Get With The Guidelines Program Participation, Process of Care, and Outcome for Medicare Patients Hospitalized With Heart Failure

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Background—Hospitals enrolled in the American Heart Association’s Get With The Guidelines Program for heart failure (GWTG-HF) have improved their process of care. However, it is unclear if process of care and outcomes are better in the GWTG-HF hospitals compared with hospitals not enrolled.

Methods and Results—We compared hospitals enrolled in GWTG-HF from 2006 to 2007 with other hospitals using data on 4 process of heart failure care measures, 5 noncardiac process measures, risk-adjusted 30-day mortality, and 30-day all-cause readmission after a heart failure hospitalization, as reported by the Center for Medicare and Medicaid Services (CMS). Among the 4460 hospitals reporting data to CMS, 215 (5%) were enrolled in GWTG-HF. Of the 4 CMS heart failure performance measures, GWTG-HF hospitals had significantly higher documentation of the left ventricular ejection fraction (93.4% versus 88.8%), use of angiotensin-converting enzyme inhibitor or angiotensin receptor antagonist (88.3% versus 86.6%), and discharge instructions (74.9% versus 70.5%) (P<0.005 for all). Smoking cessation counseling rates were similar (94.1% versus 94.0%; P=0.51). There was no significant difference in compliance with noncardiac process of care. After heart failure discharge, all-cause readmission at 30 days was 24.5% and mortality at 30 days after admission was 11.1%. After adjustment for hospital characteristics, 30-day mortality rates were no different (P=0.45). However, 30-day readmission was lower for GWTG hospitals (−0.33%; 95% CI, −0.53% to −0.12%; P=0.002).

Conclusions—Although there was evidence that hospitals enrolled in the GTWG-HF program demonstrated better processes of care than other hospitals, there were few clinically important differences in outcomes. Further identification of opportunities to improve outcomes, and inclusion of these metrics in GTWG-HF, may further support the value of GTWG-HF in improving care for patients with HF. (Circ Cardiovasc Qual Outcomes. 2012;5:37-43.)

Key Words: process assessment ■ quality of health care ■ heart failure

Improving the quality of care and clinical outcomes for patients hospitalized with cardiovascular disease and stroke is a challenging, but critically important, goal. The American Heart Association (AHA) developed the Get With The Guidelines (GWTG) program with the primary aim of improving care for patients with heart disease and stroke.1,2 Three GWTG program modules have been implemented and target hospital-based quality improvement for heart failure, stroke, and coronary artery disease.3 Each module has a patient management tool that provides patient-specific guideline recommendations, allows for real-time data validation, and enables each institution to track its adherence to the guidelines individually and against national benchmarks. GWTG programs have demonstrated improved performance over time4,5 on process-of-care measures recommended by guidelines from the American College of Cardiology and the AHA.6–11 In addition to data collection, GWTG provides quality improvement tools to hospitals, including clinical decision support and dissemination of best practices, and regularly reports performance back to the participating hospitals.

Hospitals enrolled in GWTG have had better process of care for acute myocardial infarction than other hospitals when examined in a discrete time period.12 However, it is unclear if GWTG for heart failure (GWTG-HF) hospitals are more likely to provide recommended care than nonparticipating hospitals. In addition, it is unclear if patient outcome is better at GWTG-HF hospitals.

To examine these issues, we compared hospitals enrolled in GWTG-HF with those not enrolled using publicly available process of care, 30-day rehospitalization, and 30-day mortality data from the Hospital Compare program of the Center for

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Get With The Guidelines-Heart Failure (GWTG-HF) program is provided by the American Heart Association. The GWTG-HF program is currently supported in part by Medtronic, Ortho-McNeil, and the American Heart Association Pharmaceutical Roundtable. GWTG-HF has been funded in the past through support from GlaxoSmithKline.

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Medicare and Medicaid Services (CMS). By directly comparing hospitals within GWTG-HF with other hospitals for guideline adherence at a fixed period in time, we can avoid confounding by secular trends over time in quality of care.

Methods

Hospital Characteristics
We compared hospitals enrolled in GWTG-HF from 2006 to 2007 with other hospitals using Medicare patient data on process of care for heart failure, process of care for surgery and pneumonia, risk-adjusted 30-day mortality, and readmission for heart failure as reported by the CMS. Medicare beneficiaries are predominately ≥65 years, although some patients are eligible because of end-stage renal disease or disability. Hospital characteristics were obtained from the American Hospital Association database and CMS, including bed size, profit status (government, private, or nonprofit), teaching status (yes or no), and US census region. The American Hospital Association survey covers 98% of all hospitals, and missing items were rare (<5%).

WHAT IS KNOWN

- There is variation in process of care and outcome (30-day readmission and mortality) among US hospitals after a hospitalization for heart failure.
- The Centers for Medicare and Medicaid Services (CMS) publicly reports process of care and outcome of Medicare beneficiaries for individual US hospitals.
- The AHA has created a quality improvement program for hospitals called Get-With-The-Guidelines.

WHAT THE STUDY ADDS

- Hospitals participating in Get-With-The-Guidelines had better process of care, as defined by CMS, when compared with hospitals not participating in the program.
- Readmission rates may be slightly lower among hospitals participating in Get-With-The-Guidelines compared with nonparticipating hospitals.

Process-of-Care Measures
We used hospital-specific process-of-care data from June 2006 to June 2007 reported by CMS. The performance measures are reported by hospitals based on specific criteria for eligibility that exclude patients with contraindications (Hospital Compare).14

Heart Failure Measures
The heart failure measures included documentation of the following: (1) assessment of left ventricular function, (2) use of angiotensin-converting enzyme inhibitor or angiotensin receptor blocker for left ventricular systolic dysfunction (defined as an ejection fraction <40%), (3) provision of discharge instructions, and (4) counseling for smoking cessation. A composite heart failure measure was created by averaging all quality measures available per patient. The single surgical measure was preventive antibiotic 1 hour before incision.

Noncardiac Measures
We obtained data for 5 noncardiac measures reported by CMS that address pneumonia and surgical care. The 4 pneumonia measures included documentation of the following: (1) pneumonia vaccination, (2) antibiotics within 6 hours of admission, (3) oxygen use, and (4) counseling for smoking cessation. A composite pneumonia measure was created by averaging all quality measures available per patient. The single surgical measure was preventive antibiotic 1 hour before incision.

Get With The Guidelines Program
Details of the GWTG Program have been described.2,3 In brief, the AHA launched the GWTG initiative with the goal of improving hospital care for coronary artery disease, stroke, and heart failure. GWTG uses a web-based patient management tool (Outcome Sciences, Inc; Cambridge, MA) to collect clinical data, provide decision support, and provide real-time online reports.

Clinical data collected include patient demographics, medical history, symptoms on admission, in-hospital treatment and events, discharge treatment and counseling, and patient disposition. Participating institutions are instructed to submit consecutive eligible patients to the GWTG-HF database using case ascertainment techniques similar to the Joint Commission.15 Institutions with large volumes (>75 cases per year) are allowed to submit a sample of cases through random selection on a quarterly basis.

All participating institutions were required to comply with local regulatory and privacy guidelines and, if required, to secure institutional review board approval. Because data were used primarily at the local site for quality improvement, sites were granted a waiver of informed consent under the common rule. Outcome Sciences, Inc (Cambridge), served as the registry coordinating center. The Duke Clinical Research Institute (Durham, NC) served as the data analysis center, and institutional review board approval was granted to analyze aggregate deidentified data for research purposes.

30-Day Readmission and Mortality Rates
We used risk-adjusted 30-day all-cause readmission and mortality data reported by CMS on their Hospital Compare Web site.16 Risk-adjusted 30-day readmission and mortality are reported for patients discharged with a primary diagnosis of heart failure. The risk adjustment algorithms are based on demographics and prior and concurrent diagnoses, and the models’ validation has been previously published.17 Readmission data were available from July 2005 to June 2008, and mortality data were available from July 2006 to June 2007.

Statistical Analysis
Hospitals were excluded from an analysis of a particular performance measure if they reported to CMS on <25 patients for that measure. On average, 5% of GWTG and 14% of non-GWTG hospitals were excluded in analyses because of lack of CMS data. Excluded hospitals were smaller (lower average bed size) than included hospitals. GWTG and non-GWTG hospitals were compared using Pearson χ² tests for categorical variables and Wilcoxon rank-sum tests for continuous variables. Percentages were reported to describe categorical variables, and means with SDs and medians with 25th and 75th percentiles were reported for continuous variables.

Hospitals were ranked based on the composite of the 4 HF process-of-care measures, and then multivariable logistic regression analyses were performed to examine the association of GWTG participation with top quartile hospitals. The other covariates in the model included the potential hospital characteristic covariates: profit status, bed size, teaching status, and census region. The pneumonia and surgical composites served as control and were also included in the model to allow the comparison of GWTG-HF versus non-GWTG-HF centers, adjusted for hospitals’ performance in noncardiac conditions.

Similar multivariable regression analyses were performed to explore the relationship of GWTG participation and the risk-adjusted 30-day outcomes. Because CMS report estimates of hospitals’ risk-adjusted outcome rates and variance of the estimates varied by hospitals, the weighted approach using the inverse of the estimate variance was used in the regression analyses. Although the readmission and mortality rates have already been adjusted by CMS for patient characteristics,16,17 differences in hospital characteristics might explain some differences in outcomes and, thus, the hospital characteristics were included in the model as adjustment. Missing covariate hospital data were <1%, and these patients were excluded in multivariable models.
Table 1. Hospital Characteristics for Those Enrolled and Not Enrolled in GWTG-HF

<table>
<thead>
<tr>
<th>Measure</th>
<th>GWTG-HF Participation</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
<td>Yes (215 (5))</td>
<td>No (4245 (95))</td>
</tr>
<tr>
<td>Bed size*</td>
<td>268±220 (169±182)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Teaching†</td>
<td>87 (40)</td>
<td>946 (22)</td>
</tr>
<tr>
<td>Financing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For profit</td>
<td>30 (14)</td>
<td>729 (17)</td>
</tr>
<tr>
<td>Not for profit</td>
<td>139 (65)</td>
<td>2544 (60)</td>
</tr>
<tr>
<td>Government</td>
<td>46 (21)</td>
<td>972 (23)</td>
</tr>
<tr>
<td>Census region‡</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>44 (20)</td>
<td>759 (18)</td>
</tr>
<tr>
<td>Midwest</td>
<td>63 (29)</td>
<td>1174 (28)</td>
</tr>
<tr>
<td>South</td>
<td>69 (32)</td>
<td>1606 (38)</td>
</tr>
<tr>
<td>Northeast</td>
<td>34 (16)</td>
<td>563 (13)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0)</td>
<td>48 (1)</td>
</tr>
</tbody>
</table>

Data are given as number (percentage) or mean±SD. GWTG-HF indicates Get With The Guidelines–Heart Failure.

*The bed size measure has 158 centers missing, 4% for both GWTG and non-GWTG groups.
†Teaching status data were missing for 206 hospitals (8% of GWTG-HF and 9% of non-GWTG-HF).
‡The region variable has 100 centers missing, 2% for both GWTG and non-GWTG-HF.

All P values are 2 sided, with P<0.05 considered statistically significant. Analyses were performed using SAS software, version 9.2 (SAS Institute; Cary, NC).

Results

Hospital Characteristics
Facility characteristics for the 215 GWTG (5%) and 4245 (95%) other facilities are displayed in Table 1. Hospitals enrolled in GWTG-HF were larger and more likely to be teaching institutions compared with hospitals not enrolled.

Process-of-Care Heart Failure Measures
Performance on the 4 main measures of inpatient heart failure care, as defined by the CMS, is shown in Table 2 and Figure 1. Hospitals enrolled in the GWTG-HF had significantly more documentation of left ventricular ejection fraction (LVEF; absolute difference, 4.6%), use of angiotensin-converting enzyme inhibitors, or angiotensin receptor blockers if the LVEF was <40% (absolute difference, 1.7%), and more patient education at discharge (absolute difference, 4.4%) when compared with other hospitals (P<0.05 for all). There was no difference in rates of smoking cessation counseling between GWTG-HF and other hospitals. However, a composite of all 4 measures was significantly higher for the GWTG-HF hospitals (absolute difference, 5.5%; P<0.0001).

Process-of-Care Surgical and Pneumonia Measures
Analyses were performed to determine if hospitals with better adherence to pneumonia and surgical care (markers of the institutions’ overall, but noncardiac, quality of care) also performed well on the heart failure process failure measures. In contrast to the process of care findings for heart failure, GWTG-HF hospitals had no better compliance with process of care for pneumonia and surgical measures of quality than other hospitals (Table 3).

Adjusted Differences in Process-of-Care Heart Failure Measures
After adjustment for hospital characteristics, hospitals enrolled in GWTG-HF were significantly more likely to be in the top 25% of hospitals ranked by the composite measure (odds ratio, 1.46; 95% CI, 1.06–2.01). After additional adjustment for performance on pneumonia and surgical measures, the odds ratio for GWTG-HF hospitals being ranked in the top 25% on the heart failure composite remained significant (odds ratio, 1.73; 95% CI, 1.21–2.50).

Hospital-Level Predictors of Process of Care
Table 4 displays the hospital characteristics associated with being in the top quartile for the heart failure composite process-of-care measure. Facilities were more likely to be in the top quartile if they were a GWTG-HF participant or a large (versus small) hospital and reported high levels of performance on the pneumonia and surgical composite process-of-care measures.

30-Day All-Cause Readmission
Readmission data were available for a wider time period (July 2005 and June 2008) than the other performance measures. There were 3923 hospitals with 30-day all-cause readmission data from CMS for at least 25 patients. Of these participants, 364 (9%) were enrolled in GWTG-HF. The 30-day all-cause readmission rate (risk adjusted for patient characteristics) was lower (24.2%) for GWTG-HF hospitals compared with non-GWTG-HF hospitals (24.6%; absolute difference, 0.4%; P=0.0009; Table 5). When hospitals were ranked by 30-day readmission and separated into tertiles (Table 6), GWTG-HF hospitals were more likely to be the lower readmission groups. The impact of adjustment for hospital characteristics is shown in Figure 2. After adjustment for hospital location, profit status, bed size, and teaching status, enrollment in GWTG-HF was associated with a small, but significant, decrease (−0.33%) in 30-day all-cause readmission (95% CI,
In the GWTG-HF program, there was no significant difference in the distribution of GWTG-HF and other hospitals. After adjustment into tertiles (Table 6), there was no significant difference in the performance by 10% on the heart failure composite process-of-care measure was associated with a 0.1% decrease in the composite measure of time in the GWTG-HF program and the 30-day all-cause readmission rate. Hospitals may have participated in a precursor to the GWTG-HF program, and length of time in that program is not available.

### Other Hospital-Level Predictors of Readmission and Mortality

Hospital characteristics significantly associated with decreased 30-day all-cause readmission rates included not-for-profit status (−0.29%) compared with government funding and West census region (−1.47%), Midwest census region (−0.80%), and South census region (−0.94%) compared with hospitals in the Northeast census region. An increase in performance by 10% on the heart failure composite process-of-care measure was associated with a 0.1% decrease in the 30-day all-cause readmission rate (P<0.0001).

Hospital characteristics significantly associated with increased 30-day mortality included West census region (0.46% increase) and South census region (0.21% increase) compared with hospitals in the Northeast census region and fewer hospital beds (0.1% increase, for a decrease in 100 beds) compared with larger hospitals. The composite measure of heart failure process of care was not associated with adjusted 30-day mortality (P=0.46).

### Table 3. GWTG Participation and Pneumonia and Surgical Care

<table>
<thead>
<tr>
<th>Measures</th>
<th>GWTG-Heart Failure Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (n)</td>
</tr>
<tr>
<td>CMS pneumonia performance</td>
<td></td>
</tr>
<tr>
<td>Pneumococcal vaccination</td>
<td>78.2±17 (200)</td>
</tr>
<tr>
<td>Antibiotics within 6 h</td>
<td>93.9±6 (158)</td>
</tr>
<tr>
<td>Smoking cessation counseling</td>
<td>89.5±12 (169)</td>
</tr>
<tr>
<td>Oxygen use</td>
<td>99.6±2 (202)</td>
</tr>
<tr>
<td>Pneumonia composite measure</td>
<td>90.3±7 (211)</td>
</tr>
<tr>
<td>CMS surgical performance</td>
<td></td>
</tr>
<tr>
<td>Preventive antibiotic 1 h before incision</td>
<td>84.7±9 (186)</td>
</tr>
</tbody>
</table>

Data are given as mean±SD. Each comparison includes hospitals reporting at least 25 patients for the measure.

The number of hospitals reporting data and included in the analysis is shown in parenthesis.

GWTG indicates Get With The Guidelines; CMS, Center for Medicare and Medicaid Services.
Significant gaps, variations, and disparities in the use of guideline-recommended therapies for heart failure have been described.7,18 As a result, several hospital-based initiatives have been developed to improve quality of care and outcomes for patients hospitalized with heart failure, including GWTG-HF. Hospitals enrolled in the GWTG-HF program have demonstrated increased heart failure process of care over time at levels higher than historical controls.12 In addition, those hospitals performing well on the GWTG-HF measures also performed well on similar measures when measured by CMS.19 The current study shows that process of care, as defined by CMS performance measures, is higher in the GWTG-HF–participating hospitals than in other US hospitals. In addition, readmission rates, but not mortality, were lower in GWTG-HF hospitals. A 10% increase in the composite heart failure process-of-care measure was associated with a 0.1% decrease in all-cause readmission rates. Past studies12 have shown that GWTG for coronary artery disease has better process of acute myocardial infarction care than non-GWTG hospitals. Our study demonstrates that this finding extends to the care of patients with heart failure. This may be expected given that the Get With The Guidelines program promotes improvement in hospital systems for cardiovascular disease that are not specific to a certain diagnosis. The GWTG program provides patient-specific guideline recommendations, frequent webinars aimed at improving quality of cardiovascular care, on-demand reports for each institution to track process of care, and national performance data to benchmark against peers.

**Table 4. Hospital Characteristics Associated With Being in the Top Quartile for Heart Failure Process of Care**

<table>
<thead>
<tr>
<th>Hospital Characteristic</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWTG-HF participation</td>
<td>1.73</td>
<td>1.21–2.50</td>
</tr>
<tr>
<td>Teaching hospital</td>
<td>0.83</td>
<td>0.67–1.03</td>
</tr>
<tr>
<td>Funding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For-profit hospital vs government</td>
<td>1.33</td>
<td>0.96–1.83</td>
</tr>
<tr>
<td>Not-for-profit hospital vs government</td>
<td>0.98</td>
<td>0.75–1.27</td>
</tr>
<tr>
<td>Bed size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;200 vs &gt;500</td>
<td>0.48</td>
<td>0.34–0.69</td>
</tr>
<tr>
<td>200–500 vs &gt;500</td>
<td>0.75</td>
<td>0.54–1.24</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>West vs Northeast</td>
<td>0.96</td>
<td>0.70–1.30</td>
</tr>
<tr>
<td>Midwest vs Northeast</td>
<td>1.22</td>
<td>0.94–1.60</td>
</tr>
<tr>
<td>South vs Northeast</td>
<td>0.84</td>
<td>0.64–1.09</td>
</tr>
<tr>
<td>Pneumonia composite</td>
<td>1.21</td>
<td>1.18–1.24</td>
</tr>
<tr>
<td>Surgical composite</td>
<td>1.03</td>
<td>1.02–1.04</td>
</tr>
</tbody>
</table>

Data are based on 2946 hospitals (172 GWTG-HF and 2774 non-GWTG-HF) with both Center for Medicare and Medicaid Services data on all measures needed to create the composite and hospital characteristic data. GWTG-HF indicates Get With The Guidelines–Heart Failure.

**Table 5. GWTG Participation and 30-Day Readmission and Mortality**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>GWTG-Heart Failure Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>30-d All-cause readmission</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>24.2 ± 2.2</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>24.0 (22.8–25.6)</td>
</tr>
<tr>
<td>30-d All-cause mortality</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>11.1 ± 1.5</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>11.0 (10.1–11.9)</td>
</tr>
</tbody>
</table>

Data are adjusted for patient characteristics. Readmission data (2005–2008) are based on 3923 hospitals (364 GWTG-HF and 3559 non-GWTG-HF), and mortality data (2006–2007) are from 3117 hospitals (188 GWTG-HF and 2929 non-GWTG-HF). GWTG indicates Get With The Guidelines; IQR, interquartile range.

**Table 6. Tertiles of Hospitals Ranked by Outcome and GWTG Participation**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-d Readmission</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean rate for all hospitals in tertile, %</td>
<td>22.4</td>
<td>24.4</td>
<td>26.8</td>
<td>...</td>
</tr>
<tr>
<td>GWTG hospitals, No. (%)</td>
<td>155 (43)</td>
<td>104 (29)</td>
<td>105 (29)</td>
<td>0.0018</td>
</tr>
<tr>
<td>Non-GWTG hospitals, No. (%)</td>
<td>1175 (33)</td>
<td>1197 (34)</td>
<td>1187 (33)</td>
<td></td>
</tr>
<tr>
<td>30-d Mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean rate for all hospitals in tertile, %</td>
<td>9.7</td>
<td>11.0</td>
<td>12.6</td>
<td>...</td>
</tr>
<tr>
<td>GWTG hospitals, No. (%)</td>
<td>57 (30)</td>
<td>63 (34)</td>
<td>68 (36)</td>
<td>0.47</td>
</tr>
<tr>
<td>Non-GWTG hospitals, No. (%)</td>
<td>952 (33)</td>
<td>984 (34)</td>
<td>993 (34)</td>
<td></td>
</tr>
</tbody>
</table>

Readmission and mortality data are adjusted for patient characteristics. GWTG indicates Get With The Guidelines.

## Discussion

Significant gaps, variations, and disparities in the use of guideline-recommended therapies for heart failure have been described.7,18 As a result, several hospital-based initiatives have been developed to improve quality of care and outcomes for patients hospitalized with heart failure, including GWTG-HF. Hospitals enrolled in the GWTG-HF program have demonstrated increased heart failure process of care over time at levels higher than historical controls.12 In addition, those hospitals performing well on the GWTG-HF measures also performed well on similar measures when measured by CMS.19 The current study shows that process of care, as defined by CMS performance measures, is higher in the GWTG-HF–participating hospitals than in other US hospitals. In addition, readmission rates, but not mortality, were lower in GWTG-HF hospitals. A 10% increase in the composite heart failure process-of-care measure was associated with a 0.1% decrease in all-cause readmission rates. Past studies12 have shown that GWTG for coronary artery disease has better process of acute myocardial infarction care than non-GWTG hospitals. Our study demonstrates that this finding extends to the care of patients with heart failure. This may be expected given that the Get With The Guidelines program promotes improvement in hospital systems for cardiovascular disease that are not specific to a certain diagnosis. The GWTG program provides patient-specific guideline recommendations, frequent webinars aimed at improving quality of cardiovascular care, on-demand reports for each institution to track process of care, and national performance data to benchmark against peers.
Although the difference in readmission rates between
GWTG-HF and other hospitals was <1% at 30 days, there
are an estimated 240 000 readmissions at 30 days each year
for heart failure (24% of 1 million admissions). If all
hospitals could reach the 0.32% reduction seen after adjust-
ment for patient and hospital characteristics, this would lead
to >750 fewer readmissions (and potential savings of >4
million dollars) per year. Any hospital quality improvement
activity used an undetermined amount of facility resources.
At a minimum, each hospital had to collect data on each
admission.

The lack of a mortality effect is consistent with a prior
study that found that GWTG-HF hospitals that were rewarded
for ≥85% compliance with the 4 CMS heart failure measures
did not have significantly better 30-day mortality after a heart
failure admission (although post–myocardial infarction mor-
tality was significantly reduced in GWTG hospitals).19 Al-
though the sample size of the current study was large, the
differences in process of care were small and a small impact
on mortality may be difficult to detect without a much larger
cohort. The lack of mortality benefit may also be due to a lack
of in-hospital therapies for heart failure, monitored by CMS,
that have improved mortality.24 Of the CMS performance
measures for which hospitals are evaluated, only the use of
angiotensin-converting enzyme inhibitors or angiotensin re-
ceptor blockers at discharge for those with a depressed LVEF
has improved survival in randomized trials. A stronger
relationship between process of care and mortality may have
been found if other life-prolonging therapies, such as
β-blockers or aldosterone antagonist use in appropriate pa-
tients, were reported by CMS.21

There are several potential limitations to our study. The
improvements in performance measures may have been influ-
enced by factors other than GWTG-HF participation. Our study
could not determine if enrollment in Get-With-The Guidelines
led to improved quality of care or was just a marker of hospitals
that provide high quality of care. Hospitals enrolled in
GWTG-HF may have been more interested in quality improve-
ment because GWTG hospitals have had higher rates of accred-
itation than other hospitals in past studies.19 To prove causality,
a randomized trial of GWTG participation would be required.
We attempted to control for preexisting hospital quality by
controlling for pneumonia and surgical process of care. Al-
though GWTG-HF hospitals had better heart failure process-of-
care and readmission rates than nonenrolled hospitals after
adjustment for noncardiac process of care; this adjustment may
have been inadequate to control for baseline hospital quality.
Thus, it is possible that residual measured and unmeasured
confounding may account for the observed differences. A long
follow-up for outcome (for both mortality and admission) may
be a better measure of the GWTG-HF program, and our
readmission and mortality data were limited to 30 days. Al-
though the inpatient GWTG program has both heart failure and
stroke components, our analysis was limited to heart failure
because CMS only reports data for heart failure.

We could not determine the difference in cost of care
between those facilities participating and not participating in
GWTG-HF. Thus, the financial impact of GWTG-HF partic-
ipation is unclear.

The outcome for patients with Medicare may differ from
non-Medicare patient outcomes, and we only had Medicare
data available for the hospitals not enrolled in GWTG-HF.
Hospital Compare process-of-care measure data are self-
reported by hospitals, and facilities have an interest in
reporting higher values for compliance with process of care.
To address this, CMS audits randomly selected reports as part
of a data quality assurance process. Finally, we could not
determine what part of the GWTG program has the greatest
impact on both process of care and readmission.

In summary, our study demonstrated that hospitals enrolled
in the GWTG-HF program had better process of care and
slightly better risk-adjusted 30-day readmission rates for
heart failure than other hospitals publicly reporting data at the
same time. This study suggests that quality improvement
programs, such as GWTG, that improve use of recommended
care strategies for heart failure may also reduce 30-day

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**Figure 3.** The association of time in the Get With The Guides-
lines–Heart Failure (GWTG-HF) program and 30-day all-cause
readmission is shown. The numbers of hospitals in each group
were relatively small. There were 72 facilities enrolled for <1
year, 118 enrolled for at least 1 and <2 years, 83 enrolled for
at least 2 and <3 years, and 91 enrolled for ≥3 years.
readmission rates. The quality of care provided to patients hospitalized with HF may be further enhanced by the GWTG-HF program features, including use of Web-based patient data submission and performance feedback, collaborative care models, and a focus on evidence-based care processes. Additional studies are needed to determine what hospital practices were most strongly associated with reduced readmission rates at the hospitals participating in GWTG-HF. In addition, more effective interventions are needed given the small improvement noted with the GWTG-HF program.

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