Detailed Comments on NQF Proposal #2414
Pediatric Lower Respiratory Infection (LRI) Readmission Measure, updated 2/12/14
3M HIS 4/1/14

I. Summary

We agree with the concept of a rate based, risk adjusted approach to systems for measuring preventable readmissions, especially if they are intended for comparison across hospitals and for payment. We do not, however, agree with the all-conditions approach or specific methodologies of proposed NQF pediatric lower respiratory infection (LRI) readmissions measure #2414, and *do not support the proposal.*

In our view, the ultimate objective of any quality measurement system is to provide meaningful information that will lead to behavior changes that result in sustainable improvements in quality. In order for this objective to be achieved, the quality measure and method of risk adjustment must be clinically credible and communicate actionable information in a readily understandable manner. We do not believe the proposed methodology meets these fundamental criteria for the following reasons:

- The approach does not contain a method for defining what readmissions are considered related and potentially preventable. It counts essentially all conditions except those it considers likely planned.

- The risk adjustment methodology omits key clinical variables, uses clinically less specific variables, and does not propose an approach for SES factors.

- The detailed definitions and logic for the various components of the proposed system contain a number of important weaknesses. Also, the output from the system does not include any clinical categorization of hospitalizations considered index admissions and readmissions, limiting its interpretability and use.

- The proposed system has not been tested and evaluated for the kinds of cases captured as preventable or potentially preventable readmissions, or for its risk adjusted impact across different subgroups of the pediatric population and different hospitals.

In all, the proposal represents an incomplete approach and lacks the clinical specificity needed to identify related and potentially preventable readmissions and to risk adjust across different populations of pediatric patients. As a result, it would not provide an accurate or fair basis for measuring hospital performance, or a clinically targeted and useful approach to support performance improvement.

II. Overall Comments

1. Issues with Approach to Preventable Readmissions:
   NQF pediatric proposal #2414 for LRI includes essentially all readmissions for any cause, except those that it considers likely planned, and uses a time window of 30 days. It is a fundamental concern that the proposal does not attempt to define what readmissions are related and preventable or potentially preventable. The 30 day time window is also a concern in this context, as the number of unrelated and low preventability readmissions will increase as one moves from a 7 to 15 to 30 day time window.

   This proposed approach will not provide a clear or sound basis for measuring hospital performance, quality improvement, public comparative reporting, or payment for pediatric patients. The readmission rates will contain many readmissions that are for unrelated conditions or have very low preventability. This will vary from hospital to hospital based on case mix, i.e., in a non-random way, and this is especially problematic. The proposal also doesn't provide any condition-specific readmission rates that hospitals and physicians can examine and target for performance improvement. It simply identifies that one admission was followed by another admission within a 30-day time window, except those it considers likely planned.

   This all-conditions approach to readmissions is also at odds with the approach that states are beginning to adopt and implement. Of note, four of the largest state Medicaid programs, New York, Texas, Massachusetts and Illinois, have recently implemented pay-for-performance readmissions programs and each has focused on readmissions that are clinically related and potentially preventable. Similarly, the Minnesota Hospital Association has launched a very successful collaborative effort with Stratis Health and the Institute for Clinical Systems Improvement entitled, "Reducing Avoidable Readmissions Effectively" (RARE) Campaign. This is a large-scale initiative engaging hospitals and providers across the continuum of care to prevent 6,000 readmissions. The success of the initiative led to its selection as one of the 2013 winners of the NQF John M. Eisenberg Patient Safety and Quality Award.

   The language in the enabling laws and regulations of these states is very specific that the approach should focus on readmissions that are clinically related and potentially preventable. Likewise for the NQF award winning Minnesota collaborative. It is hard to understand how it would be helpful to have federally sponsored and adopted measures for pediatrics that do not take into account whether the readmission is clinically related and potentially preventable. Following is a brief description of how each state has gone about defining their readmissions programs.

   - New York State regulations (July 21, 2010) require that Medicaid payments to hospitals be adjusted for readmissions that are "clinically related to the prior

admissions" and "could reasonably have been prevented by the provision of appropriate care consistent with accepted standards in the prior discharge or during the post-discharge follow-up period."

- Texas law requires that Medicaid payments be adjusted beginning May 1, 2013 for readmissions that "resulted from deficiencies in the care or treatment provided during a previous hospital stay or from deficiencies in post-hospital discharge follow-up."

- Illinois Department of Healthcare and Family Services implemented a Potentially Preventable Readmissions Policy beginning 2013 for its Medicaid program where a readmission is defined as a PPR if it occurs within the specific time frame and is "clinically related to an initial admission."

- Massachusetts Medicaid implemented a policy beginning 2012 for Potentially Preventable Readmissions (PPR) where a PPR is defined as "A readmission (return hospitalization) within the specified readmission time interval that is Clinically Related to the Initial Admission."

Lastly, it should be noted that the approach by these states is also similar to that envisioned by the federal Accountable Care Act. The ACA called for the Medicare Readmissions Reduction Program to "have exclusions for readmissions unrelated to the prior discharge." CMS has not yet implemented such exclusions, but it is the policy direction from the ACA and the approach being adopted by an increasing number of states that have launched readmissions programs.

2. Issues with Approach to Risk Adjustment:
NQF pediatric proposal #2414 for LRI does not provide a fully developed clinical case mix, risk adjustment methodology. It omits key clinical variables, namely - reason for admission, acuity of hospitalization, and impact of specific complex chronic conditions, all of which have been shown to be major drivers of pediatric readmissions. There are many published articles in the pediatric literature about this, especially the impact of complex chronic conditions. This includes articles by C. Feudtner in a 2009 issue of Pediatrics entitled, "How Well Can Hospital Readmissions Be Predicted in a Cohort of Hospitalized Children;" by J. Berry in a February 2011 issue of JAMA entitled, "Hospital Utilization and Characteristics of Patients with Recurrent Readmissions within Children's Hospitals"; by J.Gay in June 2011 issue of Pediatrics entitled, "Epidemiology of 15-Day Readmissions at a Children's Hospital"; and by J. Berry in a January 2013 issue of JAMA entitled, "Pediatric Readmission Prevalence and Variability Across Hospitals."

Instead, the proposal uses four less clinically specific variables - age, gender, presence of any CCI chronic condition, and number of chronic condition "body systems" per the AHRQ

Chronic Condition Indicators (CCIs) as the patient case mix variables in a 2-level logistic regression model. Along with being relatively non-specific, there are a number of specific limitations to the proposal's ability to capture the impact of multiple chronic conditions (see section III(8) on pages 10-14). It is simply not possible for a two-level logistic regression model to compensate for omitting key clinical variables and working with variables that are clinically less specific and that have many definitional issues.

The proposal includes a summary level analysis showing the effect of payor status and race/ethnicity on readmissions, but does not offer a proposal for handling socioeconomic status (SES) factors for risk adjustment purposes. The impact of SES factors is increasingly being recognized as an important factor. In its June 2013 Report to Congress, the Medicare Payment Advisory Commissions (MedPAC) recommended that Medicare incorporate this into its payment methodology through a peer group approach. Whether through peer group target rates or continuous variable adjustment factors (the latter we think is a better approach), we suggest some kind of approach is needed.

In sum, the proposed risk adjustment approach is very limited and will not provide accurate and fair measurements of readmission rates for different populations of pediatric patients. The measurement of readmission rates will be unduly driven by unmeasured differences in pediatric case mix and will be a misleading measurement for the quality of care provided by the hospital. This is especially true for hospitals treating large numbers of pediatric patients with high acuity, malignancies, and complex chronic conditions, and patients with greater SES challenges.

3. Issues with Definitions and Logic for Each Component of Proposed Readmissions System:

   A. Target Group Definitions: The definitions do not fully take into account the PDX/SDX sequencing of certain conditions. This leads to incomplete capture of the target population.

   B. Chain Concept: This concept is sound, but suggest there isn't a need to truncate at 30 days.

   C. Episode Concept: Clarification is sought. The proposal combines two hospitalizations into one hospital episode if the first hospitalization involves a transfer to a second acute hospital. In these situations, which hospital is charged with responsibility for subsequent readmissions? Is it the second hospital? We suggest it should be the second hospital.

   D. Data Quality: The requirements for >= 80% of a hospital's records to have unique patient identifiers and dates of admission/discharge that are logically possible, and for >= 80% of a hospital's records to have a PDX, are not nearly strict enough to ensure

data integrity and reliability.

E. Index Admissions: The index admissions are essentially all LRI admissions (except those missed because of PDX/SDX sequencing), followed by any other admission except those considered likely planned. There aren't any breakouts by specific respiratory condition, which is unhelpful. There are no exclusions other than for discharge destination of died or left against medical advice. This is a major concern.

F. Readmissions: Overall, exclusions are much too narrow. It is not sufficient to just exclude readmissions that are considered likely planned (chemotherapy, certain procedures). There are many other kinds of readmissions that are very important to exclude. To illustrate, readmissions that are unrelated (e.g., appendicitis, trauma) or of very low preventability (e.g., metastatic malignancy, awaiting transplant) should be excluded.

   There are also instances where the exclusions are overly broad and should be narrowed. For example, readmissions for planned procedures, those thought to be scheduled or planned in advance ≥80% of the time, should not be excluded if the principal diagnosis (PDX) is a complication of care or infection diagnosis.

4. <u>Issues with Testing and Evaluation:</u>

   A. Testing of Validity:
   There was not any effort to identify or assess the kinds of readmissions captured, whether they were for related conditions and whether viewed as preventable or potentially preventable readmissions. This is a fundamental omission. There was only a review for chemotherapy and procedures considered to be likely planned procedures.

   It is not clear what kind of review was done for planned readmissions. For 500 readmissions cases at Boston Children's Hospital, the electronic health record was reviewed "to determine whether the readmission had been for a planned procedure or chemotherapy." Does this mean that information on procedures from the electronic health record was simply compared to information from the medical record abstract, and confirmed as identifying the same procedures from the list of planned procedures?

   Or, does it mean that an evaluation was done to determine whether the procedure was in fact a readmission for a planned procedure? Did this include a review of principal diagnoses to determine if the readmission was for a complication of care or infection?

Lastly, did it include a review of the rest of the 500 readmission cases to identify whether there were additional planned readmissions missed by the proposed methods?

B. Testing of Statistical Performance and Impact:
There was not any testing or evaluation of actual-to-expected, risk adjusted rates for subgroups of children or hospitals that might be expected to have higher or lower readmission rates. It is critical that this be done. Without it, there is no bottom line assessment of the model's performance and systematic effects.

Instead, the proposal included several tests for statistical significance for the hospital database population as a whole. This included a C statistic for statistical discrimination and a readmission rate reliability statistic for the 1,763 hospitals in the "MAX" Medicaid database.

Then, to test for "clinically/practically meaningful differences in performance measure scores," the proposal identified that about half the hospitals had readmission rates higher than predicted, about half had lower than predicted readmission rates, and for those that had higher rates the median difference was +18%. There was no evaluation of which groups of patients or hospitals had higher or lower than "expected" readmission rates. There therefore is very little basis to put forth the conclusions that the model "can identify hospitals with meaningfully different readmission performance."

III. **Detailed Comments**:

A. Target Group Definitions (Pediatric LRI):
Admissions for LRI are identified using a case definition of "a primary diagnosis of bronchiolitis, influenza, or community acquired pneumonia or a secondary diagnosis of one of these LRIs plus a primary diagnosis as asthma, respiratory failure, or sepsis/bacteremia."

This definition does not fully take into account the PDX/SDX sequencing of certain conditions, notably two chronic respiratory conditions frequently admitted for lower respiratory infections, bronchopulmonary dysplasia (BPD) and cystic fibrosis (CF). These patients frequently have readmissions, so their incomplete capture will distort rates, especially for inter-hospital comparisons.

B. Chain Concept:
We agree that counting multiple readmissions following an index admission as part of a chain of readmissions is a useful approach. It better represents the underlying readmissions pattern for a hospital and lessens the impact of outlier patients.

Our suggestion is that there isn't a need to truncate a readmission chain at 30 days. If multiple readmissions are continuing to occur within 30 days of another hospitalization (or within 15 days if that time window was used), we suggest not truncating the chain.

C. Episode Concept:
As identified earlier, clarification is sought. The proposal combines two hospitalizations into one hospital episode if the first hospitalization involves a transfer to a second acute hospital. In these situations, which hospital is charged with responsibility for subsequent readmissions? Is it the second hospital? We suggest it should be the second hospital. Following are two examples.

- If one hospital transfers a patient to a second hospital for more definitive diagnostic and treatment, the second hospital should be charged with responsibility for subsequent readmissions.

- If one hospital performs the more definitive diagnostic and treatment services, and then transfers a patient to a second hospital for the remainder of hospital inpatient services (e.g., a hospital closer to home), the second hospital should be charged with responsibility for subsequent readmissions.

Attribution for readmissions for patients whose inpatient care involves transfers from one acute hospital to another, is especially important for hospitals that send or receive a large number of transfer patients.

D. Data Quality:
There are two criteria used for hospital level exclusions for incomplete data.
- Hospitals with <80% of records that have complete a unique patient identifier, and a logically possible admission date and end-of-service date.
- Hospitals with <80% of records that have a primary ICD-9-CM or principal ICD-10 diagnosis code.

Each of these data quality exclusion criteria needs to be specified in a stricter manner. If a hospital has as many as 20% of discharge records excluded, readmission rates will be unreliable, especially for comparative purposes.

In addition to these two hospital level exclusion criteria, there should be a third criteria for hospitals with missing information on discharge disposition. It is essential to know if the patient died, left against medical advice, or was transferred to another acute hospital in order to classify properly.

Related to this, there is a question about how the discharge disposition codes are aggregated for use in the proposed system. In hierarchical order, there are five aggregated groupings:

#4 = died
#3 = left against medical advice
#2 = transfer to acute hospital
#1 = discharge (not clear what this refers to?)
#0 = other (any disposition not accounted for above)

It is not possible from this description to know what discharge disposition codes are included in the aggregation for #1 = "discharge" and #0 = "other". Clarification is sought. In particular, how are patients classified who are transferred to hospital distinct part units for rehab or psych services?

The last item and concern is the lack of a combined data quality exclusion edit for all of the criteria combined. As currently set, in the most extreme example, a hospital could fail for 20% of its records for one criteria and another 20% of its records for the second criteria, and still be included in the aggregate hospital record set. So, a fourth criterion should be added, a combined edit criteria.

We suggest that further testing and evaluation be done with respect to the two data quality criteria contained in the proposal and the additional two criteria we have proposed. In addition, we suggest that the pass rate for each individual criterion be increased from 80% to something in the range of 90%, and that the pass rate for all criteria combined be something in the range of 85%.

E. Index Admissions:

As described earlier, the index admissions are essentially all LRI admissions (except those missed because of PDX/SDX sequencing), followed by any other admission except those considered likely planned. There aren't any breakouts by specific LRI or underlying chronic respiratory condition or for medical versus surgical conditions. There should be breakouts to improve interpretability and use as a performance improvement tool.

There are no exclusions other than for discharge destination of died or left against medical advice. This is a major concern. There should be exclusions for the following kinds of patients.

- Patients transferred to another acute care hospital should not be eligible to be an index admission. This might happen depending on how hospital episodes of care are defined in this proposal (see clarification request in previous item III (C)).

- Patients with conditions for which there is very low preventability. For example:
  - Patients with malignancy admitted for neutropenia, aplastic anemia, pneumonia, septicemia, et.al.
  - Patients with metastatic malignancy.
  - Patients with V code for awaiting organ transplant.

- Patients with conditions for which preventability is very low for certain age ranges:
  - Seizure disorder, age < 1 year.
  - Poisonings, age < 10 years (likely accidental)

For the pediatric population as a whole, these are relatively uncommon conditions, but are more common at hospitals that serve as pediatric specialty and referral centers, sufficient to distort inter-hospital comparisons.

F. Readmissions:

The proposal provides two kinds of exclusions for readmissions: (1) patients with a principal diagnosis code or a procedure code for chemotherapy, and (2) patients with primary procedure code from a list of procedures considered likely to be scheduled or planned in advance at least 80% of the time.

Overall, this approach to exclusions is much too narrow because it does not address:

- Readmissions for unrelated conditions. Examples include appendicitis, trauma, other unrelated illnesses. To illustrate further, in a medical record review of 2,546 15-day readmissions over a two year period at a large children's hospital, 5.5% of 0-7 day readmissions and 10.9% of 8-15 day readmissions were found to be for unrelated illnesses (JGay, Pediatrics, May 2011).

- Readmissions for conditions that have very low preventability. Examples include patients readmitted for treatment of malignancy effects (e.g., neutropenia), metastatic malignancies, and patients awaiting organ transplant.

- Patients readmitted at the same hospital or another acute hospital to receive rehabilitative or aftercare services.

As with the exclusions for index admissions, these conditions are relatively uncommon for the pediatric inpatient population as a whole, but more common for hospitals that serve as pediatric specialty and referral centers.

There are also instances where the exclusions are overly broad and should be narrowed. In particular, readmissions for procedures considered likely to be scheduled or planned in advance at least 80% of the time. This is determined by a list of procedures without

taking into account the relationship to the prior admission or whether the principal diagnosis for the readmission was a complication of care or infection.

There are also a number of procedures where it is not clear that the procedure will be planned at least 80% of the time. This includes procedure such as 341 incision of mediastinum, 0123 reopening of craniotomy site, 5491 percutaneous abdominal drainage, and 3942 revision of arteriovenous shunt for renal dialysis. This is another reason why it is important to take into account the relationship to the prior admission or the principal diagnosis for the readmission.

Lastly, there are some procedures on the planned procedure list that are generally not O.R. procedures and/or aren't necessarily the primary reason for the hospitalization. Examples include: 640 circumcision, 9652 irrigation of ear, 9546 other auditory and vestibular function test, 9716 replacement of wound packing or drain. Also, the list of procedures should only contain valid 3-digit and 4-digit ICD-9-CM procedure codes, not any 2-digit or 3-digit header record codes (e.g., 21 operations on nose, 241 diagnostic procedures of teeth, gums, and alveoli).

G. Risk Adjustment:
As described earlier, the proposed risk adjustment methodology omits key clinical variables, uses clinically less specific variables, and does not include any approach for SES factors. Following is a further description of these issues.

The proposal omits four key clinical variables – reason for admission (PDX), acuity of hospitalization, major chronic respiratory conditions, and other complex chronic conditions, all of which have been shown in various analyses and publications to be major drivers of pediatric readmissions.

1. Re Principal Diagnoses (PDXes): For most of the more common LRI PDXes such as bronchiolitis, pneumonia NOS, asthma with bronchiolitis or pneumonia, and influenza with pneumonia or other (upper) respiratory manifestations, readmission rates tend to be in the 3% to 5% range. For some of the less common but more serious LRI PDXes such as pseudomonal pneumonia, pneumonia with other gram negative bacteria, or septicemia with other gram negative bacteria, readmission rates are in the 10% to 15% range (see references in Section II (2) of this document; also, 3M pediatric analyses).

2. Re Acuity of Hospitalization: Readmission rates vary very significantly with higher levels of acuity. To illustrate, for APR-DRG 138 Other Pneumonia (excludes aspiration pneumonia and major bacterial pneumonia PDXes), the overall rate for readmission chains using a somewhat broader set of exclusions is about 4%, with a range from 2% for severity level 1, 3 ¼% for severity level 2, 8% for severity level 3, and 10% for

severity level 4 (3M pediatric analyses).

3. Re Major Chronic Respiratory Conditions: For pediatric LRI patients with diagnoses of bronchopulmonary dysplasia (BPD), cystic fibrosis (CF), chronic respiratory failure, or ventilator dependence, the readmission rate for readmission chains tends to be in the range of 10% to 15%. Patients awaiting organ transplant (e.g., subset of CF patients) have even higher readmission rates (3M pediatric analyses).

4. Re Other Complex Chronic and Technology Dependence Conditions: There have been numerous studies identifying that, children with complex chronic conditions (e.g., nervous system, blood, immunologic, renal) and technology dependence conditions (e.g., ventricular shunt, gastrostomy, TPN status) have high rates of hospitalization and readmission (see references in Section II (2) of this document; also, 3M pediatric analyses).

The proposal does not take these specific variables into account. *Instead, it uses four clinically less specific variables* - age, gender, presence of any CCI chronic condition, and number of chronic condition "body systems" per the AHRQ Chronic Condition Indicator (CCI) system. There are also important limitations to these four variables.

1. Age: Age can provide some differentiation, but would be better used in conjunction with other more specific clinical variables. To illustrate, of all pediatric LRI patients, those patients age 0 years and 12-17 years have higher overall readmission rates than patients age 1-4, 5-7, and 8-11 years, but there are very substantial differences within each age range.

   The pediatric LRI proposal didn't include explanatory power statistics, but the parallel pediatric all-conditions readmission proposal identifies that age accounts for 30% of the variance explained by the proposed risk adjustment methodology. This would likely be a lot less if the other variables and were more clinically specific.

2. Gender: The pediatric LRI proposal did not include explanatory power statistics, but the parallel pediatric all-conditions readmission proposal identifies that gender accounts for just 1% of the variance in the proposed risk adjustment methodology. This being the case, it is not clear why gender was included in the methodology?

3. Presence of any Chronic Condition per the AHRQ CCIs: The proposal makes no attempt to distinguish among the approximately 4,500 diagnoses on the list of conditions. It also makes no attempt to distinguish between the CCI "body systems." It just counts for the presence of any condition and multiple CCI "body systems." Accordingly, it is severely lacking in clinical specificity.

4. Number of Chronic Condition "Body Systems" per the AHRQ CCIs.

   There are a number of limitations to using the AHRQ CCIs for risk adjustment for pediatric readmissions. It first must be recognized that the CCIs are only intended to categorize the ICD-9-CM diagnoses codes into two categories, chronic and not chronic. "Chronic" is intended to mean a condition expected to last 12 months or longer and which either places limitations on the person or results in the need for ongoing medical services (or both).

   Judgments were made for the CCI system about which DXes to consider as chronic, except that all DXes with "chronic" in their ICD-9-CM title and all congenital anomaly diagnoses were automatically assigned to the chronic category. It is a problem that this has not been taken into account because not every ICD-9-CM diagnosis with the word "chronic" is necessarily expected to last 12 months or longer and create an ongoing limitation or medical service need (e.g., chronic otitis media). Likewise for congenital anomaly diagnoses (e.g., congenital skin pigmentation anomaly).

   Following are eight specific limitations of the AHRQ CCIs as used for risk adjustment for pediatric readmissions.

   - First, the AHRQ CCIs are a very broad listing of chronic conditions including about 4,500 DX codes, many that are relatively mild or have little impact on hospitalization (e.g., allergic rhinitis, chronic otitis media, chronic gingivitis).

   - Second, some of the diagnoses included in the CCIs are for conditions that are acute (e.g., acute osteomyelitis, acute stress reaction), some are not necessarily chronic (e.g., hearing loss NOS, premature beats NOS), and some are usually not chronic (e.g., congenital pyloric stenosis, persistent fetal circulation).

   - Third, there are particular problems with the use of the CCI respiratory chronic DXes. The problems are not unique to respiratory, but pronounced because of case volume. The most common of the chronic respiratory DXes – asthma, allergic rhinitis, chronic tonsillitis - are associated with lower readmission rates. One of the more serious chronic respiratory conditions, DX 7707 chronic respiratory conditions arising in perinatal period (bronchopulmonary dysplasia), is not included in either the chronic respiratory or chronic perinatal conditions list.

   - Fourth, the proposal does not make any distinction by specific CCI body system. They are all counted as the same. To illustrate, for the 1,743 hospitals in the "Max" Medicaid dataset, 49% of the CCI body system counts were for CCI chronic

respiratory conditions and these are given the same weight as all other CCI body system counts.

- Fifth, the proposal treats having no CCI condition and having one CCI condition as the same. This is probably related to the prior problems – that many of the CCIs are for chronic conditions that are relatively mild or have little impact on readmissions. This is problematic because the impact of complex chronic conditions is ignored unless accompanied by a CCI diagnosis from another chapter of ICD-9-CM, which may or may not be a serious condition.

- Sixth, the CCIs do not attempt to distinguish the more complex from less complex chronic conditions within each body system (e.g., end stage renal failure vs. bladder neck obstruction; major depressive disorder vs. tic disorder NOS; gastrostomy status versus overweight as represented by BMI 30-39).

- Seventh, the CCIs do not provide a reliable way to count body systems. They are organized by the 18 chapters of ICD-9-CM which often contain several body systems (e.g., cardiovascular and cerebrovascular), and sometimes do not align at all with clinical body systems, especially for childhood conditions.

  To illustrate, there is an ICD-9-CM chapter for congenital anomalies. This includes anomalies from all body systems. So, a child with multiple anomalies across many body systems would be counted as having a CCI in only one body system. Conversely, a child with an anomaly in one body system, but with a related chronic condition DX from the same body system but another chapter of ICD-9-CM would be counted as having CCIs from multiple body systems.

- Eighth, the count of CCI body systems does not take into account multiple comorbid chronic conditions within the same body system. To illustrate, a child with cerebral palsy and seizure disorder and encephalopathy is far more complex and likely to have many more hospitalizations than a child that has cerebral palsy but no other neurologic comorbidities, but are all classified the same.

Regarding Socioeconomic Status Factors: The proposal includes a summary level analysis showing effects of *payor status* and *race/ethnicity* on readmissions, but does not develop it into a proposal for handling SES factors for risk adjustment purposes. Section I.b.4 of the proposal presents 1 ½ pages of summary level results from a disparities analysis of the 2005-2009 AHRQ Revisit data for New York and Nebraska and the 2007-2008 Max (Medicaid) dataset. It showed that after controlling for case mix per the proposal's methodology (age, gender, presence of any CCI chronic condition, and count of CCI chronic conditions), readmission rates were higher for children with Medicaid insurance

than other forms of insurance. It also showed that readmission rates were higher for children who were Black or Hispanic, with part of this explained by insurance status. Lastly, it showed that some of the effect of insurance coverage correlated or overlapped with the effect of the individual hospital. It is not possible to tell, however, how much of this might be the effects of location, overall insurance mix, and unmeasured clinical case mix.

It would be very useful and important for these analyses to be conducted in a more detailed way, with more current data, and with more than one state (New York) that has information on all payors and race/ethnicity. It would also be important to consider other variables, such as hospital location and zip code of patients and income level by zip code, and use of clinically more specific case mix measures. We suggest this area receive further attention and development.

To summarize, the full proposed risk adjustment methodology consists of "a 2-level logistic regression model with fixed effect variables for patient case mix at the first level and random intercepts for hospitals at the second level." This is intended to account for hospital case mix, clustering of certain types of patients within hospitals, and differences in sample size across hospitals.

It is simply not possible, however, for a 2-level logistic regression model to compensate for omitting key clinical variables and working with variables that are clinically less specific and have many definitional issues. The adjustments for hospital random effects may be a way to adjust the predictive model for hospital-specific performance differences, though part of this also involves differences related to the limited clinical case mix methodology. More importantly, this doesn't help a hospital whose actual rates are greater than predicted rates due to deficiencies in the clinical case mix methodology. The opposite is also true for hospitals whose performance appears more favorable than it actually is.

Inpatient pediatric care includes a large number of admissions for common conditions with relatively low readmission rates. It also includes many admissions for high acuity and complex chronically ill children with much higher readmission rates. The methodologies for measuring and comparing preventable pediatric readmissions need to be highly specific if they are to be clinically credible and useful.