

Preventive Care for Chronically Ill Children in Medicaid Managed Care

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The Health Resources and Services Administration's (HRSA's) Maternal Child Health Bureau defines children with special healthcare needs (CSHCN) as "Those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally."¹ In the United States, estimates range between 10% and 20% for children with chronic health issues.² The estimated prevalence in New York State (NYS) generally matches these national estimates, with 22.3% of all NYS children reported as having at least 1 chronic health condition.^{3,4}

In terms of their more complicated health needs, CSHCN represents an even larger proportion of healthcare utilization.⁵⁻⁹ While these children often require condition-specific services to optimize their health or functioning, they also benefit from preventive services, such as those included in the Recommendations for Preventive Pediatric Health Care.¹⁰ General preventive care for CSHCN is important because such services may reduce the need for intensive or specialized care beyond the standard treatment of their condition(s).^{11,12} Additionally, there is evidence that preventive care visits provide an opportunity for physicians to discuss and manage a child's chronic condition in addition to discussing recommended preventive care topics with parents, resulting in fewer unmet needs reported for CSHCN.¹³

Enrollment in health insurance is critical to accessing comprehensive and quality healthcare services, including preventive care.^{9,14-19} Yet possession of health insurance alone does not guarantee improved access or quality. In NYS, Medicaid managed care (MMC) plans provide health insurance for one-third of the state's approximately 4.5 million total children and for 82% of children in Medicaid generally. While we know that in 2008 the majority of these children received the recommended number of well-child visits from birth through 6 years, rates were much lower for other recommended preventive services, including annual dental and adolescent well-care visits, a trend that has been historically consistent.²⁰ Whether these rates have been even lower for CSHCN has not been studied.

While healthcare researchers have examined many aspects of children's healthcare, information is limited on how preventive care quality for

Objectives: To determine whether there is an association between the quality of child preventive care received and the existence of 1 or more chronic conditions.

Study Design: A retrospective study of all New York State children and adolescents enrolled in Medicaid managed care in 2008.

Methods: Using a cohort identified through mandatory annual quality reporting, a clinical algorithm was applied to administrative data to assign children to 3 health status levels: healthy/acute, minor chronic, and significant chronic. We performed bivariate and logistic regression analyses to compare the quality of care received by these 3 groups on 10 child-relevant preventive care services.

Results: One-fourth of the children in our cohort were deemed to have either minor or significant chronic health conditions. Children with chronic conditions generally had a higher or equal probability of receiving recommended preventive care compared with healthy or acutely ill children, even after controlling for member characteristics. For those services where children with chronic conditions were significantly more likely to receive a preventive care service, the risk ratios ranged from 1.03 to 1.11 for minor chronic children and from 1.03 to 1.17 for significant chronic children.

Conclusions: The quality of preventive health care for children with chronic conditions in New York State Medicaid managed care is equivalent to or better than that for healthy or acutely ill children. Investigating quality concerns for subpopulations of members by combining existing standardized quality measures with administrative health status data is a useful tool for informing state quality-improvement initiatives.

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Take-Away Points

Recommended preventive care can reduce chronically ill children's need for intensive or specialized care and reduce unmet needs. In New York State Medicaid managed care, and other care systems, utilization of preventive services has been less than ideal. This study investigated the comparability of rates for chronically ill and healthier children.

- Existence of chronic conditions did not adversely impact the ability of children to access and utilize recommended preventive care through Medicaid managed care.
- Generally, children with minor and significant chronic conditions received care at levels comparable or 3% to 17% higher than healthy and acutely ill children

CSHCN directly compares with that for children without special needs. Published research comparing these groups has been limited to utilization of specific service types, such as well-child visits, or general service use patterns, such as the number of physician visits.^{5-9,21} None have compared CSHCN with children without special needs across a range of recommended preventive services using standardized quality measures. Such research is particularly relevant as national interest in developing and expanding quality measures for children and their subpopulations gains momentum in conjunction with reducing disparities.

In this study, we examined the performance of NYS MMC plans using 10 existing, standardized child quality measures (representing a subset of all recommended child preventive care), stratifying the children by 3 levels of health status. Our goal was to determine whether CSHCN (defined as having minor or significant chronic conditions) received a range of recommended preventive care at a level comparable to that of children without chronic conditions in NYS MMC.

METHODS

Defining Health Status

In this analysis, we limited our definition of CSHCN to children having at least 1 chronic condition as defined by using Clinical Risk Grouping software. This is a proprietary 3M product which categorizes individuals into health status levels based on the type and severity of existing health conditions. Clinical Risk Group (CRG) levels are determined using a combination of diagnosis, pharmacy, and procedure information obtained from submitted healthcare claims and encounters. CRGs place individuals into 1 of 9 mutually exclusive levels, ranging from healthy to catastrophic, which were designed to act as a tool for case identification, program evaluation, and case management.²² This method of defining CSHCN is consistent with other attempts to identify high-needs children using a categorical approach, although it results in a somewhat different definition of CSHCN than HRSA's definition, which includes those at increased risk for a chronic condition.^{1,22}

Since their creation, CRGs have been tested and used in a variety of research and program applications.^{1,6,23-25} In

unpublished analyses from the Chronic Condition module of the NYS-sponsored 2005 Consumer Assessment of Health-care Providers and Systems (CAHPS) survey of MMC children, we found a high level of concordance (86%) between the CRG and self-reported positive screen for chronic conditions (based on the CAHPS CSHCN screener), indicating that CRGs are consistent with self-reported conditions. Other unpublished analyses examining children enrolled in Medicaid in 2008 through the Temporary Assistance for Needy Families program found that services for children in CRG levels 3 or higher cost 2.5 times more than for those in CRG levels 1 or 2. Since increased cost is generally associated with an increased number and/or intensity of services, this finding suggests that the service use of children in more chronic CRG categories is consistent with HRSA's service-based definition.

Based on the types of health conditions included in each CRG level, we created a health status indicator composed of the following 3 mutually exclusive categories (**Table 1**): 1) Healthy/acute, comprising healthy children and children with significant acute illness, defined by CRG levels 1 and 2; 2) Minor chronic, comprising children with minor chronic diseases, defined by CRG levels 3 and 4; and 3) Significant chronic, comprising children with extensive chronic conditions ranging from dominant/moderate chronic diseases through catastrophic conditions, defined by CRG levels 5 through 9. The most common health conditions included in each health status category for our cohort are listed in Table 1.

The CRGs for our cohort were calculated using 2008 encounter and claims data, except in the rare instances where there were insufficient member data, resulting in 2007 data being used. Children with no calculated CRG in either 2007 or 2008 and those not using any healthcare services were excluded from the analysis. Table 1 compares the proportion of children assigned to each of the 9 CRG categories within this study's final cohort and within the NYS MMC child/adolescent population.

Measuring Quality of Care

For this study, quality of care refers to the receipt of recommended preventive healthcare services. All NYS managed care plans are required to annually submit healthcare quality data and information to the NYS Department of Health (DOH) as part of its Quality Assurance Reporting Requirements (QARR).^{26,27} Health plans submit aggregate summaries of plan performance based on claims and medical records for measures defined by the National Committee for Quality Assurance's Healthcare

■ **Table 1.** CRG Levels and Common CRG Conditions by Health Status

Health Status Category	CRG Level	Proportion of NYS MMC Population ^a	Proportion of Study Cohort	Most Common CRG Conditions in Health Status Category
Healthy/acute	CRG = 1: Healthy	70.5	66.3	Healthy (82.5%); acute ear-nose-throat illnesses (4.2%)
	CRG = 2: History of significant acute disease	9.2	8.9	
Minor chronic	CRG = 3: Single minor chronic disease	5.5	6.5	ADHD (14.2%); chronic eye diagnoses (14.4%); psoriasis (13.8%); chronic joint/musculoskeletal diagnoses (8.0%)
	CRG = 4: Minor chronic disease in multiple organ systems	0.4	0.5	
Significant chronic	CRG = 5: Single dominant or moderate chronic disease	12.0	14.6	Asthma (47.2%); developmental delay (11.3%); schizophrenia (7.3%); obesity (4.9%)
	CRG = 6: Significant chronic disease in 2 organ systems	2.3	2.9	
	CRG = 7: Dominant chronic disease in 3 or more organ systems	0.02	0.02	
	CRG = 8: Dominant, metastatic, and complicated malignancies	0.1	0.1	
	CRG = 9: Catastrophic conditions	0.1	0.1	

ADHD indicates attention-deficit/hyperactivity disorder; CRG, clinical risk group; NYS MMC, New York State Medicaid managed care.

^aThe MMC population is restricted to members aged birth to 20 years with an assigned CRG in 2008 that indicated service use during the year. Proportions for cohort are not weighted.

Effectiveness Data and Information Set (HEDIS) and NYS DOH.²⁸ MMC plans are also required to submit member-level information to NYS for a subset of the full measure set. For this latter requirement, plans submit information for each MMC enrollee qualifying for at least 1 measure in the specified set. The submission identifies whether each member was eligible for each measure and, if eligible, whether the relevant service was received. Data submitted for QARR are reviewed by independent auditors for accuracy and completeness.

For this study we examined 10 child-relevant HEDIS preventive care measures submitted to NYS DOH as part of the QARR MMC member-level reporting requirements for the 2008 measurement year. For 8 of the 10 measures, plans were allowed to submit samples instead of full population data, with the sampling methodology dictated by HEDIS specifications. Five of the measures were collected biannually and related data were collected for the 2007 measurement year.

Outcome Measures

Our general approach to examining preventive care quality for our cohort was to compare each preventive care measure's performance rate across the 3 health status groups. The performance rate is the proportion of children receiving the recommended preventive care service, as specified by HEDIS. Since each quality measure has its own HEDIS-defined requirements regarding member eligibility for inclusion, the children in each measure differ slightly but are not necessarily mutually exclusive. For the sampled measures, population

performance rates were generated by applying measure- and plan-specific weights and then stratifying the analysis by plan.

Member Characteristics

The sociodemographic variables used for these analyses were obtained from Medicaid enrollment data and include: sex, race/ethnicity, age group, aid category, receipt of cash assistance, and region of residence (Table 2). Since sociodemographic variables are believed to be potential confounders in predicting access and quality, we chose to control for any disproportionate influence they might have on performance outcomes.^{8,9,29} Primary care service utilization may also be related to receipt of recommended preventive care services, so we controlled for this factor as well.

Statistical Analysis

We began the analysis by examining the bivariate performance rates for each measure across the 3 health status categories. This was done using analysis of variance and Scheffé's multiple comparison methodologies for the population measures and a generalized least squares methodology for the sampled measures. We then obtained relative risk ratios (RRs) using generalized linear modeling to determine the probability of measure performance for the minor chronic and significant chronic categories in comparison with the healthy/acute group. Relative RRs are more appropriate than odds ratios for predicting variables with common outcomes.³⁰ For each measure we generated 2 RRs from separate regression models: 1) an unadjusted model

■ **Table 2.** Demographic Characteristics by Health Status

Characteristic ^a	All Children	Healthy/Acute (CRG ≤2)	Minor Chronic (CRG = 3 or 4)	Significant Chronic (CRG ≥5)
Total				
n	606,301	456,109	42,592	107,600
%	100	75.2	7.0	17.8
Sex, %				
Male	49.0	47.3	48.0	56.0
Female	51.0	52.7	52.0	44.0
Race and ethnicity, %				
Non-Hispanic white	21.1	21.6	23.4	18.3
Non-Hispanic black	22.7	22.9	17.1	24.1
Hispanic	39.3	38.4	39.8	42.8
Other	16.9	17.1	19.6	14.8
Age group, %				
Early childhood, 0-5 y	30.3	30.2	21.2	34.5
Middle childhood, 6-11 y	30.8	31.0	30.9	29.6
Adolescence, 12-20 y	38.9	38.8	47.9	35.9
Aid category, %				
SSI	5.0	2.7	6.8	13.9
TANF	94.5	96.8	92.5	85.8
Received cash assistance, %				
Yes	29.5	27.3	27.0	39.9
No	70.5	72.7	73.0	60.1
Region of residence, %				
New York City	80.8	81.2	80.5	79.3
Rest of state	19.2	18.8	19.5	20.7
Primary care utilization (mean No. of visits in 2007)				
	3.6	3.2	4.2	5.0

CRG indicates clinical risk group; SSI, Supplemental Security Income; TANF, Temporary Assistance for Needy Families.
^aP values are <.0001 based on χ^2 comparisons across health status categories for all characteristics. 1.4% of the study cohort had incomplete demographic data.
 Proportions and numbers are not weighted.

predicting performance based solely on health status; and 2) an adjusted model predicting performance based on health status and member characteristics. This study was approved to include minors by the NYS DOH Institutional Review Board.

RESULTS

Cohort Characteristics

There were 606,301 unique members who were identified as being included in at least 1 of the 10 examined measures. Three-fourths of our cohort fell into the healthy/acute category, 7.0% fell into the minor chronic category, and 17.8% were categorized as significant chronic (Table 2).

In examining the sociodemographic information of the

full cohort, males and females were evenly represented, with a consistent distribution across the age groups (Table 2). The largest proportion of children was Hispanic (39.3%), followed by an even split between non-Hispanic black (22.7%) and non-Hispanic white (21.1%). The vast majority of children (94.5%) were eligible for Medicaid through the Temporary Assistance for Needy Families program. Nearly one-third of the cohort received cash assistance. More than three-fourths of the children lived in the New York City (NYC) region. Significant chronic children were more likely to be male, non-white, and younger compared with the healthy/acute and minor chronic children. The significant chronic children also had higher rates of receiving Supplemental Security Income and cash assistance and had a slightly higher rate of liv-

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Table 3. Rates for the 2008 Children and Adolescent Preventive Care Measures by Health Status

Children/Adolescent Preventive Care Measure	Healthy/Acute (CRG ≤2)		Minor Chronic (CRG 3 or 4)		Significant Chronic (CRG ≥5)	
	n	Performance Rate	n	Performance Rate	n	Performance Rate
Weight assessment and counseling for children/adolescents, 2-17 y–BMI percentile ^a	5997	41.7	624	43.1	1655	45.7
Weight assessment and counseling for children/adolescents, 2-17 y–Nutrition ^a	5997	55.7 ^b	624	54.9	1655	62.8 ^b
Weight assessment and counseling for children/adolescents, 2-17 y–Physical activity ^a	5997	41.4 ^b	624	42.0	1655	46.9 ^b
Annual dental visit, 2-18 y	359,352	51.5 ^{b,c}	32,937	57.6 ^e	85,922	49.7 ^b
Chlamydia screening, 16-20 y	27,322	59.4 ^b	4650	60.4	7752	57.4 ^b
Childhood immunizations combo 3 (4312314), 2 y ^{a,d}	6364	69.6 ^{b,c}	272	77.8 ^e	1841	75.3 ^b
Lead testing, 2 y ^{a,d}	6367	86.1 ^b	275	90.2	1842	91.0 ^b
Well-child visits, 15 mo ^{a,d}	14,412	79.0 ^b	739	82.0	4371	85.3 ^b
Well-child visits, 3-6 y ^{a,d}	42,731	81.6 ^{b,c}	3658	89.4 ^e	8299	85.9 ^b
Adolescent well-care visits, 12-20 y ^{a,d}	51,493	60.3 ^{b,c}	5321	67.6 ^e	10,011	69.6 ^b

BMI indicates body mass index; CRG, clinical risk group; QARR, Quality Assurance Reporting Requirements.

^aFor these sampled measures the reported performance rate is calculated from the weighted sample; the number eligible is not weighted.

^bRates for the healthy/acute and significant needs groups are significantly different at alpha = 0.05.

^cRates for the healthy/acute and minor needs groups are significantly different at $P = .05$.

^dThese measures are collected biannually and were not collected in 2008. In accordance with QARR reporting, the 2007 data were analyzed for these measures.

All measures are registered to the Healthcare Effectiveness Data and Information Set (HEDIS) by the National Committee for Quality Assurance.

ing outside of NYC. Minor chronic children had the highest proportion of non-Hispanic whites and adolescents compared with the other 2 health status groups. Lastly, primary care utilization was lowest for the healthy/acute group and increased for both the minor chronic and significant chronic groups.

Quality of Preventive Care

Children in the significant chronic group had significantly higher bivariate performance rates than those in the healthy/acute group for 7 of the 10 preventive care measures (Table 3), were statistically lower on 2 measures (annual dental visit and chlamydia screening), and were equivalent on 1 measure (weight assessment/counseling–body mass index [BMI]). The adjusted RRs matched the bivariate trends for all measures except weight assessment/counseling–BMI and annual dental visit (Table 4). For these 2 measures, the adjusted RRs showed children in the significant chronic group had a higher probability of receiving a BMI percentile during a weight assessment counseling visit and an equal probability of having a dental visit compared with those in the healthy/acute group. For those measures with higher adjusted RRs for the significant chronic group, the probability of receiving a preventive care service ranged from 3% to 17% higher compared with the healthy/acute group (Table 4). Chlamydia screening was

the only preventive measure where the significant chronic group had a lower adjusted probability of performance, with the probability of receiving this screening being 4% lower for the significant chronic children.

Minor chronic children had significantly higher bivariate quality rates compared with the healthy/acute group on 4 of the 10 preventive care indicators and were statistically equivalent on the remaining 6 measures (Table 3). After controlling for member characteristics, the RR trends remained consistent with the bivariate trends for all but 2 measures (childhood immunization combo 3 and well-child visits for the first 15 months) (Table 4). For the 15-month well-child measure, the minor chronic group's adjusted RR became significantly higher compared with the healthy/acute group. For immunization, the adjusted RR became equivalent to that of the healthy/acute group. For those measures with higher adjusted RRs for the minor chronic group, the probability of receiving a preventive care service ranged from 3% to 11% higher for the minor chronic group compared with the healthy/acute group.

DISCUSSION

Our primary goal was to gain a better understanding of preventive care quality for children with chronic conditions.

■ METHODS ■

■ **Table 4.** Adjusted and Unadjusted Relative RR of Receiving a Service for the 2008 Children and Adolescent Preventive Care Measures

Children/Adolescent Preventive Care Measure	Minor Chronic (CRG 3 or 4)		Significant Chronic (CRG ≥5)	
	Unadjusted Relative RR ^a (95% CI)	Adjusted Relative RR ^{a,b} (95% CI)	Unadjusted Relative RR ^a (95% CI)	Adjusted Relative RR ^{a,b} (95% CI)
Weight assessment and counseling for children/adolescents, 2-17 y–BMI percentile ^c	1.03 (0.91-1.18)	1.05 (0.92-1.20)	1.10 (1.02-1.18)	1.12 (1.03-1.21)
Weight assessment and counseling for children/adolescents, 2-17 y –Nutrition ^c	0.99 (0.90-1.08)	1.03 (0.94-1.12)	1.13 (1.06-1.20)	1.14 (1.06-1.23)
Weight assessment and counseling for children/adolescents, 2-17 y –Physical activity ^c	1.01 (0.89-1.15)	0.99 (0.88-1.12)	1.13 (1.01-1.27)	1.14 (1.01-1.29)
Annual dental visit, 2-18 y	1.12 (1.11-1.13)	1.08 (1.07-1.09)	0.97 (0.96-0.97)	1.00 (0.996-1.01)
Chlamydia screening, 16-20 y	1.02 (0.99-1.04)	1.02 (0.99-1.05)	0.97 (0.95-0.99)	0.96 (0.94-0.98)
Childhood immunizations combo 3 (4312314), 2 y ^{c,d}	1.12 (1.02-1.22)	1.07 (0.98-1.17)	1.08 (1.05-1.11)	1.07 (1.03-1.11)
Lead testing, 2 y ^{c,d}	1.05 (1.01-1.09)	1.00 (0.96-1.05)	1.06 (1.04-1.07)	1.03 (1.01-1.05)
Well-child visits, 15 mo ^{c,d}	1.04 (0.99-1.09)	1.03 (1.00-1.05)	1.08 (1.06-1.10)	1.05 (1.04-1.07)
Well-child visits, 3-6 y ^{c,d}	1.10 (1.05-1.15)	1.10 (1.06-1.14)	1.05 (1.03-1.08)	1.05 (1.02-1.08)
Adolescent well-care visits, 12-20 y ^{c,d}	1.12 (1.04-1.20)	1.11 (1.03-1.19)	1.15 (1.11-1.20)	1.17 (1.11-1.22)

BMI indicates body mass index; CI, confidence interval; CRG, clinical risk; QARR, Quality Assurance Reporting Requirements; RR, risk ratio.
^aThe referent group is children who are healthy or have acute illness (CRG ≤2).
^bAdjusted for sex, race/ethnicity, age group, aid category, receipt of cash assistance, region of residence, and number of primary care visits during 2007. For the chlamydia measure, sex and age were not included since the measure is restricted to adolescent females. For the immunization, lead testing, well-child visits in the first 15 months, and adolescent well-care measures, age was not adjusted for, since these measures are restricted to single-age groups. For the well-child and adolescent well-care measures the number of primary care visits was not included since these items directly measure receipt of primary care services.
^cFor these sampled measures, the RRs are calculated from the weighted samples.
^dThese measures are collected biannually and were not collected in 2008. In accordance with QARR reporting, the 2007 data are reported for these measures.
 All measures are registered to the Healthcare Effectiveness Data and Information Set (HEDIS) by the National Committee for Quality Assurance.

Our results show that chronic conditions did not negatively impact child preventive care in NYS MMC. Specifically, after adjusting for member characteristics, children in the significant chronic group generally had a higher probability of receiving preventive services compared with those in the healthy/acute group, while those in the minor chronic group were at least comparable to children in the healthy/acute group on all measures. Since we controlled for primary care utilization, this finding cannot be solely attributed to CSHCN having inherently more interactions with the healthcare system.

For the chlamydia screening measure, the significant chronic group had a lower adjusted probability of receiving services compared with the healthy/acute group. The reason for the lower screening rate is not clear. One factor may be that some young women in the significant chronic group received reproductive services or medications for conditions not related to sexual activity but which the measure's eligibility criteria specify as a determinant of sexual activity. Another factor may be that physicians assess the applicability of this

service differently for patients with disabilities. Regardless, the magnitude of the disparity was relatively small.

Overall, one-fourth of our cohort fell into the minor chronic and significant chronic categories. This proportion falls within the higher end of other reported CSHCN rates but is consistent with the 22.9% rate reported for NYS public health insurance in the 2007 National Survey of Children's Health's Child Health and System Performance Profile.^{2,4} Generally we would expect to see a higher prevalence of CSHCN within our Medicaid-based cohort due to the known relationship between lower socioeconomic status and health issues, as well as the inclusion of disability in the Medicaid eligibility criteria.^{8,31,32}

While our finding that children with chronic conditions are receiving preventive care at rates similar to healthy children in NYS MMC is important, this study also has implications beyond NYS. As federal child quality initiatives are implemented and healthcare reform focuses on the role of measurement to improve care quality and reduce disparities, states and health plans must find methods for collecting

timely, cost-effective, and reliable data. While some consider self-reported health status and medical record review the gold standards, these methods are rarely timely or cost-effective and are usually limited to a subset of the population.^{6,22} Likewise, aggregate results from available claims and encounter data provide limited information regarding the quality of healthcare for subpopulations. NYS's approach to these issues has been to synchronize and augment the strengths of existing information. The requirement of member-level data for selected quality measures has been integrated into the general requirements for annual state reporting. These requirements, in conjunction with an algorithm-based health status synthesized from claim and encounter data, create the flexibility to perform in-depth reporting and quality improvement analyses efficiently and consistently over time.

The use of these standardized methods to define the quality of care and health status does have limitations. First, this study is limited to children insured through an MMC plan, meaning that uninsured children, children with private insurance, and those not enrolled in MMC are not represented. However, NYS MMC covers 32% of children in NYS, a substantial proportion of the NYS child and adolescent population. Additionally, the QARR quality indicators do not measure many of the diverse services and needs more frequently required by CSHCN, a national concern which is being partially addressed through Children's Health Insurance Program Reauthorization Act of 2009 (CHIPRA)-funded measure development. These generalized measures do, however, address the healthcare services recommended for all children, including CSHCN, although many quality benchmarks for subpopulations are not available. Finally, while performance rates for children with chronic conditions met or exceeded those of healthy children for most measures, overall performance rates were still below 60% for many measures. While the NYS rates are actually higher than those reported nationally,³³ they still indicate that quality improvement is needed statewide.

Using CRGs as a standardized method for defining health status also has its limitations. First, CRGs are only as accurate as reporting by health plans. Second, they are biased toward conditions that require frequent interaction with the healthcare system.²² The impact of this bias is unclear. While CRGs may misclassify CSHCN as healthy or non-users when chronic conditions do not result in frequent healthcare encounters (perhaps due to the nature of the condition or barriers to care), CRGs are also more likely to capture conditions that are missed through self-reporting because parents do not view them as chronic or as substantially impacting the child's quality of life. Despite these potential limitations, other methods for defining CSHCN are often time- and resource-intensive and may not include samples comparable to those of

standardized measurement sets. This is particularly true when using self-reported health status, a common method of designating CSHCN. One last limitation of CRGs is that they do require the use of proprietary software, which may create a financial barrier for some agencies. However, there are several other, non-proprietary, standardized methods available for using administrative data to stratify populations by chronic conditions.³⁴

While this study provides an initial picture of preventive care for CSHCN, there are other, more in-depth topics deserving investigation, including comparing the performance rates of minor chronic and significant chronic children, determining the role of sociodemographic factors in performance, and examining clinical considerations and provider-level characteristics influencing treatment decisions. The role of CRG severity, an additional property of CRGs accounting for disease, should also be investigated. Ultimately, this and similar analyses can be used to inform population-focused quality-improvement initiatives leading to improved care quality through health plan engagement.

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