Improvements in Access to Care for Vulnerable Children in California Between 2001 and 2005

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SYNOPSIS

Objective. We examined population changes in access to care for children in California during a period of major efforts to improve access to care for children.

Methods. We used cross-sectional data on 36,010 children aged 0–19 years from the 2001 and 2005 California Health Interview Survey to assess population changes in access to care. We assessed changes in access by individual risk factors and a composite risk profile.

Results. In 2005, a smaller proportion of children were uninsured (8.2% vs. 10.9% in 2001), living in poverty (20.7% vs. 23.2% in 2001), and in families without a high school education (20.8% vs. 23.6% in 2001), all $p < 0.001$. Before and after adjusting for these changes in risk, children were more likely in 2005 to have had a physician visit (odds ratio [OR] = 1.09, 95% confidence interval [CI] 1.07, 1.12) and dental visit (OR=1.11, 95% CI 1.08, 1.14). Children were slightly less likely in 2005 to have a regular source of care (OR=0.94, CI 0.91, 0.96). Children who had the highest risk profiles (≥ 4 risk factors) experienced the largest gains in access. For example, children with three and ≥ 4 risk factors had gains in dental visits of 11 and 20 percentage points, respectively ($p < 0.001$ for each), compared with ≤ 3 percentage points for children with fewer risk factors.

Conclusions. This study found improvements in physician and dental visits between 2001 and 2005 that were not fully explained by changes in insurance coverage or other demographic risk factors. Vulnerable children fared well during this period, suggesting that California may be making important and potentially replicable strides in reducing disparities.

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Primary care remains a critical cornerstone of the health-care system.¹ Access to primary care has been associated with better self-reported health status, lower morbidity and mortality, and reduced complications of illness.^{2–10} Despite its value, many children in California still do not have access to primary care. Prior studies in California, for example, have shown that about two of every 10 children do not visit a physician in a given year, and that approximately one of 10 children do not have a regular source of care.¹¹ Children in lower socioeconomic status families or racial/ethnic minorities, as well as uninsured children continue to report poor access to basic health-care services.^{12–20} Such disparities in access are compounded for children that have multiple risk factors associated with poor access to care (e.g., children who are poor and lack health insurance).^{20–22}

Several economic and policy trends at the beginning of this decade had the potential to affect children's access to primary care by influencing risk factors for poor access among families. In particular, reductions in employment-based insurance and rising immigration of often poor and non-English-speaking families influence the number and proportion of children statewide who are at risk for poor access to care.^{21–23} At the same time, major efforts were launched to address these impacts on vulnerable children in California. California's most populous counties launched new initiatives to increase the child insurance coverage rate.

Such initiatives—known as Children's Health Initiatives (CHIs)—aimed to reach and enroll uninsured children already eligible for Medi-Cal and Healthy Families (California's Medicaid and State Children's Health Insurance Program [SCHIP], respectively).²⁴ CHIs also created new local insurance programs, known as Healthy Kids programs, for low-income children who were ineligible for Medi-Cal and SCHIP. These changes were accompanied by a new rule instituted in 2002 by the California Department of Health Services (CDHS) mandating that public health insurance plans assure that all clients are seen by a primary care physician within 120 days of enrolling.

Given these trends and new efforts to improve access to care, we designed this study to monitor population changes in children's risk factors for poor access and rates of access to care. Using cross-sectional data from the 2001 and 2005 California Health Interview Survey (CHIS), which provides a representative sample of California's non-institutionalized population, this study examined (1) whether changes occurred in the population prevalence of risk factors for poor access to care (expressed as individual risk factors and a composite risk profile), (2) whether changes occurred in

population rates of access to care and to what extent these were associated with changes in risk factors, and (3) whether vulnerable children fared as well as less vulnerable children during this period.

METHODS

Study design and sampling

This study analyzed data on 36,010 children aged 0–19 years from the 2001 ($n=19,771$) and 2005 ($n=16,239$) CHIS, conducted by the University of California Los Angeles (UCLA) Center for Health Policy Research, CDHS, and the Public Health Institute. Each year, CHIS was completed with a different set of randomly selected households drawn from each county in California. In each household, one individual (aged ≥ 18 years) was randomly selected for interview. In households with children, CHIS interviewed one adolescent aged 12–17 years, and obtained information for one child younger than 12 years of age by interviewing the adult who was most knowledgeable about the child.

We conducted telephone interviews in six languages: English, Spanish, Chinese (Mandarin and Cantonese), Vietnamese, Korean, and Khmer (Cambodian). The response rates for CHIS were lower in 2005 than in 2001. Response rates included the screener completion rates (2005 = 49.8%, 2001 = 59.2%) and interview completion rates for children aged 0–11 years (75.2% in 2005 vs. 87.6% in 2001), 12–17 years (48.5% in 2005 vs. 63.5% in 2001), and 18–19 years (54.0% in 2005 vs. 63.7% in 2001). Information on the design of the CHIS is available at www.chis.ucla.edu.

Measures

Risk factors. The independent measures of risk factors for poor health-care access included: (1) uninsured status, (2) household income $<200\%$ of the Federal Poverty Level (FPL), (3) less than a high school education, (4) child nonwhite race/ethnicity, and (5) a language other than English spoken at home. These factors were selected because they are among the strongest predictors of poor health-care access for children.¹² These factors have also been shown in a previous analysis to be strongly and independently associated with the same measures of health status and access used in this study.¹¹

We coded health insurance coverage as employment, Medicaid, SCHIP, other, or uninsured. We asked participants to provide the best estimate of their total annual household income from all sources prior to taxes. We then recoded family income as a percentage of the FPL ($<100\%$ FPL, 100%–199% FPL, 200%–299% FPL, and $\geq 300\%$ FPL) based on family size and reported

income. We coded education of the adult respondent (i.e., the person most knowledgeable about the child; a parent in 87% of cases) as less than high school, high school graduate, some college, or college graduate. We asked participants to self-report if their child was Latino or Hispanic; if they answered “yes,” they were asked to identify their ancestry/origin and to list all that apply. We also asked them to self-identify their child’s race as white, African American, Asian/Pacific Islander, or Native American, and to identify all that applied. We then recorded a race/ethnicity variable as Latino/Hispanic, non-Latino/Hispanic white, non-Latino/Hispanic African American, non-Latino/Hispanic Asian/Pacific Islander, and non-Latino/Hispanic other or multiracial. Language spoken at home was based on the adult respondent for children aged 0–11 years and adolescent self-report for children aged 12–19 years. We dichotomized responses (any English vs. non-English) based on whether English was one of the languages spoken at home.

Risk profiles. For some analyses, we combined risk factors into a risk profile that was designed to summarize the level of risk for poor access to care. This risk profile counted the number of co-occurring risk factors, such that a child who was uninsured, had a household income <200% FPL, and had a responding parent with less than a high school education had a vulnerability risk profile of three risks. A child with none of these risk factors was considered to have a risk profile of zero.

Access to care. We measured access in three ways: (1) physician visit in the past year, (2) dental visit in the past year (asked for children aged 2–11 years only), and (3) having a regular source of care. We dichotomized responses for physician and dental visits as any visit vs. no visits. We defined a regular source of care as a “health-care source (your child) usually visits if sick or if advice is needed about (his or her) health.” Parents also reported the source of care, and we considered those who identified an emergency department as not having a regular source of care.

Covariates. Covariates used in most adjusted analyses included child age (in years), gender, immigration status (child and parent are both citizens, child is a citizen and parent is a non-citizen, and both are non-citizens), geographic residence (urban, second city, suburban, small town, and rural), and health status (dichotomized as excellent/very good vs. good/fair/poor).

Analysis

We performed analyses using survey procedures in Stata® 9.1²⁵ to account for the complex sampling

designs of the 2001 and 2005 CHIS, and to weight the estimates to be representative of children/adolescents aged 0–19 years in California. All analyses required Jackknife replication methods to assure that the variance estimates were not underestimated because of the complex sampling design.²⁶

First, we present changes between 2001 and 2005 in child risk factors and risk profiles by age group and for the total sample (Table 1). Population prevalence and standard errors are shown, and we assessed statistical significance using Chi-square tests of association.

Second, changes between 2001 and 2005 in access measures are reported for each risk factor (Table 2). Population prevalence and 95% confidence intervals (CIs) are presented. We used multiple logistic regression to adjust the results for demographic risk factors and the study covariates. Odds ratios (ORs) for 2005 (with 2001 as the reference group) are presented with 95% CIs.

Third, changes in access to care between 2001 and 2005 are presented according to child risk profile in three graphs (Figure). We adjusted population proportions for study covariates using multiple logistic regression and predicted probabilities. We based statistical significance of the difference between 2001 and 2005 at each risk profile on the coefficient for year included in the regression.

Finally, we made population estimates of the change in the number of children who had access to care in 2005 vs. 2001. Population estimates, which are designed to correspond with U.S. Census data, are available in CHIS. To begin, we calculated the difference in the proportion of children who had the access measure in 2005 vs. 2001, and estimated the maximum and minimum using 95% CIs. Then, we multiplied this difference (and the maximum and minimum) with the child population in 2001 to report the change in number of children with access while accounting for the effect of population growth on the estimate.

RESULTS

Table 1 shows statistically significant trends in the population prevalence of risk factors for poor access to care. Among all children aged 0–19 years, for example, a smaller portion of children were uninsured in 2005 (8.2%) vs. 2001 (10.9%), a smaller portion of children were living in poverty in 2005 (20.7%) vs. 2001 (23.2%) ($p<0.001$), and the proportion living with a parent who did not graduate from high school dropped to 20.8% in 2005 from 23.6% in 2001 ($p<0.001$).

The proportion of children of white race/ethnicity decreased slightly in 2005 (39.9%) compared with

2001 (40.8%), and the proportion of children with “other” ethnicity increased to 6.7% in 2005 from 4.5% in 2001 ($p<0.001$). The proportion of children whose families did not speak English increased to 12.9% in 2005 compared with 11.1% in 2001 ($p<0.01$). These changes resulted in a small change in risk profiles, with groups having zero and one risk factor increasing to 29.3% in 2005 from 28.7% in 2001, and 28.6% in 2005 from 26.6% in 2001, respectively ($p<0.05$).

Table 2 shows statistically significant trends in the

population prevalence of major access to care measures. Overall, the proportion of children with a physician visit in the past year increased to 87.1% in 2005 from 82.9% in 2001 (OR=1.09, CI 1.07, 1.12), and dental visit (for children aged 2–11 years) increased to 79.5% in 2005 compared with 73.2% in 2001 (OR=1.11, CI 1.08, 1.14). Children having a regular source of care decreased to 88.5% in 2005 from 90.7% in 2001 (OR=0.94, CI 0.91, 0.96).

The uninsured experienced an increase in dental

Table 1. Changes in risk factors for access to care and risk profiles by child age group: California, 2001–2005

Risk factors and profile	Population percent (SE)					
	Children aged 0–11		Adolescents aged 12–19		Total aged 0–19	
	2001 (n=12,802)	2005 (n=11,358)	2001 (n=6,969)	2005 (n=4,881)	2001 (n=19,771)	2005 (n=16,239)
Estimated population (n)	6,300,000	6,400,000	4,100,000	4,500,000	10,400,000	10,900,000
Child health insurance						
Uninsured ^a	8.4 (0.003) ^b	5.9 (0.004) ^b	14.8 (0.006) ^b	11.6 (0.007) ^b	10.9 (0.004) ^b	8.2 (0.004) ^b
Medicaid	25.0 (0.005)	30.8 (0.006)	19.5 (0.006)	21.2 (0.009)	22.8 (0.004)	26.9 (0.005)
SCHIP	5.0 (0.003)	5.8 (0.003)	3.5 (0.003)	6.7 (0.005)	4.4 (0.002)	6.2 (0.003)
Employment	57.8 (0.005)	51.6 (0.007)	56.6 (0.007)	51.9 (0.011)	57.3 (0.004)	51.7 (0.006)
Other insurance	3.9 (0.002)	6.0 (0.003)	5.6 (0.004)	8.7 (0.005)	4.6 (0.002)	7.1 (0.003)
Poverty status						
<100% FPL ^a	23.0 (0.006) ^b	22.2 (0.006) ^b	23.7 (0.007) ^b	18.5 (0.009) ^b	23.2 (0.005) ^b	20.7 (0.005) ^b
100%–199% FPL ^a	23.4 (0.005)	22.2 (0.006)	22.0 (0.009)	22.4 (0.007)	22.8 (0.005)	22.3 (0.005)
200%–299% FPL	15.6 (0.004)	13.0 (0.005)	14.6 (0.006)	14.2 (0.007)	15.2 (0.004)	13.5 (0.004)
≥300% FPL	38.1 (0.005)	42.5 (0.006)	39.7 (0.008)	44.9 (0.010)	38.7 (0.004)	43.5 (0.005)
Education						
<High school ^a	23.4 (0.005) ^b	20.9 (0.007) ^b	23.9 (0.007) ^b	20.8 (0.007) ^c	23.6 (0.005) ^a	20.8 (0.005) ^b
High school graduate	25.3 (0.005)	24.5 (0.006)	31.5 (0.008)	33.6 (0.008)	27.7 (0.005)	28.2 (0.005)
Some college	24.4 (0.004)	22.8 (0.006)	24.8 (0.007)	24.6 (0.007)	24.5 (0.004)	23.5 (0.005)
College graduate	27.0 (0.004)	31.9 (0.006)	19.8 (0.005)	21.1 (0.008)	24.1 (0.004)	27.4 (0.005)
Child race/ethnicity						
African American ^a	7.8 (0.001) ^d	6.8 (0.001) ^d	8.1 (0.003) ^b	8.0 (0.004) ^b	7.9 (0.002) ^b	7.3 (0.002) ^b
Asian ^a	9.9 (0.000)	10.5 (0.001)	11.9 (0.004)	11.5 (0.004)	10.7 (0.002)	10.9 (0.002)
Latino ^a	3.8 (0.004)	3.8 (0.003)	32.8 (0.005)	31.0 (0.007)	36.1 (0.003)	35.2 (0.004)
Other ^a	4.2 (0.002)	4.5 (0.003)	5.0 (0.003)	9.7 (0.006)	4.5 (0.002)	6.7 (0.003)
White	39.9 (0.003)	39.9 (0.003)	42.2 (0.006)	39.9 (0.006)	40.8 (0.003)	39.9 (0.003)
Non-English language ^a	13.2 (0.004) ^b	16.5 (0.006) ^b	7.9 (0.005)	7.9 (0.006)	11.1 (0.004) ^c	12.9 (0.004) ^c
Number of risk profiles						
0	28.7 (0.003)	29.5 (0.005)	28.6 (0.006) ^d	29.1 (0.007) ^d	28.7 (0.003) ^d	29.3 (0.004) ^d
1	26.9 (0.005)	27.4 (0.006)	26.1 (0.007)	30.2 (0.009)	26.6 (0.004)	28.6 (0.005)
2	19.8 (0.006)	19.6 (0.007)	21.1 (0.006)	18.4 (0.007)	20.3 (0.004)	19.1 (0.005)
3	15.1 (0.005)	13.9 (0.006)	16.4 (0.007)	16.2 (0.009)	15.6 (0.004)	14.8 (0.005)
≥4	9.6 (0.003)	9.6 (0.004)	7.8 (0.004)	6.2 (0.003)	8.8 (0.003)	8.2 (0.003)

^aDenotes the risk factors counted in the risk profile.

^b $p<0.001$ for the difference in the risk factors or risk profiles between 2001 and 2005

^c $p<0.01$ for the difference in the risk factors or risk profiles between 2001 and 2005

^d $p<0.05$ for the difference in the risk factors or risk profiles between 2001 and 2005

SE = standard error

SCHIP = State Children's Health Insurance Program

FPL = Federal Poverty Level

Table 2. Changes from 2001 to 2005 in children's access to care in California by major risk factors

Population and risk factors	Unadjusted population percent and adjusted OR (95% CI)							
	Physician visit in past year				Has regular source of care			
	2001	2005	OR		2001	2005	OR	
Total	82.9 (82.2, 83.7)	87.1 (86.2, 87.9)	1.09 ^a (1.07, 1.12)		90.7 (90.0, 91.4)	88.5 (87.7, 89.2)	0.94 ^a (0.91, 0.96)	
Age (in years)								
0–11	89.4 (88.6, 90.2)	91.7 (90.8, 92.4)	1.07 ^a (1.03, 1.11)		96.5 (95.9, 96.9)	96.5 (95.9, 97.1)	1.00 (0.94, 1.06)	1.11 ^a (1.08, 1.14)
12–19	73.3 (71.9, 74.5)	80.6 (79.1, 81.9)	1.11 ^a (1.08, 1.14)		82.0 (80.6, 83.3)	77.0 (75.6, 78.5)	0.92 (0.89, 0.97)	NA
Child health insurance								
Uninsured ^b	66.8 (63.3, 69.9)	69.1 (65.0, 72.8)	1.03 (0.97, 1.10)		67.7 (64.5, 70.7)	66.6 (61.8, 71.1)	0.99 (0.93, 1.06)	1.11 ^a (1.02, 1.22)
Medicaid or SCHIP	84.9 (83.0, 86.4)	87.6 (85.9, 89.0)	1.06 ^a (1.01, 1.12)		91.1 (89.5, 92.4)	87.9 (86.0, 89.6)	0.91 ^a (0.86, 0.97)	1.08 ^a (1.03, 1.13)
Employment	85.2 (84.3, 86.1)	89.7 (88.6, 90.7)	1.12 ^a (1.08, 1.15)		95.1 (94.4, 95.7)	92.1 (91.2, 92.9)	0.88 ^a (0.84, 0.92)	1.13 ^a (1.09, 1.17)
Poverty status								
<200% FPL ^b	81.1 (79.9, 82.3)	84.3 (82.8, 85.8)	1.06 ^a (1.02, 1.10)		86.6 (85.3, 87.8)	84.4 (82.9, 85.8)	0.94 ^a (0.90, 0.98)	1.12 ^a (1.08, 1.16)
≥200% FPL	84.6 (83.7, 85.4)	89.1 (88.2, 90.0)	1.12 ^a (1.09, 1.15)		94.2 (93.6, 94.9)	91.5 (90.7, 92.3)	0.91 ^a (0.87, 0.95)	1.10 ^a (1.07, 1.14)
Education level								
<High school ^b	78.5 (76.5, 80.5)	82.4 (79.8, 84.8)	1.07 ^a (1.01, 1.12)		85.4 (83.7, 87.0)	82.9 (80.4, 85.1)	0.95 (0.89, 1.00)	1.20 ^a (1.13, 1.27)
≥High school	84.4 (83.6, 85.1)	88.3 (87.4, 89.1)	1.10 ^a (1.07, 1.12)		92.3 (91.6, 93.0)	89.9 (89.1, 90.7)	0.92 ^a (0.89, 0.95)	1.08 ^a (1.05, 1.12)
Child race/ethnicity								
African American ^b	85.8 (83.2, 88.2)	88.0 (84.6, 90.6)	1.06 (0.96, 1.16)		92.0 (89.4, 94.0)	88.8 (84.9, 91.9)	0.91 (0.82, 1.02)	1.06 (0.94, 1.18)
Asian ^b	80.0 (77.3, 82.4)	82.0 (78.6, 85.0)	1.03 (0.95, 1.11)		90.8 (88.7, 92.5)	86.9 (83.8, 89.4)	0.87 ^a (0.79, 0.96)	1.13 ^a (1.05, 1.22)
Latino ^b	80.6 (78.9, 82.1)	85.9 (84.2, 87.5)	1.11 ^a (1.06, 1.16)		87.3 (86.0, 88.4)	86.1 (84.5, 87.5)	0.97 (0.92, 1.01)	1.13 ^a (1.08, 1.18)
White	85.6 (84.7, 86.4)	90.0 (89.0, 91.0)	1.11 ^a (1.08, 1.15)		94.0 (93.3, 94.7)	92.6 (91.4, 93.6)	0.94 ^a (0.89, 0.99)	1.10 ^a (1.05, 1.15)
Language								
Non-English ^b	81.5 (78.8, 83.8)	83.2 (80.0, 86.0)	1.02 (0.95, 1.09)		86.0 (83.5, 88.2)	85.4 (82.6, 87.8)	0.96 (0.89, 1.04)	1.19 ^a (1.11, 1.27)
English	83.2 (82.4, 83.9)	87.7 (86.7, 88.6)	1.10 ^a (1.07, 1.13)		91.3 (90.6, 92.0)	88.9 (88.1, 89.7)	0.93 ^a (0.90, 0.96)	1.10 ^a (1.07, 1.13)

Note: Population percentages for 2001 and 2005 were unadjusted. Odds ratios were statistically adjusted for child age, gender, immigration status, geographic region, and health status.

^aStatistically significant

^bDenotes the risk factors counted in the risk profile

OR = odds ratio

CI = confidence interval

NA = not available

SCHIP = State Children's Health Insurance Program

FPL = Federal Poverty Level

Figure. Changes in primary care access by child risk profile for children aged 0–19 years: California, 2001–2005

NOTE: Analyses are adjusted for child age, gender, immigration status, geographic region, and health status.

^a $p < 0.05$ for the difference between 2001 and 2005 for each risk profile (i.e., number of risk factors)

^b $p < 0.01$ for the difference between 2001 and 2005 for each risk profile (i.e., number of risk factors)

^c $p < 0.001$ for the difference between 2001 and 2005 for each risk profile (i.e., number of risk factors)

^dThe 4 risk factor category combined children with 4 and 5 risk factors to assure sufficient sample size for analysis.

visits to 64.4% in 2005 from 53.6% in 2001 (OR=1.11, CI 1.02, 1.22), but experienced no other significant changes. Children in Medicaid or SCHIP experienced gains between 2001 and 2005 in physician (OR=1.06, CI 1.01, 1.12) and dental (OR=1.08, CI 1.03, 1.13) visits and a decrease in having a regular source of care (OR=0.91, CI 0.86, 0.97), all similar to the privately insured. Latino (OR=1.11, CI 1.06, 1.16) and white (OR=1.11, CI 1.08, 1.15) respondents were the only groups to experience an increase in physician visits, and Latino (OR=1.13, CI 1.08, 1.18) and Asian (OR=1.13, CI 1.05, 1.22) respondents had an increase in dental visits that was similar to white respondents. Latino and African American respondents did not show a decrease in having a regular source of care that was experienced by Asian (OR=0.87, CI 0.79, 0.96) and white (OR=0.94, CI 0.89, 0.99) respondents. Non-English speakers had an increase in dental visits only (OR=1.19, CI 1.11, 1.27).

The Figure suggests that increases in physician and dental visits were greater for children at the highest levels of risk (at least four risk factors) than for other risk profile children. For example, children with three and four or more risk factors had gains in dental visits of 11.0% and 20.0%, respectively ($p<0.001$ for both), compared with $\leq 3.0\%$ for children with fewer risk factors. When studied by risk profile, only children with one risk factor were less likely to have a regular source in 2005 than in 2001 (96.0% vs. 95.0%, $p<0.01$).

DISCUSSION

This study found notable changes in children's access to care between 2001 and 2005 in California. Before and after adjusting for demographic covariates, we found statistically significant increases in the proportion of children with a physician (4.2 percentage points; range: 2.5–5.7) and dental (6.3 percentage points; range: 4.1–8.6) visit in the past year. If we hold the child population constant using 2001 estimates, in 2005 this would translate into roughly 437,000 more children aged 0–19 years who had a physician visit (range: 260,000–593,000) and about 318,000 more children aged 2–11 years who had a dental visit (range: 207,000–433,000). Counter to this trend was a slight decrease in having a regular source of care.

These trends varied by insurance status, child race/ethnicity, and language, though not by poverty or educational status. Of particular note was the increase in dental visits for the uninsured, Latino, and non-English-speaking families. Latino respondents also experienced an increase in physician visits (while other nonwhite groups did not) and did not experi-

ence the same decrease in having a regular source of care that was experienced by white respondents. When summarizing the results through risk profiles, the most vulnerable children (those who had at least four risk factors) appeared to experience the largest gains in utilization.

Why these changes in access occurred is not entirely clear. A smaller proportion of children were uninsured in 2005 (–2.7 percentage points), and there was a decrease in children living in poverty (–2.5 percentage points) and in families with less than a high school education (–2.8 percentage points). These trends in demographic risk factors may have contributed to a lower risk for poor access to care, but the changes in access occurred both before and after adjusting for the differences between years in insurance coverage and other risk factors.

To further explore what may be accounting for these changes in access, we also examined reports of comparable nationally representative data from the National Health Interview Survey and found limited national changes in the prevalence of physician visits or having a regular source of care. Among children aged 0–18 years nationally, we found statistically significant increases in having a physician visit in the past year (from 88.4% in 2001 to 89.8% in 2005) and the proportion of children with a regular source of care (from 94.0% in 2001 to 94.6% in 2005).²⁷

These limited changes in the national prevalence of physician visits and having a regular source of care discounts—but does not rule out—that there was an effect of broader secular trends on access to care.

We also investigated whether there may have been improvements in health-care provider capacity that may have contributed to the changes we observed. One study that examined trends in physician practitioners overall found that between 1990 and 2001, the provider-to-population ratio in California had improved, but at a rate of $<0.5\%$ per year (growing from 191 to 203 physicians per 100,000 population statewide at this time).²⁸ These data were, unfortunately, not specific to children, nor did they cover the exact time period of our study. However, if these trends were maintained during our study period (which is not unlikely), they would suggest a very limited or negligible impact of physician supply on the observed changes in access. Moreover, the increase was attributed mostly to the growth in the number of specialists in the state, further suggesting that there were few, if any, improvements in the primary care-to-population ratio that would explain our results.

With regard to dental care, however, there may indeed have been a national trend that accounted

for some of the gains in California. National data on children having a dental visit in the past year revealed a statistically significant increase from 73.3% in 2001 to 76.2% in 2005.²⁷ Yet, even the sizeable changes in dental care at the national level likely do not fully explain the observed changes in California. As such, there is good reason to explore what is unique about California health policy or the health-care environment that may be contributing to the changes.

Perhaps one of the most substantial child health policy changes in California between 2001 and 2005 has been the launch of county-based efforts to assure that all children have access to care. Since 2001, counties have been forming CHI coalitions that (1) seek to expand outreach and enrollment for public programs and (2) design and operate locally funded Healthy Kids insurance programs that provide comprehensive coverage to low-income children who are not eligible for Medi-Cal or SCHIP due primarily to undocumented immigration status. By mid-2005, 10 counties (including Los Angeles) offered Healthy Kids coverage, collectively covering about 60,000 children. Prior studies have shown that Healthy Kids programs increase access to both medical and dental care among enrollees.^{29–31}

While our study did not find that insurance coverage explained the changes in access to care between 2001 and 2005, CHIs might have stimulated improvements in access through other mechanisms. The expanded outreach and enrollment efforts typically include an additional component of utilization case management for enrollees in Medi-Cal, SCHIP, or Healthy Kids. In Los Angeles, for example, outreach workers not only enrolled children, but also made follow-up calls to link them with pediatric providers who were located primarily at local clinics or community health centers and encourage a first visit. It is possible that this may explain why children in 2005 were more likely to have a physician visit but less likely to have a regular source of care, as families may be less likely to view a health center as a regular source of care (because they may not always see the same provider or receive more team care).³²

It is possible that the particular increases in access observed for vulnerable populations (e.g., Latino and non-English-speaking people) might be partially related to expansion of the CHIs because of the focus on these populations. Additionally, CDHS instituted a rule in 2002 stating that Medi-Cal and SCHIP health plans aim to assure clients receive an initial health assessment with a primary care physician within 120 days of enrolling, and that the health plans report these data annually.³³ By 2005, it is possible that this change may have contributed partially to the increase

in physician visits, again benefiting primarily vulnerable populations.

With regard to dental care, some data suggest the dentist-to-population ratio has increased in California at about double the national rate (21.0% vs. 12.0%, respectively, from 1991 to 2004).³⁴ Whether these dentists care for low-income populations remains a substantial problem, but there is some indication that there may have been a growing trend toward doing so. One study showed a large (35.0%) increase from 1998 to 2000 in the percentage of all dentists in California who reported caring for at least one Denti-Cal patient (California's dental program for families who receive Medicaid).³⁵ This trend may partially explain the large gains in dental care use in California.

Limitations

This study had several limitations. First, this study demonstrated only association, not causality. Second, there were differences in response rates for the two iterations of the CHIS. CHIS reduces the potential for bias in the measures across years by carefully weighting both datasets to account for the differences across year in nonresponse. Moreover, the representativeness of CHIS may not be highly affected by the nonresponse, with the largest difference between respondents and nonrespondents being in the percent renting (an indicator of income and socioeconomic status factors). This difference each year was not only small but equivalent in 2001 and 2005 (about 4.0%).³⁶ Nonetheless, this cannot fully eliminate concerns about potential selection bias in explaining the population changes we observed that may be attributed to factors that were unknown or unable to be weighted.

Third, the decrease in having a regular source of care might have been affected by some degree of regression to the mean because the rate was notably high in 2001 (91.0%). Supporting this potential trend is an analysis of emergency department visits for children, which might be expected to increase if fewer children reported a regular source of care. According to CHIS, however, differences in any emergency department visit for children between 2001 and 2005 were not statistically significant (e.g., 18.3% in 2001 to 18.9% in 2005 among children aged 0–11 years).

CONCLUSION

We found substantial improvements in physician and dental visits between 2001 and 2005 for children in California. If these changes are not related to changes in insurance coverage or other population demographic risk factors over time (as this study suggests),

this implies that some significant improvements in access might well have been achieved through non-insurance means (e.g., case management activities and quality monitoring) that deserve further exploration. Improvements that we found among the most vulnerable children further suggest there may be unique policy approaches in California to reducing access disparities that may be replicable in other states and nationally.

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REFERENCES

- Starfield B. Primary care: balancing health needs, services, and technology. New York: Oxford University Press; 1998.
- Seid M, Varni JW, Cummings L, Schonlau M. The impact of realized access to care on health-related quality of life: a two-year prospective cohort study of children in the California State Children's Health Insurance Program. *J Pediatr* 2006;149:354-61.
- Shi L, Macinko J, Starfield B, Xu J, Regan J, Politzer R, et al. Primary care, infant mortality, and low birth weight in the states of the USA. *J Epidemiol Community Health* 2004;58:374-80.
- Shi L. Primary care, specialty care, and life chances. *Int J Health Serv* 1994;24:431-58.
- Shi L, Starfield B. The effect of primary care physician supply and income inequality on mortality among blacks and whites in US metropolitan areas. *Am J Public Health* 2001;91:1246-50.
- Shi L, Green LH, Kazakova S. Primary care experience and racial disparities in self-reported health status. *J Am Board Fam Pract* 2004;17:443-52.
- Safran DG, Taira DA, Rogers WH, Kosinski M, Ware JE, Tarlov AR. Linking primary care performance to outcomes of care. *J Fam Pract* 1998;47:213-20.
- Macinko J, Starfield B, Shi L. The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries, 1970-1998. *Health Serv Res* 2003;38:831-65.
- Chande VT, Kinnane JM. Role of the primary care provider in expediting care of children with acute appendicitis. *Arch Pediatr Adolesc Med* 1996;150:703-6.
- Franks P, Fiscella K. Primary care physicians and specialists as personal physicians. Health care expenditures and mortality experience. *J Fam Pract* 1998;47:105-9.
- Stevens GD, Seid M, Mistry R, Halfon N. Disparities in primary care for vulnerable children: the influence of multiple risk factors. *Health Serv Res* 2006;41:507-31.
- Stevens GD, Shi L. Racial and ethnic disparities in the primary care experiences of children: a review of the literature. *Med Care Res Rev* 2003;60:3-30.
- Seid M, Stevens GD, Varni JW. Parents' perceptions of pediatric primary care quality: effects of race/ethnicity, language, and access. *Health Serv Res* 2003;38:1009-31.
- Elster A, Jarosik J, VanGeest J, Fleming M. Racial and ethnic disparities in health care for adolescents: a systematic review of the literature. *Arch Pediatr Adolesc Med* 2003;157:867-74.
- Lurie N, Zhan C, Sangl J, Bierman AS, Sekscenski ES. Variation in racial and ethnic differences in consumer assessments of health care. *Am J Manag Care* 2003;9:502-9.
- Newacheck PW, Hung Y, Hochstein M, Halfon N. Access to health care for disadvantaged young children. *J Early Intervention* 2002;25:1-11.
- Weech-Maldonado R, Morales LS, Spritzer K, Elliot M, Hays RD. Racial and ethnic differences in parents' assessments of pediatric care in Medicaid managed care. *Health Serv Res* 2001;36:575-94.
- Ortega AN, Stewart DC, Dowshen SA, Katz SH. Perceived access to pediatric primary care by insurance status and race. *J Community Health* 2000;25:481-93.
- Newacheck PW, Stoddard JJ, Hughes DC, Pearl M. Health insurance and access to primary care for children. *N Engl J Med* 1998;338:513-9.
- Newacheck PW, Hughes DC, Stoddard JJ. Children's access to primary care: differences by race, income, and insurance status. *Pediatrics* 1996;97:26-32.
- DeNavas-Walt C, Proctor BD, Lee CH. Income, poverty, and health insurance in the United States: 2005. Washington: Census Bureau (US); August 2006. P60-231. Also available from: URL: <http://www.census.gov/prod/2006pubs/p60-231.pdf> [cited 2008 Dec 1].
- DeNavas-Walt C, Proctor BD, Mills RJ. Income, poverty, and health insurance in the United States: 2004. Washington: Census Bureau (US); August 2005. Also available from: URL: <http://www.census.gov/prod/2004pubs/p60-229.pdf> [cited 2008 Dec 1].
- Brown ER, Lavarreda SA. Job-based coverage drops for adults and children but public programs boost children's coverage. Los Angeles: University of California Los Angeles Center for Health Policy Research; February 2005. Also available from: URL: <http://www.healthpolicy.ucla.edu/pubs/publication.asp?pubID=110> [cited 2008 Dec 1].
- Stevens GD, Rice K, Cousineau MR. Children's Health Initiatives in California: the experiences of local coalitions pursuing universal coverage for children. *Am J Public Health* 2007;97:738-43.
- StataCorp. Stata®: Version 9.1. College Station (TX): StataCorp.; 2007.
- Flores-Cervantes I, Brick JM, Alvarez-Rojas L, Jones ME. Weighting and estimation of variance in the CHIS public use files. Los Angeles: University of California Los Angeles Center for Health Policy Research; 2005. Also available from: URL: http://www.chis.ucla.edu/pdf/CHIS2005_method5.pdf [cited 2008 Dec 1].
- National Center for Health Statistics (US). Health, United States 2007: with chartbook on trends in the health of Americans. Hyattsville (MD): Centers for Disease Control and Prevention (US); 2008. Also available from: URL: <http://www.cdc.gov/nchs/data/health/us07.pdf> [cited 2008 Dec 1].
- Coffman J, Quinn B, Brown TN, Scheffler R. Is there a doctor in the house? An examination of the physician workforce in California over the past 25 years. Berkeley (CA): Nicholas C. Petris Center on Health Care Markets and Consumer Welfare, University of California Berkeley; June 2004. Also available from: URL: <http://www.petrisc.org/Docs/CADocs.pdf> [cited 2008 Dec 1].
- Howell EM, Hughes D. A tale of two counties: expanding health insurance coverage for children in California. *Milbank Q* 2006;84:521-54.
- Howell EM, Hughes D, Kenney G, Sullivan J, Rubenstein J. Evaluation of the San Mateo County Children's Health Initiative: second annual report. Washington: The Urban Institute; August 2005. Also available from: URL: http://www.urban.org/UploadedPDF/411240_san_mateo.pdf [cited 2008 Dec 1].
- Trenholm C. Expanding coverage for children: the Santa Clara County Children's Health Initiative. Princeton (NJ): Mathematica Policy Research, Inc.; June 2004. Also available from: URL: <http://www.mathematica-mpr.com/publications/pdfs/expandcoverage.pdf> [cited 2008 Dec 1].
- Chung EK, Mathew L, McCollum KF, Elo IT, Culhane JF. Continuous source of care among young underserved children: associated characteristics and use of recommended parenting practices. *Ambul Pediatr* 2008;8:36-42.
- Medi-Cal Managed Care External Quality Review Organization. 2005 Medi-Cal Managed Care Quality Strategy annual report. Sacramento: California Department of Health Services; March 2008. Also available from: URL: http://www.dhcs.ca.gov/dataandstats/reports/Documents/MMCD_Qual_Rpts/Studies_Quality_Strategy/2005_Annual_Report_FINAL_20080908.pdf [cited 2009 Mar 23].

34. The New York Center for Health Workforce Studies. The United States health workforce profile. Rensselaer (NY): The New York Center for Health Workforce Studies; October 2006. Also available from: URL: <http://chws.albany.edu/download.php?id=1842398,271,2> [cited 2009 Mar 23].
35. Gehshan S, Hauck P, Scales J. Increasing dentists' participation in Medicaid and SCHIP. Washington: National Conference of State Legislatures; 2001. Also available from: URL: <http://www.ncsl.org/bookstore/productdetail.htm?prodid=0168000002> [cited 2008 Dec 1].
36. Cervantes IF, Brick JM, Edwards WS. CHIS 2005 response rates. Los Angeles: University of California Los Angeles Center for Health Policy Research; April 2007. Also available from: URL: http://www.chis.ucla.edu/pdf/CHIS2005_method4.pdf [cited 2008 Dec 1].