

**Critical Review Form**  
**Prognosis**

Rame JE, Sheffield MA, Dries DL, Gardner EB, Toto KH, Yancy CW, Drazner MH. Outcomes after emergency department discharge with a primary diagnosis of heart failure. Am Heart J. 2001 Oct;142(4):714-9.

**Objectives:** "to characterize the clinical course of patients discharged from the ED with a primary diagnosis of CHF and to identify risk factors for adverse events in this population." (p. 714)

**Methods:** This retrospective chart review was conducted using patients seen in the Parkland Memorial Hospital ED in Dallas, TX between October 1, 1998 and December 31, 1998. Patients discharged from the ED with a primary diagnosis of CHF were included. Exclusion criteria included end-stage renal disease requiring dialysis or absence of clinical follow-up after the index ED visit.

The primary outcome of interest was "failure of outpatient therapy," which was defined as a composite of recurrent ED visits for CHF, hospitalization for CHF, or death within 3 months of the index ED visit. Variables recorded included triage vital signs upon arrival to the ED, discharge heart rate (HR) (final heart rate recorded in the ED), change in HR during the ED visit (triage HR minus discharge HR), the presence of "obvious volume overload" (defined as either 2+ or greater lower extremity pitting edema or ascites recorded on the index ED visit), diuretic dose administered in the ED, changes in the patient's home maintenance diuretic dose, and "adequacy of discharge planning" (defined by a documented follow-up appointment scheduled within 2 weeks).

Left ventricular dysfunction was defined as either ischemic (history of MI, CABG, or at least one coronary vessel with documented stenosis > 50%), or nonischemic. Systolic dysfunction was classified as moderately or severely depressed if quantitative ejection was fraction  $\leq$  45%.

A total of 150 patients were identified by computerized search, of whom only 142 had medical records available. An additional 14 patients were excluded due to end-stage renal disease and 16 were excluded due to lack of follow-up, leaving a study population of 112 patients. The majority were African American (78%), most did not have private insurance (91%), and most had a nonischemic cardiomyopathy (73%). A majority of patients (91%) received IV diuretics in the ED, while on 18% received antihypertensive therapy (usually an oral ACE inhibitor).

<b>Guide</b>		<b>Comments</b>
<b>I.</b>	<b>Are the results valid?</b>	
A.	<p><b>Was the sample of patients representative?</b>  <i>In other words, how were subjects selected and did they pass through some sort of "filtering" system which could bias your results based on a non-representative sample. Also, were objective criteria used to diagnose the patients with the disorder?</i></p>	<p>Yes. These were all patients discharged from the ED with a primary outcome of CHF during the given time period, identified using a computerized search that was shown to detect 98% of eligible patients. This computerized search was very objective, in that it looked at ED discharge diagnoses only. Possible filters included:</p> <ul style="list-style-type: none"> <li>• The study included a small selection of patients seen in October, November, and December, and hence certain seasonal characteristics may have influenced the likelihood of the outcomes.</li> <li>• Sixteen patients with no clinical follow-up were excluded from the study, with no attempt made to assess outcomes in these patients.</li> </ul>
B.	<p><b>Were the patients sufficiently homogeneous with respect to prognostic risk?</b>  <i>In other words, did all patients share a similar risk from during the study period or was one group expected to begin with a higher morbidity or mortality risk?</i></p>	<p>Likely yes, although there was some heterogeneity within the group. Only 9% had private insurance and hence better access to follow-up care. Presence of LV systolic dysfunction was documented in only 70% of patients. Obvious volume overload was seen in ~40% of patients. Other factors, including etiology of heart failure (ischemic vs. nonischemic), documented medical noncompliance, and initial vital signs, varied among patients.</p>
C.	<p><b>Was follow-up sufficiently complete?</b>  <i>In other words, were the investigators able to follow-up on subjects as planned or were a significant number lost to follow-up?</i></p>	<p>No. The investigators relied in the presence of clinical follow-up within the medical record to which they had access. As a result, 16 patients were excluded from the study due to lack of follow-up. It is quite possible that cases of treatment failure were missed due to visits to other EDs or deaths not recorded in their medical records.</p>
D.	<p><b>Were objective and unbiased outcome criteria used?</b>            Investigators should clearly specify and define their target outcomes before the study and whenever possible they should base their criteria on objective measures.</p>	<p>Yes. The primary outcome of interest was "failure of outpatient therapy," which was defined as a composite of recurrent ED visits for CHF, hospitalization for CHF, or death within 3 months of the index ED visit. These criteria are all objective.</p>
<b>II.</b>	<b>What are the results?</b>	
A.	<p><b>How likely are the outcomes over time?</b>  <i>For the defined follow-up period,</i></p>	<ul style="list-style-type: none"> <li>• Within 3 months of the index ED visit, the composite outcome occurred in 68 patients (61%, 95% CI). There were 37 patients</li> </ul>

	<i>how likely were subjects to have the outcome of interest.</i>	<p>requiring hospitalizations, 30 recurrent ED visits without hospital admission, and one death.</p> <ul style="list-style-type: none"> <li>• Univariate analysis of 27 clinical and demographic variables revealed that only respiratory rate at triage was a predictor of failure of outpatient therapy (<math>p &lt; 0.03</math>).</li> <li>• In multivariate analysis of 8 pre-specified variables, only respiratory rate again was found to be predictive of outpatient treatment failure (odds ratio 1.6 for each increase of 5 breaths per minute, 95% CI 1.1-2.6).</li> </ul>
B.	<p><b>How precise are the estimates of likelihood?</b> <i>In other words, what are the confidence intervals for the given outcome likelihoods?</i></p>	See above.
III.	<b>How can I apply the results to patient care?</b>	
A.	<b>Were the study patients and their management similar to those in my practice?</b>	Likely yes. These were adult patients treated at an urban emergency department with a large African American population and large number of patients without private insurance (or with none at all). The primary difference between these patients and ours appears to be temporal, as this study sample was treated nearly 20 years ago.
B.	<b>Was the follow-up sufficiently long?</b>	Yes. Follow-up was out to 3 months, which is likely sufficient to analyze predictors of outpatient treatment failure.
C.	<b>Can I use the results in the management of patients in my practice?</b>	No. The only variable identified as a predictor of outpatient treatment failure was respiratory rate. The authors report that the range of respiratory rates was 16 to 48, and 25% had a rate of $\geq 29$ . As these values represent the triage respiratory rate and not the rate at discharge, it may be difficult to use such a value to determine disposition from the ED. No other value was found to be predictive of outpatient treatment failure.

**Limitations:**

1. Several subjective variables were used, including "obvious volume overload" which is based on the non-standardized grading of edema and the possible appearance of ascites (which was not determined in any objective fashion).

2. No details regarding chart review methods were provided ([Gilbert 1996](#) and [Worcester 2004](#)).
3. Not all patients had crucial lab values assessed at the index ED visit: creatinine was only measured in 94 patients (84%), and sodium was only measured in 92 patients (82%) ([incomplete data](#)).
4. This study was conducted in the 1990s, and while treatment of acute heart failure in the ED may not have changed significantly, diagnosis and risk stratification has. For example, BNP is commonly used to diagnose heart failure in the ED, and has been shown to predict adverse outcomes.
5. The study was conducted from October through December. Given that [seasonal variation](#) has been shown to impact mortality and need for hospitalization, the results of this study can not easily be generalized.

### **Bottom Line:**

In this small, retrospective chart review of patients discharged from the ED of a large, urban hospital in Dallas, TX with a primary diagnosis of CHF, only respiratory rate was found to be predictive of outpatient therapy failure (OR 1.6 for every increase of 5 breaths per minute). The study was limited by its small sample size, lack of reported chart review methods, and the age of the study itself (nearly 20 years).