

# Rate of Spending on Chronic Conditions Among Medicaid and CHIP Recipients



**WHAT'S KNOWN ON THIS SUBJECT:** Previous analyses have documented that the prevalence of children with chronic conditions is growing and is responsible for increased growth in hospital charges; however, such utilization trends have not been documented in Medicaid and the Children's Health Insurance Program.



**WHAT THIS STUDY ADDS:** From 2007 through 2010 in Illinois, children with chronic conditions became Medicaid and Children's Health Insurance Program recipients at a higher rate than healthy children. In contrast to studies of hospital data, this analysis found per-member spending decreases in most chronic condition groups.

## abstract

**OBJECTIVE:** To evaluate the rate at which children with and without chronic conditions became recipients of Medicaid and the Children's Health Insurance Program (CHIP) during a period of economic recession and to evaluate changes in spending and service utilization among children with chronic conditions.

**METHODS:** Child recipients of Illinois fee-for-service Medicaid and CHIP from 2007 to 2010 were assigned to 5 chronic condition groups using 3M Clinical Risk Group software. Outcome measures were change in recipient number in each chronic condition category, total and per capita spending changes within various categories of service, and changes in service utilization.

**RESULTS:** From 2007 to 2010, children with chronic conditions became recipients of Illinois fee-for-service Medicaid and CHIP at a higher rate than children without chronic conditions (26.7% vs 14.5%). Inflation-adjusted mean spending fell with a linear trend in all chronic condition categories except malignancy ( $P < .001$ ). Per member inpatient and emergency department service utilization fell and outpatient service utilization increased in all condition categories. Average inpatient length of stay declined in all chronic condition groups ( $P < .001$ ) but not in children without chronic conditions.

**CONCLUSIONS:** From 2007 to 2010, a period of severe economic recession, a disproportionately high number of children with chronic conditions became Illinois Medicaid and CHIP recipients. Total spending increases were driven by an increase in the number of recipients with the most complex chronic conditions, not increases in per-member spending. *Pediatrics* 2014;134:e80–e87

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### KEY WORDS

children, chronic conditions, children with special health care needs, children with medical complexity, Medicaid, private insurance, Children's Health Insurance Programs (CHIP)

### ABBREVIATIONS

CHIP—Children's Health Insurance Program  
CRG—Clinical Risk Group  
ED—emergency department

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The proportion of children with chronic conditions has been rising, fueled by increased detection, higher prevalence of certain conditions, and improved survival rates of children with previously fatal conditions.<sup>1–12</sup> An increasing proportion of pediatric hospital admissions are for children with complex chronic conditions.<sup>13–15</sup> However, the apparent rise in childhood chronic condition prevalence and the associated fiscal consequences have not, to our knowledge, been documented in a state Medicaid program.

Medicaid spending has come under increased scrutiny since the 2007–2009 “Great Recession,” which led to a large increase in the number of children receiving coverage from Medicaid and the Children’s Health Insurance Program (CHIP).<sup>16</sup> Little is known about the prevalence of chronic conditions among these new recipients of Medicaid and CHIP. Illinois provides a unique opportunity to study the recession’s impact on changes in Medicaid and CHIP recipients; from July 2006 to June 2011, Illinois offered open access to public insurance to all state residents through the combined Medicaid and CHIP All Kids Program.<sup>17</sup> Families with higher incomes could buy into the program with a waiting period and a sliding scale of cost sharing approximate to that of private insurance. We hypothesized that a greater percentage of children with chronic illnesses than healthy children became All Kids Program recipients during the economic recession. We also posited that mean spending on children with the most progressive and complex conditions rose at a faster rate than in other populations and that these changes were driven by a disproportionate growth of inpatient hospital utilization.

To test these hypotheses, we conducted an analysis of Illinois All Kids Program claims from 2007 to 2010, a period that

encompasses the recession and during which program eligibility criterion and reimbursement levels remained unchanged. We evaluated whether children with chronic conditions became recipients of the All Kids Program at a greater rate than children without chronic illnesses during a period of economic recession. We also examined changes in mean spending and service utilization among children with chronic conditions within the All Kids Program.

## METHODS

### Data Source

The All Kids Program provided access to health care coverage from the State of Illinois to all uninsured children between July 2006, when the program was inaugurated, and June 2011, when eligibility was limited to children with family income <300% of the federal poverty level. The All Kids Program is a mixture of a Title XIX Medicaid Program, Medicaid Expansion, a CHIP-funded Medicaid Expansion, and a standalone CHIP-like program in Illinois in which families can purchase Medicaid coverage. For this study, we obtained All Kids Program claims data from January 2006 to December 2010 for individuals under age 19 years from the State of Illinois Department of Healthcare and Family Services under a data-sharing agreement; this study was approved by the Institutional Review Board at the Ann and Robert H. Lurie Children’s Hospital of Chicago.

### Inclusion Criteria

We defined recipients as those enrolled in the All Kids Program who had  $\geq 1$  service claim in a given year. The number of recipients was adjusted to account for those enrolled <12 months in a given year. For example, if a recipient was enrolled in the All Kids Program for 6 months, he or she was counted as 0.5 of a recipient. Age was

determined at the time of the recipient’s first service in a given year.

The study period was January 1, 2007, to December 31, 2010. Data from 2006 were only used to determine the Clinical Risk Group for recipients in 2007 (discussed subsequently). We excluded recipients with claims paid by managed care programs and third parties (such as private insurers) to focus on pure fee-for-service recipients, who comprised 83.9% to 85.5% of all Medicaid recipients in Illinois during each year in the study period, and because claims data were incomplete for those recipients enrolled in managed care or third-party insurance. For example, in 2010, there were 1 577 175 unique recipients. After adjustment for months of enrollment, there were 1 473 835 recipients in 2010, with 128 617 in managed care, 92 668 receiving third-party payments and 4004 receiving both managed care and third-party payments. This left 1 248 546 pure fee-for-service recipients in 2010. Of note, children enrolled in the state’s Primary Care Case Management program, which provides a \$2 per member per month payment to primary care physicians in addition to fee-for-service claims, were considered fee-for-service recipients.

### Data Definition

We used Clinical Risk Group (CRG) software to assign each recipient to a single, mutually exclusive CRG based on the individual’s diagnoses and health service utilization over a period of time. The CRG software is a risk adjustment method developed by 3M Health Information Systems and the National Association of Children’s Hospitals and Related Institutions.<sup>18–21</sup> The risk groups were further categorized into 5 groups following the methodology described by Berry et al<sup>15</sup>: nonchronic (CRG 1 and 2), episodic chronic (CRG 3,4, 5a; eg, asthma), lifelong chronic in a single

body system (CRG 5b; eg, sickle cell disease), complex and/or progressive chronic (CRG 6, 7, 9; eg, cerebral palsy, muscular dystrophy), and malignancy (CRG 8; eg, acute lymphoblastic leukemia). In our study, 1 year of previous claims data were used to make a CRG category assignment in this study, rather than 3 years as described by Berry et al.<sup>15</sup> A sensitivity analysis indicated a >99% concordance in CRG assignment when 1, 2, or 3 years of previous claims data were used to assign CRG status, with added specificity attributed to the inclusion of outpatient and pharmaceutical data in Medicaid claims data that was not available in hospital administrative data.

We classified claims data into 5 service categories: (1) inpatient medical (includes inpatient admissions and inpatient physician services but not inpatient mental health admissions), (2) outpatient medical, (3) emergency department (ED), (4) pharmacy, and (5) other services (includes inpatient and outpatient mental health, home health, durable medical equipment, medical supplies, therapies, transportation, and a variety of other services).

### Data Analyses

Recipients' demographic characteristics were collected, including age, gender, and race/ethnicity for 2010 after determining there was no significant difference in demographic characteristics between 2007 and 2010. We totaled the number of recipients in each CRG group for each year; percent growth was calculated in reference to 2007. Mean per-member spending and services were calculated for each CRG group and service category. Spending reflects actual payment by the state of Illinois in response to claims, not charges or costs. "Mean services" refers to the mean number of encounters for inpatient, outpatient, and emergency categories, and the mean number of prescribed

medications filled in the pharmacy category. The percent change was computed as the difference between 2007 and 2010. Within each CRG group, mean per-member per-month spending was calculated for each year. Analysis of variance was used to determine statistical significance and a linear trend in mean spending among the years. Mean spending data before 2010 were adjusted to 2010 dollars using the Medical Consumer Price Index.<sup>22</sup> For inpatient services, we calculated mean length of stay and number of admits in each CRG category and compared between 2007 and 2010 using a *t* test. SPSS statistical software version 21 was used for all analyses.

### RESULTS

Table 1 presents demographic information for Illinois All Kids Program recipients in 2010. Recipients were diverse in terms of age, gender, and race. In 2007, 308 761 recipients had chronic illnesses, which increased to 391 314 in 2010, a 26.7% increase (Fig 1A). The number of recipients without chronic illness grew from 748 342 to 857 232 over the same period of time, a 14.5% increase. Among specific chronic condition subpopulations, recipients with episodic chronic, malignant, and complex/progressive conditions

had similar rates of increase from 2007 to 2010, whereas recipients with lifelong chronic conditions in a single body system increased at a slower rate (Fig 1B). Numbers of recipients per year and per CRG are reported in Table 2.

As shown in Table 2, total spending increased in all chronic condition groups except for the group with lifelong chronic conditions in a single body system. However, mean per-member spending fell following a linear trend ( $P < .001$ ) in all 5 chronic condition groups between 2007 and 2010, except for the malignancy group; in this group, spending fell but did not achieve statistical significance. The percent decrease in spending ranged from 11.5% to 19.0%.

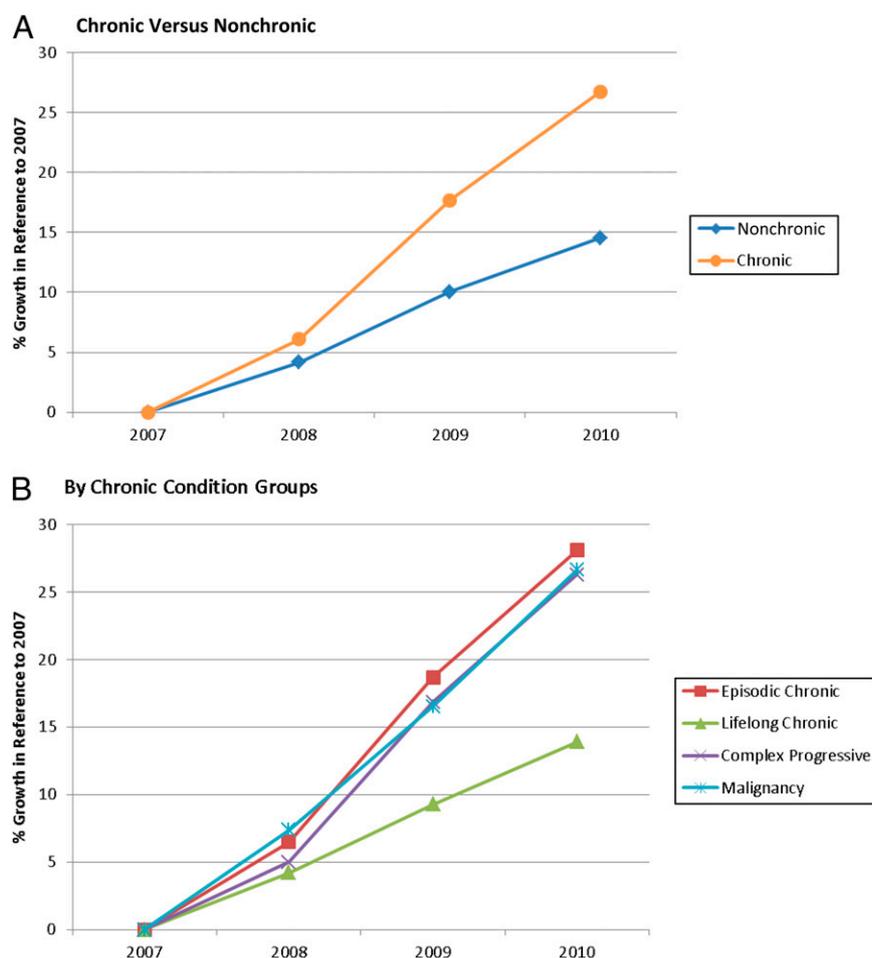
Figure 2 shows the percent change in per-member, inflation-adjusted spending, and mean service utilization within each chronic condition and each service category. Inflation-adjusted per-member spending declines occurred in all categories of service and all chronic condition groups, except for an increase in spending on ED services in the lifelong chronic and complex chronic groups (Fig 2A). However, examination of service utilization showed consistent decreases in per-member inpatient service use and ED service use, coupled with increases in outpatient medical service use (Fig 2B). Per capita pharmacy service utilization showed minimal change in different condition groups.

Table 3 provides more detail on changes in inpatient utilization, showing fewer admissions in the nonchronic, episodic chronic, and lifelong chronic groups despite increases in the number of recipients in these groups. Mean length of stay declined in all groups except for the nonchronic group, which remained constant. Overall, despite recipient growth, total medical hospital days for children in the All Kids Program fell from 572 645 to 425 268 between 2007 and 2010.

**TABLE 1** Demographic Characteristics of Illinois All Kids Program Recipients in 2010

	n (%)
Total recipients <sup>a</sup>	1 577 175
Age (y)	
<1	92 623(5.9)
1–4	387 027(24.5)
5–12	654 890(41.5)
13–18	442 626(28.1)
Gender	
Male	781 187(49.5)
Female	795 988(50.5)
Race	
White	517 803(34.1)
African American	436 013(28.7)
Hispanic	521 666(34.4)
Other	42 684(2.8)

<sup>a</sup> Unadjusted for months of enrollment.



**FIGURE 1**  
Growth in the number of Illinois All Kids Program recipients, 2007–2010.

## DISCUSSION

Using fee-for-service claims data from the Illinois All Kids Program, we found that children with chronic conditions became recipients at a higher rate during a period of program expansion and severe economic recession than children without chronic conditions. Unexpectedly, we found that per-member spending fell significantly in most chronic condition groups and that there was a shift from inpatient to outpatient service utilization. Together these data suggest that an influx of children with chronic conditions during the economic recession drove total spending increases but not per-member spending growth.

Although existing data have shown a rise in chronic condition prevalence

generally<sup>1,2</sup> and in inpatient settings,<sup>13–15</sup> to our knowledge, this study is the first to quantify an increase in chronic condition prevalence in a state Medicaid program as well as describe the associated fiscal consequences.

US Census data from Illinois indicate that as All Kids Program enrollment increased, private insurance coverage dropped and the number of uninsured children remained unchanged during the study period.<sup>23</sup> Thus, it is likely that a large number of the new recipients in the All Kids Program were previously enrolled in private insurance. It is well documented that during and after the recession, a large number of children enrolled in Medicaid and CHIP because of parental job loss and di-

minished access to employer-sponsored insurance,<sup>24</sup> federal incentives to enroll children in Medicaid and CHIP,<sup>25</sup> voluntary substitution of private insurance coverage for public coverage,<sup>26</sup> and the Maintenance of Effort provisions of the Recovery and Affordable Care Acts preventing states from reducing Medicaid and CHIP enrollment.<sup>27</sup> Our study adds a new potential dimension to such coverage shifts by raising the possibility that children with chronic illness may be more likely than healthy children to become recipients of public insurance coverage during an economic recession. Because our study does not directly measure private health insurance coverage of children with chronic conditions, further investigation with studies

**TABLE 2** Illinois All Kids Program Spending<sup>a</sup> for Recipients by CRG, 2007–2010

	2007	2008	2009	2010	Change 2007–2010 (%)
<b>Nonchronic</b>					
Recipients	748 342	779 519	823 452	857 232	14.6
Monthly payments per member (mean ± SD)	\$80 ± 1061	\$78 ± 792	\$76 ± 632	\$71 ± 573	–11.6 <sup>b</sup>
Total payments	\$722 455 806	\$725 390 948	\$757 281 727	\$731 409 321	1.2
<b>Episodic chronic</b>					
Recipients	235 251	250 536	279 191	301 304	28.1
Monthly payments per member (mean ± SD)	\$209 ± 2570	\$194 ± 2060	\$180 ± 1656	\$173 ± 1538	–17.2 <sup>b</sup>
Total payments	\$590 470 867	\$584 899 129	\$604 576 815	\$627 230 781	6.2
<b>Lifelong chronic</b>					
Recipients	22 758	23 718	24 866	25 922	13.9
Monthly payments per member (mean ± SD)	\$856 ± 8499	\$793 ± 6576	\$756 ± 6263	\$694 ± 5769	–19.0 <sup>b</sup>
Total payments	\$234 239 513	\$226 073 533	\$225 917 584	\$216 233 757	–7.7
<b>Complex progressive</b>					
Recipients	49 868	52 355	58 267	62 971	26.3
Monthly payments per member (mean ± SD)	\$1512 ± 10 652	\$1431 ± 9265	\$1368 ± 9414	\$1277 ± 9006	–15.6 <sup>b</sup>
Total payments	\$905 687 448	\$899 848 047	\$957 271 625	\$965 537 766	6.6
<b>Malignancy</b>					
Recipients	883	948	1029	1118	26.6
Monthly payments per member (mean ± SD)	\$3519 ± 17 223	\$2737 ± 12 271	\$3074 ± 15 918	\$3113 ± 17 267	–11.5
Total payments	\$37 300 011	\$31 173 286	\$38 021 871	\$41 793 470	12.0
<b>All recipients</b>					
Recipients	1 057 103	1 107 076	1 186 805	1 248 546	18.1
Monthly payments per member (mean ± SD)	\$196 ± 3087	\$186 ± 2572	\$181 ± 2530	\$172 ± 3345	–12.3 <sup>b</sup>
Total payments	\$2 490 153 645	\$2 467 384 943	\$2 583 069 621	\$2 582 195 365	3.7

<sup>a</sup> Adjusted to 2010 dollars using Medical Care consumer price index.

<sup>b</sup>  $P \leq .001$  for percent change between 2007 and 2010 as well as trend over 4 years.

specifically designed to measure insurance migration in such children should be conducted.

The statistically significant decline in inflation-adjusted, per capita spending in most chronic condition groups was an unexpected finding because studies based on hospital data have suggested high charge growth in children with chronic illness.<sup>13,15</sup> There are several important differences between those studies and this investigation. First, hospital-based studies used data from multiple payers, whereas this study was limited to a single public payer, the Illinois All Kids Program. Second, inpatient studies used charges or calculated costs to assess resource utilization, whereas this study used state payments, which reflects actual state budget liabilities but may not reflect the true cost of providing care. Finally, use of payer data allows examination of recipients throughout the continuum of care, not just those adversely selected through hospitalization. Such methodologic differences may help explain why

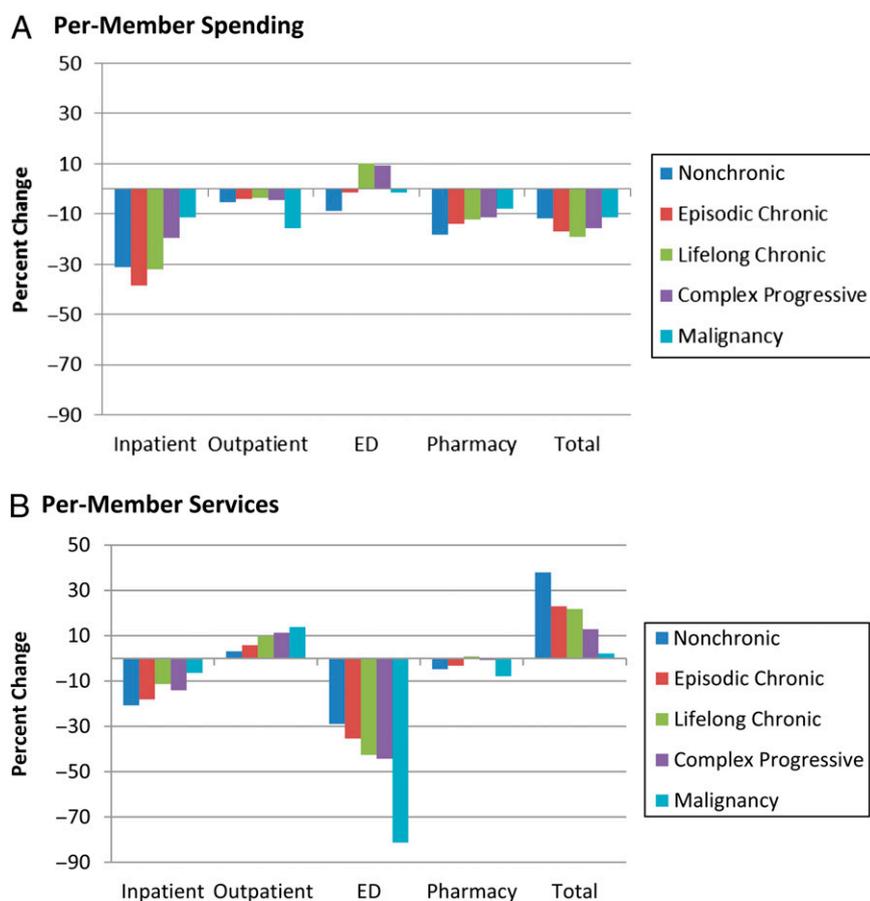
Illinois All Kids Program spending trends differed from hospital charge trends.

In addition, reimbursement levels stayed constant over the study period, so inflation adjustment alone likely explains some of the observed decline in spending. An alternative explanation for these spending declines is that, despite growth in the proportion of All Kids Program recipients with chronic conditions, recipients who were recently driven into the All Kids Program within each chronic condition category were healthier than long-standing recipients. Although heterogeneity within each of the CRG chronic condition groupings makes this possible, the fact that total inpatient days for recipients in the All Kids Program declined despite an increase in the number of All Kids Program recipients suggests that the observed per-member spending declines cannot be entirely attributed to better health among new recipients.

Given the large decrease in hospital utilization during the study period, it is possible that these data reflect systemic improvements in the quality of pediatric

care, such as improved care practices and coordination, leading to increased use of outpatient settings of care or enhancements in inpatient care leading to the observed declines in length of stay for children with chronic illness. Another potential explanation is that tighter administrative control of spending, such as approval of payment for hospital bed days, occurred over the study period. However, we are not aware of any evidence of this possibility, and the State of Illinois did not enact reimbursement cuts to providers during the study period. Further investigation into the drivers of such utilization shifts is warranted.

Although there was a decline in per-member spending from 2007 to 2010 among children with malignancies, this decline did not achieve statistical significance. This may be explained in part by a relatively smaller sample size in the malignancy group; however, this group did experience a statistically significant decrease in inpatient length of stay from 2007 to 2010, suggesting that there were some favorable utilization changes.

**FIGURE 2**

Percent change in Illinois All Kids Program spending and service utilization by CRG, 2007–2010.

This study has several limitations. First, *International Classification of Diseases, Ninth Revision, Clinical Modification* coding practices can change over time but also likely underestimate the prevalence of certain chronic conditions, such as obesity, which may be infrequently coded in physician encounters. Medicaid claims data can be incomplete. Finally, the findings are limited to the State of Illinois with a unique Medicaid and CHIP and

may not be generalizable to other states.

Despite these limitations, this study has potential policy implications. In the midst of a severe economic downturn, a large state Medicaid and CHIP program with open access to coverage experienced spending growth driven by a disproportionate increase in recipients with chronic conditions, especially those with complex and progressive conditions. The growth in spending was

not related to per-member spending increases. With implementation of the Affordable Care Act, a similar level of open access to health insurance is now available to children nationally through a combination of Medicaid, CHIP, and the new Health Insurance Marketplaces. Thus, the experience of the Illinois All Kids Program from 2007 through 2010 may have implications for the number and types of children who enroll in Medicaid and CHIP and make use of federal

**TABLE 3** Illinois All Kids Program Recipients LOS for Inpatient Admissions by CRG, 2007–2010

	2007		2010		Change in Admits (%)	Change in LOS (%)	P (LOS)
	Admits (n)	Mean LOS (d)	Admits (n)	Mean LOS (d)			
Nonchronic	90 806	2.5	82 130	2.5	-9.6	0.0	.555
Episodic chronic	20 171	4.8	19 557	3.9	-3.0	-18.5	<.001
Lifelong chronic	4342	9.0	4017	6.0	-7.5	-33.3	<.001
Complex progressive	15 690	12.6	15 960	6.7	1.7	-46.9	<.001
Malignancy	1493	6.7	1717	5.7	15.0	-14.2	<.001

LOS, length of stay.

subsidies for Marketplace coverage in future economic downturns. Although public health insurance spending control efforts have focused on delivery system changes, such as implementation of managed care, accountable care, and patient-centered medical homes, our data suggest that it might also be important for stakeholders to examine and address why children with chronic conditions may be more likely to become recipients of public health insurance systems during economic downturns.

## CONCLUSIONS

Children with chronic illnesses became Illinois All Kids Program recipients at a higher rate than children without chronic illness during the 2007–2009 Great Recession. However, per-member spending declined in most chronic condition groups. Strategies to control state Medicaid spending in children must not only focus on changes to delivery systems but also examine the forces driving disproportionate use of public insurance among children with chronic illness.

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