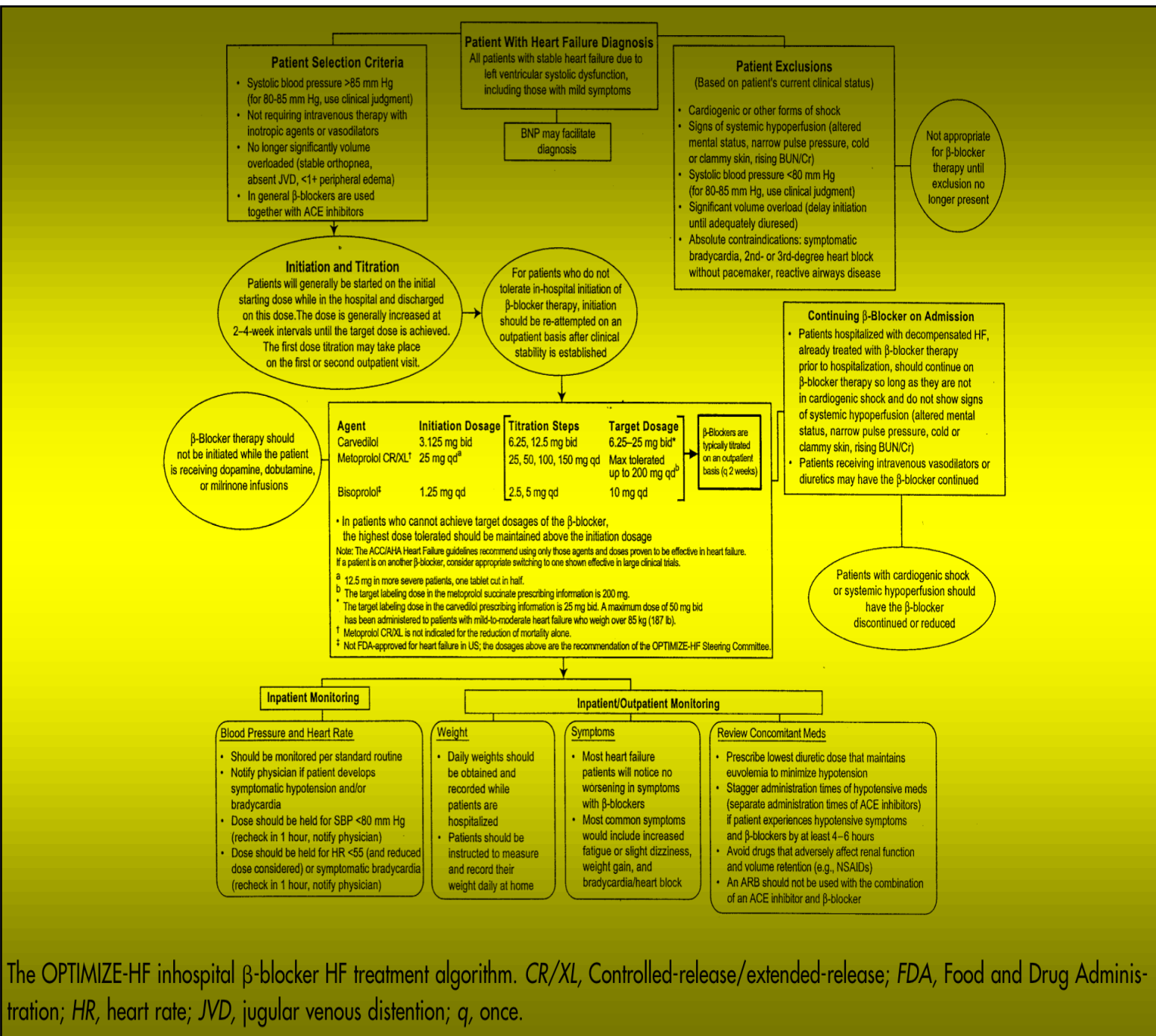
Reprinted from Krumholz et al,⁵ with permission from Lippincott Williams & Wilkins. Copyright 2006, American Heart Association.

Appendix E Model of ACE-I Titration in OPTIMIZE-HF (Ref 34)



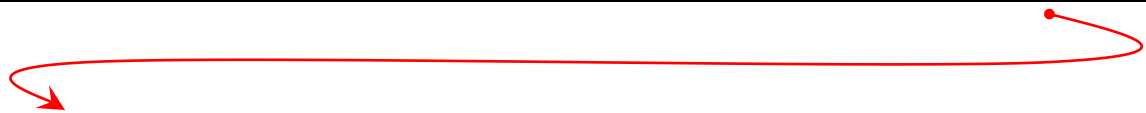
The OPTIMIZE-HF in-hospital ACEI HF treatment algorithm. Developed by the OPTIMIZE-HF Steering Committee. *bid*, Twice daily; *BNP*, brain natriuretic peptide; *BP*, blood pressure; *BUN/Cr*, blood urea nitrogen/creatinine level; *Meds*, medications; *NSAIDs*, nonsteroidal anti-inflammatory drugs; *qd*, once daily; *SBP*, systolic blood pressure; *SCr*, serum creatinine level; *tid*, three times daily.

Appendix F Model of Beta- Blocker Titration in OPTIMIZE-HF (Ref 34)



APPENDIX H: The Flinders Program™ for Chronic Condition Management
Information Paper - SUMMARY (Ref 45)

The Principles of Self-management	Aim of the Flinders Program™	Assessment Tools Goals
<ol style="list-style-type: none"> 1. Have knowledge of their condition 2. Follow a treatment plan (care plan) agreed with their health professionals 3. Actively share in decision making with health professionals 4. Monitor and manage signs and symptoms of their condition 5. Manage the impact of the condition on their physical, emotional and social life 6. Adopt lifestyles that promote health 7. Have confidence, access and the ability to use support services. 	<ol style="list-style-type: none"> 1. Improves the partnership between the client and health professional(s) 2. Collaboratively identifies problems and therefore better (i.e. more successfully) targets interventions 3. Is a motivational process for the client and leads to sustained behaviour change 4. Allows measurement over time and tracks change 5. Has a predictive ability, i.e. improvements in self-management behaviour as measured by the PIH scale, relate to improved health outcomes. 	<ol style="list-style-type: none"> 1. Partners in Health Scale 2. Cue and Response interview 3. Problems and Goals <p>Assessment</p> <ul style="list-style-type: none"> • Identification of Issues • Formation of an individualised Care Plan • Monitoring and reviewing



PIH	C&R	Problem and Goals (P&G) Assessment
<ul style="list-style-type: none"> • Knowledge of condition • Knowledge of treatment • Ability to take medication • Ability to share in decisions • Ability to arrange appointments • Ability to attend appointments • Understanding of monitoring and recording • Ability to monitor and record • Understanding of symptom management • Ability to manage symptoms • Ability to manage the physical impact • Ability to manage the social impact • Ability to manage the emotional impact • Progress towards a healthy lifestyle • Ability to know and navigate the health system 	<ul style="list-style-type: none"> • The C&R process uses a series of open-ended questions or cues to explore the patient's responses to the PIH Scale in more depth. E.g. • Knowledge of Treatment <ul style="list-style-type: none"> - What can you tell me about your treatment? - What other treatment options including alternative therapies do you know about? - What does your family/carer understand about your treatment? • Sharing in Decisions <ul style="list-style-type: none"> - Does your doctor/health worker listen to you? - How involved to you feel in making decisions about your health? • Healthy Lifestyle <ul style="list-style-type: none"> - What are you doing to stay healthy as possible? - What things to you do that could make your health 	<ul style="list-style-type: none"> - The Problems and Goals assessment is another tool that can be used as an adjunct to the PIH and C&R process or as a stand-alone assessment. <p>Notes: The health worker may well see one of these issues as the main or biggest problem for the client. The client may see the same thing as their biggest problem but they may see something else as having a far greater impact. For example, the clinician might think that the way the client uses their medication is the biggest problem, however the client may think their biggest problem is the demands the family places on them, perhaps they are caring for grandchildren everyday and have little time for themselves.</p> <p>As well as defining the problem from the client's perspective, this assessment also clearly identifies a goal or goals that the client can work towards</p>