Resuscitation Preferences Among Patients With Severe Congestive Heart Failure
Results From the SUPPORT Project
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Background—We sought to describe the resuscitation preferences of patients hospitalized with an exacerbation of severe congestive heart failure, perceptions of those preferences by their physicians, and the stability of the preferences.

Methods and Results—Of 936 patients in this study, 215 (23%) explicitly stated that they did not want to be resuscitated. Significant correlates of not wanting to be resuscitated included older age, perception of a worse prognosis, poorer functional status, and higher income. The physician’s perception of the patient’s preference disagreed with the patient’s actual preference in 24% of the cases overall. Only 25% of the patients reported discussing resuscitation preferences with their physician, but discussion of preferences was not significantly associated with higher agreement between the patient and physician. Of the 600 patients who responded to the resuscitation question again 2 months later, 19% had changed their preferences, including 14% of those who initially wanted resuscitation (69 of 480) and 40% of those who initially did not (48 of 120). The physician’s perception of the patient’s hospital resuscitation preference was correct for 84% of patients who had a stable preference and 68% of those who did not.

Conclusions—Almost one quarter of patients hospitalized with severe heart failure expressed a preference not to be resuscitated. The physician’s perception of the patient’s preference was not accurate in about one quarter of the cases, but communication was not associated with greater agreement between the patient and the physician. A substantial proportion of patients who did not want to be resuscitated changed their minds within 2 months of discharge. (Circulation. 1998;98:648-655.)

Key Words: resuscitation ▪ patients ▪ heart failure

The end of life for patients with severe congestive heart failure is often characterized by repeated hospitalizations and a progressively declining quality of life. Although many patients with poor prognoses refuse medical interventions,1 patients with severe congestive heart failure usually receive maximal medical therapy until death. The prevalence of do-not-resuscitate (DNR) orders in patients with severe congestive heart failure has been reported to be <5%,1 and patients with congestive heart failure who die in the hospital commonly undergo cardiopulmonary resuscitation.2 Although it is not known why DNR orders are written infrequently in this population, physicians discuss resuscitation issues less often with patients with severe congestive heart failure than with patients who have other terminal diseases such as AIDS or cancer.1

See p 619

Until recently there has been very little information about the resuscitation preferences of patients with severe congestive heart failure. To address this issue in detail, we used data obtained as part of the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments (SUPPORT) project,3 a prospective multicenter study of prognoses and preferences for treatment for severely ill patients, including individuals hospitalized with an exacerbation of severe congestive heart failure (New York Heart Association class IV, or clinical heart failure and an ejection fraction <20%). In the SUPPORT project, patients and their physicians were asked about the patient’s health, quality of life, daily activity level, functional status, prognosis, and resuscitation preferences.

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Methods

Study Design

Patients in SUPPORT had 1 of 9 high-mortality conditions: acute exacerbation of congestive heart failure, acute respiratory failure, acute exacerbation of chronic obstructive pulmonary disease, chronic liver disease, nontraumatic coma, colon cancer metastatic to liver, stage III/IV non–small cell carcinoma of the lung, multiple organ system failure with malignancy, and multiple organ failure and sepsis. Patients, their designated surrogate decision makers (usually family members), and physicians were interviewed at several points in the patient’s hospitalization. The study was conducted at 5 hospitals: Beth Israel Hospital, Boston, Mass; MetroHealth Medical Center, Cleveland, Ohio; Duke University Medical Center, Durham, NC; Marshfield Clinic/St Joseph’s Hospital, Marshfield, Wis; and the University of California School of Medicine, Los Angeles, Calif. The coordinating center was the Intensive Care Unit Research Unit at the George Washington University Medical Center.

Phase 1 (1989 to 1991) of SUPPORT was designed to evaluate preferences, decisions, and outcomes of severely ill hospitalized patients. Phase 2 (1992 to 1994) was a clinical trial of a program that provided information about patient prognoses and preferences for end-of-life care and a nurse-based intervention to facilitate communication. The program failed to increase the frequency of DNR orders or to reduce the number of days it took to write them. Furthermore, there were no secular trends in DNR order writing during the study period (1989 to 1994). Thus, the data from both phases were combined for this analysis.

Patient Sample

Subjects in this analysis were restricted to patients with an acute exacerbation of symptoms of chronic congestive heart failure as the primary reason for hospital admission or transfer to an intensive care unit and at least 1 of the following 3 conditions: (1) a history of severe congestive heart failure at baseline (New York Heart Association class IV) despite being treated medically with 2 or more of the following classes of drugs: diuretics, vasodilators, and ACE inhibitors; (2) a definite history of New York Heart Association class IV congestive heart failure at hospital admission; or (3) documentation of a left ventricular ejection fraction <20%. Patients were excluded from the study if they had any of the following conditions: severe chronic obstructive pulmonary disease, high output congestive heart failure, septic shock, primary acute renal failure, circulatory overload caused by excessive administration of fluids, cardiac surgery scheduled within 24 hours, congestive heart failure caused by valvular heart disease, or a thoracotomy on the same admission and before study entry.

Clinical Data

Clinical data were obtained by chart review and included cardiac history; comorbid conditions; information required to calculate an acute physiology score (based on the APACHE III scoring system); and documentation of decisions related to the use of life-sustaining therapy, including the presence of a DNR order. The acute physiology score, measured on study days 1, 3, 7, 14, and 25, is a composite of information about heart rate; primary acute renal failure; circulatory overload caused by excessive administration of fluids; cardiac surgery scheduled within 24 hours; congestive heart failure caused by valvular heart disease; or a thoracotomy on the same admission and before study entry.

Statistical Analysis

In bivariable analyses, Student’s t test was used to compare continuous, normally distributed variables, and nonparametric tests were used to compare variables that were not normally distributed. In the multivariable analysis, 2 stepwise multiple logistic regression models were developed. Variables were retained in the model if the regression coefficient was significantly associated at the α = 0.10 on the basis of the Wald test. Each model was adjusted for study site by including indicator variables.

The first model predicted patient preferences not to be resuscitated. The following variables were considered in the construction of the model: age (years); sex; race; acute physiology score on hospital day 3; whether the patient lived alone before admission; activities of daily living dependencies based on patient status 2 weeks before admission; modified Duke Activity Status Index based on patient status 2 weeks before admission; number of comorbidities; the patient’s estimate of living for 2 more months; the patient’s estimate of living independently in 2 months; the patient’s assessment of his or her quality of life; and whether the patient reported that he or she had a cardiopulmonary arrest.

The second model determined the factors most strongly associated with a physician’s perception that a patient did not want to be resuscitated. There were 750 phase 1 and 2 patients who responded to the resuscitation question. To adjust for the physician’s preference if he or she were in the patient’s situation, we their resuscitation preferences, probability of survival, functional status, symptoms, quality of life, and sociodemographics. Patients were asked, “What are the chances that you will live for 2 months or more (and 6 months or more) if the current plan of care stays the same?” Patients also were asked, “What are the chances that you will be able to take care of yourself 2 months (and 6 months) from now?” Patients were asked to rate their quality of life (“How would you rate the overall quality of your life at present?”) on a 5-point scale from excellent to poor.

Functional status in the 2 weeks before admission was assessed by a revised version of the Katz Activities of Daily Living score on the basis of the ability to perform bathing, dressing, toileting, transfer, continence, and feeding. A summary score was calculated, with 0 indicating independence in all categories. Activity status 2 weeks before admission was estimated by a revised version of the Duke Activity Status Index, which is a modification of the Specific Activity Scale. Activity status was defined as the ability of patients to perform personal, household, and recreational activities associated with known metabolic costs.

The question about resuscitation was as follows: “As you probably know, there are a number of things that doctors can do to try to revive someone whose heart has stopped beating, which usually includes a machine to help breathing. Thinking of your current condition, what would you want your doctors to do if your heart ever stops beating? Would you want your doctors to try to revive you, or would you want your doctors not to try to revive you?” Only patients who explicitly and unequivocally answered negatively were classified as not wanting resuscitation because, in practice, patients with an equivocal response would be resuscitated. The test-retest reliability (exact agreement) of this measure in the SUPPORT study, assessed within 24 hours of the initial interview for a subsample of patients, was 93%.10

Physician Interview

The physician chiefly responsible for each study patient was interviewed. The interviews collected information about physician characteristics, perceptions of their patient’s preferences, and perceptions of their patient’s prognosis and quality of life. Physicians were asked, “What do you think the patient would want you to do if he or she had a cardiopulmonary arrest?”
restricted the analysis to the 339 phase 1 patients with information on
their preferences and the matched physician perception questions because
that question was asked at a later time in phase 2.

The same method of model construction was used as above except
that the following additional variables were considered: the physi-
cian’s resuscitation preference if he or she were in the patient’s condi-
tion; the physician’s perception of the patient’s quality of life
(excellent, very good, good, fair, or poor); whether the physician was
a cardiologist; the physician’s age; the physician’s sex; the physi-
cian’s year of graduation from medical school; whether the physician
planned to care for the patient after hospital discharge; the length of
time that the physician had known the patient (≤1 week versus >1
week); the physician’s perception of the likelihood that the patient
would live 2 months (0% to 100%); and the physician’s perception
of the patient’s belief about his or her quality of life (excellent, very
good, good, fair, or poor). We repeated the procedure after excluding
the variable describing what the physician would do if he or she were
in the patient’s position.

The agreement between patients’ own reports of and the physi-
cians’ estimates of these resuscitation preferences, prognoses, and
quality of life was evaluated by use of the kappa coefficient.1 A
kappa coefficient >0.40 represents a moderate or greater degree of
agreement beyond that expected by chance.1 The associations of
patient and physician characteristics with agreement between the
patient and the physician were tested with χ² tests.

For all analyses, when information on income or level of educa-
tion was not available, we imputed values using previously described
methods.12 When information on functional status and activity status
was not available from the patients, we used calibrated surrogates’
reports of the patients’ functional and activity status. When informa-
tion was not available from patients or their surrogates, we
imputed values.12

Results

Study Sample

Phases 1 and 2 of SUPPORT enrolled 9105 subjects (4301
patients were enrolled in phase 1 and 4804 in phase 2),
including 1404 patients with an exacerbation of chronic
congestive heart failure. The study sample consisted of 936
patients with congestive heart failure who participated in the
study interview and responded to the question about resusci-
tation. The interviewed patients were younger, were less ill,
and had a lower in-hospital mortality than patients who did
not participate in the interview, but they were not different
with respect to sex, history of myocardial infarction, number
of comorbid conditions, or ejection fraction.

Patient Resuscitation Preferences

Among the study sample, 215 (23%) of 936 patients did not
wish to be resuscitated in the case of a cardiac arrest, 646
(69%) definitely did want to be resuscitated, and 75 (8%) were
unsure whether they wanted a full resuscitation effort.
Factors associated with resuscitation preference are summa-
rized in Table 1.

In a multivariable model (Table 2), a strong predictor of the
patient’s preference not to be resuscitated was the patient’s
perception of a worse prognosis (expressed as likelihood of
living 2 months). Other factors that were significantly asso-
ciated with not wanting to be resuscitated included worse
activity status in the 2 weeks before admission, higher
income, and older age. The model did not change substan-
tially if patients who expressed uncertainty about their resus-
citation preferences were excluded.

Of the 936 patients in the sample, 600 also responded to the
resuscitation questions at 2 months after discharge. Overall,
19% did not have a stable preference, including 14% of the
patients (69 of 480) who initially expressed a preference for
resuscitation and 40% (48 of 120) who did not.

Physician Perceptions of Patient Preferences

Of the 936 patients in our study sample, 475 were in phase 1
of SUPPORT. Of these, 339 patients had matching physician
interviews with complete data collection for the analysis,
which were conducted between days 3 and 6 (see “Meth-
ods”). In 62 (18%) of the interviews, physicians believed that
their patients did not want to be resuscitated.

In the multivariable analysis, the strongest independent
correlate of the physician’s perception that the patient did not
want to be resuscitated was the physician’s resuscitation
preference if he or she were in the patient’s condition.
Physicians who would not want to be resuscitated if in the
patient’s condition commonly thought that the patient would
not want to be resuscitated (OR, 14.7; 95% CI, 4.2 to 51.9).
Other factors that were associated with the physician’s
perception that the patient did not want to be resuscitated
included older patient age (adjusted OR for each year, 1.08;
95% CI, 1.04 to 1.13); the physician’s perception of the
patient’s view of his or her quality of life as fair or poor
compared with excellent, very good, or good (adjusted OR,
3.65; 95% CI, 1.48 to 9.02); physician’s prognostic estimate
of a worse chance for survival at 2 months (adjusted OR for
each percent decrease in predicted 2-month chance of sur-
vival, 1.02; 95% CI, 1.00 to 1.04); and the patient’s expressed
preference (to the interviewer) that he or she did not want to
be resuscitated (adjusted OR, 3.25; 95% CI, 1.50 to 7.04).
Dropping the variable describing the physician’s preference if
he or she were in the patient’s position from the model did not
substantially affect the association of the other independent
variables with the patient’s preference.

Patient and Physician Agreement

Only 25% of the patients (236 of 936) with heart failure who
responded to the resuscitation question reported having told
their physician about their resuscitation preferences. Of the
936 patients in the study sample, 750 had a matching
physician interview. The mean time between the patient and
physician interviews was 0.1 days (interquartile range, −1 to
1 day).

Physicians did not correctly perceive their patient’s resus-
citation preference in 24% of the cases (177 of 750; kapp-
a=0.26). The discordance between patients and physicians
was in both directions, but it was more likely to occur when
the patient did not want to be resuscitated: in 69 (9%) of the
cases, physicians thought patients did not want resuscitation
when the patients did want it (or did not know), and in 108
(14%) of the cases, physicians thought patients wanted
resuscitation when the patients did not want it (McNemar
statistic = 8.59, P=0.003). Discordance between the patient’s
resuscitation preference and the physician’s perceptions of
the preference was strongly associated with the patient’s age
(Table 3). The frequency of disagreement between patients
and their physicians increased from 17% among patients 40
TABLE 1.  Bivariable Analysis of Factors Associated With Patients Not Wanting CPR* (n=936)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number of Interviewed Patients With Factor, (%)*</th>
<th>Patients Not Wanting CPR, n (%)</th>
<th>Relative Risk for Not Wanting CPR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographics</strong></td>
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</tr>
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<td>Hospital</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Site 1</td>
<td>205 (22)</td>
<td>31 (15)</td>
<td>0.9</td>
<td>0.6–1.3</td>
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<tr>
<td>Site 2</td>
<td>155 (17)</td>
<td>37 (24)</td>
<td>1.4</td>
<td>0.9–2.1</td>
</tr>
<tr>
<td>Site 3</td>
<td>200 (21)</td>
<td>35 (18)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Site 4</td>
<td>234 (25)</td>
<td>57 (24)</td>
<td>1.4</td>
<td>1.0–2.0</td>
</tr>
<tr>
<td>Site 5</td>
<td>142 (15)</td>
<td>55 (39)</td>
<td>2.2</td>
<td>1.5–3.2</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>&lt;40</td>
<td>47 (5)</td>
<td>4 (9)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>40–64</td>
<td>386 (41)</td>
<td>60 (16)</td>
<td>1.8</td>
<td>0.7–4.8</td>
</tr>
<tr>
<td>65–74</td>
<td>261 (28)</td>
<td>71 (27)</td>
<td>3.2</td>
<td>1.2–8.3</td>
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<tr>
<td>≥75</td>
<td>242 (26)</td>
<td>80 (33)</td>
<td>3.9</td>
<td>1.5–10.1</td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Female</td>
<td>348 (37)</td>
<td>99 (28)</td>
<td>1.0</td>
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<tr>
<td>Male</td>
<td>588 (63)</td>
<td>116 (20)</td>
<td>0.7</td>
<td>0.5–0.9</td>
</tr>
<tr>
<td>Race</td>
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<tr>
<td>Nonwhite</td>
<td>254 (27)</td>
<td>38 (15)</td>
<td>1.0</td>
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<tr>
<td>White</td>
<td>682 (73)</td>
<td>177 (26)</td>
<td>1.7</td>
<td>1.3–2.4</td>
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<td>Education, y</td>
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<td></td>
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<tr>
<td>&lt;12</td>
<td>405 (43)</td>
<td>99 (24)</td>
<td>1.0</td>
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<tr>
<td>≥12</td>
<td>531 (57)</td>
<td>116 (22)</td>
<td>0.9</td>
<td>0.7–1.1</td>
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<td>Patient living situation</td>
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<tr>
<td>Lives with others</td>
<td>668 (72)</td>
<td>149 (22)</td>
<td>1.0</td>
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<tr>
<td>Lives alone</td>
<td>254 (28)</td>
<td>61 (24)</td>
<td>1.1</td>
<td>0.8–1.4</td>
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<td>Annual income</td>
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<tr>
<td>≥$11 000 or more</td>
<td>426 (46)</td>
<td>96 (23)</td>
<td>1.0</td>
<td></td>
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<tr>
<td>&lt;$11 000</td>
<td>510 (54)</td>
<td>119 (23)</td>
<td>1.0</td>
<td>0.8–1.2</td>
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<td><strong>Characteristics of the patient’s illness</strong></td>
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<td>Etiology of congestive heart failure</td>
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<tr>
<td>Not ischemic/not known</td>
<td>529 (57)</td>
<td>127 (24)</td>
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<td>Ischemic</td>
<td>401 (43)</td>
<td>88 (22)</td>
<td>0.9</td>
<td>0.7–1.2</td>
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<td>Not hypertensive/not known</td>
<td>763 (82)</td>
<td>179 (23)</td>
<td>1.0</td>
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<tr>
<td>Hypertensive</td>
<td>167 (18)</td>
<td>36 (22)</td>
<td>0.9</td>
<td>0.7–1.3</td>
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<td>New York Heart Association class</td>
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<td></td>
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</tr>
<tr>
<td>Not III/IV or not known</td>
<td>126 (14)</td>
<td>25 (20)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>III/IV</td>
<td>804 (86)</td>
<td>190 (24)</td>
<td>1.2</td>
<td>0.8–1.1</td>
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<td>History of myocardial infarction</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No history/not known</td>
<td>518 (56)</td>
<td>128 (25)</td>
<td>1.0</td>
<td></td>
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<tr>
<td>Yes</td>
<td>412 (44)</td>
<td>89 (21)</td>
<td>0.9</td>
<td>0.7–1.1</td>
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<tr>
<td>Medications on admission</td>
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<tr>
<td>No digitalis/not known</td>
<td>359 (39)</td>
<td>72 (20)</td>
<td>1.0</td>
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<tr>
<td>Digitalis</td>
<td>571 (61)</td>
<td>143 (25)</td>
<td>1.3</td>
<td>1.0–1.6</td>
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<td>No diuretics/not known</td>
<td>83 (9)</td>
<td>14 (17)</td>
<td>1.0</td>
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<td>Diuretics</td>
<td>847 (91)</td>
<td>201 (24)</td>
<td>1.4</td>
<td>0.9–2.3</td>
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<tr>
<td>No ACE inhibitors/not known</td>
<td>329 (35)</td>
<td>67 (20)</td>
<td>1.0</td>
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</tr>
<tr>
<td>ACE inhibitors</td>
<td>601 (65)</td>
<td>148 (25)</td>
<td>1.2</td>
<td>0.9–1.6</td>
</tr>
</tbody>
</table>
to 64 years of age to 29% among patients ≥75 years
(P<0.001). Cardiologists were significantly more likely than
noncardiologists to agree with the patient’s preference
(P<0.001). Physicians were not more likely to understand
patients’ preferences when patients reported discussing their
preferences with their physicians. Of the 392 patients with a
stable resuscitation preference over 2 months and a matched
physician interview (92 did not have a physician interview),
the physician’s perception of the patient’s preference dis-
agreed with the patient’s actual preference in 16% of the
cases compared with 42% for those whose preference
changed over time.

DNR Order
Of the entire study sample of 1404 patients with an exacer-
bation of congestive heart failure, 241 (17%) had a DNR
order written in the hospital chart before discharge. The
median time between study admission and the DNR order
among those who had a DNR order written after study
admission was 2 days (range, 0 to 88 days). Of the 936
patients who answered the resuscitation question, 86 (9%)
had a DNR order by study day 6 and 111 (12%) by hospital
discharge. Of the 215 patients who expressed a preference not
to be resuscitated, 52 (24%) had a DNR order by study day 6
and 57 (27%) by hospital discharge. Of the 721 patients who
stated that they would want to be resuscitated or were unsure,
34 (5%) had a DNR order by study day 6 and 54 (7%) by
hospital discharge.

### TABLE 1. Continued

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number of Interviewed Patients with Factor, (%)*</th>
<th>Patients Not Wanting CPR, n (%)</th>
<th>Relative Risk for Not Wanting CPR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ejection fraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥20%/not known</td>
<td>575 (62)</td>
<td>151 (26)</td>
<td>1.0</td>
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</tr>
<tr>
<td>Known, &lt;20%</td>
<td>355 (38)</td>
<td>64 (18)</td>
<td>0.7</td>
<td>0.5–0.9</td>
</tr>
<tr>
<td>ADL dependencies</td>
<td></td>
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<tr>
<td>&lt;2</td>
<td>710 (76)</td>
<td>152 (21)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>≥2</td>
<td>226 (24)</td>
<td>63 (28)</td>
<td>1.3</td>
<td>1.0–1.7</td>
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<td>Duke Activity Status Index</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥17</td>
<td>474 (51)</td>
<td>97 (20)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>&lt;17</td>
<td>462 (49)</td>
<td>118 (26)</td>
<td>1.3</td>
<td>1.0–1.6</td>
</tr>
<tr>
<td>Acute Physiology Score, day 1</td>
<td></td>
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<tr>
<td>&lt;45</td>
<td>783 (84)</td>
<td>182 (23)</td>
<td>1.0</td>
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</tr>
<tr>
<td>≥45</td>
<td>153 (16)</td>
<td>33 (22)</td>
<td>0.9</td>
<td>0.7–1.3</td>
</tr>
<tr>
<td>Cox Model estimate of patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>survival by 2 mo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥90%</td>
<td>188 (20)</td>
<td>30 (16)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>75%–89%</td>
<td>613 (65)</td>
<td>144 (23)</td>
<td>1.5</td>
<td>1.0–2.1</td>
</tr>
<tr>
<td>56%–74%</td>
<td>113 (12)</td>
<td>31 (27)</td>
<td>1.7</td>
<td>1.1–2.7</td>
</tr>
<tr>
<td>≤55%</td>
<td>22 (2)</td>
<td>10 (45)</td>
<td>2.9</td>
<td>1.6–5.0</td>
</tr>
<tr>
<td>Patient view of quality of life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent/very good</td>
<td>150 (16)</td>
<td>31 (21)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>200 (21)</td>
<td>46 (23)</td>
<td>1.1</td>
<td>0.7–1.7</td>
</tr>
<tr>
<td>Fair/poor</td>
<td>586 (63)</td>
<td>138 (24)</td>
<td>1.1</td>
<td>0.8–1.6</td>
</tr>
<tr>
<td>Patient estimate of 2-mo survival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥90%</td>
<td>615 (67)</td>
<td>112 (18)</td>
<td>0.8</td>
<td>0.5–1.4</td>
</tr>
<tr>
<td>~75%</td>
<td>69 (7)</td>
<td>15 (22)</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>~50/50</td>
<td>64 (7)</td>
<td>29 (45)</td>
<td>2.1</td>
<td>1.2–3.5</td>
</tr>
<tr>
<td>~≤25%</td>
<td>15 (2)</td>
<td>8 (53)</td>
<td>2.5</td>
<td>1.3–4.7</td>
</tr>
<tr>
<td>Don’t know</td>
<td>156 (17)</td>
<td>45 (29)</td>
<td>1.3</td>
<td>0.8–2.2</td>
</tr>
</tbody>
</table>

ADL indicates activities of daily living.
*Missing data means complete information was not available on all patients. The number of patients with missing data is as follows:
living situation (14 patients); patient estimate of 2-mo survival (17 patients).

Duke Activity Status Index is scored so that higher scores equal higher function.
The 17 patients with a missing patient's estimate of 2-month prognosis were not included in the model.

Discussion

This prospective study of resuscitation preferences in patients who were admitted with an exacerbation of severe heart failure reveals the marked complexity of this issue. About one quarter of the patients and physicians reported that they had discussed resuscitation issues. This lack of communication has been observed in other settings, despite evidence that patients want to have these discussions. However, we found that the physician’s perception of the patient’s preference was not more likely to be accurate among those who reported communicating with the physician. Moreover, the SUPPORT intervention, designed to improve communication about these issues between patients and physicians, failed to change practice.

Despite the complexity of this issue, our study did reveal some interesting findings. Except for patient age, the correlates of the physician’s belief that the patient did not want to be resuscitated differed from those predictors of patients’ preferences. The most important predictor of the physician’s belief that the patient did not want to be resuscitated was the physician’s own preference not to be resuscitated if he or she were in the patient’s condition. The patient’s preference not to be resuscitated was also a significant predictor, as was the physician’s perception of the patient’s prognosis and quality of life.

Although the age of the patient was an important factor associated with both the patients’ preferences for resuscitation and the physicians’ beliefs about the patients’ resuscitation preferences, the physicians may have placed greater emphasis on age than the patients did. The age of the patient was strongly related to the likelihood of discordance between patients and physicians. Older age was associated with a higher likelihood that physicians would incorrectly perceive the patient’s resuscitation preference.

The physician’s perception of the patient’s quality of life was associated with his or her belief about the patient’s preference. However, the patients’ assessments of their own quality of life (with a single-item question) were not related to their own resuscitation preferences. Other studies have also found that the patient’s quality of life has not been related to resuscitation preferences. Among patients who had experienced medical intensive care, Patrick and colleagues found no significant association between the willingness of patients to undergo intensive care and their quality of life as measured by the Perceived Quality of Life Scale. In another study among outpatients, Uhlmann and Pearlman found that neither global quality of life nor selected dimensions of quality of life, including aspects of social, physical, emotional, and intellectual functioning, were associated with resuscitation preferences.

These studies of quality of life and resuscitation preferences suggest either that the instruments that measure quality of life are not sensitive to factors that influence decisions about resuscitation or that patients consider other factors when making this decision. Zweibel has suggested that patients do not consider abstract concepts such as current quality of life when making decisions about life-sustaining therapy but rather focus on concrete factors such as the presence and level of chronic pain, their immediate prognosis, and the likelihood of self-care. This observation regarding prognosis appears to be true of patients with severe congestive heart failure.

Physician characteristics were generally not associated with the degree of agreement with patient preferences. In

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, each year</td>
<td>1.04</td>
<td>1.02–1.05</td>
<td>0.0001</td>
</tr>
<tr>
<td>Duke Activity Status Index, each point</td>
<td>0.96</td>
<td>0.93–0.99</td>
<td>0.01</td>
</tr>
<tr>
<td>Income &lt;$11,000/year</td>
<td>0.69</td>
<td>0.48–0.99</td>
<td>0.04</td>
</tr>
<tr>
<td>Patient estimate of 2-mo survival</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50%</td>
<td>4.03</td>
<td>1.31–12.41</td>
<td>0.02</td>
</tr>
<tr>
<td>≥50/50</td>
<td>2.63</td>
<td>1.42–4.87</td>
<td>0.002</td>
</tr>
<tr>
<td>≥75%</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥90%</td>
<td>0.65</td>
<td>0.44–0.94</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**Hospital**

| Site 1 | 0.66 | 0.38–1.15 |
| Site 2 | 0.96 | 0.53–1.70 |
| Site 3 | 1.00 | |
| Site 4 | 1.38 | 0.82–2.30 |
| Site 5 | 2.02 | 0.65–6.22 |

**SUPPORT prognostic model estimate of 2-mo survival**

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.38</td>
<td>0.07–2.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*In the 2 weeks before admission; Duke Activity Status Index is scored so that higher scores equal higher function.
†The “do not knows” were not different from the referent group in the bivariate analysis and were combined with the referent group in this model. The 17 patients with a missing patient’s estimate of 2-month prognosis were not included in the model.

resuscitation had been attempted, 10 were discharged alive; the others died in the hospital. Among the 42 patients with cardiac arrest, 11 had stated that they did not want to be resuscitated. Of the 11 patients who stated that they did not want to be resuscitated, 5 had DNR orders written and were not resuscitated. The remaining 6 patients had resuscitation attempted, and 1 patient survived to hospital discharge.
In particular, agreement was not significantly associated with age, sex, year of graduation from medical school, or whether the physician knew the patient for <1 week. Interestingly, the characteristic that was significantly associated with agreement was specialty, with cardiologists performing better than the other physicians.

Our overall findings are very consistent with findings from the overall SUPPORT population. In the study by Phillips and colleagues, 28% of the SUPPORT population was reported not to want to be resuscitated. In their multivariable analysis, patients with congestive heart failure were more likely to want to be resuscitated. In the overall sample, as in our group,
study site, age, functional status, and perception of prognosis were strong predictors of resuscitation preferences.

Although the patient’s estimated prognosis by the SUPPORT prognostic model and the physician emerged as important factors in predicting resuscitation preferences, it is important to note that heart failure may be inherently more unpredictable in its short-term prognosis than many other conditions such as lung cancer. Lynn and colleagues have shown that estimates of prognosis for critically ill patients may not accurately predict which patients with heart failure will die soon. Many patients with heart failure may die of a fatal arrhythmia at a time when they are clinically stable. Consequently, patients and physicians, acknowledging the risk of sudden and unexpected death in this condition, may need to discuss issues about death and treatment at a time that may not be perceived as close to the time of death. If physicians and patients wait until the short-term prognosis becomes so grave that death is imminent, they may never have the opportunity to discuss these issues.

An important finding of this study is the lack of stability of the resuscitation preferences for many patients who initially did not want to be resuscitated. Our findings are consistent with a recent report that found that 80% of the overall SUPPORT cohort had stable resuscitation preferences over 2 months. The lack of stability may reflect initial uncertainty about the preference, inaccurate classification by the initial assessment, or a change in perspective or circumstance that led patients to reconsider their initial preferences. Whatever the cause, physicians were more likely to report accurately the preferences of the patients who did not change their minds. This observation adds complexity to the study of physician perceptions of patient preference. It is not clear that physician discordance with patients who change their minds should be considered a problem.

Study Limitations
This study has several important limitations. Any study of resuscitation preferences is inherently difficult. The patients in this study were interviewed by individuals who had no relationship with them and were not involved in their care. There may be concerns that patients responded differently to the interviewers than they did with their physicians. In addition, the question used to assess resuscitation preferences may not reflect many of the nuances of this issue. Many physicians may have difficulty with the question because they consider many levels of resuscitation to exist. Also, physicians may consider the issue of resuscitation differently, depending on the circumstance in which the cardiac arrest occurs.

In addition, although the interviews of the patients and physicians were close in time, they were not simultaneous. It is possible that preferences changed after the patient interview and before the physician interview. This change may have caused some physicians to appear not to know the preference of their patient and overestimated the discordance. For the identification of factors associated with this discordance, however, this misclassification would have been expected to add noise, not bias. It is also possible that the process of conducting this study may have altered behaviors. Patients who consented to be interviewed about their resuscitation preferences should have been motivated to discuss these issues with their physicians and may have done so before the physician interview. This effect may have increased the communication and agreement between patients and their physicians. Other limitations of the study include the possible misinterpretation of the questions by ill patients and the possible lack of generalizability of our findings to patients in other medical centers.

Acknowledgments
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References
Resuscitation Preferences Among Patients With Severe Congestive Heart Failure: Results From the SUPPORT Project
for the SUPPORT Investigators

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