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CAH Participation in Hospital Compare and Initial Results

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The Flex Monitoring Team is a consortium of the Rural Health Research Centers at the Universities of Minnesota, North Carolina, and Southern Maine. With funding from the federal Office of Rural Health Policy (PHS Grant No. U27RH01080), the Flex Monitoring Team is 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 Critical Access Hospitals (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

This report examines the participation of Critical Access Hospitals (CAHs) in public reporting of quality measures in the Centers for Medicare and Medicaid Services (CMS) Hospital Compare database and presents the initial Hospital Compare results for CAHs and comparisons with other groups of 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 December 2005, there were a total of 1,190 CAHs nationally.

The Hospital Quality Alliance (HQA) was implemented in December 2002 as a voluntary national initiative to encourage public reporting of hospital quality information. The initial HQA quality performance measures reflected recommended treatments for three conditions: acute myocardial infarction (AMI), heart failure, pneumonia. CMS launched the Hospital Compare website in April 2005 to provide health care consumers with access to the hospital quality data.

Unlike Prospective Payment System (PPS) hospitals, which are required to report quality measure data for the HQA initiative and have it displayed on the Hospital Compare website or face a reduction in their annual payment update from Medicare, CAHs are reimbursed by Medicare on a cost basis, and have no 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. Those who report data can chose to not have it displayed on the Hospital Compare website.

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, and the Institute of Medicine Committee on the Future of Rural Health has recommended that rural providers be included in public reporting initiatives.

Overall, 41% of CAHs were participating in Hospital Compare to some degree (by submitting data on at least one measure) as of September 2005. By state, the percent of participating CAHs ranges from 0% to 86%. On average, participating CAHs have more inpatient admissions and inpatient days than non-participating CAHs. CAH participants also are more likely than non-participants to be accredited and to be system members.

The current Hospital Compare measure set includes 18 measures that reflect recommended treatments for three conditions - acute myocardial infarction (AMI), heart failure, and pneumonia. The number of CAHs reporting data and the number of patients for whom data are submitted varies widely across measures. For the pneumonia and heart failure measures, less than ten percent of participating CAHs are missing data, while 30% or more are missing data on the AMI measures. Less than four percent of participating CAHs are reporting data for 25 or

more patients on the AMI measures and some of the heart failure measures. More than half of participating CAHs are reporting data for 25 or more patients on three pneumonia measures.

Over the next year, both the number of cases per hospital and the number of CAHs participating in the Hospital Compare database are expected to increase. In their 8th Scope of Work activities, state Quality Improvement Organizations (QIOs) have an evaluation goal of obtaining a 50% increase in CAH reporting of quality measure data to QualityNet Exchange, the national QIO data warehouse. The federal Office of Rural Health Policy (ORHP) is also encouraging state Flex programs to work with CAHs in their states on quality improvement and to increase their Hospital Compare participation. These efforts should contribute to increased CAH participation in Hospital Compare.

Overall, the initial Hospital Compare results suggest that CAHs as a group are performing as well or better than non-CAH rural and urban hospitals on several measures for patients with pneumonia, including the initial antibiotic in four hours, pneumoccal vaccine, and blood culture prior to antibiotic measures. They are also performing as well or better than small non-CAHs on most AMI and pneumonia measures. However, they are not performing as well as other rural or urban hospitals on most quality of care measures for patients with AMI and heart failure. The measures on which CAHs score lower include administration of aspirin and beta-blockers on arrival and at discharge for AMI patients; assessment of left ventricular systolic dysfunction and discharge instructions for heart failure patients; and smoking cessation advice for all three conditions.

Several caveats are necessary in evaluating the policy implications of this study. First, differences in the proportion of CAH and non-CAH patients receiving recommended care according to these measures may be due to lack of experience or problems with documentation and reporting on the measures as well as actual differences in the care provided. Second, 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 the scores presented here are averages for the groups of CAHs, non-CAHs, and urban hospitals. Obviously there is variation within these groups, with some hospitals performing much better than the average, and others performing worse. By making hospital performance information more accessible to the public, payers, and providers of care, the Hospital Compare initiative aims to encourage hospitals to improve the quality of health care they provide. Toward that end, it will be important to analyze individual hospital performance across CAHs in addition to CAH performance as a group, once additional data is available with sample sizes for individual CAHs that are sufficiently large.

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. CMS launched the Hospital Compare website in April 2005 to provide health care consumers with access to the HQA data.

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. The initial ten measures were widely tested by JCAHO and CMS prior to inclusion in Hospital Compare. They include: AMI (aspirin at arrival, aspirin at discharge, ACE inhibitor for left ventricular systolic dysfunction (LVSD), beta blocker at arrival, beta blocker at discharge); heart failure (assessment of LVSD, ACE inhibitor for LVSD); and pneumonia (oxygenation assessment, pneumoccal vaccination, initial antibiotic within 4 hours).

In 2005, a total of ten 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. Seven of the new measures were effective for discharges beginning with the 2nd quarter of 2004: AMI (smoking cessation advice, thrombolytic within 30 minutes, percutaneous coronary intervention (PCI) within 120 minutes); heart failure (smoking cessation advice, discharge instructions); and pneumonia (smoking cessation advice, blood culture before first antibiotic). Three measures were effective for discharges beginning with the 3rd quarter of 2004: pneumonia (initial antibiotic selection); and surgical infection prevention (antibiotic within one hour prior to surgery and antibiotics discontinued within 24 hours after surgery). All 20 HQA measures are part of the JCAHO core measure set, and have been endorsed by NQF (CMS, 2005). Another pneumonia measure, influenza vaccination, is scheduled to be added in 2006, and data from HCAHPS, the patient perspectives on hospital care survey, is expected to be available for public reporting in 2007.

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. Hospitals that did not report the required data faced a 0.4 percentage point reduction in their annual payment update from Medicare in fiscal year

2006. According to CMS, almost all of the PPS hospitals eligible for the payment incentive provided data for the 10 initial measures on care delivered during 2004.

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 December 2005, there were a total of 1,190 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. Those that submit data can choose whether or not to have it displayed on the Hospital Compare website. 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, and the Institute of Medicine Committee on the Future of Rural Health has recommended that rural providers be included in public reporting initiatives (IOM, 2005).

The initial ten Hospital Compare measures related to AMI, HF, and pneumonia were identified by Moscovice, Wholey, Klingner et. al. (2004) as relevant quality measures for small rural hospitals with less than 50 beds. An additional measure that combines assessment of timing and appropriate selection of prophylactic antibiotics for surgical patients was also identified by Moscovice et. al. (2004) as relevant for small rural hospitals; this measure is similar to the surgical infection prevention measures added to Hospital Compare in 2005.

Because Hospital Compare data has only recently become available, little research has been done using the data, and the performance of CAHs has not been examined. In an early analysis of the national HQA data, Jha, Li, Orav et. al. (2005) analyzed Hospital Compare data from the first half of 2004 on the initial ten measures. They found that rural hospitals constituted 38% of the hospitals reporting at least one stable measure (defined as being based on data for at least 25 patients); 21% of the hospitals that reported only non-stable measures; and 69% of the hospitals in the database that reported no data.[1] At the individual hospital level, performance scores for AMI closely predicted scores for HF, but not pneumonia. The smallest hospitals had the highest pneumonia performance scores.

Purpose of this Project

The purpose of this project is to:

- estimate the proportion of CAHs that are participating in the Hospital Quality Alliance;

[1] For each participating hospital, the Hospital Compare website provides the number of patients receiving recommended care for each measure. However, the proportion of patients receiving recommended care is only reported for a measure if the hospital has data on the measure for at least 25 patients. 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.

- identify key characteristics related to CAH participation in the Hospital Quality Alliance;
- determine how many CAHs have sufficient sample sizes to calculate accurate rates for specific measures; and
- compare the initial year of quality measure results for all participating CAHs with relevant subgroups of hospitals such as small non-CAHs, other rural hospitals and urban hospitals.

This analysis provides the first opportunity to assess how CAHs fare with respect to common hospital performance measures that represent the evidence-based standard of care for the treatment of some of the most common conditions that result in hospitalization.

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 Hospital Compare measures are based on data abstracted from patient records, starting with hospital discharges in the first quarter of 2004. In September 2005, 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 2003 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 the hospitals that were not in the AHA database or had missing data, data on accreditation, system participation, and county codes were obtained from on-line databases, including the JCAHO Quality Check website and 2005 AHA data from the U.S. News and World Report Directory of America's Hospitals. Of the 4,048 hospitals in the Hospital Compare database, 53 hospitals in Puerto Rico, Guam, and the Virgin Islands were removed from this analysis, leaving 3,995 hospitals.

Participation rates for CAHs were calculated by accreditation status, size, date of CAH conversion, ownership type and urban influence code categories. Chi-square tests were used to test for significant differences between participants and non-participants. Next, the quality measure results for participating CAHs were compared with those of relevant hospital subgroups such as small non-CAHs, other rural hospitals and urban hospitals (Tables 4-7). Because many CAHs had a very small number of patients for several measures, aggregate scores were calculated across all reporting hospitals in each subgroup.[2] 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. This method gives more weight to hospitals with more patients. For each measure, we then conducted statistical

[2] 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).

tests of the differences in proportions of patients in hospitals in each group that received the recommended care, to determine which differences 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 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. Therefore, this method was only used to show the distribution of scores for measures that had more than 50 CAHs reporting data for 25 or more patients.

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 2005. Overall, 41% of CAHs are participating in Hospital Compare, defined as submitting data for one or more measures; by state, participation ranges from 0% to 86%. Of the 45 states with CAHs, four states do not have any participating CAHs; eight states have up to 25 percent participation; 20 states have between 26 and 50 percent participation; nine states have between 51 and 75 percent participation and four states have more than 75 percent participation.

On average, participating CAHs have more inpatient admissions and inpatient days than non-participants (Table 2). CAH participants are more likely than non-participants to be accredited (36% vs. 21%) and to be system members (50% vs. 39%). Participants also are more likely than non-participants to be private non-profit CAHs (59% vs. 44%) and less likely to be public/government owned (38% vs. 52%); for-profit CAHs account for small percentages of participants and non-participants. Table 3 shows the percent of CAHs that participate in Hospital Compare by type of CAH organizational characteristic. CAHs that converted earlier tend to have lower participation rates than later converters. Higher percentages of accredited CAHs, system members and private non-profit CAHs participate than those that are not accredited, not system members, and have government/public or for-profit ownership.

CAHs reported data on 17 of the 20 measures currently in the Hospital Compare measure set. 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. Data on the two measures related to antibiotic prophylaxis for surgical patients were not available at the time of the analysis.

For the 468 CAHs that are participating in Hospital Compare, Table 4 shows the percentages of CAHs for each measure that are missing data, have no eligible patients and have data for one more patients. For example, 30% of participating CAHs did not report any data on the AMI aspirin at arrival measure; four percent reported no eligible patients for the measure; and 66% reported data on one or more patients. The number of CAHs reporting data and the number of patients for whom data are submitted varies widely across measures. Most of the CAHs that are

participating in Hospital Compare are reporting data for the pneumonia and heart failure measures, while 30% or more of the CAHs are missing data on the AMI measures. The percent of CAHs who reported that they did not have any eligible patients for a measure ranges from less than one percent for several of the pneumonia measures to 57% for the PCI measure.

Less than four percent of participating CAHs are reporting data for 25 or more patients on all of the AMI measures and some of the heart failure measures. More than half of participating CAHs are reporting data for 25 or more patients on three of the pneumonia measures. The total number of CAH patients nationally per measure ranges from 130 for two AMI measures (smoking cessation advice and thrombolytic within 30 minutes of hospital arrival) to 21,094 for the most frequently reported pneumonia measure (oxygenation assessment).

The number of CAHs reporting and the number of patients for whom data are available may differ by measure for several reasons. The second set of ten measures that were added to the HQA were effective for discharges on or after the 2nd or 3rd quarter of 2004, so data on these measures are only available for part of the year. Some measures only apply to a portion of patients (e.g., the smoking cessation advice measures only apply to smokers; the ACE inhibitor for LVSD measure only applies to patients who have been diagnosed with LVSD; 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; many CAHs transfer the majority of AMI patients seen in their emergency departments to larger hospitals, rather than admitting them as inpatients (Ellerbeck, Bhimaraj, & Perpich, 2004). Consequently, CAHs may have few eligible patients for these measures.

Comparison of CAH Results with Other Hospitals

In the next section, we compare the initial results for CAHs as a group with those of other groups of hospitals classified by size and rural/urban location. It is important to recognize that hospital characteristics such as patient volume, the size and composition of medical and nursing staff, financial resources, and the availability of technology may influence the measurement of quality 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.

Four sets of comparisons were made using the Hospital Compare data. CAH patients were compared to 1) all non-CAH patients; 2) patients in small (50 beds or less) rural and urban hospitals that are not CAHs; 3) patients in rural hospitals that are not CAHs; and 4) patients in urban hospitals. The comparisons are based on the 17 measures for which CAHs reported data; as noted above, the number of CAHs reporting data for each measure varies.

When measure results for all CAH patients are compared to all non-CAH patients nationally, the proportion of CAH patients receiving recommended care is lower on the AMI and HF measures (Table 5). For pneumonia, the proportion of CAH patients receiving recommended care is higher on two measures (initial antibiotic in four hours and pneumoccal vaccine) and not statistically

different on one measure (blood culture prior to antibiotic). It is significantly lower on three measures (oxygenation assessment, appropriate initial antibiotic, and smoking cessation advice), but only the difference in the smoking cessation measure is sufficiently large to be of much practical significance.

Table 6 compares the results nationally for all CAH patients with patients in small rural and urban non-CAHs (those with 50 or fewer staffed hospital beds according to the FY 2003 AHA Annual Survey). The proportion of CAH patients receiving recommended care is not significantly different from the proportion of small non-CAH patients on six AMI measures; it is lower on one AMI measure (smoking cessation). For heart failure, the proportion of CAH patients receiving recommended care is lower than that of small non-CAHs on three measures (assessment of LVSD, discharge instructions, and smoking cessation advice). For pneumonia, the proportion of CAH patients receiving recommended care is higher on four measures (oxygenation assessment, pneumoccal vaccine, initial antibiotic in four hours and appropriate initial antibiotic); not statistically different on one measure (blood culture prior to antibiotic); and lower on one measure (smoking cessation).

When CAH patients are compared to rural non-CAH patients nationally, the proportion of CAH patients receiving recommended care is lower on six AMI measures, including those related to administration of aspirin and beta-blockers at arrival and discharge, thrombolytics, and smoking cessation advice (Table 7). The proportion of CAH patients receiving recommended care is also lower on three HF measures (assessment of LVSD, discharge instructions, and smoking cessation advice). The proportion of patients receiving recommended care is not statistically different for the ace inhibitor for LVSD AMI and HF measures. For pneumonia, the proportion of CAH patients receiving recommended care is higher on four measures (oxygenation assessment, pneumoccal vaccine, initial antibiotic in four hours and appropriate initial antibiotic); not statistically different on one measure (blood culture prior to antibiotic); and lower on one measure (smoking cessation advice). A few of these differences, while significant, are again not sufficiently large to be of much practical significance (e.g., aspirin at arrival, oxygenation assessment and appropriate initial antibiotic).

Table 8 shows quality measure results for CAHs and all urban hospitals nationally. The proportion of CAH patients receiving recommended care is higher than urban patients for two pneumonia measures (initial antibiotic in four hours and pneumoccal vaccine). It is not statistically different on one pneumonia measure (blood culture prior to antibiotic). The proportion of CAH patients receiving recommended care is lower on all seven AMI measures and all four HF measures.

Overall, these initial Hospital Compare results suggest that CAHs as a group are performing as well or better than non-CAH rural and urban hospitals on several measures for patients with pneumonia, including the initial antibiotic in four hours, pneumoccal vaccine, and blood culture prior to antibiotic measures. They are also performing as well or better than small non-CAHs on most AMI and pneumonia measures. However, they are not performing as well as other rural or urban hospitals on most quality of care measures for patients with AMI and HF. The measures on which CAHs score lower include administration of aspirin and beta-blockers on arrival and at

discharge for AMI patients; assessment of LVSD and discharge instructions for HF patients; and smoking cessation advice for all three conditions.

Finally, a significant number of CAHs reported data for 25 or more patients on seven measures, including two heart failure measures (assessment of LVSD and discharge instructions) and five pneumonia measures (oxygenation assessment, pneumoccal vaccine, initial antibiotic in four hours, blood culture prior to antibiotic and appropriate initial antibiotic). For these measures, we calculated the percent of patients receiving recommended care across CAHs that reported data for 25 or more patients (Table 9). The range for each measure varies widely, indicating that some CAHs are performing poorly on the measure while others are doing very well.

DISCUSSION

Over 40% of CAHs are participating to some degree in Hospital Compare. 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 report on quality of care measures. However, participation rates vary widely across states, and are significantly higher among CAHs that have other incentives to report such as JCAHO accreditation requirements and more resources (e.g., larger hospitals and system members). These differences suggest that non-participating CAHs may need additional encouragement and assistance to participate in Hospital Compare. Toward that end, the 8th Scope of Work for Quality Improvement Organizations has an evaluation goal of obtaining a 50% increase in reporting by CAHs of quality measure data to QualityNet Exchange, the national QIO data warehouse. ORHP is also encouraging state Flex programs to work with CAHs in their states on quality improvement and to increase their Hospital Compare participation. These efforts should contribute to increased CAH participation in Hospital Compare over the next year.

In addition, 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 for CAHs must be relevant to the small rural hospital environment and the volume of patients must be large enough for CAHs to have stable measures. The current Hospital Compare measure set includes several measures that are generally relevant for small rural hospitals (e.g., the pneumonia and heart failure measures). For these measures, many CAHs have (or will have over the next year) sufficient sample sizes to allow calculation of hospital-specific rates. Other current measures are not relevant to small rural hospitals because they involve procedures that are rarely performed (e.g., PCI). The small number of rural hospital patients for several AMI measures underscores the importance of developing and testing new quality measures focused on the triage, stabilization, and transfer process for emergency department patients who are transferred from small rural hospitals to larger facilities.

To what extent do the differences in the proportion of patients receiving recommended care identified in this study reflect actual differences in the quality of care provided? Several caveats are necessary in evaluating the quality measure results and policy implications of this study. First, differences in the proportion of CAH and non-CAH patients receiving recommended care may be due to lack of experience or problems with documentation and reporting on the measures as well as actual differences in the care provided. Since 2002, JCAHO has required accredited

hospitals with an average daily census of 10 or more patients to report performance measurement data on at least two of four conditions, including AMI, heart failure and pneumonia. However, CAHs are significantly less likely than non-CAHs to be JCAHO accredited. Cost is a major reason given by rural hospitals for lack of participation in the accreditation process; many rural hospital administrators feel that they lack adequate resources to meet accreditation standards (Brasure, Stensland & Wellever, 2000). Even if accredited, CAHs are likely to have been exempt from the JCAHO performance measurement reporting requirement because of having an average daily census of less than 10 patients. Therefore, many CAHs have less experience than non-CAHs in collecting and reporting data on these quality measures.

Second, 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. For example, scores are uniformly high on the oxygenation assessment measure for pneumonia patients.

Differences across groups of hospitals on other measures are larger. In particular, the smoking cessation advice measures for all three conditions, and the LVSD assessment and discharge instruction measures for HF are much lower in rural CAHs than in rural non-CAHs or urban hospitals. The experience of JCAHO accredited hospitals with the smoking cessation measures suggests that CAHs' scores on these measures may improve quickly as CAHs become more familiar with the measures and their documentation requirements (Williams, Schmaltz, Morton et. al., 2005). The HF discharge instruction measure requires hospitals to document that written instructions are given to the patient or care giver at discharge or during the hospital stay that address activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen. Performance on this measure may also improve quickly as CAHs become more familiar with the measure and documentation requirements.

CAHs' lower performance on the LVSD assessment measure may be related to the fact that small rural hospitals are much less likely to have the echocardiography or cardiac catheterization facilities needed to assess left ventricular function. The LVSD assessment measure counts a patient in the numerator if the hospital record documents that LVS function was evaluated before arrival, during hospitalization, or is planned for after discharge. Thus, patients that are referred to another facility for the assessment count toward the numerator. However, rural patients may still be less likely to be assessed if they must travel a long distance to a facility with echocardiography or cardiac catheterization capabilities.

While it is important to recognize the limitations of this initial analysis of CAH quality performance, the overall results of the study are consistent with previous research on differences in quality of care measures for patients with AMI, HF, and pneumonia. In previous research that examined performance on quality of care measures similar to several of the Hospital Compare measures, small rural hospitals have generally been less likely than urban hospitals to provide recommended care on some measures for patients with AMI (Sheikh & Bullock, 2001; Baldwin, MacLehose, Hart et. al., 2004) and HF (Baker, Fitzgerald, & Moore,1999; Havranek, Wolfe, Masoudi et. al., 2004). In contrast, small rural hospitals have been more likely than urban

hospitals to provide recommended care on some pneumonia measures including timely administration of antibiotics (Fine, Fine, Galusha et. al., 2002).

The literature proposes several possible reasons for the better performance of larger urban hospitals on AMI and HF measures, including urban hospitals' higher patient volumes that provide more experience in treating AMI, greater use of clinical and administrative protocols for managing AMI, more extensive resources, and better access to specialists and technology (Baldwin et. al., 2004; Ellerbeck et. al., 2004). In particular, lack of cardiac catheterization and echocardiography facilities as well as limited access to on-site cardiologists have been cited as explanatory factors in rural hospitals' poorer performance on some AMI and HF measures (Ellerbeck et al., 2004; Havranek, et. al., 2004; Baker et. al., 1999).

Higher nurse staffing ratios may be a factor in the better performance of rural hospitals on pneumonia measures such as timely administration of antibiotics (Fine et. al., 2002). Other studies have also found evidence of a relationship between nurse staffing and positive patient outcomes (Heinz, 2004). Nurse staffing ratios may be higher in some rural hospitals than in urban hospitals because of the need to have a minimum level of nurse staffing and to be prepared for unexpected new admissions; this is the case in rural hospitals in California (Spetz, Seago, Coffman, et. al., 2000). Another factor that may help to explain the better performance of CAHs on the timely administration of antibiotics is that pneumonia patients are frequently admitted through the emergency department (Chu, Bratzler, Lewis et al., 2003), and rural patients are less likely than urban patients to experience long delays in getting care in EDs (Agency for Healthcare Research and Quality, 2003).

The consistency of the Hospital Compare results for CAHs with previous research results suggests that AMI and HF remain potential areas for quality improvement in many CAHs. Although CAHs may not have on-site access to specialists and advanced technology, they can still implement actions such as protocols for administration of aspirin and beta-blockers in consultation with cardiologists at their referral hospitals. The Medicare Quality Improvement Community (MedQIC), a national knowledge forum for healthcare and quality improvement professionals, provides tools and strategies for improving the quality of care provided to patients with AMI, HF, and pneumonia, as well as other medical conditions on its website (http://www.medqic.org/).

Finally, it is important to remember that the data presented in this report are averages for the groups of CAHs, non-CAHs, and urban hospitals. Obviously there is variation within these groups, with some hospitals performing much better than the average, and others performing worse. By making hospital performance information more accessible to the public, payers, and providers of care, the Hospital Compare initiative aims to encourage hospitals to improve the quality of health care they provide. Toward that end, it will be important to analyze individual hospital performance across CAHs in addition to CAH performance as a group, once additional data is available with sample sizes for individual CAHs that are sufficiently large.

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APPENDIX: Acronyms Used In This Report

(CAH) Critical Access Hospital

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.

(Flex Program) Medicare Rural Hospital Flexibility 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.

(HQA) Hospital Quality Alliance

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.

(JCAHO) Joint Commission on Accreditation of Healthcare Organizations

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

(ORHP) Federal Office of Rural Health Policy

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/

(PPS) Prospective Payment System

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.

(QIOs) Quality Improvement Organizations

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/QualityImprovementOrgs/

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

State[1]	Number of CAHs[2]	Percent of CAHs participating in Hospital Compare
Alaska	10	0.0%
Alabama	2	0.0%
Arizona	11	45.5%
Arkansas	24	50.0%
California	17	5.9%
Colorado	25	44.0%
Florida	11	27.3%
Georgia	35	45.7%
Hawaii	6	0.0%
Idaho	26	7.7%
Illinois	49	63.3%
Indiana	28	50.0%
Iowa	73	57.5%
Kansas	79	36.7%
Kentucky	26	46.2%
Louisiana	22	0.0%
Maine	12	41.7%
Massachusetts	3	33.3%
Michigan	24	25.0%
Minnesota	70	24.3%
Mississippi	21	33.3%
Missouri	24	75.0%
Montana	44	27.3%
Nebraska	60	66.7%
Nevada	9	11.1%
New Hampshire	13	84.6%
New Mexico	6	50.0%
New York	11	18.2%
North Carolina	20	45.0%
North Dakota	31	25.8%
Ohio	30	60.0%
Oklahoma	30	43.3%
Oregon	22	40.9%
Pennsylvania	9	44.4%
South Carolina	5	80.0%
South Dakota	37	27.0%
Tennessee	13	23.1%
Texas	64	10.9%
Utah	6	66.7%
Vermont	6	83.3%
Virginia	6	66.7%
Washington	37	32.4%
West Virginia	18	65.4%
Wisconsin	52	55.6%
Wyoming	14	85.7%
Total	1141	40.9%

[1]Five states (Connecticut, Delaware, Maryland, New Jersey and Rhode Island) do not have any CAHs.

[2] Number of CAHs as of September 2005, based on University of North Carolina CAH database.

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

	Participants (N = 468)	Non-participants (N = 673)
Utilization Measures		
Inpatient hospital admissions (mean)***	900.2	636.7
Inpatient days (mean)***	3943.0	3523.9
Year of CAH Conversion***		
1999 or earlier	7.3%	12.3%
2000	12.6%	19.1%
2001	19.3%	20.5%
2002	13.9%	16.9%
2003	13.9%	11.4%
2004	25.3%	12.5%
2005	7.7%	7.3%
	100%	100%
Accreditation***		
Accredited	35.6%	21.2%
Not Accredited	64.4%	78.8%
	100%	100%
System Membership***		
System member	49.9%	39.3%
Not a system member	50.1%	60.7%
	100%	100%
Ownership***		
Government/Public	37.5%	52.2%
Private non-profit	59.1%	43.8%
For profit	3.4%	4.0%
	100%	100%

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 30, 2005; University of North Carolina CAH database; FY 2003 AHA Annual Survey, updated with 2005 AHA data from the US News and World Report Directory of America's Hospitals and from the JCAHO Quality Check website.

***Significant differences between participants and non-participants at p< .001 based on chi-square tests.

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

	Percent of CAHs that Participate in Hospital Compare
Year of CAH Conversion	
1999 or earlier	29.1%
2000	31.4%
2001	39.5%
2002	36.3%
2003	45.8%
2004	58.4%
2005	42.3%
Accreditation	
Accredited	53.7%
Not Accredited	36.2%
System Membership	
System member	46.9%
Not a system member	36.4%
Ownership	
Government/Public	33.9%
Private non-profit	49.1%
For profit	38.1%

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 30, 2005; University of North Carolina CAH database; FY 2003 AHA Annual Survey, updated with 2005 AHA data from the US News and World Report Directory of America's Hospitals.

Table 4
Hospital Compare 2004 Quality Measure Results for CAHs
(n = 468 CAHs)

Condition	Measure	Percent of CAHs not reporting any data on the measure	Percent of CAHs reporting no eligible patients for measure	Percent of CAHs reporting data for one or more patients	Percent of CAHs reporting data for 25 or more patients	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[1]	30.5	3.9	65.6	3.4	0-48	2,688	89.8
	Aspirin prescribed at discharge[1]	30.8	9.0	60.3	0.0	0-23	1,397	84.3
	ACE inhibitor for LVSD[1]	30.8	35.9	33.3	0.0	0-10	332	74.4
	Beta blocker at arrival[1]	30.8	4.5	64.7	3.2	0-43	2,524	80.5
	Beta blocker prescribed at discharge[1]	30.8	9.0	60.3	0.2	0-26	1,455	81.4
	Smoking cessation advice[2]	34.4	47.2	18.4	0.0	0-8	130	47.7
	Thrombolytic within 30 minutes of hospital arrival[2]	35.7	50.0	14.3	0.0	0-7	130	30.0
	PCI within 120 minutes of arrival[2]	43.2	56.8	0.0	0.0	-	0	-
Heart Failure	Assessment of LVSD[1]	6.8	0.6	92.5	42.5	0-135	11,950	64.2
	ACE inhibitor for LVSD[1]	6.8	16.2	76.9	3.2	0-55	2,519	73.4
	Discharge instructions[2]	8.5	1.3	90.2	14.7	0-75	6,092	44.8
	Smoking cessation advice[2]	8.5	24.6	66.9	0.0	0-20	1,087	56.9
Pneumonia	Oxygenation assessment[1]	0.9	0.4	98.7	66.5	0-204	21,094	98.3
	Pneumoccal vaccination status[1]	1.1	0.6	98.3	51.7	0-112	13,372	55.1
	Initial antibiotic within 4 hours of hospital arrival[1]	1.1	0.9	98.1	60.7	0-191	18,633	82.3
	Blood culture performed prior to first antibiotic received in hospital[2]	3.2	3.2	93.6	27.1	0-107	8,484	82.4
	Smoking cessation advice[2]	3.6	13.9	82.5	1.1	0-36	2,584	58.4
	Appropriate initial antibiotic selection[3]	8.8	3.0	88.2	22.2	0-75	7,302	74.5

[1]Initial ten measure set.
[2]Effective for discharges on or after 2nd Quarter 2004.
[3]Effective for discharges on or after 3rd Quarter 2004.

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 23, 2005.

Table 5
Comparison of Hospital Compare 2004 Quality Measure Results
Mean Percent of Patients Receiving Recommended Care in CAHs and Non-CAHs

Condition	Measure	CAHs (n = 468)		Non-CAHs (n = 3,527)	
		Number reporting for ≥1 patient	Percent of patients receiving recommended care	Number reporting for ≥1 patient	Percent of patients receiving recommended care
AMI	Aspirin at arrival[1]	307	89.8***	3,423	94.5
	Aspirin prescribed at discharge[1]	282	84.3***	3,381	94.3
	ACE inhibitor for LVSD[1]	156	74.4*	3,040	79.3
	Beta blocker at arrival[1]	303	80.5***	3,424	89.5
	Beta blocker prescribed at discharge[1]	282	81.4***	3,388	92.2
	Smoking cessation advice[2]	86	47.7**	2,402	86.0
	Thrombolytic within 30 minutes of hospital arrival[2]	87	30.0*	1,453	38.6
	PCI within 120 minutes of arrival[2]	0	-	1,118	64.8
Heart Failure	Assessment of LVSD[1]	433	64.2***	3,524	86.9
	ACE inhibitor for LVSD[1]	360	73.4*	3,445	75.7
	Discharge instructions[2]	422	44.8***	2,877	51.3
	Smoking cessation advice[2]	313	56.9***	2,856	72.1
Pneumonia	Oxygenation assessment[1]	462	98.3**	3,529	98.6
	Pneumoccal vaccination status[1]	460	55.1***	3,510	46.7
	Initial antibiotic within 4 hours of hospital arrival[1]	459	82.3***	3,526	70.6
	Blood culture performed prior to first antibiotic received in hospital[2]	438	82.4	2,900	82.3
	Smoking cessation advice[2]	386	58.4***	2,860	68.0
	Appropriate initial antibiotic selection[3]	413	74.5**	2,834	75.9

[1]Initial ten measure set.
[2]Effective for discharges on or after 2nd Quarter 2004.
[3]Effective for discharges on or after 3rd Quarter 2004.

***Significant differences in proportions of CAH and non-CAH patients receiving recommended care at p< .001.
**Significant differences in proportions of CAH and non-CAH patients receiving recommended care at p< .01.
*Significant differences in proportions of CAH and non-CAH patients receiving recommended care at p< .05.

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 23, 2005.

Table 6
Comparison of Hospital Compare 2004 Quality Measure Results
Mean Percent of Patients Receiving Recommended Care in CAHs and Non-CAHs with 50 beds or less

Condition	Measure	CAHs (n = 468)		Non-CAHs with 50 beds or less[4] (n = 589)	
		Number reporting for ≥1 patient	Percent of patients receiving recommended care	Number reporting for ≥1 patient	Percent of patients receiving recommended care
AMI	Aspirin at arrival[1]	307	89.8	501	89.8
	Aspirin prescribed at discharge[1]	282	84.3	468	84.0
	ACE inhibitor for LVSD[1]	156	74.4	275	73.5
	Beta blocker at arrival[1]	303	80.5	503	80.2
	Beta blocker prescribed at discharge[1]	282	81.4	474	81.2
	Smoking cessation advice[2]	86	47.7***	163	68.6
	Thrombolytic within 30 minutes of hospital arrival[2]	87	30.0	107	37.0
	PCI within 120 minutes of arrival[2]	0	-	4	67.8
Heart Failure	Assessment of LVSD[1]	433	64.2***	569	67.5
	ACE inhibitor for LVSD[1]	360	73.4	510	73.3
	Discharge instructions[2]	422	44.8***	395	47.4
	Smoking cessation advice[2]	313	56.9***	365	62.9
Pneumonia	Oxygenation assessment[1]	462	98.3***	581	97.7
	Pneumoccal vaccination status[1]	460	55.1***	579	48.8
	Initial antibiotic within 4 hours of hospital arrival[1]	459	82.3***	581	78.9
	Blood culture performed prior to first antibiotic received in hospital[2]	438	82.4	401	81.6
	Smoking cessation advice[2]	386	58.4***	391	62.4
	Appropriate initial antibiotic selection[3]	413	74.5***	384	71.7

[1]Initial ten measure set.
[2]Effective for discharges on or after 2nd Quarter 2004.
[3]Effective for discharges on or after 3rd Quarter 2004.
[4]Based on number of set up and staffed hospital beds in AHA 2003 Annual Survey.

***Significant differences in proportions of CAH and non-CAH patients receiving recommended care at p< .001.
**Significant differences in proportions of CAH and non-CAH patients receiving recommended care at p< .01.
*Significant differences in proportions of CAH and non-CAH patients receiving recommended care at p< .05.

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 23, 2005.

Table 7
Comparison of Hospital Compare 2004 Quality Measure Results
Mean Percent of Patients Receiving Recommended Care in Rural CAHs and Rural Non-CAHs

Condition	Measure	CAHs (n = 468)		Rural Non-CAHs (n = 1,133)	
		Number reporting for ≥1 patient	Percent of patients receiving recommended care	Number reporting for ≥1 patient	Percent of patients receiving recommended care
AMI	Aspirin at arrival[1]	307	89.8***	1064	91.7
	Aspirin prescribed at discharge[1]	282	84.3***	1033	89.3
	ACE inhibitor for LVSD[1]	156	74.4	809	76.0
	Beta blocker at arrival[1]	303	80.5***	1065	84.3
	Beta blocker prescribed at discharge[1]	282	81.4***	1038	87.2
	Smoking cessation advice[2]	86	47.7***	569	81.2
	Thrombolytic within 30 minutes of hospital arrival[2]	87	30.0*	406	40.0
	PCI within 120 minutes of arrival[2]	0	-	87	62.8
Heart Failure	Assessment of LVSD[1]	433	64.2***	1123	76.1
	ACE inhibitor for LVSD[1]	360	73.4	1061	72.5
	Discharge instructions[2]	422	44.8***	882	49.6
	Smoking cessation advice[2]	313	56.9***	856	68.6
Pneumonia	Oxygenation assessment[1]	462	98.3*	1128	97.4
	Pneumoccal vaccination status[1]	460	55.1***	1125	52.1
	Initial antibiotic within 4 hours of hospital arrival[1]	459	82.3***	1128	76.2
	Blood culture performed prior to first antibiotic received in hospital[2]	438	82.4	890	83.0
	Smoking cessation advice[2]	386	58.4***	882	66.6
	Appropriate initial antibiotic selection[3]	413	74.5**	871	73.4

[1]Initial ten measure set.
[2]Effective for discharges on or after 2nd Quarter 2004.
[3]Effective for discharges on or after 3rd Quarter 2004.

***Significant differences in proportions of CAH and rural non-CAH patients receiving recommended care at p< .001.
**Significant differences in proportions of CAH and rural non-CAH patients receiving recommended care at p< .01.
*Significant differences in proportions of CAH and rural non-CAH patients receiving recommended care at p< .05.

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 23, 2005.

Table 8
Comparison of Hospital Compare 2004 Quality Measure Results
Mean Percent of Patients Receiving Recommended Care in CAHs and Urban Hospitals

Condition	Measure	CAHs (n = 468)		Urban Hospitals (n = 2,394)	
		Number reporting for ≥1 patient	Percent of patients receiving recommended care	Number reporting for ≥1 patient	Percent of patients receiving recommended care
AMI	Aspirin at arrival[1]	307	89.8***	2,310	94.8
	Aspirin prescribed at discharge[1]	282	84.3***	2,299	94.7
	ACE inhibitor for LVSD[1]	156	74.4*	2,188	79.6
	Beta blocker at arrival[1]	303	80.5***	2,310	90.2
	Beta blocker prescribed at discharge[1]	282	81.4***	2,301	92.6
	Smoking cessation advice[2]	86	47.7***	1,826	86.3
	Thrombolytic within 30 minutes of hospital arrival[2]	87	30.0*	1,043	38.2
	PCI within 120 minutes of arrival[2]	0	-	1,030	64.9
Heart Failure	Assessment of LVSD[1]	433	64.2***	2,350	88.7
	ACE inhibitor for LVSD[1]	360	73.4**	2,336	76.1
	Discharge instructions[2]	422	44.8***	1,987	51.5
	Smoking cessation advice[2]	313	56.9***	1,992	72.6
Pneumonia	Oxygenation assessment[1]	462	98.3***	2,349	98.9
	Pneumoccal vaccination status[1]	460	55.1***	2,335	45.3
	Initial antibiotic within 4 hours of hospital arrival[1]	459	82.3***	2,347	69.2
	Blood culture performed prior to first antibiotic received in hospital[2]	438	82.4	2,003	82.1
	Smoking cessation advice[2]	386	58.4***	1,972	68.3
	Appropriate initial antibiotic selection[3]	413	74.5***	1,956	76.4

[1]Initial ten measure set.
[2]Effective for discharges on or after 2nd Quarter 2004.
[3]Effective for discharges on or after 3rd Quarter 2004.

***Significant differences in proportions of CAH and urban hospital patients receiving recommended care at p< .001.
**Significant differences in proportions of CAH and urban hospital patients receiving recommended care at p< .01.
*Significant differences in proportions of CAH and urban hospital patients receiving recommended care at p< .05.

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 23, 2005.

Table 9
Comparison of Hospital Compare 2004 Quality Measure Results
Distribution of Results Across CAHs with 25 or More Patients for the Measure

Condition	Measure[4]	Number of CAHs with 25 or more patients in denominator	Percent of patients receiving recommended care across CAHs with ≥ 25 patients			
			Median	Mean	Standard Deviation	Range
Heart Failure	Assessment of LVSD[1]	199	69.7	66.0	23.3	0 -100
	Discharge instructions[2]	69	60.6	53.4	28.1	3.3-100
Pneumonia	Oxygenation assessment[1]	311	100	98.4	4.0	70.3-100
	Pneumoccal vaccination status[1]	242	58.9	54.9	25.1	0-100
	Initial antibiotic within 4 hours of hospital arrival[1]	284	83.5	82.5	9.2	50-100
	Blood culture performed prior to first antibiotic received in hospital[2]	127	83.7	81.8	10.3	46.7-100
	Appropriate initial antibiotic selection[3]	104	76.5	74.2	16.5	3.8-100

[1]Initial ten measure starter set.
[2]Effective for discharges on or after 2nd Quarter 2004.
[3]Effective for discharges on or after 3rd Quarter 2004.
[4]Measures for which 50 or more CAHs had 25 patients or more patients in the denominator were included.

Data sources: Hospital Compare data for 2004, downloaded from CMS website September 23, 2005.