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August 28, 2008

Ms. Victoria McClanahan, Planner
Division of Health Service Regulation
2714 Mail Service Center
Raleigh, NC 27699-2714

RE: Novant Health, Inc. Comments on August 1, 2008 Carolinas Medical Center Petition for Study Group for the Acute Care Bed Need Methodology

Dear Ms. McClanahan:

We appreciate the opportunity to comment on the above-referenced petition, which requests that "the State Health Coordinating Council form an expert workgroup to review and update the acute care bed need methodology for the 2010 State Medical Faculties Plan (SMFP)." CMC's reasons for adjustment are identified as: (1) the use of a single, statewide growth rate is inadequate for projected days for hospitals in North Carolina in counties experiencing a high population growth and higher rates of growth in acute care bed utilization; and (2) the current method does not consider a hospital's average length of stay.

First off, this type of petition should have been submitted to the SHCC at the March 2008 public hearing as it impacts the total methodology for acute care beds. As described on page 7 of the *2008 SMFP*, CMC's petition is for a "Change in Basic Policies and Methodologies." Chapter 2 of the 2008 SMFP defines these petitions as "changes with the potential for statewide effect are the addition, deletion, and revision of policies and projection methodologies." Clearly, CMC's petition seeks an overhaul of the entire acute bed need method by use of an expert workgroup. Those petitions were required to be filed on March 5, 2008 for the 2009 SMFP. Likewise, for changes to the bed need method for the 2010 SMFP (as identified in the CMC petition), the petition is required to be filed in March of 2009. CMC filed its petition on August 1, 2008, which is about 7-8 months too early.

Secondly, Novant Health does not support CMC's request for another Acute Care Bed Need Methodology Work Group at this time. It is Novant's observation that the SMFP Chapter 5 acute bed need methodology has stood the test of time and that the overall framework of the method is sound. The method is barely five years old and has generated the need for over 960 beds in 18 North Carolina counties since its inception. The method has only two key variables: each hospital's annual acute inpatient days and the state's estimated Annual Statewide Growth Rate for Acute Inpatient Days applied to the days over a six-year horizon to project future bed days.

While Novant agrees that the existing methodology is not perfect and does not work for all North Carolina hospitals. However, there is a mechanism defined in the State Medical Facilities Plan for existing hospitals to petition during the summer public hearing process for an adjusted bed need in a particular County. However, there are annual opportunities for hospitals in high growth counties to petition the SHCC during the summer for adjusted bed need determinations in the upcoming year's proposed State Medical Facilities Plan. At least two such petitions have

been filed in August 2008 pertaining to the *Proposed 2009 SMFP*. This petition process provides a safety valve for hospitals located in high growth areas.

Thirdly, CMC proposes adding a variable in the Acute Care Bed Need Methodology to adjust bed need based upon a Case Mix Index-Adjusted Average Length of Stay. CMI-Adjusted ALOS is **only one measure** of efficiency and should not be used to make general assumptions regarding a hospital's overall efficiency, or to make determinations about the award of new acute beds in a competitive CON review. Furthermore, "this particular benchmark might not be the most appropriate measure of a hospital's length of stay (LOS) status" as reflected in the article from Besler Consulting, included in Attachment 1. According to Besler Consulting:

> "The case-mix factor adjusts for the resources used in treating patients with particular medical conditions. Two major variables have a direct impact on the case-mix index: (1) the cost of services furnished, and (2) the patient's LOS. In many cases, **the LOS will be a comparatively insignificant component** in the case-mix factor, while the cost of services furnished will account for more than 90% of the case-mix factor for that particular DRG." [Emphasis added.]

An alternative methodology discussed in this article compares actual patient days to the expected Medicare standard. "Standard Days" equal Discharges times Medicare Arithmetic Mean Length of Stay (LOS), where Actual LOS is used for DRGs with no Medicare Arithmetic Mean LOS. This approach is discussed directly below.

CMI Adjusted ALOS does not reflect a comprehensive measure of quality or efficiency according to the managed care contract experts. In addition, acuity levels are redefined by CMS annually on a FFY basis. Furthermore, service lines at every North Carolina acute care inpatient hospital are very different. The following table shows only a few DRGs which illustrate this issue.

Sample DRG Weights and Length of Stay

DRG	MDC	TYPE	DRG title	Weights	Arithmetic mean LOS
114	05	SURG	UPPER LIMB & TOE AMPUTATION FOR CIRC SYSTEM DISORDERS	1.7527	8.7
440	21	SURG	WOUND DEBRIDEMENTS FOR INJURIES	1.9291	8.5
439	21	SURG	SKIN GRAFTS FOR INJURIES	1.9071	8.3
269	09	SURG	OTHER SKIN, SUBCUT TISS & BREAST PROC W CC	1.7920	8.3
79	04	MED	RESPIRATORY INFECTIONS & INFLAMMATIONS AGE >17 W CC	1.6268	8.3
238	08	MED	OSTEOMYELITIS	1.4100	8.3
423	18	MED	OTHER INFECTIOUS & PARASITIC DISEASES DIAGNOSES	1.8379	8.2
489	25	MED	HIV W MAJOR RELATED CONDITION	1.7921	8.2
403	17	MED	LYMPHOMA & NON-ACUTE LEUKEMIA W CC	1.8625	8.0
515	05	SURG	CARDIAC DEFIBRILLATOR IMPLANT W/O CARDIAC CATH	5.2293	3.8
498	08	SURG	SPINAL FUSION EXCEPT CERVICAL W/O CC	2.9896	3.7
557	05	SURG	PERCUTANEOUS CARDIOVASCULAR PROC W DRUG-ELUTING STENT W MAJOR CV DX	2.7616	4.1
111	05	SURG	MAJOR CARDIOVASCULAR PROCEDURES W/O CC	2.4879	3.1
552	05	SURG	OTHER PERMANENT CARDIAC PACEMAKER IMPLANT W/O MAJOR CV DX	2.0860	3.5
558	05	SURG	PERCUTANEOUS CARDIOVASCULAR PROC W DRUG-ELUTING STENT W/O MAJ CV DX	2.0814	1.8

The top nine DRGs in the following table have low DRG Weights, all are less than 2.0. However, the CMS defined Arithmetic Mean LOS for these DRGs is greater than 8.0. The following six DRGs, five of which are cardiac DRGs, have higher DRG Weights, with much lower Arithmetic Mean LOS. As a result, higher acuity does not always reflect higher length of stay and lower acuity does not always reflect lower length of stay.

In conclusion, average length of stay at any hospital is far from completely within the control of hospital operational processes. Rather average length of stay at an acute care hospital is based upon: (1) a physician's determination that a patient is in need of inpatient care; and (2) the determination by the patient's insurance company that the care received and the length of stay provided is appropriate.

Sincerely,

Barbara L. Freedy

Barbara L. Freedy, Director
Certificate of Need
Novant Health, Inc.

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Case-Mix Adjusted Length of Stay -- What does it mean?

By Phil Besler, CPA, FHFMA

As the song goes, *Absolutely Nothing!*

This might be a slight exaggeration. Nevertheless, this particular benchmark might not be the most appropriate measure of a hospital's length of stay (LOS) status.

The case-mix factor adjusts for the resources used in treating patients with particular medical conditions. Two major variables have a direct impact on the case-mix index: (1) the cost of services furnished, and (2) the patient's LOS. In many cases, the LOS will be a comparatively insignificant component in the case-mix factor, while the cost of services furnished will account for more than 90% of the case-mix factor for that particular DRG. This point can be illustrated by reviewing the following DRGs.

DRG #	Title	Weight	Arithmetic Mean LOS*	Geometric Mean LOS**
536	Cardiac defib. implant, w/ Cardiac Cath. w/o AMI/HF/Shock	6.9144	7.6	5.9
430	Psychoses	.6483	7.9	5.8
552	Other permanent Cardiac pacemaker Implant w/o major CV Dx	2.0996	3.5	2.5
342	Circumcision >17	.8737	3.4	2.5
134	Hypertension	.6068	3.1	2.4

Source: *Federal Register*, August 12, 2005, Medicare Program Changes to the Hospital Inpatient Prospective Payment Systems and Fiscal Year 2006 Rates; Final Rule – Table 5

* The "Arithmetic Mean" is the value obtained by dividing the sum of a set of quantities by the number of quantities in the set. The Arithmetic Mean is also referred to as the "average."

** The "Geometric Mean" is found by multiplying all values in a list, and then taking the root of that product equal to the number of values (e.g., the square root if there are two numbers). The geometric mean is typically used in cases of exponential growth or decline.

Now, consider the following hypothetical (based on Medicare cases and patient days), involving: (1) Hospital A (a general acute care hospital that has a cardiac program); and (2) Hospital B (a general acute care hospital that has an inpatient psychiatric unit). Assume that Hospital A treats only DRG 536 cases and Hospital B treats only DRG 430 cases. Both hospitals treat the patients, on average, at the Arithmetic Mean LOS.

Hospital A's case-mix-adjusted average LOS (ALOS) is 1.099 (7.6/6.9144), while Hospital B's case-mix-adjusted ALOS is 12.1857 (7.9/.6483). One might infer from these case-mix-adjusted ALOS values that Hospital A is more adept than Hospital B in controlling LOS. Of course, the inference would not be correct based solely and exclusively on these case-mix-adjusted ALOS values.

The case-mix-adjusted ALOS is used in most cases as a measurement tool to compare general acute care facilities. Although this hypothetically does not compare all the patients of the general acute care facilities, a fundamental (albeit somewhat exaggerated) point is illustrated by the above hypothetical; i.e. that case-mix-adjusted ALOS is not an accurate measurement when comparing LOS among general acute care facilities unless the facilities have the exact same case mix.

What is a better measurement for comparison?

A more appropriate and accurate measure would be to take Hospital A's cases by DRG and multiply those cases by the Arithmetic Mean. This approach results in the calculation of the "standard days" for Hospital A's patients. For example, and with reference to the above hypothetical, if Hospital A has 1,000 cases for DRG 536, the standard days would equal 7,600 (7.6 x 1,000). As noted in the above hypothetical, Hospital A's average LOS equaled the Arithmetic Mean, so their total days would be

7,600. The actual days of 7,600 divided by standard days of 7,600 would yield a factor of 1.0, which places Hospital A in the middle or at standard.

If we assume that Hospital B's actual total LOS for all of its DRG 430 cases is 7,800 days, then its actual LOS will be less than its calculated standard LOS. That is, Hospital B has 1,000 cases for DRG 430 for which the Arithmetic Mean LOS is 7.9 which, when multiplied by the 1,000 cases, results in total standard days of 7,900. Now, dividing its actual days of 7,800 by standard days of 7,900, a factor of 0.987 results. One may then conclude that Hospital B's LOS is 1.3% **under** standard and, therefore, Hospital B has a more favorable LOS compared to Hospital A.

Examples Based on Actual Data

The following charts display actual results of hospitals (based on Medicare cases), comparing the flawed "case-mix-adjusted ALOS" values (Chart 1) to a case-mix formula utilizing the Arithmetic Mean methodology (Chart 2).

Chart 1 -- CMI Adjusted ALOS	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
	Medicare Pt Days	Medicare Cases	Medicare ALOS	Medicare CMI	Medicare ALOS CMI Adjusted*
Comparison Hospital	**12,121**	**2,130**	**5.69**	**1.2752**	**4.46**
Hospital 1	78,182	12,090	6.47	1.8230	3.55
Hospital 2	27,116	5,230	5.18	1.4224	3.65
Hospital 3	40,325	6,673	6.04	1.8330	3.30
*Medicare ALOS CMI Adjusted = Patient Days /(Cases * CMI)					

Conclusion: The Medicare ALOS/CMI Adjusted (see column (5)) for the Comparison Hospital is almost one day greater than the respective ALOS/CMI Adjusted for each of the other three hospitals.

Chart 2 -- Arithmetic Mean ALOS						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
	Medicare Pt Days	Medicare Cases	Medicare ALOS	Standard: M'Care ALOS using Arithmetic Mean**	M'Care ALOS / M'Care ALOS using Arithmetic Mean [(3)/(4)]	Variance from Standard***
Comparison Hospital *	**12,121**	**2,130**	**5.69**	**5.69**	**1.000**	**0.01%**

Hospital 1	78,182	12,090	6.47	5.82	1.111	11.11%
Hospital 2	27,116	5,230	5.18	5.87	0.883	-11.67%
Hospital 3	40,325	6,673	6.04	5.86	1.031	3.12%

*Medicare ALOS Using Hospital Calculated Medicare GMLOS = Sum of (Cases by DRG * Hospital Calculated Medicare Geometric Mean LOS by DRG) for all DRGs divided by Total Cases.

**Medicare ALOS using Geometric Mean = Sum of (Cases by DRG * Geometric Mean LOS by DRG) for all DRGs divided by Total Cases.

***If a hospital's variance from standard is positive, their Medicare GMLOS is higher than the standard and if the hospital's variance from standard is negative, their Medicare GMLOS is better than the standard.

Conclusion: The Comparison Hospital is above their standard Medicare ALOS using the Geometric Mean. However, applying this methodology, the Comparison Hospital's Medicare ALOS falls within the range of the three other hospitals (see column 7).

In reality, the Comparison Hospital depicted in Charts 1, 2 and 3 has been characterized over the years as a provider with a higher LOS compared to its peers, and this characterization has been based in substantial part on the flawed case-mix-adjusted LOS methodology. Now that enormous amounts of data are available and can be processed in milliseconds, a more incisive analysis, utilizing a more appropriate measure of LOS, demonstrates that this hospital exhibits a favorable LOS and, in fact, might be better in managing LOS than many of its peers.

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Summary

For the reasons outlined above, it is apparent that case-mix-adjusted ALOS is not an appropriate measurement when comparing LOS across general acute care facilities. The alternate methodologies discussed provide the hospital with better information to assess its management of LOS, especially as compared to other facilities. Using either the Arithmetic Mean or Geometric Mean provides the hospital with a more reliable tool to calculate a standard ALOS. A hospital can then use the more reliable standard to compare its particular ALOS to those of other hospitals._ftn1

However, it is important to note that neither the Arithmetic Mean nor Geometric Mean is without limitation. For example, all hospitals have atypical cases (that is, cases in which the LOS far exceeds the expected LOS for the given DRG) and these cases may tend to skew the results of the analysis. Therefore, these very unusual cases should be carved out of the analysis and dealt with separately in a subsequent corrective process. In this way, hospitals can then analyze cases falling within a bell-shaped curve to provide a more accurate benchmark of how the hospital generally manages LOS for its typical cases. Although the Geometric Mean does adjust for the atypical cases, this methodology does not eliminate completely the attendant distorting effect. Therefore, removing the unusual cases from the database for all hospitals prior to processing and then comparing the resultant database will establish a better barometer of how the institution is generally addressing its LOS.

_ftnref1Although the examples set forth in this article focus on Medicare cases, the analytical approach described above can be used to assess LOS for non-Medicare cases as well. The standard used for either all cases (including Medicare cases) or all non-Medicare cases will be different than the standards listed above for Medicare cases only. These standards can be obtained from databases listing just a particular state's data or a sample from states reporting uniform data.

For more information, please contact Phil Besler, CPA, FHFMA at 609-514-1400 or via email at pbesler@beslerconsulting.com.

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