

Interpreting Variability in the Health Care Utilization of Children With Medical Complexity

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The prevalence of children with medical complexity (CMC) has increased in recent decades.^{1,2} This increase is attributable, in part, to advances in medical care that improved survival of children with chronic, congenital, or critical illnesses. These children account for a disproportionate amount of inpatient utilization. Among 6.9 million pediatric discharges in 2006, just 10.1% of pediatric admissions included children with complex chronic conditions (CCC)³; however, these admissions accounted for 26.1% of pediatric hospital days and 40.6% of pediatric hospital charges.³ Few data, however, examine variability of utilization across health care systems.

In this issue of *Pediatrics*, Ralston et al,⁴ by using an all payer claims database, examine variation in health care utilization in a population-based cohort of CMC across 4 children's hospitals in New England. This cohort was defined based on revised CCC discharge diagnosis codes³ further refined to minimize bias by excluding children with disease processes necessitating care at 1 specific hospital (eg, bone marrow transplantation). Claims data provided information on utilization across the continuum of care. Health care encounters, imaging studies, and diagnostic testing were compared among hospitals. The entire utilization of each patient was attributed to the hospital in which the patient spent most inpatient days or the hospital of the provider hospital service area⁵ in which the patient had the most number of outpatient visits.

Ralston and colleagues⁴ found high variation in rates of encounters, imaging, and diagnostics among the 4 hospitals: twofold variation in inpatient and intensive care days, threefold variation in head MRI, and fivefold variation in electrocardiography. Key differences in patient characteristics across the hospitals were adjusted for, notably median household income by zip code, percent Medicaid, and CCC diagnostic categorizations. This study highlights the substantial utilization by CMC; even children receiving care at the lowest utilizing hospital experienced over 400 inpatient days, 94 emergency department visits, and 917 office visits per 100 person-years.

The study should be interpreted in the context of several limitations. The population of CMC is inherently variable. Utilization was not examined by condition- or illness-specific processes and did not account for illness severity or location of testing (inpatient versus outpatient). Therefore, it is not possible to understand which aspects of utilization represent effective and necessary care. Additionally, socioeconomic status is a potentially important driver of health care utilization, especially given the impact of CMC on families' finances.⁶⁻⁸ Adjusting for only Medicaid incompletely accounts for socioeconomic status, as children in this study may receive Medicaid because of their degree of medical complexity rather than their family's economic circumstances.⁹ Additionally, although the use of household income classified by zip code is a valid

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ecological measure, zip code socioeconomic heterogeneity may limit its utility.¹⁰ Census tract measures of poverty or income may better account for socioeconomic differences when patient-level measures are not available.

So, how can we use the results of this study to advance the field?

Unwarranted variation, defined as variation due to differences in health system performance, is the target of standardization and improvement in health care.¹⁰ Unwarranted variability in utilization has been demonstrated for many pediatric medical and surgical conditions.^{5,11-14} It is likely that unwarranted variability is exaggerated in the care of CMC. With limited evidence and lack of consensus to guide practice, clinicians make medical decisions based on anecdotal personal experiences, engrained practice cultures, parental preferences, and their biases to intervene in the context of uncertainty.^{10,15,16} Subsequent studies should help us interpret unwarranted variability within condition- and disease-specific context to further our understanding of best practices.

Although utilization as a measure of system performance provides a powerful examination of health care costs, complementary work is needed to determine care practices of value. Highlighting variation or canonizing low users should not be our primary goal. Disease-specific outcomes, when they are evidence-based and measurable, are more important than utilization patterns. For example, the Cystic Fibrosis Foundation tracks BMI and forced expiratory volume as indicators of health in patients with cystic fibrosis, with lesser importance placed on utilization.¹⁷ Unfortunately, given the heterogeneity of conditions that lead to medical complexity and the lack of evidence for many conditions, disease-specific outcomes might not always be possible to measure.

There is promise in the evolution of outpatient and inpatient complex care clinical programs. Comprehensive and coordinated care programs for CMC have been associated with improved utilization outcomes; including decreased emergency department visits, decreased hospital days, and decreased costs.¹⁸⁻²¹

Further study of outcomes reflecting quality of care (eg, care coordination) and/or patient- or family-centered priorities (eg, quality of life) may provide complementary data to utilization patterns.²²

In conclusion, variation in the utilization patterns for CMC likely indicates inefficiency and overuse. Further understanding the drivers of variation and identifying best practices will provide targets of focus as we strive to improve the health system caring for this important population.

ABBREVIATIONS

CCC: complex chronic condition
CMC: children with medical complexity

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GETTING THE RIGHT FIT: *Recently, I needed to buy a new pair of trousers. I did not have much time to make a decision so I went to a large department store to browse their selection. While I have a fairly standard waist and leg length, I grabbed several different sizes of each pant style I liked. The sales clerk looked at me a touch quizzically as I staggered into the dressing room with an armload of pants but I knew from experience there was bound to be a lot of variation. As I tried them on I could not help but wonder how such similar pants could fit so differently. For example, depending on the manufacturer, pants with a 32-inch or 33-inch waist fit best, while pant lengths from 31-33 inches seemed best. Some seemed tight across my thighs while others were loose. It turns out that the fit of pants or other men's clothing is not purely chance.*

As reported in T: The New York Times Style Magazine (Business of Style: September 3, 2015), clothing manufacturers often use a fit model to help with sizing details. Fit models do not walk the runways or model clothes for glossy photographs. Rather, they help the designer actually improve the fit of the clothes. A fit model wears the prototype clothing made by the designer and makes recommendations about the fit to include such things as the height of the waist band, the tightness in the armhole, or the gap in the fly. Essentially, the fit model helps make sure the clothing designed is actually functional. The most in-demand fit model in men's clothing is, amazingly enough, 54 years old. He is 5-foot-11, 175 pounds, and has a 32 inch waist. He is in so much demand that a few years ago his body was scanned, and the images used to create mannequins with his exact dimensions. These mannequins can be used as guides to tailor clothing, but he still goes to 1,400 fittings a year, charging approximately \$300 an hour. Most designers do not use other fit models so his measurements are simply scaled up or down for larger and smaller sizes. I am not sure if the trousers that fit me best were tested by him, but I am glad that someone is looking out for fit rather than just style.

Noted by WVR, MD

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