Evaluation of New York State’s Child Health Plus: Access, Utilization, Quality of Health Care, and Health Status

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ABSTRACT. Background. The recently enacted State Children’s Health Insurance Program (SCHIP) is modeled after New York State’s Child Health Plus (CHPlus) program. Since 1991, CHPlus has provided health insurance to children 0 to 13 years old whose annual family income was below 222% of the federal poverty level and who were ineligible for Medicaid or did not have equivalent health insurance coverage. CHPlus covered the costs for ambulatory, emergency, and specialty care, and prescriptions, but not inpatient services.

Objectives. To assess the change associated with CHPlus regarding 1) access to health care; 2) utilization of ambulatory, inpatient, and emergency services; 3) quality of health care; and 4) health status.

Setting. Six western New York State counties (including the city of Rochester).

Subjects. Children (0–6.99 years old) enrolled for at least 9 consecutive months in CHPlus.

Methods. The design was a before-and-after study, comparing individual-level outcomes for the 12 months immediately before CHPlus enrollment and the 12 months immediately after enrollment in CHPlus. Parent telephone interviews and medical chart reviews conducted 12 months after enrollment to gather information. Subjects’ primary care charts were located by using interview information; emergency department (ED) charts were identified by searching patient records at all 12 EDs serving children in the study; and health department charts were identified by searching patient records at the 6 county health department clinics. Logistic regression and Poisson regression were used to compare the means of dependent measures with and without CHPlus coverage, while controlling for age, prior insurance type, and gap in insurance coverage before CHPlus.

Results. Complete data were obtained for 1730 children. Coverage by CHPlus was associated with a significant improvement in access to care as measured by the proportion of children reported as having a usual source of care (preventive care: +1.9% improvement during CHPlus and sick care: +2.7%). CHPlus was associated, among children 1 to 5 years old, with a significant increase in utilization of preventive care (+.23 visits/child/year) and sick care (+.91 visits/child/year) but no measurable change in utilization of specialty, emergency, or inpatient care. CHPlus was also associated, among children 1 to 5 years old, with significantly higher immunization rates (up-to-date for immunizations: 76% vs 71%), and screening rates for anemia (+11% increased proportion screened/year), lead (+9%), vision (+11%), and hearing (+7%). For 25% of the children, a parent reported that their child’s health was improved as a result of having CHPlus.

Conclusion. After enrollment in CHPlus, access to and utilization of primary care increased, continuity of care improved, and many quality of care measures were improved while utilization of emergency and specialty care did not change. Many parents reported improved health status of their child as a result of enrollment in CHPlus.

Implication. This evaluation suggests that SCHIP programs are likely to improve access to, quality of, and participation in primary care significantly and may not be associated with significant changes in specialty or emergency care. Pediatrics 2000;105:711–718; children, SCHIP, underinsured, uninsured, health care utilization, access to care, quality of care, health status, health insurance.

ABBREVIATIONS. SCHIP, State Children’s Health Insurance Program; CHPlus, Child Health Plus; ED, emergency department.
care because lack of access to medical care for uninsured children has been well documented.3–5 Specifically, uninsured children are more likely to lack usual sources of routine and sick care than insured children.3,6 They use significantly fewer ambulatory and inpatient services than insured children and are less likely to have had any routine visits to the doctor or to be up-to-date for well-child care.7,8 Uninsured children are also more likely to be underimmunized than insured children.5,10 Several studies have noted that lack of health insurance among children and adolescents is a marker for utilization of the emergency department (ED) for nonemergent conditions.11–13 Other studies have found that children who lack a primary care provider or lack adequate access to primary care services are more likely to use the ED as a usual source of care,14–16 thereby missing out on comprehensive primary care.

Several studies, based on parental report of child health status, suggest that lack of health insurance may have a deleterious effect on the health of children.17 Other studies have used hospital discharge data to assess the relationship between health insurance and health outcomes.18 Among newborns, lack of insurance was associated with adverse outcomes,19 and uninsured patients <18 years old, compared with their privately insured peers, were found to have higher rates of hospitalization for conditions that often can be treated out of hospital or avoided altogether.18 However, little is known about whether providing health insurance for uninsured children improves their health care and reduces adverse health outcomes. For example, the Rand Health Insurance Experiment examined the relationship between health insurance coverage and health outcomes, but did not include previously uninsured children.20 A recent study of an insurance program in western Pennsylvania, similar to CHPlus, showed that providing insurance improved parent-reported access to care, reduced unmet care, and reduced ED visits.21 However, parental report, in particular of ED visits, is subject to recall bias.22

Nationally, an estimated 14% of children <18 years old, or 9 to 11 million children, are uninsured.23,24 An additional 7.9 million children are underinsured for part of each year.25 About 13% of families that have private insurance meet the accepted definition of underinsurance by being at risk for out-of-pocket medical expenses exceeding 10% of family income. In New York State, 10.7% of children were uninsured in 1993, although the proportion of uninsured children varied significantly by region (calculations by Andrew W. Dick, PhD, personal communication, 1998).26

CHPlus was designed to improve health care for uninsured and underinsured children in New York State. CHPlus provided fully subsidized health insurance coverage for children 0 to 13 years old whose family income was below 222% of the federal poverty level and who lacked equivalent health insurance coverage, including Medicaid. Children whose family income was above 222% of the federal poverty level were also eligible, but were charged full-cost annual premiums of $498 to $798. Coverage was provided for preventive, illness, emergency, and specialist outpatient care and prescription medications but not for hospitalizations. CHPlus required a $35 copayment for an ED visit. Most families did not pay a premium and the maximum enrollment fee was $100/family/year. The New York State annual subsidy paid to the insurer averaged $617 for each child. Enrollment began in August 1991 and reached approximately 120,000 in 1996.27

This study took advantage of a natural experiment in New York State when CHPlus became available. The study objectives were to evaluate the association between enrollment in CHPlus and changes in: 1) quality and access to health care; 2) utilization of health services; and 3) health status.

STUDY DESIGN AND METHODS

Study methods are described in detail in an accompanying article.28 The evaluation was a before-and-during study of children who enrolled in CHPlus. Information about the 12 months before and the 12 months after enrollment in CHPlus was obtained for each subject by interview and chart reviews. Comparisons were made between the period before CHPlus with the period during CHPlus.

Because this study took advantage of a natural experiment, randomization was not feasible. As a result, assessment of the impact of CHPlus could be affected by other, confounding factors. However, comparison of before CHPlus and during CHPlus periods for each child allowed us to minimize the effects of child- or family-specific factors such as propensity to seek medical care.

This study was approved by the University of Rochester's Research Subjects Review Board and by Blue Cross/Blue Shield of the Rochester Area.

SETTING AND SUBJECT SELECTION

A managed care, independent practice association plan, serving approximately 750,000 inhabitants in 6 western New York counties (4 urban, 2 rural), was the sole insurer offering CHPlus in the study area. Participating providers were reimbursed at rates similar to those received from other insurance plans in the area. Subjects were children, enrolled in CHPlus between November 1, 1991 and August 1, 1993, <7 years old at enrollment, and remained in CHPlus for at least 9 consecutive months. Young children were studied because more preventive care is recommended and more illnesses requiring health services occur in this age group compared with older children. Enrollment for <9 consecutive months was felt to be an inadequate period of time to draw conclusions about changes associated with CHPlus.

Names and addresses of eligible children were obtained from the insurance company administering CHPlus. The parents of all eligible children were contacted initially by mail. Subsequent contact was by mail and telephone. A structured telephone interview was conducted with the parent or guardian of a subject 12 months after enrollment of the child in CHPlus.

Parents were asked to identify all of their child’s primary care physicians during the study period. Based on this information, each child’s primary care medical chart(s) was reviewed for the study period. If more than 1 source of primary care was identified or noted during the chart review, the subsequently identified medical chart(s) was obtained and reviewed. Additional medical charts were identified at all 12 EDs that provide emergency care for children within the study area. Each ED registration database, restricted to the study period, was compared with the database of study participants, matching by name, birthdate, and address. The linking was done blind to study period.

Information from the parent interview and from the primary care chart review was used to create a list of study subjects who were reported to have received immunizations at a public health clinic, had no record of immunizations at their primary care physician, or had an incomplete immunization record. For any study subject whose immunization record was incomplete, the lists of all 6 county public health clinics were searched for the medical chart. A standardized chart review form was used.
MEASURES

Table 1 shows the sources for each outcome measure. Parents were asked to name the health insurance plan that provided coverage for their child just before enrollment in CHPlus. Type of prior insurance was categorized by the extent of services covered. Four categories were created: 1) uninsured; 2) underinsured (plans providing inpatient and/or catastrophic or major medical coverage but limited coverage of ambulatory services); 3) fully insured (plans, such as a health maintenance organization, that provide coverage of both ambulatory and inpatient services); and 4) Medicaid.

Parents were asked whether their child had experienced a gap in coverage—that is, a period of time without health insurance coverage before enrollment in CHPlus. The length of the gap in coverage was categorized as none, 1 to 5 months, and 6 months or greater.

Access to health care was assessed by asking about usual sources of preventive and sick care; 24-hour/day access to a regular medical provider; and whether immunizations were received at a primary care site or at a public health clinic.

Information about utilization of preventive, sick, and follow-up health care was gathered by identifying all outpatient visits recorded, during the study period, in the child’s primary care chart(s). Visits were classified as preventive if there was an indication of well-child care or evidence of preventive services (screening tests or routine immunizations). Sick visits were defined as visits that included a diagnosis of an acute illness in the medical chart. Follow-up visits were defined as visits that occurred within 48 hours of a ED visit, contained a notation of follow-up, or were focused on a single chronic illness.

Primary care medical charts frequently lacked information about specialty care, ED visits, and hospitalizations. Thus, utilization of specialty care and hospitalization data were also obtained by parental report of services received by their child during the study period.

ED medical records were reviewed to determine the following characteristics: date and time, reason for visit, arrival mode to the ED, contact with the primary care provider, use of medical procedures, prescription of medications, use of laboratory testing, and disposition from the ED. Date and time of visits were analyzed to determine if the visit occurred during routine office hours. Reason for visit was classified as injury or poisoning, illness, or other. Arrival mode was classified as ambulance or other transportation. The visit itself was classified arbitrarily as appropriate if either the child was admitted to the hospital or transferred to another inpatient hospital, a procedure was performed, a prescription was written, or a laboratory test was performed. Determining the appropriateness of individual ED visits was difficult and no chart review-based method of distinguishing between appropriate and inappropriate ED visits has been agreed on. For each ED visit, continuity of care was ascertained based on whether a visit to the child’s primary care provider was made within 1 month after the ED visit.

Hospitalizations were determined by parental report and by recording all hospitalizations after an ED visit and identified by the ED chart review. A number of quality of care measures were assessed by using chart review data to calculate the status of lead, anemia, and hearing and vision screening tests based on recommended schedules of the American Academy of Pediatrics and other public health experts. Although physicians have some discretion in their screening practice, this variability was controlled for because most children received care from the same provider both before and during enrollment in CHPlus. Immunization status at the end of the before-CHPlus and during-CHPlus periods (up-to-date with respect to the recommended schedule of the American Academy of Pediatrics given above) was also determined. The vaccination schedule used was: 5 diphtheria toxoid, tetanus toxoid, and pertussis vaccines (at 2, 4, 6, and 18 months and at 5 years); 4 oral poliovirus vaccines (at 2, 4, and 18 months and at 5 years); and 1 measles mumps rubella vaccine (at 15 months).

Health status was assessed by asking parents to report their perception of the effect of CHPlus on their child’s health.

STATISTICAL ANALYSIS

The goal of the analysis was to estimate the effect of the CHPlus program on access, utilization, and quality of health care. Additional details about the statistical methods are in the accompanying article. Outcome measures were analyzed using logistic regression for dichotomous outcomes and Poisson regression for outcomes that were counts (eg, number of primary care visits during a study period). Each child in the study typically contributed 2 observations to the analysis, 1 for the year before enrollment in CHPlus (before CHPlus period) and 1 for the year after enrollment (during CHPlus period). Regression models were estimated using generalized estimating equations, with an exchangeable working correlation structure for all observations from the same family.

The explanatory variables in the regression models were: type of period covered by the observation (before CHPlus or during CHPlus); age (in years) at the start of the period; type of health insurance coverage before CHPlus; gap in insurance coverage immediately before CHPlus enrollment; and interactions of period type with each of the other factors. The interactions were included to test whether the CHPlus effect differed across the levels of the other factors. Insurance history was not applicable as an explanatory variable for children who enrolled in CHPlus after age at enrollment equal to 0; therefore, data for infants were analyzed separately.

The regression models were used to estimate means of the outcome measures with and without CHPlus, while controlling for the other factors in the models (age, prior insurance, and gap in insurance coverage). The means were standardized to the distribution of age and insurance history in our dataset, using the models. The difference between means with and without CHPlus was the estimate of the CHPlus effect for that variable.

For some dichotomous outcomes, nearly all observations had the same value (eg, few children were hospitalized during the study interval). This led to convergence problems for the logistic regression models. In these cases the models were simplified by leaving out interaction terms. When this was not sufficient to allow convergence, the data were analyzed by McNemar’s test (with exact, small-sample P values), treating the before CHPlus and during CHPlus observations for each child as paired data, and unstandardized means are reported. These cases are noted in the tables.

RESULTS

We attempted to reach 3203 families and successfully contacted 2606 (81%). Of the 3136 children potentially eligible for the study, 188 (6%) were ineligible.

<table>
<thead>
<tr>
<th>TABLE 1. Measures and Sources of Data</th>
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<tbody>
<tr>
<td>Measure</td>
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<td>--------------------------------------</td>
</tr>
<tr>
<td>Prior health insurance and parent experience with CHPlus</td>
</tr>
<tr>
<td>Type of prior insurance</td>
</tr>
<tr>
<td>Gap in coverage</td>
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<tr>
<td>Satisfaction with CHPlus</td>
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<tr>
<td>Health status</td>
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<tr>
<td>Overall health status</td>
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<tr>
<td>Access to care</td>
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<tr>
<td>Usual source of preventive and sick care due to CHPlus</td>
</tr>
<tr>
<td>24-h availability of medical provider</td>
</tr>
<tr>
<td>Having the same preventive and sick care medical home</td>
</tr>
<tr>
<td>Utilization of health services</td>
</tr>
<tr>
<td>Primary care visits</td>
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<tr>
<td>Specialty visits</td>
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<tr>
<td>ED visits</td>
</tr>
<tr>
<td>Hospitalizations</td>
</tr>
<tr>
<td>Quality of care</td>
</tr>
<tr>
<td>Immunization status</td>
</tr>
<tr>
<td>Appropriate number of preventive care visits</td>
</tr>
<tr>
<td>Screening for anemia, lead, vision, hearing</td>
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</table>

I indicates interview of parents; CR, chart review.
ble because they were enrolled in CHPlus for <9 consecutive months; 715 (23%) refused to participate. We were able to interview 1828 (82%) of these children and complete 1606 (88%) medical chart reviews (including emergency charts). Of 2232 eligible children 0 to 6 years old at enrollment, complete data were obtained for 1730 (78%).

Results of analyses are shown for age ranges 0 to 5.99 years. Although the study included children 0 to 6.99 years at time of enrollment in CHPlus, there were no children who contributed before CHPlus observations for age 6 to 6.99 years. Therefore during CHPlus periods for 6-year-old children were eliminated from the analyses and only their before CHPlus observations were used to serve as comparisons for the during CHPlus observations for children enrolled at age 5; hence, the analyses in this article covered the age range from 0 to 5.99 years. Results are frequently presented separately for infants (0–0.99 years) and for children 1.0 to 5.99 years.

Among the 1813 children with a known insurance history, there were 364 enrolled in CHPlus as infants (0–0.99 years), 1299 enrolled at ages 1.0–5.99, and 220 enrolled at age 6.0–6.99 years. Among the 1715 children who had complete chart reviews, 347 were enrolled as infants (0–0.99 years), 1167 enrolled at ages 1.0 to 5.99 years, and 201 enrolled at age 6.0 to 6.99 years.

ACCESS AND CONTINUITY OF HEALTH CARE

As shown in Table 2, more children were reported to have a usual source of preventive (+1.9%; \( P < .001 \)) and sick care (+2.7%; \( P < .001 \)) during CHPlus compared with before CHPlus. The proportion of children reported to have access 24 hours/day to their preventive care and sick care physician also improved during CHPlus compared with before CHPlus (96% vs 92%, \( P = .014 \); and 99% vs 97%, \( P = .028 \), respectively). More than three-quarters (78%) of children continued, during CHPlus, to have the same primary care physician as before CHPlus.

Continuity of care was considered as improved if children received fewer immunizations at a public health clinic and more immunizations at a source of primary care. Table 3 shows that children in both age groups received significantly fewer immunizations at public health clinics during CHPlus compared with before CHPlus (\( -.29 \) immunizations/child/year, \( P = .01 \); and \( -.08 \) immunizations/child/year, \( P = .003 \), respectively). As also shown in Table 3, children in both age groups also received significantly more immunizations at a usual source of primary care during CHPlus compared with before CHPlus (+1.13 immunizations/child/year, \( P < .001 \); and +.25 immunizations/child/year, \( P = .002 \), respectively).

TABLE 2. Proportion of Children Having Usual Sources of Preventive and Sick Care Before and During Enrollment in CHPlus (Children 1–5.99 Years Old)

<table>
<thead>
<tr>
<th>All Children</th>
<th>Before CHPlus</th>
<th>During CHPlus</th>
<th>Change</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual source of preventive care</td>
<td>98%</td>
<td>100%</td>
<td>1.9%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Usual source of sick care</td>
<td>96%</td>
<td>99%</td>
<td>2.7%</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

TABLE 3. Mean Number of Immunizations/Child/Year Received at Public Health Clinics and at a Source of Primary Care Before and During Enrollment in CHPlus

<table>
<thead>
<tr>
<th>Number of Immunizations per Child Received:</th>
<th>Public Health Clinics</th>
<th>Before CHPlus</th>
<th>During CHPlus</th>
<th>Change</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children &lt;1 y</td>
<td>.42</td>
<td>.14</td>
<td>−.29</td>
<td>.011</td>
<td></td>
</tr>
<tr>
<td>Children 1–5 y</td>
<td>.11</td>
<td>.04</td>
<td>−.08</td>
<td>.003</td>
<td></td>
</tr>
<tr>
<td>At source of primary care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children &lt;1 y</td>
<td>4.79</td>
<td>5.92</td>
<td>1.13</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>Children 1–5 y</td>
<td>1.00</td>
<td>1.25</td>
<td>0.25</td>
<td>.002</td>
<td></td>
</tr>
</tbody>
</table>

| TABLE 4. Mean Number of Primary Care Visits/Year Before and During CHPlus Among Children Less Than 1 Year Old

<table>
<thead>
<tr>
<th>Children &lt;1 Year Old</th>
<th>Before CHPlus</th>
<th>During CHPlus</th>
<th>Change</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preventive visits</td>
<td>2.81</td>
<td>3.34</td>
<td>.54</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sick visits</td>
<td>4.15</td>
<td>5.02</td>
<td>.86</td>
<td>.006</td>
</tr>
<tr>
<td>Chronic illness visits</td>
<td>.32</td>
<td>.34</td>
<td>.12</td>
<td>.821</td>
</tr>
<tr>
<td>Follow-up visits</td>
<td>1.34</td>
<td>1.32</td>
<td>−.02</td>
<td>.880</td>
</tr>
<tr>
<td>All primary care visits</td>
<td>9.40*</td>
<td>10.78*</td>
<td>1.37</td>
<td>.004</td>
</tr>
</tbody>
</table>

* All primary care visits includes other visits (ie, nursing and home visits).

TABLE 5. Mean Number of Primary Care Visits/Year Before and During CHPlus Among Children 1 to 5 Years Old at Enrollment

<table>
<thead>
<tr>
<th>Children 1–5 Years Old</th>
<th>Before CHPlus</th>
<th>During CHPlus</th>
<th>Change</th>
<th>( P ) Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preventive visits</td>
<td>.75</td>
<td>.97</td>
<td>.23</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sick visits</td>
<td>2.11</td>
<td>2.78</td>
<td>.67</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Medicaid</td>
<td>.97</td>
<td>1.02</td>
<td>.05</td>
<td>.486</td>
</tr>
<tr>
<td>Fully insured</td>
<td>.80</td>
<td>1.00</td>
<td>.20</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Fully insured</td>
<td>2.11</td>
<td>2.78</td>
<td>.67</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Follow-up visits</td>
<td>.48</td>
<td>.75</td>
<td>.27</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* All primary care visits includes other visits (ie, nursing and home).
visits/child/year; \( P < .001 \) had significantly more primary care visits compared with before CHPlus, as shown in Tables 4 and 5. Among older children, the increase in primary care visits was significantly greater among children who were previously uninsured (+1.89 visits/child/year; \( P < .001 \)) and among children who had a gap in coverage of >6 months (+1.79 visits/child/year; \( P < .001 \)).

Among children <1 year old, as shown in Table 4, the mean number of both preventive (+.54 visits/child/year, \( P < .001 \)) and sick visits (+.86 visits/child/year, \( P = .006 \)) increased significantly, although there was no significant change in other types of visits. Significant increases in the mean number of preventive, sick, chronic illness, and follow-up visits occurred among older children 1 to 5 years old, with the exception of children previously insured by Medicaid during CHPlus compared with before CHPlus (Table 5). The increase in preventive visits and sick visits was significantly greater among previously uninsured children (+.32 visits/child/year, \( P < .001 \) and +.91 visits/child/year, \( P < .001 \), respectively).

### Specialty Visits, ED Visits, and Hospitalizations

The proportion of children reported to have received specialty care during CHPlus compared with before CHPlus did not change significantly as shown in Table 6.

As shown in Table 6, there was no significant change in the proportion of children having an emergency visit during CHPlus compared with before CHPlus. A total of 373 visits to EDs before CHPlus and 437 visits during CHPlus were made. Table 7 compares the characteristics of children who had at least 1 ED visit with those who did not have any ED visit during the entire study period. In general, those who had an ED visit were younger, more likely to be of Hispanic ethnicity, and more likely to have been insured by Medicaid before joining CHPlus than those who did not have an ED visit.

Table 8 compares the characteristics of ED visits before CHPlus and during CHPlus. For this table, the unit of analysis is the ED visit. There was no significant difference in the proportion of ED visits for which a child was transported to the ED via ambulance; had documentation indicating that the primary care provider was contacted by the ED; received a laboratory test or procedure; had a medication prescribed; was hospitalized; or made a follow-up visit to a primary care provider within 1 month of the ED visit, during CHPlus compared with before CHPlus.

CHPlus did not provide any coverage for hospitalization, but hospitalization data were gathered because it was hypothesized that health insurance coverage for primary care might affect hospitalization rates. As shown in Table 6, we obtained hospitalization data based on both parental report and by ED chart review. No significant change in hospitalization during CHPlus compared with before CHPlus was found among either age group of children.

### QUALITY OF CARE AND HEALTH STATUS

As shown in Table 9, the proportion of children 1 to 5 years old who were up-to-date for immunizations during CHPlus was significantly higher (76% vs 71%; \( P < .001 \)) compared with before CHPlus. Screening for anemia (+7% children screened per...
year, \( P = .04 \) and +11, \( P = .007 \), lead (+14%, \( P < .001 \) and +9%, \( P < .001 \), respectively) among children <1 year old and older children and screening for vision (+11%; \( P < .001 \), and hearing (+7%; \( P = .008 \) among older children was significantly increased during CHPlus compared with before CHPlus (Table 9).

Parents of 25% of the children reported that they felt that their child’s health status was improved as a result of enrollment in CHPlus, 67% reported no change, and only 22% of parents reported that their child’s health status was worse.

**DISCUSSION**

This evaluation of a state-funded health insurance program, with many of the same characteristics as recently developed SCHIP plans, suggests that implementation of SCHIP may result in improved health care for low-income children. The study focused on changes in access to primary care, utilization of health care services, quality of care, and health status associated with the availability of affordable health insurance for children.

All measures of access were significantly improved during enrollment in CHPlus. Our findings of improved access to care are consistent with a recent study of a similar child health insurance program in Western Pennsylvania. In our study area, access to care before CHPlus was already quite high, participation in CHPlus by pediatric physicians was extensive (98%), and the local health care system was well developed. Such underlying factors may affect the degree to which SCHIP programs will result in improved access to care. In areas with poorer baseline access to care, improvements associated with SCHIP may be even greater than those noted in this study.

We have shown that utilization of primary care was significantly increased during CHPlus compared with before CHPlus. This finding confirms the results of the previously mentioned Pennsylvania study. However, the increase in utilization for those children presumed to have the greatest unmet health care needs (children previously uninsured and/or with a gap in coverage >6 months) was greatest for sick care rather than for preventive care.

There was no significant change in specialty care utilization associated with CHPlus. Baseline utilization among uninsured children was also less than that of insured children. Several explanations are possible. Uninsured children may: 1) have fewer conditions necessitating specialist visits; 2) lack contact with a primary care physician (CHPlus required a primary care referral to a specialist); 3) have different health care-seeking behaviors; and 4) not visit a specialist because of lack of insurance. Uninsured and insured children have similar rates of chronic illness; although uninsured children are more likely to be reported as having fair or poor health. Lower utilization of routine care by uninsured children compared with insured children, both before and after enrollment in CHPlus, may indicate an underlying different health care seeking pattern, and an increase in utilization of specialty care associated with becoming insured may reflect improved health care rather than inappropriate or excessive care. Of note, our statewide evaluation of CHPlus did show a significant increase in visits to specialists although an increase in specialty care was not noted in our current study.

Implementation of CHPlus was not measurably associated with changes in patterns of ED utilization by young children. Children who visited the ED were more likely to be younger and previously insured by Medicaid than children who did not use the ED, and in most of the ED visits a laboratory test or procedure was performed. By using medical chart reviews rather than parent report to measure ED utilization, this study provides an unbiased measure of ED utilization. These findings are consistent with the Taiwan experience of the impact of health insurance on ED use and are also consistent with the results of our statewide evaluation. However, this finding differs from results, based on parent-report, described by Lave et al. Although CHPlus was not associated with a change in ED utilization in our study, the significant increase in sick care visits suggests that a previously unmet need for sick care occurred in the primary care office rather than in EDs.

Surprisingly, the lack of association of CHPlus with changes in ED utilization existed regardless of prior insurance coverage, although CHPlus resulted in incentives for ED use differentially by insurance. This independence of health insurance status and ED use is consistent with Halfon and colleagues’ findings from the 1988 National Health Interview Survey. Because of a modest copayment ($35), the economic incentive for parents of previously uninsured children was increased ED utilization whereas the economic incentive for parents of children previously...
covered by Medicaid was for decreased ED utilization and was in either direction for previously fully insured children depending on their previous copayment.

Nationally, 38% of children visit the ED each year. Our estimates of ED utilization (18% before CHPlus and 20% during CHPlus) were considerably lower than that of the national average for children and may be related to the well-developed primary care health system in the study area. Results may differ in areas with less primary care infrastructure.

Concern has been expressed that low utilization of emergency services by children represents a potentially dangerous delay in seeking care for serious emergencies. Overpeck and Kotch found that uninsured children were less likely than insured children to be brought in for the treatment of injuries. Our findings of low ED utilization before CHPlus among previously uninsured and underinsured children and the increase in total acute care visits at the primary care office during CHPlus support this concern.

CHPlus was not associated with a significant change in hospitalization rates. Although CHPlus did not cover hospitalization during the study period, improved access to primary care and favorable financial incentives may have altered physician behavior and limited hospitalization. This finding is different from results (obtained by parental report only) of the study conducted in Pennsylvania and of our statewide study. Factors other than health insurance, particularly related to both physicians and patients, may result in significant variation in the decision to hospitalize and in hospitalization rates. One factor that may have limited any change in hospitalizations after enrollment in CHPlus is the underlying quality and access to primary care, which was high in the study area. The likely impact of SCHIP on hospitalization cannot be predicted from this study.

CHPlus was associated with a modest improvement in quality of care. Parents reported satisfaction with the insurance plan and a high proportion of parents reported that their child’s health improved during CHPlus. Screening levels for disease and immunization rates were significantly higher during CHPlus but did not achieve goals recommended by pediatric and public health experts. This suggests that merely providing health insurance coverage is not sufficient to optimize preventive care for children and families who have experienced periods without health insurance. However, SCHIP should indirectly contribute to the positive effects of an affordable and regular source of primary care, which by enhancing the establishment of a stable patient-doctor relationship, may, in time, result in improved preventive health care-seeking behavior and improved quality of care. These results confirm that factors in addition to health insurance are essential to achieve high quality of care; having health insurance may be the required cornerstone to begin to improve quality of care but other interventions are needed to optimize quality of care.

LIMITATIONS AND STRENGTHS

There are some limitations to our ability to generalize results of this study to SCHIP programs. The study took place in a 6-county area of New York State and involved only 1 insurer. Neither practice style variation nor physician participation rates were major confounding factors in our study, but could potentially affect outcomes in other settings. Most children did not have to change primary care physicians after enrollment, and most pediatric practitioners in the geographic area participated in CHPlus. Physicians in this plan also were reimbursed at usual and customary rates. Such a favorable reimbursement structure may not occur in some other settings and, therefore, could affect physician participation rates and practice style.

It is possible that the results of this study were affected by secular trends; however, the study design should have minimized such trends. The study period was relatively short, which should minimize such effects. In addition, because enrollments were distributed throughout a 12-month period and because the before CHP and after CHPlus observation periods were also 12-month periods, there is a great deal of overlap between the before CHPlus and after CHPlus groups, limiting the threat that secular trends in outcomes could be confounding the results. Furthermore, a comparison of characteristics of the study population with the entire CHPlus population, since implementation of CHPlus, does not reveal any notable differences, suggesting that neither the study population nor the study period was unusual.

The potential for biases in the results was minimized in this study because of the mixed mode of data collection. Medical chart data were collected for utilization of primary care, ED, and inpatient care in addition to parental report. Access and quality of primary care for immunizations and screening procedures were assessed by chart review.

IMPLICATIONS

As SCHIP programs are developed throughout the nation, knowledge about the impact of such programs, including both the improvements and disadvantages, is crucial. In this study, providing health insurance was associated with greater access to care and increased utilization of primary care services but not higher utilization of other costly services such as ED visits and hospitalizations. In particular, the increase in utilization of primary care, particularly of sick care rather than ED care, and the shift from public health clinics to primary care physicians for immunizations, is a notable achievement.

Although the results of this study predict that SCHIP will improve health care for millions of American children, they also demonstrate that limitations of our health care system will require innovative solutions beyond the provision of health insurance to achieve high-quality, affordable health care for all children.
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Evaluation of New York State's Child Health Plus: Access, Utilization, Quality of Health Care, and Health Status

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