Access to Care and Children's Primary Care Experiences: Results from a Prospective Cohort Study

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Objective. To examine whether and how different kinds of access to care (financial, potential, and realized) predict parent-report child primary care experiences in an urban community sample.

Data Sources/Study Setting. A prospective cohort study was performed. Baseline survey data were collected (67 percent response rate) from 3,406 parents of kindergarten through sixth grade students in a large urban school district in California during the 1999–2000 school year. A 1-year survey (80.4 percent response rate) resulted in a final sample of 2,738.

Study Design. Data were analyzed using multiple regression models with robust estimation. The dependent variable was Time 2 parent reports of primary care experiences, assessed via the Parents' Perceptions of Primary Care (P3C) measure. The independent variables were financial access (insurance status), potential access (presence of a regular source of care), and realized access (foregone care), controlling for child and family characteristics (race/ethnicity, parent's language, mother's education level, and child chronic health condition status) and baseline P3C scores.

Data Collection. Data were collected by mail, telephone, and in person in English, Spanish, Vietnamese, and Tagalog.

Principal Findings. Controlling for baseline P3C scores and child and family characteristics, having no health insurance at both baseline and Time 2 was associated with a 6.2-point lower Time 2 P3C score, relative to having had health insurance at both time points. Having a regular provider at Time 2 (either always having had one or gaining one during the year) was associated with, on average, a 10-point higher Time 2 P3C score, compared to children without a regular provider (either never having had one or losing one during the year). Episodes of foregone care during the year were associated with 10.7 points lower Time 2 P3C scores, relative to children whose parents did not report foregone care. Similar relationships were found between all three measures of access to care and each of the sub-domain measures of primary care experience.

Conclusions. Financial, potential, and realized access to care are associated prospectively with the full range of primary care experiences—comprehensiveness, communication, coordination, and contextual knowledge—beyond continuity and accessibility. Access to a regular source of care and to needed care are each associated with larger effects on primary care experiences than is the presence of health

insurance. Gaining insurance or a regular source of care results in primary care experiences similar to always having had these, while losing a regular source of care has a more immediate effect than losing insurance on primary care experiences.

Key Words. Health care quality, children, primary care, access to care, health disparities

High-quality primary care is a cornerstone of efforts to improve health outcomes, control health care spending, and reduce health care disparities (Starfield and Simpson 1993; Starfield 1996, 1998; Starfield and Shi 2004). Primary care has been defined by the Institute of Medicine as an approach to delivering health care, rather than a set of specific activities or a type of health care provider. Primary care is "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community" (Institute of Medicine 1996). While operational definitions of these concepts vary across researchers, there is general agreement that primary care is at a minimum *accessible, longitudinal, comprehensive, and coordinated* (Starfield 1998). These constructs of primary care have also similarly been recently captured in the concept of the pediatric medical home (Medical Home Initiatives for Children with Special Needs Project Advisory Committee 2002; Starfield and Shi 2004).

While primary care is important for both adults and children, continued and expanded focus on the primary care experiences of children is warranted (Forrest, Simpson, and Clancy 1997; McGlynn and Halfon 1998; Wehr 2001). Children, relative to adults, are disproportionately poor and of color, highlighting issues of health disparities (Gould, Davey, and LeRoy 1989; Feinstein 1993; Pappas, Hadden et al. 1997; Pappas, Queen et al. 1993). Children are more likely to be uninsured (Holahan et al. 2000) and to be covered by public health insurance programs, emphasizing the relevance of findings to public health policy makers. Children's physical, social, emotional, and behavioral development impacts their overall health, and they develop rapidly, underscoring the importance of longitudinal, comprehensive primary care. Children's health care needs are mostly in the realm of preventive and acute care, and to access this care children are primarily dependent on families and other institutions.

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The receipt of high-quality primary care is dependent on good access to care (Institute of Medicine 1996; Starfield 1998) and improving access is seen as an essential first step to better primary care quality (Forrest and Starfield 1998; Forrest et al. 2002; Stevens and Shi 2002). Access to care, however, has more than one meaning. Andersen and Aday (1978) have identified two types of access to care: potential and realized. Potential access, according to Andersen and Davidson, reflects “structural indicators such as characteristics of the health care delivery system and enabling resources that influence potential care seekers’ use of health services” (Andersen and Davidson 1996, p. 17). These indicators, such as having health insurance and a regular source of care, make it more likely that medical care will be used, but are distinct from the actual use of care (which is termed “realized access”). Within the domain of potential access, definitional issues remain. The first concerns distinctions between health insurance and a regular source of care. While Andersen and Aday incorporate health insurance and a regular source of care under the same category of potential access to care, others have seen fit to analyze “financial” factors separately from other indicators of potential access (Penchansky and Fox 1970; Rosenbach, Irvin, and Coulam 1999).

There is good reason, in fact, to separately examine these three types of access (financial, potential, and realized) in relation to primary care quality. Insurance is by no means a guarantee of receipt of high-quality care (Rosenbach, Irvin, and Coulam 1999; Starfield and Shi 2004). And both potential access (having a regular source of care) and realized access (actually obtaining needed health services) are also essential prerequisites, above and beyond health insurance coverage, for high-quality care. These types of access are likely to influence the development of a patient-provider relationship and communication, and enhance the accumulation of the provider’s knowledge about the patient (Institute of Medicine 1996; Starfield 1998).

Insurance and the presence of a regular source of care are likely to be related (Wood et al. 1990; Newacheck, Hughes et al. 2000; Mayer, Skinner, and Slifkin 2004), but do not overlap perfectly (Starfield and Shi 2004). Among many examples of this point, Halfon et al. (1996) found no effect of health insurance status on children’s use of emergency departments for routine sick care, in contrast to significant effects of the source of well-child care, and the supply of primary care physicians. Similarly, Weitzman, Byrd, and Avinger (1999), comparing black and white middle-class, privately insured children, found that black children made fewer physician visits and were more likely to lack continuity of care than white children.

A second issue concerns the type of provider that can be considered a "regular source" of primary care. Because the Institute of Medicine defines primary care as a health care approach (Institute of Medicine 1996), not as a certain provider type or specific set of services, a family may receive primary care from any provider type depending on the extent to which the services received match hallmarks of primary care (accessible, continuous, comprehensive, coordinated). Thus, not having a regular provider who is a pediatrician, family practitioner, or other generalist (i.e., provider types considered primary care) does not preclude the family from receiving some degree of primary health care from any source. While having a "regular source of care" does overlap to a degree with the concept of longitudinal continuity, and is often used as an indicator in national studies of either access or longitudinal continuity when no better measures are present, it does not overlap with longitudinal continuity perfectly. The concept of longitudinal continuity involves aspects of the patient-provider relationship that go beyond simply "identifying" a regular source (Starfield 1998).

Although numerous studies have shown that insurance coverage and having a regular source of care are associated with continuity of care (Newacheck, Stoddard et al. 1998; Sox et al. 1998; Shi 2000), there are still gaps in the literature regarding the links between access and primary care experiences. First, most prior studies have used cross-sectional designs and thus do not address issues of causality (see Kogan et al. [1995] for an exception). In the absence of randomized trials, observational prospective cohort studies may shed light on temporal precedence (one aspect of causality) and thus suggest suitable targets for policies or programs to improve child primary care. Second, relatively little is known about whether and how different types of access to care—financial, potential, and realized access—are related to other aspects of primary care experiences such as comprehensiveness, coordination, communication, and practicing in the context of the family and community.

Research that addresses these limitations would be useful to policy makers. The bulk of United States health policy to improve primary care for children has focused on increasing financial access in the form of expanded publicly funded insurance coverage. While clearly important, such policy only addresses one type of access to care. Far less policy has been developed to directly improve other aspects of access to care such as potential access and realized access. Evidence that potential and realized access contribute independently to primary care experiences may spur the evolution of policy in these directions as well.

We present the results of a prospective cohort study—a 1-year follow-up survey of a community sample (Seid, Stevens, and Varni 2003)—that examines whether and how financial, potential, and realized access predicts parents' reports of primary care experiences. By controlling for baseline parent reports of primary care experiences and child and family characteristics, we can examine the effect of these three types of access to care on later parent reports of primary care. We hypothesize that all three aspects of access to care—financial, potential, and realized—are significant predictors of Time 2 parent perceptions of primary care experiences, after controlling for baseline primary care and child and family characteristics.

METHODS

This study consisted of a 1-year follow-up of a survey of parents of elementary school students (Seid, Stevens, and Varni 2003). Baseline surveys were administered to parents of children in 228 classes, from kindergarten through the sixth grade, at 18 elementary schools within a large urban school district. Schools were selected for inclusion in the study based on the presence of three target languages (Spanish, Vietnamese, and Tagalog, a language spoken in the Philippines) and heterogeneity of socioeconomic status, as measured by the percent of the student body eligible for federal free or reduced-priced lunch. Classes at schools were randomly selected within grade. Classes in which the consent rate was below 50 percent were dropped before analysis and replaced with other randomly selected classes from the same school. Follow-up surveys were administered using standard mail survey procedures (Dillman 2000), supplemented by in-person interviews at subjects' homes when necessary.

This protocol was reviewed and approved by the institutional review board at Children's Hospital and Health Center, San Diego.

Measures

Independent variables were changes in child health insurance status, changes in the presence of a regular source of care, and any instance of foregone care during the year between the original and follow-up surveys. The dependent variables were Time 2 primary care experiences, presented as both a total index score and as individual domains. Baseline parent reports of primary care experience, race/ethnicity, parental language, maternal education, and child chronic health condition status were used as control variables.

Financial, Potential, and Realized Access

Financial access was measured by parent report of whether or not their child had health insurance ("Health insurance is insurance your child has to help pay the cost of medical care. Does your child now have health insurance?" Response options: yes/no). Potential access was assessed by parent report of whether their child had a regular source of care (Agency for Healthcare Research and Quality 1998) ("Do you have one person you think of as your child's PERSONAL DOCTOR OR NURSE?" Response options: yes/no). Baseline and Time 2 responses to insurance status and regular source of care were each recoded into indicator variables to create four groups for each variable: those who had insurance or a regular source of care at both times (yes–yes; the reference group); those who had insurance, or a regular physician at neither point (no–no); those who gained insurance or a regular physician (no–yes); and those who lost insurance or a regular physician (yes–no).

Realized access was measured through parents' reports of foregone care (Ford et al. 1999) ("In the past 12 months, has there been any time when you thought your child should get medical care, but did not?" Response options: yes/no). Time 2 reports of foregone care—reflecting unmet need between baseline and Time 2 surveys—were used in this analysis.

Family and Child Characteristics

Child Race/Ethnicity. Children's race/ethnicity was reported by parents to the school district and linked to survey data by means of the child's student identification number. Dummy variables were created, comparing Asian/Pacific Islander (API; combining Filipino, Vietnamese, and other Asian), Latino, and African American students to white students. Because of the small number of Native Americans in the sample ($n = 10$), this group was excluded from analyses.

Parent Language. Parents completed the surveys in the language with which they were most comfortable—English, Spanish, Vietnamese, and Tagalog—and this language preference was used as a proxy for parental English-language ability. This variable was recoded into a dichotomous variable representing English versus non-English language survey.

Maternal Education. Education levels were assessed in detail, but were grouped into three categories for this analysis: less than a complete

high-school education, high-school graduate or some college, and college graduate and beyond.

Child Chronic Health Condition Status. There are several methods for defining and identifying children with special health care needs (CSHCN). Definitions have been based on diagnoses or conditions, need for services, functional or activity limitations, or combinations of these. Our definition of chronic health condition status is based on a combination of condition and limitation, similar to that used in the Child Health Supplement of the National Health Interview Survey (NHIS). Parents were asked to report on whether their child had a chronic health condition using the following definition: "A chronic health condition is: (1) a physical or mental health condition (2) that has lasted or is expected to last at least 6 months and (3) interferes with your child's activities." Parents were instructed to respond with "yes" or "no" to the question "In the past 6 months, has your child had a chronic health condition?" Parents were also asked to identify the name of the chronic health condition. Parents who answered yes or who gave the name of a chronic health condition were coded as having a child with a chronic health condition. This methodology for identifying child chronic health conditions has been previously validated (Varni et al. 2001) by showing its relationship to health-related quality of life and utilization.

Primary Care Experiences: The Parent's Perceptions of Primary Care (P3C)

Parents' perceptions of primary care experiences were measured via the Parent's Perceptions of Primary Care (P3C) measure, a brief, practical parent report of their experiences with their children's primary care. Preliminary evidence suggests that the P3C has adequate reliability and validity (Seid et al. 2001). Information does not yet exist regarding its responsiveness or sensitivity to change. The P3C measures parents' experiences with primary care processes, rather than technical or clinical quality of care or adherence to evidence-based medicine. The P3C is based on the Institute of Medicine definition of primary care (Institute of Medicine 1996). Using this definition as a criterion, the P3C was designed to measure six components of care which, when present, constitute high-quality primary care experiences. High scores reflect care conforming to this a priori definition. Thus, the P3C measures perceptions of quality based on parent *reports* of their experiences, rather than ratings of satisfaction with those experiences. The P3C was designed to measure parents' perceptions of experiences in receiving primary care, rather than

the quality of a particular provider of primary care. This was done so that the care received by children without a regular provider could also be described in relation to the IOM definition of quality primary care. This is important, given the high rate of uninsured children (U.S. Department of Commerce 1998) and children without a regular source of care (Wood et al. 1990; Halfon et al. 1996), or those who receive primary health care at emergency rooms or community clinics where they might not see a consistent provider.

The components of primary care included in the P3C are those on which parents are thought able to report. The six components of primary care measured by the P3C are defined as follows. *Longitudinal continuity* is defined as the parent's report of the length of time they have been bringing their children to a regular place or physician (Bindman et al. 1996; Starfield 1998). *Access* is defined as the parent's report of timely and convenient access to care for their children (Bindman et al. 1996). *Communication* is defined as the parent's report of how well the physician listens and explains during their interactions (Flocke 1997). *Contextual knowledge* is defined as the parent's report that the physician knows his or her values and preferences about medical care issues, clearly understands his or her child's health needs, and knows the child's medical history (Starfield 1998). *Comprehensiveness* is defined as the parent's report of the extent to which a regular place and/or doctor provides care for acute and chronic problems and preventive services (Bindman et al. 1996; Flocke 1997). *Coordination of care* is defined as the parent's report of their physician's knowledge of other visits and visits to specialists, as well as the follow-up of problems through subsequent visits or phone calls (Starfield 1998).

The 23-item P3C yields scores on a 0–100 scale (higher scores indicate better primary care) for the total scale (an overall index score), as well as for subscales measuring continuity, access, contextual knowledge, communication, comprehensiveness, and coordination. The P3C does not specify a recall period. This is done to make it easier for parents of children who have changed primary care providers or locations to respond, and also to allow those who have had less recent utilization to respond. All items are at or below an eighth grade reading level.

The P3C was developed in English and translated to Spanish, Vietnamese, and Tagalog. Translation was accomplished using forward-backward translation striving for conceptual, as opposed to syntactical equivalence and consistent language level (Hendricson et al. 1989; Canales, Ganz, and Coscarelli 1995; Ware et al. 1995; Herdman, Fox-Rushby, and Badia 1997; Keller et al. 1998). The final English-language and translated versions of the P3C were reconciled by bilingual lay people familiar with the purpose of the survey.

Analysis

All analyses were adjusted for the cluster sampling design (with classrooms as the cluster) using Survey procedures in *STATA* version 7.0. To assess for differential response rates, baseline race/ethnicity, survey language, mother's education, chronic health condition, insurance status, and presence of a regular source of care were computed for Time 2 responders and nonresponders. The significance of these differences was assessed using χ^2 tests of association. The unadjusted means for Baseline P3C total scores were computed for Time 2 responders and nonresponders and compared using independent-sample *t*-tests.

For the analysis sample (those with responses at Baseline and Time 2), proportions of the population with non-English surveys, mother's education, chronic health condition, insurance status, and presence of a regular source of care were computed for each race/ethnic group. The significance of these differences (using white as the reference group) was assessed using χ^2 tests of association. The unadjusted means for Baseline and Time 2 P3C total scores were computed for each race/ethnic group and compared to whites, using one-way ANOVAs. Bivariate relationships between these variables and Time 2 parents' perceptions of primary care experiences were examined using independent-sample *t*-tests and one-way ANOVAs.

Multiple regression analyses with robust estimation were used to assess the effect of changes in financial access (insurance coverage), potential access (regular source of care), and realized access (foregone care) on Time 2 parent perceptions of primary care (P3C), after controlling for Time 1 P3C scores and sociodemographics. We did not attempt to compare the importance of one (set of) variables to another. Eight regression models were constructed reflecting the total Time 2 P3C score (with and without the continuity domain) and each domain of primary care: accessibility, continuity, communication, contextual knowledge, comprehensiveness, and coordination. It is important to note that the second total P3C score accounts for the analytical overlap between our independent measure of potential access (having a regular source of care) and our dependent measure of "continuity" by dropping this domain from the total score. For the same reason, we also did not analyze the relationship between regular source of care and the continuity subscale. For each model, β coefficients, standard errors, and respective *P*-values for each variable are presented.

Using *SAS*, we assessed collinearity between the independent measures by running each independent variable, in turn, as a dependent variable that is

predicted by the other independent variables. The output for these diagnostic tests includes: (1) the condition index (an index greater than 30 is considered to be indicative of collinearity); (2) the tolerance (ranges from 0 to 1, scores closer to 0 are more collinear); and (3) the variance inflation factor (a VIF > 10 is considered indicative of collinearity) (<http://www.ats.ucla.edu/stat/sas/webbooks/reg/chapter2/sasreg2.htm>).

RESULTS

The response rates were 67 percent at Baseline ($n = 3,406$) and 80.4 percent at Time 2 ($n = 2,738$). Because there were so few Native American children ($n = 10$), they were dropped from the analyses, as were children with missing data on race/ethnicity ($n = 14$). Table 1 presents the Time 2 response rate for each subset of the sample defined by baseline characteristics. For example,

Table 1: Baseline Characteristics (%) of Time 2 Responders ($N = 2,738$)

<i>Baseline Characteristic</i>	<i>Time 2 Response Rates (%)</i>
Race	
API	81.0
African American	70.9**
Latino	82.7
White	83.2
English survey	
No	84.3**
Yes	78.5**
Mother's education	
Less than high school	82.3
HS or some college	79.4
College graduate or more	83.1
Chronic health condition	
No	80.1
Yes	83.8
Insured	
No	78.9
Yes	81.1
Regular source of care	
No	80.1
Yes	81.0
Foregone care (unmet need)	
No	80.7
Yes	80.0

**Different from other groups at $p < .001$.

only 70.9 percent of African Americans (versus 81 percent of Asian/Pacific Islanders, 82.7 percent of Latinos, and 83.2 percent of whites) responded at Time 2. A higher rate of respondents with a non-English survey at baseline (84 percent) responded at Time 2, versus 78.5 percent of those with an English survey at baseline. Other comparisons, including Baseline P3C scores (non-responder mean = 62.4, SD = 24.6; responder mean = 62.0, SD = 24.8) were not significantly different (Table 1). Time 2 respondents were 74.5 percent mother, 18.8 percent father, and 6.7 percent grandparent, guardian or other. The analysis sample was 49.5 percent girls and diverse with respect to race/ethnicity (38.7 percent Latino, 34.3 percent Asian/Pacific Islander, 14.5 percent white, 11.7 percent African Americans [0.9 percent Native American are not reported]). In this sample, 62.8 percent of surveys were completed in English, with 29 percent completed in Spanish, 4.3 percent in Vietnamese, and 3.8 percent in Tagalog. One-third (32.7 percent) of mothers had less than a high-school education, 41.6 percent were high-school graduates or had some college, and 21.9 percent were college graduates or beyond (3.7 percent missing). More than one in eight of the sample (13.3 percent) reported a chronic health condition.

Table 2 displays the frequencies of these variables, as well as the measures of access to care, by race/ethnicity. As can be seen, all of these variables varied across race/ethnicity, with Latino respondents more likely than whites to have been surveyed in a language other than English, have lower maternal education, not have a chronic condition, lack or have changes in insurance coverage, and not have a regular source of care. Table 2 also shows the unadjusted mean differences across race/ethnicity for the P3C total scores at Time 1 and Time 2, as well as the individual primary care domain scores. Asians and Latinos reported lower P3C scores than African Americans and whites at both Time 1 and Time 2, and more specifically, lower accessibility, continuity, and communication scores. Asians and African Americans reported slightly better comprehensiveness scores than whites.

Table 3 shows the bivariate relationships between the variables of interest and parents' perceptions of primary care experiences, as represented by Time 2 P3C total scale scores. As can be seen, all relationships between these independent measures and Time 2 P3C total scores were significant.

Table 4 summarizes models predicting Time 2 P3C total score, total score without the continuity subscale, and each subscale separately. Time 1 P3C scores and financial, potential, and realized access to care were significantly associated with Time 2 P3C total scores and each primary care domain score. Children who remain uninsured had Time 2 P3C scores 6.2 points

Table 2: Demographic Characteristics, Potential and Realized Access, and Primary Care Characteristics by Race/Ethnicity ($N = 2,714$)

<i>Variables</i>	<i>Asian/Pacific Islander N = 938</i>	<i>African American N = 321</i>	<i>Latino N = 1,059</i>	<i>White N = 396</i>
Demographics				
Non-English language	23.8**	0.1	74.0**	2.2
Maternal education				
Less than high school	16.0	17.7**	64.8**	7.3
High school or some college	43.1**	66.0	29.3*	62.1
College grad or beyond	40.9**	16.3**	5.9**	30.6
Chronic condition	15.5	16.2	9.4**	18.7
Financial access [†]				
Insurance: no, no	2.4	1.7	23.2**	2.0
Insurance: no, yes	6.5	7.6**	13.7**	5.0
Insurance: yes, no	3.8	7.3	7.8**	3.1
Insurance: yes, yes	84.6	81.1**	54.3**	90.0
Potential access [†]				
Regular doctor: no, no	18.4**	13.6**	37.5**	9.8
Regular doctor: no, yes	14.6**	12.9	16.6**	9.5
Regular doctor: yes, no	12.3**	9.9	12.2**	7.8
Regular doctor: yes, yes	54.2**	62.3**	32.9**	72.4
Realized access				
Foregone care	5.4	6.4	9.7**	6.4
Primary care [mean (SE)]				
Time 1 P3C total score	62.1 (0.7) **	69.0 (1.2)	57.0 (0.9)**	68.7 (1.0)
Time 2 P3C total score	66.9 (0.8)**	69.6 (1.4)	60.5 (0.9)**	69.5 (1.1)
Time 2 accessibility	71.0 (0.8)**	74.7 (1.4)*	62.4 (0.8)***	78.3 (0.9)
Time 2 continuity	57.9 (1.2)***	67.9 (1.7)	47.3 (1.1)***	71.2 (1.5)
Time 2 communication	76.5 (0.8)**	79.9 (1.4)	74.5 (.08)***	80.6 (1.1)
Time 2 accumulated knowledge	69.9 (0.9)	69.1 (1.6)	59.8 (1.0)***	67.2 (1.3)
Time 2 comprehensiveness	58.6 (0.9)**	59.5 (1.7)**	56.8 (1.0)	53.6 (1.5)
Time 2 coordination	62.9 (1.2)	68.3 (2.0)	57.9 (1.2)***	65.2 (1.8)

* $p < .05$,** $p < .01$,*** $p < .001$ for the difference in percent or mean score for racial/ethnic minority group compared to white.[†]no, no = insurance (regular doctor) at neither time; no, yes = insurance (regular doctor) at Time 2 only; yes, no = insurance (regular doctor) at Time 1 only; yes, yes = insurance (regular doctor) at both times.

P3C, Parent's Perceptions of Primary Care.

lower than those continuously insured throughout the study. Children who gained or lost insurance had scores that were not statistically different from those continuously insured. Children who remained without a regular source of care had Time 2 P3C scores almost 11 points lower than those with a regular

Table 3: Bivariate Relationships between Covariates and Time 2 Parent’s Perceptions of Primary Care (P3C) Total Scale Scores

	<i>Time 2 P3C Scores: Mean (SE)</i>
Non-English language	
English	68.8 (0.6)
Other	58.6 (0.8)**
Maternal education	
Less than high school	59.0 (0.8)**
High school or some college	68.0 (0.7)
College grade or beyond	68.6 (0.9)
Chronic condition	
Yes	67.2 (1.2)*
No	64.6 (0.6)
Financial access	
Insurance: no, no	48.2 (1.5)**
Insurance: no, yes	59.9 (2.0)**
Insurance: yes, no	60.0 (1.5)**
Insurance: yes, yes	68.5 (0.6)
Potential access	
Regular doctor: no, no	51.1 (1.0)**
Regular doctor: no, yes	58.3 (1.3)**
Regular doctor: yes, no	67.3 (1.1)**
Regular doctor: yes, yes	72.4 (0.6)
Realized access	
Foregone care	
Yes	49.4 (1.8)**
No	66.3 (0.6)

Note: Higher scores indicate better quality of primary care on a 0–100 scale.

**p* < .05,

***p* < .0001.

T1, Time 1; T2, Time 2.

source of care at both time points. Children who gained a regular provider had a Time 2 P3C total score no different from those who had always had a regular provider, but children who lost a regular provider lost about nine points relative to those who always had one. Not having any foregone care was associated with 10.7 points higher Time 2 P3C scores. In contrast to the bivariate analysis, Asian/Pacific Islanders and African Americans had P3C total scores no different than whites, while Latinos had higher P3C scores than whites.

For the individual primary care domains, the same general relationships were apparent. Being continuously uninsured was significantly associated with lower accessibility, continuity, and accumulated knowledge, but not the other domains. Losing insurance coverage at Time 2 had an immediate impact on accessibility—but not on the other domains—such that those who lost

Table 4: The Multiple Regression of Access to Care and Time 2 P3C Scores, Controlling for Time 1 P3C Scores and Sociodemographics

	<i>B (SE)</i>							
	<i>P3C Total</i>	<i>P3C Total</i>	<i>Accessibility</i>	<i>Continuity</i>	<i>Communication</i>	<i>Contextual Knowledge</i>	<i>Comprehensive</i>	<i>Coordination</i>
P3C Time 1	0.4 (0.02)***	0.37 (0.02)***	0.3 (0.02)***	0.2 (0.03)***	0.4 (0.03)***	0.4 (0.03)***	0.4 (0.03)***	0.4 (0.04)***
Socio-demographics								
Race/ethnicity								
Asian/Pacific Islander	2.0 (1.1)	2.5 (1.2)*	− 3.0 (1.2)**	− 4.6 (1.9)**	0.1 (1.3)	6.9 (1.5)***	8.2 (1.8)***	2.2 (2.2)
African American	2.1 (1.6)	2.2 (1.6)	− 1.0 (1.5)	0.3 (2.0)	0.7 (1.8)	3.2 (1.9)	6.2 (2.7)*	5.5 (2.8)**
Latino	3.6 (1.5)*	3.5 (1.5)**	− 1.9 (1.6)	3.3 (2.2)	3.3 (1.7)	4.6 (1.9)*	9.1 (2.1)***	5.7 (2.8)*
Non-English language	− 1.5 (1.1)	− 0.6 (1.2)	− 2.9 (1.4)*	− 10.8 (1.8)***	− 1.5 (1.3)	1.4 (1.5)	2.1 (1.7)	− 2.9 (1.9)
Mother's education	1.2 (0.6)	0.9 (0.6)	3.7 (0.7)***	4.2 (1.0)***	− 0.4 (0.7)	1.2 (0.8)	− 1.0 (1.0)	1.0 (1.2)
Chronic condition	− 0.3 (1.1)	− 0.1 (1.2)	− 1.0 (1.2)	− 2.6 (1.8)	0.1 (1.2)	1.7 (1.4)	0.5 (1.7)	− 1.3 (1.9)
Financial access								
Insurance: no, no	− 6.2 (1.8)***	− 6.0 (1.9)***	− 7.6 (2.1)***	− 8.1 (2.2)***	− 4.1 (2.3)	− 8.8 (2.5)***	− 3.8 (2.4)	− 4.5 (3.0)
Insurance: no, yes	− 2.6 (1.5)	− 2.1 (1.6)	− 0.5 (1.6)	− 7.7 (2.1)***	− 0.6 (1.8)	− 4.3 (2.0)***	− 1.2 (2.4)	− 3.2 (2.8)
Insurance: yes, no	− 1.9 (1.8)	− 1.8 (1.9)	− 5.3 (2.0)**	− 1.9 (2.9)	− 1.1 (2.3)	− 1.1 (2.4)	1.9 (2.6)	− 3.9 (3.1)
Potential access								
Doctor: no, no	− 10.9 (1.2)***	− 8.2 (1.2)***	− 6.7 (1.4)***	− 35.8 (1.8)***	− 5.6 (1.4)***	− 13.2 (1.5)***	− 6.4 (1.8)***	− 9.4 (2.2)***
Doctor: no, yes	0.3 (1.2)	1.2 (1.3)	1.1 (1.4)	− 8.0 (1.9)***	1.9 (1.5)	0.4 (1.5)	− 0.6 (1.9)	3.9 (2.2)
Doctor: yes, no	− 9.2 (1.4)***	− 7.3 (1.5)***	− 5.8 (1.6)***	− 27.1 (2.2)***	− 6.9 (1.7)***	− 9.2 (1.9)***	− 7.9 (2.1)***	− 5.1 (2.5)*
Realized access								
No foregone care	10.7 (1.6)***	11.6 (1.7)***	13.2 (1.8)***	2.4 (2.1)	11.2 (2.2)***	11.2 (2.2)***	9.8 (2.3)***	11.5 (2.5)***

 $*p < .05,$
$$^{***}p<.01,$$
*** $p < .001$ for the β coefficient.

P3C, Parent's Perceptions of Primary Care.

coverage had about 5-point lower accessibility scores than those still insured at Time 2. Lacking a regular source of care, however, was negatively (and statistically significantly) associated with each of the primary care domains. Not having any foregone care was strongly positively (and statistically significantly) associated with each of the domains except continuity of care.

We assessed potential statistical threats to this analysis. We tested for collinearity among our access to care variables (change in insurance status, change in regular source of care, and foregone care reported at Time 2). We created a model predicting the P3C total score at Time 2 including the dummy categories for the access to care measures. Our results showed that the largest condition index was 9.2 among any of the variables (below the cut-off condition index of 30 for collinearity). The range of tolerances was 0.73–0.97 among the variables, indicating no collinearity. Finally, the variance inflation factors were small, ranging only from 1.03 to 1.37 for any of the variables. Thus, we conclude that there is no significant collinearity among the access to care variables.

DISCUSSION

This prospective cohort study examines the effects of financial access, potential access, and realized access on Time 2 parent reports of child primary care experiences. After controlling for child and family characteristics (race/ethnicity, language, mother's education, and child chronic health condition) and baseline primary care experiences, all three measures of access were significant and independent predictors of primary care experiences. Analysis of the subscale scores showed that the three access variables had effects on all aspects of primary care experiences—accessibility, continuity, communication, contextual knowledge, comprehensiveness, and coordination—not only on aspects of the measure related to continuity and accessibility. These are the first *prospective* data (i.e., establishing temporal order) we are aware of to examine the relative impact of financial access, potential access, and realized access on primary care experiences in a child sample. Taken together, these data suggest that having health insurance and a regular source of care and getting care when needed—all factors modifiable by policy—each play an important part in the overall primary care experiences of children.

Our results show that, all else being equal and given equivalent baseline P3C scores, a continuously insured child will have, on average, a total primary care score 6.2 points higher than one continuously uninsured. A child with a

regular physician will have scores 10.9 points higher, on average, than a child who never had a regular physician. And a child with no forgone care will have scores 10.7 points higher, on average, than one who reports forgone care. Gaining or losing insurance during the course of the study did not have a significant effect on primary care experiences, but gaining or losing a regular physician did. Gaining a regular physician was associated with primary care scores no different from always having had one, while losing a regular physician was associated with scores 9.2 points lower, on average. Similar relationships were found between the three measures of access to care and the subdomain measures of primary care experience. Dividing these differences by the standard deviation of P3C scores (22.8 for the sample), the effect size for adjusted mean differences between children with and without insurance is 0.27, a small effect size (Cohen 1988), while those for regular physician and forgone care are in the 0.40–0.48 range, a medium effect size (Cohen 1988).

The contribution of foregone care to child primary care experiences deserves particular consideration. Foregone care, or unmet need, reflects the ability to obtain care when needed. While this measure of realized access has been used as an outcome in other research on children's health care (Newacheck et al. 2000; Silver and Stein 2001; Mayer et al. 2004; Weathers et al. 2004), this study is the first we are aware of to document the effect of foregone care on primary care experiences. Our data suggest that parents' reports of one or more experiences of foregone care is at least as important as having a regular provider and has a greater impact than health insurance status on primary care experiences. The importance of foregone care in these data stands in contrast to the development of policy addressing realized access. While initiatives such as SCHIP address financial access and while insurance status and regular source of care are routinely monitored in national surveys, these data call for an increased focus on programs and policies to directly assess and enhance realized access as well.

Another finding of note is the lack of effect for chronic health condition status on primary care experiences. In the multivariate analysis, there were no differences by chronic health condition status for the total primary care score nor for any of subscales of the primary care measure. Recent policy recommendations suggest that a medical home is particularly important for children with special health care needs (CSHCN) (Medical Home Initiatives for Children with Special Needs Project Advisory Committee 2002). Our data suggest that the production of good primary care experiences for both CSHCN and others may derive from the common pathway of access to care (Starfield and Shi 2004).

This conclusion, however, is tempered by differences in our definition of chronic health condition and the more recent QuICCC-R (Stein et al. 2001) and CSHCN screener (Bethell et al. 2002). These instruments use the MCHB definition of CSHCN as "Children with or at increased risk for chronic physical, developmental, behavioral, or emotional conditions and who require health and related services of a type or amount beyond that required by children generally." The MCHB definition uses presence of conditions and need for services to define chronic health condition. Our definition, based on NHIS, uses presence of conditions and functional limitations and is probably more restrictive, leaving out those who need more services but are not functionally impaired. Given the differences in our definition of chronic conditions and others, further investigation is needed as to whether the factors affecting primary care are indeed the same for children with chronic health conditions compared to the broader child population.

Several shortcomings exist in this study. The sample was designed to be representative of the schools from which it was drawn and extrapolations to broader populations should be made with caution. On the other hand, this sample's diversity increases its policy relevance. Our measure of English-language ability is based on the respondent's choice of an English survey or one in Spanish, Vietnamese, or Tagalog. We did not measure English-language ability via a standard test, nor did we account for English-language ability of other members of the household. However, this operational definition is similar to that of previous researchers. We also did not track whether a child moved during the course of the study. Geographic mobility can have negative effects on primary care via provider continuity.

Our measures of financial, potential and realized access have several limitations. First, the measures do not specifically imply access to primary care services. For example, insurance coverage applies to all levels of care, but there are often different copayments for primary care services, specialty services, and tertiary care (which vary across different health plans) that could be assessed and may provide more complex results. Having a regular source of care is generally considered a prerequisite for high-quality primary care, but in our study (as in many others), no distinction is made between a regular source of primary care versus specialty care, nor between having a regular place of care versus a particular clinician for care. The measure of realized access similarly does not specify foregoing "primary" care; and for those reporting "no foregone care," it does not necessarily imply that access was actually "realized" in all cases, since some children may not have had a health need and thus care was not sought. Moreover, reporting foregone care only implies

at least one event of foregone care, and does not necessarily mean that all needed care was foregone.

The measure of primary care experiences also has limitations. In order to make the P3C applicable to parents whose children have changed primary care providers or who have not had recent utilization, the measure does not have a specific recall period. It may be the case that parents who more recently used a primary care provider will have less error in their reports than those who used a provider in the more distant past. Given that important variables such as insurance status may be related to recency of utilization, this could introduce systematic bias into the analysis. That is, those without insurance may have more error in their reports and their effect sizes will be biased toward the null, thus decreasing power. A second limitation, in the context of a prospective study, is that the test–retest reliability of the P3C is not currently known. Since this provides an estimate of the maximum longitudinal correlation possible, it is difficult to interpret the size of the regression coefficient for the baseline P3C scores predicting Time 2 P3C scores.

We lacked data on primary care providers, and so could not assess provider race/ethnicity or language. Further work is needed to determine the extent to which differences in parent reports are due to differences across providers, to differences in how providers relate to different patients, or to concordance of patient–provider race/ethnicity and language (e.g., Stevens, Shi, and Coope 2003). Providers similar to patients in race/ethnicity and language may provide care that is systematically different from that of providers dissimilar to their patients.

Another limitation is that respondents were asked to report current insurance status, which might not coincide with insurance status during the reporting period of the P3C. However, systematic bias is unlikely in this case, given the strong relationship between insurance status and P3C scores in the multivariate analysis. Finally, in the sampling scheme, we dropped classes with less than a 50 percent return rate and substituted them, before analysis, with an additional randomly selected classroom. We did this in order to increase the response rate, but this might have introduced a bias into the sample, as classes with low rates of participation might be systematically different from other classes on variables that may be related to the issues at hand.

Delivering high-quality primary care is a cornerstone of improving the health of the population (Starfield and Simpson 1993; Starfield 1996, 1998; Starfield and Shi 2004) and access to health care is a leading health indicator in the U.S. Department of Health and Human Services' *Healthy People 2010* (U.S. Department of Health and Human Services 2000). Research regarding po-

tentially modifiable factors that may affect primary care experiences can inform these efforts. The data presented here suggest that insurance coverage has some effect on primary care experiences, but a smaller effect than that of having a regular provider and receiving care when necessary. Beyond providing health insurance, policies and programs that facilitate a regular source of care (such as health plans having open panels so that new enrollees would not have to change an existing provider, or if no regular provider exists, having programs in place to actively link new enrollees based on geographic accessibility and/or language) and ensure the receipt of necessary care (such as "advanced access," nurse help lines, or extended office or urgent care hours) could improve primary care experiences for children.

These data also suggest that the effect of a regular source of care on primary care experiences is more immediate than that of insurance coverage. Losing a regular source of care had about the same effect on primary care as not having had one at both time points, while gaining a regular source of care was associated with primary care experiences on par with always having had one. The effect of insurance change was somewhat different. With the exception of continuity of care, both gaining and losing insurance during the course of the year were associated with primary care scores similar to always having had insurance. This absence of a significant effect on primary care for those who lose coverage during a year may reflect some lag time in the influence of insurance, since those who were uninsured for the entire year (i.e., at both time one and time two) had significantly poorer primary care across most domains.

Financial, potential, and realized access to care are associated prospectively with the full range of primary care experiences—comprehensiveness, communication, coordination, and contextual knowledge—beyond continuity and accessibility. Access to a regular source of care and to needed care are each associated with larger effects on primary care experiences than is access to health insurance. Gaining insurance or a regular source of care results in primary care experiences similar to always having had these, while losing a regular source of care has a more immediate effect than losing insurance on primary care experiences.

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SUPPLEMENTARY MATERIAL

The following supplementary material is available for this article online:

APPENDIX S1. Parent's Perceptions of Primary Care (p3c) Items