

Quality Reporting for CAHs and Rural PPS Hospitals: The Potential Impact of Composite Measures

*Michelle Casey MS, Peiyin Hung MSPH and Ira Moscovice PhD
University of Minnesota*

Key Findings

- Composite measures that combine quality measure data by condition could substantially increase the number of small rural hospitals with sufficient data to compare performance for inpatient pneumonia, heart failure and surgical care improvement at the individual hospital level. However, combining the data for all Acute Myocardial Infarction (AMI) measures in a composite measure does not result in 25 or more opportunities to provide recommended care for many hospitals, since small rural hospitals have few patients for many of the individual AMI measures.
- Effective January 1, 2012, CMS retired four pneumonia measures, one heart failure and one AMI measure, and suspended data collection on three inpatient AMI measures and one surgical care improvement measure. Excluding the retired measures substantially reduces the number of Critical Access Hospitals (CAHs) with 25 or more opportunities to provide recommended care on the pneumonia composite measure. Excluding retired and suspended measures has a similar impact on the composite AMI measure for rural PPS hospitals.
- Combining inpatient and outpatient data for similar measures increases the number of small rural hospitals with 25 or more patients for the AMI aspirin at arrival measure but has little impact on the AMI fibrinolytic measure. The number of small rural hospitals with 25 or more patients increases modestly for the two preventative antibiotic surgical measures.

Introduction

Health care reform has focused increased attention on potential ways to identify and reward high performing health care providers. Rural Prospective Payment System (PPS) hospitals publicly report quality measures through the Centers for Medicare and Medicaid Services (CMS) Inpatient and Outpatient Quality Reporting Programs and the Hospital Compare website. Seventy-four percent of Critical Access Hospitals (CAHs) also voluntarily submit data to Hospital Compare. Many of these quality measures address conditions commonly treated by rural hospitals, but CAHs and small rural PPS hospitals do not have a sufficient number of patients on an annual basis to reliably calculate a number of the measures.

Composite measures can increase sample size for smaller hospitals. The National Quality Forum defines composite measures broadly as “a combination of two or more individual measures into a single measure that results in a single score.”¹ Multiple scoring methodologies have been used for composite measures.² Common methodologies include summing of scores across all measures in the composite, weighting scores so that certain measures count more towards the overall composite score, and “all-or-nothing” scoring (e.g., all recommended care for an eligible patient must be provided in order to receive credit for the composite measure).

Purpose of the Project

As part of a larger project that examined alternative ways of identifying high quality rural hospitals, we assessed the use of composite scores for public reporting of quality measures as one way of addressing the low volume issue for small rural hospitals.

This policy brief has three purposes:

- to compare individual measures and composite measures by condition for publicly reporting quality results for CAHs and small rural PPS hospitals;
- to evaluate the impact of the January 2012 CMS retirement and suspension of several quality measures on composite scores for CAHs and rural PPS hospitals; and
- to assess the impact of combining data for inpatient and outpatient AMI and surgical care improvement measures.

Approach

This analysis used Hospital Compare process of care measure data for 2010 discharges from all CAHs and rural PPS hospitals that publicly reported data. We first determined how many CAHs and rural PPS hospitals publicly reported data to Hospital Compare for 25 or more patients for each individual process of care measure for heart failure, pneumonia, AMI and surgical care improvement. (CMS uses 25 patients as the minimum number to reliably calculate these measures at the individual hospital level).

Next, we calculated hospital-level composite scores for the four conditions. The composite scores were calculated by dividing the sum of the numerators by the sum of the denominators for all individual measures for each condition. All available data were used and the measures within the composite scores were equally weighted.

For each composite measure, we determined the number of CAHs and rural PPS hospitals with 25 or more opportunities to provide recommended care. (We use the term “opportunities to provide recommended care” rather than patients for the composite measures since each patient can be eligible for multiple measures for a condition.)

Effective January 1, 2012, CMS retired four pneumonia measures (initial antibiotic timing, smoking cessation, influenza vaccination and pneumococcal vaccination), one heart failure measure (smoking cessation) and one AMI measure (smoking cessation), and suspended data collection on three inpatient AMI measures (aspirin at arrival, ACEI/ARB for LVSD, and beta blocker at discharge) and one surgical care improvement measure (appropriate hair removal).³

CMS retired the initial antibiotic measure because of concerns about potential incentives to overuse antibiotics. The remaining five measures were retired because performance on the measures was high nationwide. CMS also determined that performance was high nationwide on the four suspended measures, but chose to suspend data collection rather than retire these measures since they are Joint Commission accountability measures and are still endorsed by the National Quality Forum (NQF). Hospitals may choose to voluntarily submit data to CMS on the suspended measures.

We calculated the impact of the CMS changes on the composite measures in two ways. First, we recalculated the composite scores excluding the measures that are being retired. Second, we excluded the retired measures and the suspended measures. We calculated the impact of including and excluding the retired and suspended measures for several reasons. Although performance is high nationwide, some CAHs have not publicly reported data on these measures, and rural hospitals overall are not performing as well as urban hospitals on several of these measures. Data on the measures could be valuable for quality improvement efforts in CAHs and other rural hospitals. The suspended AMI measures, in addition to remaining Joint Commission and NQF measures, are relevant for CAHs.⁴

Finally, we examined the impact of combining inpatient and outpatient data at the hospital level for AMI and surgical care improvement measures that are both inpatient and outpatient measures. The numerators and denominators were summed for the inpatient and outpatient versions of four measures: the AMI aspirin at discharge and fibrinolytic within 30 minutes of arrival measures, and the preventative antibiotic one hour prior to incision and preventative antibiotic selection measures for surgical patients.

The inpatient and outpatient versions of these measures have the same numerators and denominators. For example, the numerator for both the inpatient and outpatient versions of the preventative antibiotic one hour prior to incision measure is the number of surgical patients with prophylactic antibiotics initiated within one

hour prior to surgical incision, and the denominator is all surgical patients with no evidence of prior infection. The inpatient version of the measure applies to patients with ICD-9 codes for selected inpatient surgeries (e.g., CABG, other cardiac surgery, hip arthroplasty, knee arthroplasty, colon surgery, hysterectomy, and vascular surgery). The outpatient version of the measure applies to patients with CPT codes for selected outpatient surgeries (e.g., open treatment of certain fractures, knee arthroplasty, vaginal hysterectomy, insertion or replacement of cardiac pacemakers, etc.) A combined measure would simply involve calculating the percent of all eligible inpatients and outpatients with relevant surgeries who received a preventative antibiotic one hour prior to surgical incision.

For 2010 discharges, 977 of the 1,328 CAHs (74%) and 941 rural PPS hospitals reported data to Hospital Compare. Tables 1-4 show the number of CAHs and rural PPS hospitals that reported data for 25 or more patients for the individual pneumonia, heart failure, AMI and surgical care improvement measures, and those with 25 or more opportunities to provide recommended care using the composite measures constructed for each of these four conditions.

Composite Measure Results

Pneumonia

The number of CAHs with data for 25 or more patients for the individual pneumonia measures ranges from 51 for the influenza vaccination measure to 515 for the pneumococcal vaccination. In comparison, 884 CAHs would have 25 or more opportunities to provide recommended care using a pneumonia composite measure based on the six current individual measures (Table 1). However, excluding the retired measures from the pneumonia composite measure would reduce this number from 884 CAHs to 599 CAHs, a decrease of 32%.

A composite pneumonia measure based on the current individual pneumonia measures would not have as much of an impact on rural PPS hospitals. For the individual pneumonia measures, the number of rural PPS hospitals with data on 25 or more patients ranges from 563 hospitals for the influenza vaccination measure to 863 hospitals for the initial antibiotic within 6 hours measure. In comparison, 921 rural PPS hospitals would have 25 or more opportunities to provide recommended care using a composite pneumonia measure based on the six individual measures. Excluding the retired measures from the composite measure would decrease the number of rural PPS hospitals with 25 or more opportunities to provide recommended care by 3.7%, from 921 to 887 hospitals.

Table 1. Pneumonia Inpatient Individual and Composite Measures

Individual Pneumonia Measures: Hospitals with 25 or more patients in 2010			Composite Measures: Hospitals with 25 or more opportunities to provide recommended care		
			CAHs	Rural PPS	CAHs
Pneumococcal vaccination ¹	515	861	Including all individual measures	884	921
Blood culture prior to first antibiotic	356	812			
Smoking cessation advice ¹	63	600			
Initial Antibiotic within 6 hours ¹	485	863	Excluding retired measures	599	887
Most appropriate initial antibiotic	374	832			
Influenza vaccination ¹	51	563			

¹Measures retired by CMS; data collection ended January 1, 2012.

Heart Failure

The number of CAHs with 25 or more patients with data for the individual heart failure measures ranges from 0 for the smoking cessation advice measure to 369 for the assessment of Left Ventricular Systolic (LVS) function measure. A composite heart failure measure would result in 604 CAHs with 25 or more opportunities to provide recommended care (Table 2). The number of rural PPS hospitals 25 or more patients with data for the individual heart failure measures ranges from 249 for the smoking cessation advice measure to 844 for the assessment of LVS function measure. A composite heart failure would result in 891 rural PPS hospitals with 25 or more opportunities to provide recommended care.

Excluding smoking cessation, the only retired heart failure measure, from the composite heart failure measure would have a limited impact, since the number of CAH and rural PPS patients for this measure is low. The exclusion would decrease the number of CAHs with 25 or more opportunities to provide recommended care by 2.3%, from 604 to 590.

Table 2. Heart Failure Inpatient Individual and Composite Measures

Individual Heart Failure Measures: Hospitals with 25 or more patients in 2010			Composite Measures: Hospitals with 25 or more opportunities to provide recommended care		
	CAHs	Rural PPS		CAHs	Rural PPS
Discharge instructions	185	802	Including all individual measures	604	891
Assessment of LVS	369	844			
ACE inhibitor or ARB for LVSD	5	413	Excluding retired measures	590	889
Smoking cessation advice ¹	0	249			

¹Measure retired by CMS; data collection ended January 1, 2012.

Acute Myocardial Infarction

Very few CAHs have 25 or more patients for the individual AMI inpatient measures; many rural PPS hospitals also do not have 25 patients (Table 3). The number of CAHs with 25 or more patients with data for the individual AMI measures ranges from 0 CAHs for three measures (ACE inhibitor or ARB for LVSD, smoking cessation advice, and fibrinolytic within 30 minutes) to 5 CAHs for the aspirin at arrival measure. A composite AMI measure would result in 46 CAHs with 25 or more opportunities to provide recommended care. The number of rural PPS hospitals with 25 or more patients with data for the individual AMI measures ranges from one hospital for the fibrinolytic within 30 minutes measure to 314 hospitals for the aspirin at arrival measure. The composite AMI measure is more useful for rural PPS hospitals, resulting in 513 hospitals with 25 or more opportunities to provide recommended care.

As with the heart failure composite, excluding the retired smoking cessation measure does not have much impact on the number of CAHs (from 46 down to 43) or rural PPS hospitals (from 513 hospitals down to 500) with 25 or more opportunities to provide recommended care. Excluding both the retired measure and the three measures for which CMS has suspended data collection has a greater impact, reducing the number of hospitals with 25 or more opportunities to provide recommended care from 46 CAHs to 3 CAHs and from 513 rural PPS hospitals to 247 rural PPS hospitals.

Surgical Care Improvement

The number of CAHs with 25 or more patients for the individual inpatient surgical care measures ranges from 53 CAHs for the beta blocker measure to 262 for the appropriate hair removal measure (Table 4). A composite measure based on the current measures would result in 395 CAHs with 25 or more opportunities to provide recommended care. Exclusion of the only suspended measure, appropriate hair removal, would reduce the number

Table 3. AMI Inpatient Individual and Composite Measures

Individual AMI Measures: Hospitals with 25 or more patients in 2010			Composite Measures: Hospitals with 25 or more opportunities to provide recommended care		
	CAHs	Rural PPS		CAHs	Rural PPS
Aspirin at arrival ¹	5	314	Including all individual measures	46	513
Aspirin at discharge	3	243			
ACE inhibitor or ARB for LVSD ²	0	75	Excluding retired measures	43	500
Smoking cessation advice ¹	0	117			
Beta blocker at discharge ²	2	236	Excluding retired and suspended measures	3	247
Fibrinolytic within 30 minutes of arrival	0	1			

¹Measure retired by CMS; data collection ended January 1, 2012.

²Measure with data collection suspended by CMS effective January 1, 2012.

Table 4. Surgical Care Improvement Individual and Composite Measures

Individual Surgical Care Improvement Measures: Hospitals with 25 or more patients in 2010			Composite Measures: Hospitals with 25 or more opportunities to provide recommended care		
	CAHs	Rural PPS		CAHs	Rural PPS
Preventative antibiotics one hour before incision	222	710	Including all individual measures	395	822
Received most appropriate preventa- tive antibiotic	222	710			
Preventative antibiotic stopped within 24 hours after surgery	220	708			
Blood clot prevention treatments ordered	146	673	Excluding retired measures	375	810
Received blood clot prevention treat- ments 24 hours pre/post-surgery	145	672			
Appropriate hair removal ¹	262	750			
Beta blockers before/after surgery	53	558			
Urinary catheter removed 1st/2nd day post-surgery	143	594			

¹Measure with data collection suspended by CMS effective January 1, 2012.

of CAHs with 25 or more opportunities to 375, a decrease of 5%.

The number of rural PPS hospitals with 25 or more patients for the individual measures ranges from 558 hospitals for the beta blocker measure to 710 hospitals for the appropriate hair removal measure. A composite measure based on the current measures would result in 822 rural PPS hospitals with 25 or more opportunities to provide recommended care. Excluding the suspended appropriate hair removal measure would reduce the number of rural PPS hospitals with 25 or more opportunities to provide recommended care by 1.5%, from 822 to 810 hospitals.

Results of Combining Inpatient and Outpatient data for Similar Measures

Two AMI measures (aspirin at arrival and fibrinolytic within 30 minutes) and two surgical care improvement measures (preventative antibiotics one hour before incision and appropriate antibiotic selection) are both inpatient and outpatient measures. Table 5 shows the number of CAHs and rural PPS hospitals that reported data for 25 or more patients for the AMI and surgical care improvement measures that are both inpatient and outpatient measures, and the impact of combining the inpatient and outpatient data at the hospital level for these measures.

For the AMI/chest pain measures, combining inpatient and outpatient data substantially increases the number of CAHs and rural PPS hospitals with 25 or more patients for the AMI aspirin at arrival measure, but has almost no impact on the fibrinolytic measure. For the preventative antibiotic surgical measures, 245 CAHs have 25 or more patients for the combined inpatient/outpatient measures, an increase of 10.4% compared to the 222 CAHs with 25 patients for the inpatient measures alone.

Table 5. Impact of Combining Inpatient and Outpatient Data on AMI and Surgical Care Improvement Measures

	Hospitals with 25 or more patients	
	CAHs	Rural PPS
AMI/Chest Pain		
Aspirin at arrival		
Inpatient ¹	5	314
Outpatient	172	712
Combined inpatient and outpatient	782	848
Fibrinolytic within 30 minutes of arrival		
Inpatient	0	1
Outpatient	0	4
Combined inpatient and outpatient	0	5
Surgical Improvement		
Preventative antibiotics one hour before incision		
Inpatient	222	710
Outpatient	30	555
Combined inpatient and outpatient	245	745
Received most appropriate antibiotic		
Inpatient	222	710
Outpatient	32	562
Combined inpatient and outpatient	245	743

¹Measure with data collection suspended by CMS effective January 1, 2012.

Discussion and Conclusions

The use of composite measures for AMI, heart failure, pneumonia and surgical care prevention could substantially increase the number of small rural hospitals with sufficient data to compare performance at the individual hospital level, but the impact varies by condition and by type of hospital (CAHs vs. rural PPS).

The impact of retiring and suspending data collection for individual measures that are part of composite measures also varies by condition and type of hospital. For CAHs, composite measures by condition are more useful for pneumonia, heart failure and surgical care than for AMI. Excluding retired measures substantially reduces the usefulness (defined as having 25 or more opportunities to provide recommended care at the individual hospital level) of the pneumonia composite measure for CAHs. For rural PPS hospitals, excluding retired and suspended measures substantially reduces the usefulness of the composite AMI measure.

CMS has retired two pneumonia vaccination measures, and adopted global influenza and pneumococcal vaccination measures that apply to patients with many different medical conditions. The Joint Commission has adopted global tobacco treatment measures to replace the retired condition-specific smoking cessation measures for AMI, heart failure, and pneumonia. Since patient volume will be greater for global measures than for single diagnosis measures, increased use of global measures will be especially useful for increasing the volume of patients for public reporting of quality measures by small rural hospitals. However, replacement of condition-specific measures with global measures may make it more difficult to assess quality for patients with a given condition in small rural hospitals, by reducing the number of measures that can be included in a composite measure for that condition. For example, replacement of the two pneumonia vaccination measures with global vaccination measures has reduced the number of measures that can be used to calculate a pneumonia composite measure.

However, CAHs and rural PPS hospitals could still analyze their global measure data by condition at the individual hospital level for quality improvement purposes. For example, a hospital could analyze its global influenza vaccination measure data to determine if patients who are hospitalized for Chronic Obstructive Pulmonary Disease (COPD) are as likely as patients who are hospitalized for pneumonia to receive the influenza vaccination. If the vaccination rates differ, the hospital could then target its quality improvement efforts to sub-groups of patients that have lower vaccination rates.

Combining data on similar inpatient and outpatient AMI and surgical measures increases sample size for some measures but has limited impact on other measures. Relatively few CAHs are reporting data on the outpatient measures, limiting the usefulness of this strategy for CAHs. However, the outpatient measures have been included as Phase 2 quality measures for CAHs in the Office of Rural Health Policy's Medicare Beneficiary Quality Improvement Project (MBQIP).⁵ If CAH reporting of the outpatient measures increases significantly in the future, combining data on similar inpatient and outpatient measures would likely be more useful for CAHs. For example, an increase in the number of CAHs reporting the outpatient surgical antibiotic timing measure would significantly increase the number of CAHs with 25 or more patients for a combined inpatient and outpatient surgical antibiotic timing measure.

The results of this study indicate that composite measures can play a useful role in public reporting of quality measures by increasing the number of small rural hospitals with sufficient patient volume to reliably measure quality at the individual hospital level.

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Additional Information

For more information, contact Michelle Casey, 612.623.8316, mcasey@umn.edu

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Partners

University of Minnesota
Rural Health Research Center
Division of Health Policy and Management,
School of Public Health
2520 University Avenue SE, #201
Minneapolis, Minnesota 55414
Phone: 612.624.6151
www.hpm.umn.edu/rhrc

University of North Dakota
Center for Rural Health
School of Medicine & Health Sciences
501 N. Columbia Road Stop 9037
Grand Forks, ND 58202-9037
Phone: 701.777.3848
ruralhealth.und.edu/