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Critical Access Hospital Year 2 Hospital Compare Participation and Quality Measure Results

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With funding from the federal Office of Rural Health Policy (PHS Grant No. U27RH01080), the Rural Health Research Centers at the Universities of Minnesota, North Carolina, and Southern Maine are cooperatively conducting a performance monitoring project for the Medicare Rural Hospital Flexibility Program (Flex Program).

The monitoring project is assessing the impact of the Flex Program on rural hospitals and communities and the role of states in achieving overall program objectives, including improving access to and the quality of health care services; improving the financial performance of CAHs; and engaging rural communities in health care system development.

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The Medicare Rural Hospital Flexibility Program

The Medicare Rural Hospital Flexibility Program (Flex Program), created by Congress in 1997, allows small hospitals to be licensed as Critical Access Hospitals (CAHs) and offers grants to States to help implement initiatives to strengthen the rural health care infrastructure. To participate in the Flex Grant Program, States are required to develop a rural health care plan that provides for the creation of one or more rural health networks; promotes regionalization of rural health services in the State; and improves the quality of and access to hospital and other health services for rural residents of the State. Consistent with their rural health care plans, states may designate eligible rural hospitals as CAHs.

CAHs must be located in a rural area (or an area treated as rural); be more than 35 miles (or 15 miles in areas with mountainous terrain or only secondary roads available) from another hospital or be certified before January 1, 2006 by the State as being a necessary provider of health care services. CAHs are required to make available 24-hour emergency care services that a State determines are necessary. CAHs may have a maximum of 25 acute care and swing beds, and must maintain an annual average length of stay of 96 hours or less for their acute care patients. CAHs are reimbursed by Medicare on a cost basis (i.e., for the reasonable costs of providing inpatient, outpatient and swing bed services).

The legislative authority for the Flex Program and cost-based reimbursement for CAHs are described in the Social Security Act, Title XVIII, Sections 1814 and 1820, available at http://www.ssa.gov/OP_Home/ssact/title18/1800.htm

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Executive Summary

Improving the quality of care provided by CAHs is a goal of the Medicare Rural Hospital Flexibility Program. The Institute of Medicine Committee on the Future of Rural Health has recommended that rural providers be included in public reporting initiatives, and stressed the importance of making fair and meaningful comparisons.

This report examines the second year participation and quality measure results for Critical Access Hospitals (CAHs) in the Centers for Medicare and Medicaid Services (CMS) Hospital Compare public reporting database for hospital quality measures. Overall, 53% of CAHs were participating in Hospital Compare (by submitting data on at least one measure) as of September 2006, a substantial increase from 41% in September 2005. By state, the percent of participating CAHs ranges from 0% to 100%.

The Hospital Compare measure set for 2005 discharges included 20 measures that reflect recommended treatments for acute myocardial infarction (heart attack or AMI), heart failure, pneumonia and surgical infection prevention. Although the number of CAH patients for whom measures were reported had increased since the previous year, many CAHs still had a very small number of patients for several measures. Therefore, aggregate scores were calculated across groups of CAHs and other hospitals.

The second year results are similar to the initial year results. CAHs are not doing as well on the AMI and heart failure measures as rural and urban Prospective Payment System (PPS) hospitals. For pneumonia and surgical infection prevention, CAHs scored as well or better than other hospitals on some measures, and not as well on a few measures.

Over the two years, all groups of hospitals showed significant positive increases in the percent of patients receiving recommended care for the majority of quality measures. Of the 19 measures for which CAHs had data for both years, 13 measures had significant positive increases in the percent of patients who received recommended care. The largest increases were for the AMI smoking cessation advice, surgical infection prevention and pneumoccal vaccination measures. Five measures had increases that were not statistically significant, while one had a non-significant decrease. Rural and urban PPS hospitals showed significant positive increases for nearly all measures.

CAHs still have room for improvement, especially with regard to recommended care for AMI and heart failure patients. However, it is encouraging that the group of CAHs that reported Hospital Compare data for both years significantly improved their performance on almost all pneumonia, heart failure, and surgical infection measures.

Low volume remains a problem for calculating a number of measures, especially AMI measures, at the individual hospital level, and also will limit the usefulness of some new measures being added to Hospital Compare, such as 30-day mortality rates for AMI and heart failure. Additional research is needed to identify alternative methods of assessing and comparing quality performance at the hospital level for small rural hospitals. This research will be especially important as the CMS Medicare Value-based Purchasing initiative is developed and implemented.

INTRODUCTION

The current health care environment has fostered increased interest in the public reporting of hospital quality measures to stimulate quality improvement, enhance health provider accountability, and inform purchasers and consumers. This interest comes from a broad set of stakeholders, including federal and state policymakers, employers and consumers.

In response, the Hospital Quality Alliance (HQA) was implemented in December 2002 as a voluntary initiative to encourage public reporting of hospital quality information. The HQA collaboration includes the Centers for Medicare and Medicaid Services (CMS), the American Hospital Association, the Federation of American Hospitals, and the Association of American Medical Colleges, and is supported by other organizations, including the Agency for Healthcare Research Quality, the National Quality Forum (NQF), the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), and the American Medical Association.

For public reporting, the HQA selected ten initial quality performance measures that reflected recommended treatments for three conditions: acute myocardial infarction (AMI), heart failure, and pneumonia. These health conditions are common reasons for hospitalizations among Medicare beneficiaries. CMS launched the Hospital Compare website in April 2005 to provide health care consumers with access to the HQA data.

The Medicare Prescription Drug, Improvement and Modernization Act of 2003 (MMA) established an incentive payment for eligible acute care hospitals paid under the Medicare Prospective Payment System (PPS) to report data on the initial ten measures, beginning with their 2004 discharges. The hospitals are also required to agree to have their data publicly displayed on the Hospital Compare website. In 2005-2006, 11 more measures were added to the HQA measure set, including additional measures for AMI, heart failure and pneumonia, as well as two measures related to surgical infection prevention.

PPS hospitals that did not report the required data faced a 0.4% reduction in their annual payment update from Medicare in fiscal year 2006 and a 2.0% percent reduction in fiscal year 2007. According to CMS, almost all of the PPS hospitals eligible for the payment incentive provided data on care delivered during 2004 for the 10 initial measures. For care delivered during 2005, less than one percent of hospitals elected not to participate, and four percent participated but failed the submission requirements (CMS, 2006). Figure 1 lists the quality measures in the Hospital Compare dataset, and indicates the initial ten measures that PPS hospitals were required to report to CMS for 2004 and 2005 discharges.

Critical Access Hospitals (CAHs) are small, rural hospitals that are either located 35 miles from another hospital (or 15 miles in areas with mountainous terrain or only secondary roads) or state-certified as necessary providers of care. CAHs may have a maximum of 25 acute care and swing beds, and must maintain an annual average length of stay of 96 hours or less for their acute care patients. As of March 2007, there were a total of 1,283 CAHs nationally. Unlike PPS hospitals, CAHs are reimbursed by Medicare on a cost basis, and do not have a financial incentive to submit quality

measure data for the HQA initiative. CAHs can choose to submit data for any or all of the measures in the measure set. Although CAHs do not face the same financial incentives as PPS hospitals to participate, the Hospital Compare initiative provides an important opportunity for CAHs to assess and improve their performance on national standards of care.

Improving the quality of care provided by CAHs is a goal of the Medicare Rural Hospital Flexibility Program. The Institute of Medicine Committee on the Future of Rural Health has recommended that rural providers be included in public reporting initiatives, and stressed the importance of making fair and meaningful comparisons (IOM, 2005).

Initial Hospital Compare analyses generally excluded CAHs because of the small number of patients for most measures (Jha, Li, Orav et. al., 2005; Kahn, Ault, Isenstein et. al., 2006). Landon et. al. (2006) considered rural location in their analysis of Hospital Compare and JCAHO data, but did not analyze CAHs and rural PPS hospitals separately. Casey and Moscovice (2006) examined the Hospital Compare results for CAHs using data for 2004 discharges. They found that CAHs as a group were performing as well or better than rural and urban PPS hospitals on several measures for patients with pneumonia, but were not performing as well as other rural or urban hospitals on most quality of care measures for patients with AMI and heart failure.

Purpose of this Project

The purpose of this project is to:

- Determine the proportion of CAHs that are participating in the second year of Hospital Compare, and identify key characteristics related to CAH participation;
- Compare the second year of quality measure results for all participating CAHs with other groups of rural and urban PPS hospitals; and
- Compare the first and second year of results for CAHs and other groups of hospitals that participated in both years.

METHODS

This project uses secondary data on hospital participation and quality measure results from the CMS Hospital Compare website (http://www.hospitalcompare.hhs.gov/). The current Hospital Compare measures are based on data abstracted from patient records for hospital discharges in January through December 2005. In September 2006, the most current data from the website were downloaded and converted to a database with one record for each participating hospital using SAS Version 9.1 statistical analysis software (SAS Institute Inc., Cary, NC). These data were linked with data on all CAHs maintained by the Sheps Center at the University of North Carolina as part of its Flex Monitoring Team activities, and data on hospital characteristics from the 2004 American Hospital Association (AHA) Annual Survey.

Hospitals in the Hospital Compare database were linked to the other data sources using Medicare provider numbers, AHA identification numbers, hospital names and addresses, and county FIPs codes. For non-participating CAHs and hospitals that were

not in the AHA database or had missing data, data on accreditation was obtained from the JCAHO Quality Check website and FIPS county codes were obtained from a SAS ZIP code/FIPS code matching database. Of the 4,301 hospitals in the Hospital Compare database, 34 hospitals in Puerto Rico, Guam, the Virgin Islands and Mariana Islands were removed from this analysis, leaving 4,267 hospitals. A total of 211 hospitals, including 47 CAHs, were in the database, but were missing data on all measures and therefore were not counted as participating.

Hospital Compare data for hospital discharges in 2004 had been downloaded in September 2005 for the previous study (Casey and Moscovice, 2006) and were available for this analysis. Hospitals in the two databases were linked, using current and previous Medicare provider numbers (CAHs receive new Medicare provider numbers after converting), hospital name and ZIP code. After linking, 3,921 hospitals were identified in both databases, of which 32 were missing data on all measures in 2006, leaving 3,889 hospitals for an analysis of performance over the two years. Seventy-four hospitals were only in the 2005 database, including several hospitals that closed or merged, as well as 46 CAHs that participated as PPS hospitals in 2005 but did not participate in 2006 after conversion.

PPS hospitals were classified as rural or urban based on their location in an Office of Management and Budget designated non-metropolitan (rural) or metropolitan (urban) county. Small PPS hospitals were classified as those with 50 or fewer staffed hospital beds according to the FY 2004 AHA Annual Survey. Participation rates for CAHs were calculated by accreditation status, size, date of CAH conversion and ownership type. Chi-square tests and t-tests were used to test for significant differences between participants and non-participants.

The quality measure results for participating CAHs were compared with those of rural, urban and small PPS hospitals. Although the number of CAH patients for whom measures were reported had increased since the previous year's analysis, many CAHs still had a very small number of patients for several measures. Therefore, aggregate scores were calculated across all reporting hospitals in each subgroup. For each measure, the proportions of patients in CAHs and in the other hospital groups that received the recommended care were calculated by dividing the total number of patients in all hospitals in the group who received the recommended care by the total number of eligible patients for each measure.[1] This method gives more weight to hospitals with more patients. Statistical tests (z-tests) were conducted to determine whether the differences in the proportions of patients in each group of hospitals that received the recommended care were statistically significant.

An alternative method of comparing the performance of CAHs and other hospitals is to calculate mean scores for each hospital individually, and then calculate an average for each subgroup. An advantage of this method is that each hospital contributes equally to the subgroups' means. However, this "average of averages" method can give a less

[1] For example, if one hospital had 10 out of 20 patients and another hospital had 70 out of 100 patients receiving recommended care for a given measure, the aggregate score across the hospitals would be 67% (80 out of 120 patients). Using the alternative "average of averages" method, the score would be 60%, the average of 50% (10/20) and 70% (70/100).

accurate picture of the performance of a group of hospitals when a large number of the facilities have very small numbers of patients for the measures, as is currently the case with CAHs.

RESULTS

CAH Participation in Hospital Compare

Table 1 shows the number of CAHs in each state and the percent of CAHs that were participating in Hospital Compare as of September 2006. Overall, 53.2% of CAHs are participating in Hospital Compare, defined as submitting data for one or more measures.[2] By state, participation ranges from 0% to 100%. Of the 45 states with CAHs, one state does not have any participating CAHs; five states have up to 25 percent participation; 16 states have between 26 and 50 percent participation; 11 states have between 51 and 75 percent participation and 12 states have more than 75 percent participation.

On average, participating CAHs have more beds than non-participants (Table 2). Fifty-eight percent of participants are private non-profit CAHs; 38% are public/government owned; and 5% are for-profit CAHs. CAHs that converted earlier tend to have lower participation rates than later converters (Table 3). Accredited CAHs are more likely than non-accredited CAHs to participate (63% vs. 50%). Private non-profit and for-profit CAHs have higher participation rates than those with government/public ownership.

CAHs reported data on 19 of the 20 measures in the Hospital Compare measure set for 2005 discharges. No CAHs reported having any eligible patients for the AMI percutaneous coronary intervention (PCI) measure; PCI procedures require specialized equipment and cardiology expertise not usually present in CAHs.

For the CAHs that are participating in Hospital Compare, Table 4 shows for each measure the percentages of CAHs that reported any data (including those with zero patients in the denominator), as well as those with data for one or more patients and for 25 or more patients.[3] The number of CAHs reporting data and the number of patients for whom data are submitted varies widely across measures. Except for four AMI measures (ACE inhibitor/ARB for LVSD, smoking cessation advice, thrombolytic, and PCI) and the two surgical infection prevention measures, the majority of participating CAHs have data for at least one patient on each measure. However, less than four percent of participating CAHs are reporting data for 25 or more patients on all of the AMI measures, one heart failure (ACE inhibitor/ARB for LVSD) and one pneumonia (smoking cessation advice) measure. The total number of CAH patients nationally per measure ranges from 279 for the AMI thrombolytic measure to 37,246 for the pneumonia oxygenation assessment measure.

[2] An additional 47 CAHs were in the Hospital Compare database, but were missing data on all measures.
[3] When a hospital has less than 25 patients for a measure, the number of cases is considered by CMS to be too small to reliably predict performance at the hospital level. As the number of cases used to determine hospitals' rates increases, the reliability and stability of the rates increase.

The number of CAHs reporting and the number of patients for whom data are available may differ by measure for several reasons. Hospitals have had a longer time to become familiar with and report on the initial ten measures. Some measures only apply to a portion of patients (e.g., the smoking cessation advice measures only apply to smokers), and several measures exclude patients with contraindications for receiving that type of medication. The AMI measures only apply to patients who are admitted to the hospital as inpatients; small rural hospitals transfer many AMI patients seen in their emergency departments to larger hospitals, rather than admitting them as inpatients (Mehta, Stalhandske, McCargar et al, 1999; Baldwin, MacLehose, Hart et al, 2004; Ellerbeck, Bhimaraj, and Perpich, 2004; Westfall, Van Vorst, McGloin, et al, 2006). Consequently, CAHs may have few eligible patients for the AMI measures. Approximately two-thirds of CAHs provide some type of inpatient surgery services (Casey and Klingner, 2004). The surgical infection prevention measures apply to selected surgeries; some (e.g., hysterectomies) are more commonly provided in CAHs than others (e.g., cardiac procedures).

The next section uses data on 2005 discharges to compare the results for CAHs as a group with those of other groups of hospitals classified by rural/urban location and size. Then, for CAHs and other hospitals that reported data for both 2004 and 2005 discharges, results are compared over the two-year time period for each group of hospitals.

Comparison of Results for CAHs and PPS Hospitals

Hospital characteristics such as patient volume, the size and composition of medical and nursing staff, financial resources, and the availability of technology may influence how quality is measured as well as the provision of care in the hospital environment. For measures that are rural relevant, comparisons of results across groups of hospitals can be a useful means of exploring the extent to which differences may be occurring due to factors related to patient volume or other aspects of the rural or urban environment. Comparisons are also useful to identify high performing hospitals whose successful strategies and best practices may be replicated in other hospitals.

Three sets of comparisons were made using the Hospital Compare data on 2005 discharges. CAH patients were compared to patients in 1) rural PPS hospitals; 2) urban PPS hospitals; and 3) small (50 beds or less) PPS hospitals. The comparisons are based on the 19 measures for which CAHs reported data; as noted above, the number of CAHs reporting data for each measure varies.

When CAH patients are compared to rural PPS patients nationally, the percent of CAH patients receiving recommended care is lower on seven AMI and four HF measures (Table 5). For pneumonia, the percent of CAH patients receiving recommended care is higher on two measures (oxygenation assessment and initial antibiotic within 4 hours); not significantly different on one measure (most appropriate initial antibiotic); and lower on three measures (pneumoccal vaccination, blood culture prior to antibiotic and smoking cessation advice). CAHs score lower than rural PPS hospitals on the first surgical infection prevention measure and higher on the second measure. As with the previous set of comparisons, some differences (e.g., pneumoccal vaccination and blood

culture prior to antibiotic) are statistically significant because of the large sample sizes involved, but are not large enough to be of practical significance.

The quality measure results for CAHs and urban PPS hospitals nationally are also very similar to the previous year's results (Table 6). The percent of CAH patients receiving recommended care is lower on six AMI and four HF measures. The percentages of CAH patients receiving recommended care are higher than urban patients for two pneumonia measures (initial antibiotic in four hours and pneumoccal vaccine) and are not statistically different on one pneumonia measure (blood culture prior to antibiotic). CAHs score lower than urban PPS hospitals on the first surgical infection prevention measure and higher on the second measure.

Table 7 compares the results nationally for all CAH patients with patients in small PPS hospitals (those with 50 or fewer staffed hospital beds). The percent of CAH patients receiving recommended care is not significantly different from the percent of patients in other small hospitals on three AMI measures; it is lower on four AMI measures. For heart failure, the percent of CAH patients receiving recommended care is lower than that of small PPS hospitals on four measures. For pneumonia, the percent of CAH patients receiving recommended care is higher on three measures (oxygenation assessment, pneumoccal vaccine, initial antibiotic in four hours); not statistically different on two measures (blood culture prior to antibiotic and appropriate initial antibiotic); and lower on one measure (smoking cessation). CAHs score lower on the first surgical infection prevention measure and higher on the second measure.

A Cross-Cutting Measure for Smoking Cessation Advice

Because the smoking cessation advice measures only apply to patients who smoke, the majority of CAHs have a very small number of eligible patients for these measures. For the 2005 discharges, the number of CAHs with 25 or more eligible patients for the smoking cessation measures was one for AMI, two for heart failure and 54 for pneumonia. If the three condition-specific smoking cessation advice measures were combined into one cross-cutting smoking cessation advice measure for each CAH, 121 CAHs would have 25 or more eligible patients for the measure.

For all CAH patients, the overall heart failure and pneumonia smoking cessation rates are nearly identical (64.2% and 64.3%) while the AMI smoking cessation rate is a little lower (61.9%). The combined rate for a cross-cutting measure for all three conditions would be 64.2%, reflecting the much larger number of smoking patients with heart failure and pneumonia than with AMI.

Comparison of Results for 2004 and 2005 Discharges

Table 8 compares results for 2004 and 2005 discharges for all CAH, rural PPS and urban PPS patients for hospitals that reported data for both years. For comparison purposes, hospitals are classified based on their status in September 2006, e.g., for hospitals that reported as PPS hospitals in 2005 and as CAHs in 2006, results for both years are in the CAH columns.

Of the 19 measures for which some CAHs had data for both years, 13 measures had significant positive increases in the percent of patients who received recommended care. Five measures had increases that were not statistically significant, while one (AMI aspirin at arrival) had a decrease that was not significant. The largest percentage increases were for AMI smoking cessation advice (13.7%); the two surgical infection prevention measures (9.7% and 13.5%); and pneumoccal vaccination (11.5%). Rural PPS hospitals had significant positive increases for all measures except the AMI thrombolytic and PCI measures, and urban hospitals had significant positive increases for all measures except the thrombolytic measure.

Limitations

Several caveats are necessary in evaluating the results and policy implications of this study. First, the quality measure results for CAHs that voluntarily participate in Hospital Compare may not be representative of CAHs that chose not to participate, especially since participating CAHs differ significantly from non-participating CAHs on several organizational characteristics. Second, most CAHs have had less experience than PPS hospitals in collecting and reporting data on the quality measures in Hospital Compare. Therefore, differences in the proportion of CAH and PPS patients receiving recommended care may be due to CAHs' lack of experience or problems with documentation and reporting on the measures as well as actual differences in the care provided.

Third, some of the differences in scores between groups of hospitals are only a few percentage points, but are statistically significant because of the large sample sizes involved. However, these differences may not be of practical significance because the scores are high for all groups. Finally, it is important to remember that there is considerable variation in the aggregate scores presented for groups of CAHs, and PPS rural and urban hospitals. Some individual hospitals are performing much better than the average, and others are performing worse.

DISCUSSION

Over 53% of CAHs are participating in Hospital Compare in 2006, a significant increase from the 41% rate in 2005. This level of participation in the absence of specific financial incentives indicates that many CAHs see the value of taking part in a national effort to collect and publicly report on quality of care measures. However, participation rates continue to vary widely across states, and remain higher among CAHs that are JCAHO accredited and those that converted to CAH status in 2003-2005. Most of the 156 hospitals that reported to Hospital Compare as PPS hospitals in 2005 and subsequently converted to CAHs continued reporting in 2006, but 46 CAHs (29%) discontinued reporting after conversion.

The Office of Rural Health Policy encourages Flex programs to work with CAHs in their states on quality improvement, measurement and reporting. In the 8th Scope of Work, which continues through July 2008, Quality Improvement Organizations (QIOs) have a goal of increasing reporting by CAHs of quality measure data to the national QIO data warehouse. As of the second quarter of 2006, approximately 60% of QIOs had met their increased reporting goals; however, 23% of the 955 CAHs that submitted data to the

QIO data warehouse chose not to have their data publicly reported to Hospital Compare (personal communication, J. Lundblad, Stratis Health, March 28, 2007). These and other non-participating hospitals need additional encouragement and support to publicly report data to Hospital Compare.

As previously noted (Casey and Moscovice, 2006), efforts to improve CAH participation in Hospital Compare need to ensure that CAHs find the process useful for internal quality improvement as well as external reporting and benchmarking. The quality measures used need to be relevant to the small rural hospital environment and the volume of patients must be large enough for CAHs to have stable measures. Most measures in the current Hospital Compare measure set are generally relevant for small rural hospitals. However, some measures are not relevant because they involve procedures that are rarely performed in small rural hospitals (e.g., administration of thrombolytics and PCI). Other measures, such as the surgical infection prevention measures, are relevant for a subset of small rural hospitals that perform these types of surgery.

Efforts are underway to develop and refine additional quality measures that are relevant for the small rural hospital environment. For example, measures have been developed to assess the timeliness of care for AMI patients who are treated in a rural Emergency Department and then transferred to another hospital. These measures have been field tested by the University of Minnesota Rural Health Research Center, the Minnesota and Nevada/Utah QIOs, the Washington Rural Hospital Quality Network, and rural hospitals in Minnesota, Nevada, Utah and Washington (Klingner and Moscovice, 2007). The Oklahoma QIO is heading an effort to add these measures to the CMS Abstraction & Reporting Tool (CART), so that rural hospitals will be able to use them to collect and report data on AMI Emergency Department patients to the QIO Clinical Warehouse in the future.

The number of CAH patients for whom Hospital Compare data was reported increased in the second year of reporting. However, low volume remains a problem for calculating a number of measures, especially AMI measures, at the individual hospital level, and will limit the usefulness for CAHs of some new measures being added to Hospital Compare, such as 30-day mortality measures for AMI and heart failure. Low volume and the relevance of measures for small hospitals also are issues for other public and private reporting systems. Additional research is needed to identify alternative methods of assessing and comparing quality performance at the hospital level for small rural hospitals. This research will be especially important as the CMS Medicare Value-based Purchasing initiative is developed and implemented (CMS, 2007).

The results of this study indicate that CAHs have room to improve their performance, especially with regard to recommended care for AMI and heart failure patients. However, it is encouraging that the group of CAHs that reported Hospital Compare data for both years significantly improved their performance on almost all pneumonia, heart failure, and surgical infection measures.

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Figure 1: Hospital Compare Measures for 2004 and 2005 Discharges

Heart attack/acute myocardial infarction (AMI) Measures
Aspirin at arrival - AMI patients without aspirin contraindications who received aspirin within 24 hours before or after hospital arrival.*
Aspirin at discharge - AMI patients without aspirin contraindications who were prescribed aspirin at hospital discharge.*
ACE inhibitor or ARB for left ventricular systolic dysfunction (LVSD) - AMI patients with LVSD and without angiotensin converting enzyme inhibitor (ACE inhibitor) or angiotensin receptor blocker (ARB) contraindications who are prescribed an ACE inhibitor or an ARB at hospital discharge.*
Beta Blocker at arrival - AMI patients without beta-blocker contraindications who received a beta-blocker within 24 hours after hospital arrival.*
Beta Blocker at discharge - AMI patients without beta-blocker contraindications who were prescribed a beta-blocker at hospital discharge.*
Thrombolytic agent received within 30 minutes of hospital arrival - AMI patients receiving thrombolytic therapy during the hospital stay and having a time from hospital arrival to thrombolysis of 30 minutes or less.
PCI received within 120 minutes of hospital arrival - AMI patients receiving Percutaneous Coronary Intervention (PCI) during the hospital stay with a time from hospital arrival to PCI of 120 minutes or less (This measure was initially within 90 minutes).
Smoking cessation advice/counseling - AMI patients with a history of smoking cigarettes who are given smoking cessation advice or counseling during a hospital stay.
Heart Failure Measures
Assessment of left ventricular function (LVF) - Heart failure patients with documentation in the hospital record that LVF was assessed before arrival, during hospitalization, or is planned for after discharge.*
ACE inhibitor or ARB for left ventricular systolic dysfunction (LVSD) - Heart failure patients with LVSD and without ACE inhibitor or ARB contraindications who are prescribed an ACE inhibitor or an ARB at hospital discharge.*
Discharge instructions - Heart failure patients discharged home with written instructions or educational material given to patient or caregiver at discharge or during the hospital stay addressing activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen.
Smoking cessation advice/counseling - Heart failure patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during a hospital stay.
Pneumonia Measures
Oxygenation assessment - Pneumonia inpatients who receive an oxygenation assessment, arterial blood gas, or pulse oximetry within 24 hours of hospital arrival.*
Pneumococcal vaccination status - Pneumonia inpatients age 65 and older who were screened for pneumococcal vaccine status and were administered the vaccine prior to discharge, if indicated.*
Initial antibiotic timing - Pneumonia inpatients that receive within 4 hours after arrival at the hospital.*
Blood culture performed prior to first antibiotic received in hospital - Pneumonia patients whose initial hospital blood culture specimen was collected prior to first hospital dose of antibiotics.
Smoking cessation advice/counseling - Pneumonia patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during a hospital stay.
Appropriate Initial Antibiotic Selection - Immunocompetent patients with pneumonia who receive an initial antibiotic regimen that is consistent with current guidelines.
Surgical Infection Prevention Measures
Prophylactic antibiotic received within 1 hour prior to surgical incision - Surgical patients who received prophylactic antibiotics within 1 hour prior to surgical incision.
Prophylactic antibiotics discontinued within 24 hours after surgery end time - Surgical patients whose prophylactic antibiotics were discontinued within 24 hours after surgery end time.

*Measures that were part of the initial 10 measure set for public reporting.

Source: CMS, 2006.

Table 1
Critical Access Hospital (CAH) Participation in Hospital Compare for 2005 Discharges by State

State[1]	Number of CAHs[2]	Percent of CAHs Participating in Hospital Compare[3]	State	Number of CAHs	Percent of CAHs Participating in Hospital Compare
Alabama	4	100.0	Nebraska	65	75.4
Alaska	10	10.0	Nevada	10	20.0
Arizona	12	50.0	New Hampshire	13	92.3
Arkansas	28	60.7	New Mexico	6	83.3
California	21	23.8	New York	13	30.8
Colorado	25	44.0	North Carolina	22	50.0
Florida	11	45.5	North Dakota	31	32.3
Georgia	35	45.7	Ohio	34	67.6
Hawaii	9	0.0	Oklahoma	34	88.2
Idaho	26	7.7	Oregon	25	56.0
Illinois	51	78.4	Pennsylvania	12	66.7
Indiana	36	66.7	South Carolina	5	80.0
Iowa	82	61.0	South Dakota	38	34.2
Kansas	84	50.0	Tennessee	16	37.5
Kentucky	30	56.7	Texas	74	18.9
Louisiana	27	25.9	Utah	8	75.0
Maine	15	73.3	Vermont	8	100.0
Massachusetts	4	50.0	Virginia	7	71.4
Michigan	35	40.0	Washington	39	38.5
Minnesota	80	55.0	West Virginia	19	89.5
Mississippi	28	28.6	Wisconsin	57	75.4
Missouri	35	77.1	Wyoming	14	78.6
Montana	45	44.4	All States	1,283	53.2

[1]Five states (Connecticut, Delaware, Maryland, New Jersey and Rhode Island) do not have any CAHs.
[2]Number of CAHs as of September 2006 based on University of North Carolina CAH database.
[3]Participation was defined as providing data on at least one measure.

Data source: Hospital Compare data for 2005 discharges, downloaded from CMS website September 2006.

Table 2
Organizational Characteristics of CAH Hospital Compare Participants and Non-participants

	Participants (N = 683)	Non-participants (N = 600)
Utilization Measures		
Number of beds (mean)***	23.6	21.0
Year of CAH Conversion***		
1999 or earlier	6.9%	11.8%
2000	11.6%	18.3%
2001	14.8%	20.7%
2002	12.5%	15.3%
2003	11.1%	10.8%
2004	18.9%	11.8%
2005	23.6%	10.0%
2006	0.7%	1.2%
	100%	100%
Accreditation***		
Accredited	29.6%	20.0%
Not Accredited	70.4%	80.0%
	100%	100%
Ownership***		
Government/Public	37.5%	52.9%
Private non-profit	57.7%	43.6%
For profit	4.8%	3.5%
	100%	100%

Data sources: Hospital Compare data for 2005 discharges, downloaded from CMS website September, 2006; University of North Carolina CAH database, 2006; FY 2004 AHA Annual Survey; JCAHO Quality Check website.

***Significant differences between participants and non-participants at p< .001.

Table 3
Percent of CAHs that Participate in Hospital Compare by Type of Organizational Characteristic

	Number of CAHs	Percent of CAHs that Participate in Hospital Compare
Year of CAH Conversion		
1999 or earlier	118	39.8%
2000	189	41.8%
2001	225	44.9%
2002	177	48.0%
2003	141	53.9%
2004	200	64.5%
2005	221	72.9%
2006	12	41.7%
Accreditation		
Accredited	322	62.7%
Not Accredited	961	50.1%
Ownership		
Government/public	573	44.7%
Private non-profit	655	60.2%
For profit	54	61.1%

Data sources: Hospital Compare data for Jan. – Dec. 2005 downloaded from CMS website September 2006; University of North Carolina CAH database, 2006; FY 2004 AHA Annual Survey; JCAHO Quality Check.

Table 4
Hospital Compare Quality Measure Results for CAHs in 2005 (n = 683 CAHs)

		Percent of CAHs reporting data for ≥1 patient	Percent of CAHs reporting data for ≥25 patients	Number of CAHs reporting any data[1]	Number of patients with data per CAH (range)	Total number of CAH patients with data	Percent of CAH patients receiving recommended care
AMI	Aspirin at arrival	70.1	3.7	510	0-83	4,215	88.0
	Aspirin at discharge	60.8	0.3	510	0-82	2,118	85.7
	ACE inhibitor or ARB for LVSD	29.6	0.0	509	0-16	497	77.3
	Beta blocker at arrival	66.5	2.2	509	0-77	3,846	80.7
	Beta blocker at discharge	60.3	0.3	509	0-81	2,200	85.7
	Smoking cessation advice	15.2	0.1	507	0-34	286	61.9
	Thrombolytic w/in 30 minutes	7.6	0.0	502	0-11	279	33.3
	PCI at arrival	0.0	0.0	451	0	0	N/A
Heart Failure	Assessment of LVF	91.9	32.2	653	0-129	19,885	69.2
	ACE inhibitor or ARB for LVSD	80.1	1.5	654	0-42	4,519	78.8
	Discharge instructions	80.2	11.7	648	0-105	13,535	51.0
	Smoking cessation advice	60.8	0.0	651	0-27	2,544	64.2
Pneumonia	Oxygenation assessment	99.4	75.1	679	1-218	37,246	99.2
	Pneumoccal vaccination	95.0	37.9	677	0-155	24,709	64.5
	Initial antibiotic(s) within 4 hours	98.2	61.3	679	0-195	29,378	84.5
	Blood culture prior to first antibiotic	97.8	48.9	676	0-188	24,115	83.0
	Smoking cessation advice	84.5	3.1	674	0-58	7,064	64.3
	Most appropriate initial antibiotic(s)	96.6	55.8	667	0-156	28,262	77.8
Surgical Infection Prevention	Preventative antibiotic(s) one hour before incision	30.7	10.8	224	0-171	7,438	72.8
	Preventative antibiotic(s) stopped within 24 hours after surgery	31.5	10.8	224	0-168	6,916	72.7

[1]Includes hospitals reporting zero patients in the denominator for a measure; does not include hospitals missing all data for the measure.

Data source: Hospital Compare data for Jan. - Dec. 2005, downloaded from CMS website September 2006.

Table 5

Percent of Patients Receiving Recommended Care in CAHs and Rural PPS Hospitals in 2005

		CAHs (n=683)	Rural PPS Hospitals (n=1,003)	Significance of differences between CAHs and Rural PPS Hospitals
Condition	**Measure**	**Percent of Patients Receiving Recommended Care**	**Percent of Patients Receiving Recommended Care**	
AMI	Aspirin at arrival	88.0	92.6	.001
	Aspirin at discharge	85.7	91.9	.001
	ACE inhibitor or ARB for LVSD	77.3	81.1	.05
	Beta blocker at arrival	80.7	87.6	.001
	Beta blocker at discharge	85.7	91.0	.001
	Smoking cessation advice	61.9	89.5	.001
	Thrombolytic w/in 30 minutes of arrival	33.3	39.4	.05
	PCI at arrival	N/A	66.0	N/A
Heart Failure	Assessment of LVF	69.2	81.5	.001
	ACE inhibitor or ARB for LVSD	78.8	80.6	.01
	Discharge instructions	51.0	57.2	.001
	Smoking cessation advice	64.2	80.8	.001
Pneumonia	Oxygenation assessment	99.2	98.8	.001
	Pneumoccal vaccination	64.5	65.3	.05
	Initial antibiotic(s) within 4 hours of hospital arrival	84.5	79.6	.001
	Blood culture prior to first antibiotic in hospital	83.0	83.8	.01
	Smoking cessation advice	64.3	77.6	.001
	Most appropriate initial antibiotic(s)	77.8	78.1	NS
Surgical Infection Prevention	Preventative antibiotic(s) one hour before incision	72.8	78.0	.001
	Preventative antibiotic(s) stopped within 24 hours after surgery	72.7	68.9	.001

Data source: Hospital Compare data for Jan. - Dec. 2005, downloaded from CMS website September 2006.

Table 6

Percent of Patients Receiving Recommended Care in CAHs and Urban PPS Hospitals in 2005

		CAHs (n=683)	Urban PPS Hospitals (n=2,370)	Significance of differences between CAHs and Urban PPS Hospitals
Condition	**Measure**	**Percent of Patients Receiving Recommended Care**	**Percent of Patients Receiving Recommended Care**	
AMI	Aspirin at arrival	88.0	95.7	.001
	Aspirin at discharge	85.7	95.9	.001
	ACE inhibitor or ARB for LVSD	77.3	83.7	.001
	Beta blocker at arrival	80.7	92.6	.001
	Beta blocker at discharge	85.7	95.0	.001
	Smoking cessation advice	61.9	92.4	.001
	Thrombolytic w/in 30 minutes of arrival	33.3	38.2	NS
	PCI at arrival	N/A	69.0	N/A
Heart Failure	Assessment of LVF	69.2	91.9	.001
	ACE inhibitor or ARB for LVSD	78.8	83.1	.001
	Discharge instructions	51.0	58.6	.001
	Smoking cessation advice	64.2	83.9	.001
Pneumonia	Oxygenation assessment	99.2	99.5	.001
	Pneumoccal vaccination	64.5	60.5	.001
	Initial antibiotic(s) within 4 hours of hospital arrival	84.5	73.9	.001
	Blood culture performed prior to first antibiotic	83.0	83.1	NS
	Smoking cessation advice	64.3	79.9	.001
	Most appropriate initial antibiotic(s)	77.8	81.1	.001
Surgical Infection Prevention	Preventative antibiotic(s) one hour before incision	72.8	82.2	.001
	Preventative antibiotic(s) stopped within 24 hours after surgery	72.7	68.9	.001

Data source: Hospital Compare data for Jan. - Dec. 2005, downloaded from CMS website September 2006.

Table 7

Percent of Patients Receiving Recommended Care in 2005 in CAHs and PPS Hospitals with 50 staffed beds or less

		CAHs (n=683)	PPS Hospitals with ≤50 beds (n=480)[1]	Significance of differences between CAHs and PPS hospitals with ≤50 beds
Condition	**Measure**	**Percent of Patients Receiving Recommended Care**	**Percent of Patients Receiving Recommended Care**	
AMI	Aspirin at arrival	88.0	90.4	.001
	Aspirin at discharge	85.7	87.9	.05
	ACE inhibitor or ARB for LVSD	77.3	80.3	NS
	Beta blocker at arrival	80.7	83.0	.01
	Beta blocker at discharge	85.7	85.3	NS
	Smoking cessation advice	61.9	78.3	.001
	Thrombolytic w/in 30 minutes of arrival	33.3	35.3	NS
	PCI at arrival	N/A	77.1	N/A
Heart Failure	Assessment of LVF	69.2	72.6	.001
	ACE inhibitor or ARB for LVSD	78.8	81.8	.001
	Discharge instructions	51.0	54.5	.001
	Smoking cessation advice	64.2	74.8	.001
Pneumonia	Oxygenation assessment	99.2	98.9	.001
	Pneumoccal vaccination	64.5	61.2	.001
	Initial antibiotic(s) within 4 hours of hospital arrival	84.5	80.8	.001
	Blood culture performed prior to first antibiotic	83.0	82.7	NS
	Smoking cessation advice	64.3	72.4	.001
	Most appropriate initial antibiotic(s)	77.8	77.7	NS
Surgical Infection Prevention	Preventative antibiotic(s) one hour before incision	72.8	78.0	.001
	Preventative antibiotic(s) stopped within 24 hours after surgery	72.7	69.7	.001

[1]Based on staffed beds reported in FY2004 AHA Annual Survey. Does not include 73 hospitals missing data on staffed beds.
Data source: Hospital Compare data for Jan. - Dec. 2005, downloaded from CMS website September 2006.

Table 8

Percent of Patients Receiving Recommended Care in Hospitals with Data for both 2004 and 2005 (n=3,889)

		CAHs (n=558)[1]		Rural PPS Hospitals (n=998)		Urban PPS Hospitals (n=2,333)	
Condition	**Measure**	**2004**	**2005**	**2004**	**2005**	**2004**	**2005**
AMI	Aspirin at arrival	89.2	87.9	91.8	92.6***	94.9	95.7***
	Aspirin at discharge	84.5	85.7	89.4	91.9***	94.7	95.9***
	ACE inhibitor or ARB for LVSD	72.7	76.8	76.0	81.1***	79.6	83.7***
	Beta blocker at arrival	80.5	80.7	84.6	87.7***	90.3	92.6***
	Beta blocker at discharge	81.3	85.7***	87.5	91.0***	92.6	95.1***
	Smoking cessation advice	50.5	64.3**	81.6	89.5***	86.3	92.4***
	Thrombolytic w/in 30 minutes of arrival	27.8	32.4	40.5	39.4	38.2	38.2
	PCI at arrival	N/A	N/A	62.7	66.0	65.0	69.1***
Heart Failure	Assessment of LVF	65.1	69.7***	76.8	81.5***	88.8	91.9***
	ACE inhibitor or ARB for LVSD	73.1	79.0***	72.5	80.6***	76.1	83.1***
	Discharge instructions	45.7	52.6***	49.9	57.2***	51.5	58.7***
	Smoking cessation advice	57.6	65.1***	69.3	80.8***	72.6	83.9***
Pneumonia	Oxygenation assessment	98.4	99.2***	97.4	98.8***	98.9	99.5***
	Pneumoccal vaccination	54.2	65.7***	52.3	65.3***	45.4	60.6***
	Initial antibiotic(s) within 4 hours	82.3	84.5***	75.8	79.6***	69.2	73.9***
	Blood culture prior to first antibiotic	82.5	82.9	83.0	83.8***	82.1	83.1***
	Smoking cessation advice	59.7	65.1***	67.1	77.6***	68.4	79.9***
	Most appropriate initial antibiotic(s)	74.2	78.0***	73.4	78.1***	76.5	81.1***
Surgical Infection Prevention	Preventative antibiotic(s) 1hour before incision	63.4	73.2***	73.9	78.0***	76.3	82.2***
	Preventative antibiotic(s) stopped within 24 hours after surgery	59.3	72.8***	63.3	68.9***	62.8	68.8***

[1]Hospitals are classified based on their status in Sept. 2006. Includes 110 CAHs that reported as PPS acute care hospitals for 2004 discharges and as CAHs for 2005 discharges.

***For each group of hospitals, differences in proportions of patients receiving recommended care in 2004 and 2005 are significant at p< .001.
** For each group of hospitals, differences in proportions of patients receiving recommended care in 2004 and 2005 are significant at p< .01

Data source: Hospital Compare data for Jan. - Dec. 2004 and Jan. - Dec. 2005, downloaded from CMS website September 2005 and September 2006

Appendix: ACRONYMS USED IN THIS REPORT

Critical Access Hospital (CAH) A CAH is a facility that is designated as a CAH by the State in which it is located and meets the following criteria:

- Is a rural public, non-profit or for-profit hospital; or is a hospital that was closed within the previous ten years; or is a rural health clinic that was downsized from a hospital;
- Is located in a State that has established a State plan with CMS for the Medicare Rural Hospital Flexibility Program;
- Is located more than a 35-mile drive from any other hospital or CAH (in mountainous terrain or in areas with only secondary roads available, the mileage criterion is 15 miles); or is certified by the State in the State plan as being a necessary provider of health care services to residents in the area;
- Makes available 24-hour emergency care services 7 days per week;
- Provides not more than 15 beds for acute (hospital level) inpatient care. An exception to the 15-bed requirement is made for swing-bed facilities, which are allowed to have up to 25 inpatient beds that can be used interchangeably for acute or SNF-level care, provided that not more than 15 beds are used at any one time for acute care; and
- Provides an annual average length of stay of less than 96 hours per patient for acute care patients.

Federal Office of Rural Health Policy (ORHP)
The Office of Rural Health Policy (ORHP) promotes better health care service in rural America. Established in August 1987 by the Administration, the Office was subsequently authorized by Congress in December 1987 and located in the Health Resources and Services Administration. Congress charged the Office with informing and advising the Department of Health and Human Services on matters affecting rural hospitals, and health care, co-coordinating activities within the department that relate to rural health care, and maintaining a national information clearinghouse. Additional information is available at http://www.ruralhealth.hrsa.gov/

Hospital Quality Alliance (HQA)
The Hospital Quality Alliance (HQA) is a public-private collaboration to improve the quality of care provided by the nation's hospitals by measuring and publicly reporting on that care. This collaboration includes the Centers for Medicare & Medicaid Services (CMS), the American Hospital Association, the Federation of American Hospitals, and the Association of American Medical Colleges, and is supported by other organizations such as the Agency for Healthcare Research and Quality, the National Quality Forum, the Joint Commission on Accreditation of Healthcare Organizations, American Medical Association, American Nurses Association, National Association of Children's Hospitals and Related Institutions, Consumer-Purchaser Disclosure Project, AFL-CIO, AARP, and U.S. Chamber of Commerce. Additional information is available at
http://www.cms.hhs.gov/HospitalQualityInits/15_HospitalQualityAlliance.asp#TopOfPage

The goal of the program is to identify a robust set of standardized and easy-to-understand hospital quality measures. An important element of the collaboration, Hospital Compare, a Web site/Web tool developed to publicly report credible and user-friendly information about the

quality of care delivered in the nation's hospitals, debuted on April 1, 2005 at www.hospitalcompare.hhs.gov and www.medicare.gov.

Joint Commission on Accreditation of Healthcare Organizations (JCAHO) JCAHO evaluates and accredits more than 15,000 health care organizations and programs in the United States. JCAHO's comprehensive accreditation process evaluates an organization's compliance with state-of-the-art standards that focus on improving the quality and safety of care provided by health care organizations and other accreditation requirements. Additional information is available at http://www.jcaho.org/index.htm

Medicare Rural Hospital Flexibility Program (Flex Program)
The Medicare Rural Hospital Flexibility Program (Flex Program) was authorized by section 4201 of the Balanced Budget Act of 1997 (BBA), Public Law 105-33. The Flex Program provides funding to States for the designation of critical access hospitals (CAHs) in rural communities and the development of networks to improve access to care in these communities. Under the program, hospitals certified as CAHs can receive cost-based reimbursement from Medicare.

Prospective Payment System (PPS)
Section 1886(d) of the Social Security Act sets forth a system of payment for the operating costs of acute care hospital inpatient stays under Medicare Part A based on prospectively set rates. Under the inpatient prospective payment system (PPS), each case is categorized into a diagnosis-related group (DRG). Each DRG has a payment weight assigned to it, based on the average resources used to treat Medicare patients in that DRG. The base payment rate is divided into a labor-related and non-labor share. The labor-related share is adjusted by the wage index applicable to the area where the hospital is located. This base payment rate is multiplied by the DRG relative weight. Hospitals that treat a high-percentage of low-income patients receive a percentage add-on payment, the disproportionate share hospital (DSH) adjustment. Approved teaching hospitals receive a percentage add-on payment for each case paid through IPPS. Finally, for outlier cases that are unusually costly, the PPS payment is increased.

Quality Improvement Organizations (QIOs)
Under the direction of CMS, the Quality Improvement Organization (QIO) Program consists of a national network of 53 QIOs, responsible for each U.S. state, territory, and the District of Columbia. QIOs work with consumers and physicians, hospitals, and other caregivers to refine care delivery systems to make sure patients get the right care at the right time, particularly patients from underserved populations. The Program also safeguards the integrity of the Medicare Trust Fund by ensuring that payment is made only for medically necessary services, and investigates beneficiary complaints about quality of care.

To achieve the vision of the QIO Program, the right care for every person every time, the Program assists providers in transforming quality to make healthcare: safe, effective, patient-centered, timely, efficient, and equitable. Through QIOs and End-Stage Renal Disease Networks, and in partnership with other stakeholders, the Program assists providers in transforming healthcare quality, and protects beneficiaries and the Trust Fund, using the following strategies: 1) measure and report performance; 2) adopt healthcare information

technology and use it effectively; 3) redesign process; 4) transform organizational culture; and 5) beneficiary protection. Additional information is available at: http://www.cms.hhs.gov/QualityImprovemen-rgs/