

PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

The Effects of Varying Periods of Uninsurance on Children's Access to Health Care

Janet R. Cummings, Shana Alex Lavarreda, Thomas Rice and E. Richard Brown
Pediatrics 2009;123:e411-e418
DOI: 10.1542/peds.2008-1874

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://www.pediatrics.org/cgi/content/full/123/3/e411>

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2009 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



The Effects of Varying Periods of Uninsurance on Children's Access to Health Care

Janet R. Cummings, BA^a, Shana Alex Lavarreda, MPP^{a,b}, Thomas Rice, PhD^{a,b}, E. Richard Brown, PhD^{a,b}

^aDepartment of Health Services, University of California, Los Angeles School of Public Health, and ^bCenter for Health Policy Research, University of California, Los Angeles, Los Angeles, California

The authors have indicated they have no financial relationships relevant to this article to disclose.

What's Known on This Subject

Uninsurance among children has adverse effects on health care access and utilization. Children who have breaks in insurance coverage during a year can face similar barriers to care relative to those who are continuously uninsured.

What This Study Adds

We examined how distinct periods of uninsurance, including very brief periods, compare to continuous public and private coverage and to one another in their effect on health care access and utilization among children.

ABSTRACT

OBJECTIVE. Many studies have documented the adverse consequences of uninsurance for children, but less is known about the differential effects of varying periods of uninsurance. This study examines the relative effects of varying periods of uninsurance (uninsured for 1–4 months, 5–11 months, or all year) on children's access to care.

METHODS. Using data from the 2005 California Health Interview Survey Children's File (ages 0–11), we estimated logistic regressions to examine the effect of insurance status on 6 measures of health care access, controlling for child demographics, child health status, family characteristics, and urban residence. Indicators for insurance status included the following categories: (1) privately insured all year (reference); (2) Medicaid all year; (3) State Children's Health Insurance Program all year; (4) uninsured for 1 to 4 months; (5) uninsured for 5 to 11 months; (6) uninsured all year; and (7) other insurance all year.

RESULTS. We found that children who experience short spells of uninsurance (1–4 months) are less likely to have a usual source of care and are more likely to experience delays in needed care than those with continuous private or public insurance. The consequences are even worse for children who experience more substantial periods of uninsurance, because they are also less likely to receive preventive care (well-child visits and flu shots) or visit the doctor during the year and are more likely to experience delays in receiving needed medical care and prescriptions than those with continuous coverage. The Medicaid program and State Children's Health Insurance Program in California both seem to have ensured levels of health care access similar to that obtained by children with year-round private coverage.

CONCLUSIONS. These findings highlight the benefits gained through continuous health insurance, whether public or private. Public policies should be adopted to ensure continuity of coverage and retention in public insurance programs. *Pediatrics* 2009;123:e411–e418

www.pediatrics.org/cgi/doi/10.1542/peds.2008-1874

doi:10.1542/peds.2008-1874

Key Words

insurance coverage, delivery of health care, infant, child, preschool

Abbreviations

CPS—Current Population Survey
CHIS—California Health Interview Survey
SCHIP—State Children's Health Insurance Program
USOC—usual source of care
OR—odds ratio
CI—confidence interval

Accepted for publication Nov 11, 2008

Address correspondence to Janet R. Cummings, BA, Department of Health Services, School of Public Health, Campus Box 951772, Los Angeles, CA 90095-1772 E-mail: jrc12@ucla.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275). Copyright © 2009 by the American Academy of Pediatrics

THE CURRENT POPULATION Survey (CPS) estimates that nearly 8.1 million children <18 years of age in the United States were uninsured in 2007.¹ A large body of literature has documented the consequences of uninsurance among this population, including the decreased likelihood of having a usual source of care (USOC),^{2–7} the decreased likelihood of receiving health care services,^{2,3,5–9} and the increased likelihood of having unmet health care needs.^{2,3,6,8,10,11} The adverse consequences of uninsurance have been shown to be especially pronounced for children with high health care needs.^{12,13}

Many researchers have noted that although the CPS estimates of the uninsured are generally the benchmark used by policymakers, this survey does not adequately account for those with part-year coverage gaps.^{14–16} To examine this issue, Tang et al¹⁴ used the Medical Expenditure Panel Survey to calculate the percentage of children who were uninsured for part of the year as well as for the full year in 1999. By fully accounting for those with coverage gaps, their estimates of the number of uninsured children in 1999 were nearly double (23%) the estimates provided by the CPS (12%) for that time period.¹⁷

Olson et al¹⁸ highlighted the importance of accounting for the “hidden uninsured” by examining the effects of

discontinuous coverage on access to care among this population. This study found that those who were uninsured for part of the year were far more likely than those with continuous private coverage to have unmet medical care, delayed care, unfilled prescriptions, no USOC, no well-child visit during the year, and no doctor visit during the previous year.¹⁸ Moreover, other studies have identified deleterious consequences of insurance gaps for particularly vulnerable populations of children such as those living in poverty,^{2,19} children with asthma,²⁰ and preschool-aged children.⁴

Although recent studies have highlighted the importance of considering discontinuous insurance coverage among children, little is known about how the length of time that a child is uninsured affects access to and use of health care. Olson et al,¹⁸ for example, examined the effect of a single indicator for discontinuous insurance coverage during a 12-month period, which grouped children who were uninsured for 1 month with those who were uninsured for 11 months. This article addresses this gap in the literature by examining the effects of varying periods of uninsurance on 6 indicators of health care access and utilization among children ages 0 to 11. Specifically, this study addresses the following research questions: (1) Compared with children with continuous private and public coverage, how do varying periods of uninsurance affect health care access and utilization and (2) What is the relationship between the duration of uninsurance and health care access and utilization?

METHODS

Data come from the 2005 California Health Interview Survey (CHIS), a random-digit dial telephone survey of >44 000 California households. To capture the rich diversity of California's population, the CHIS was conducted in 5 languages (English, Spanish, Chinese [Mandarin and Cantonese dialects], Vietnamese, and Korean). Our study used data from the children's portion of the survey (ages 0–11), in which a parent answered questions concerning their child's health care access and utilization, health insurance status, health status, and sociodemographic characteristics. The CHIS used a multistage sampling design in which households were contacted to determine eligibility, and then an adult respondent in the household was randomly selected for interview in eligible households. If there were any children in the household, a child was randomly selected and the most knowledgeable parent was interviewed. The overall adult response rate was 29.5%. Among sampled children, 75.2% of parents responded to the child survey, resulting in an overall response rate for the child portion of 25.2%.²¹ The main analytic sample comprised 11 343 children aged 11 and younger.* One question of interest, whether the child had received a flu shot in the previous 12 months, was only asked about those who were at least 6 months of age; thus, the analytic sample for this question was reduced to 10 915 children.

We estimated weighted logistic regressions to examine the effect of insurance status on preventive care and

*Fifteen individuals with missing information on parental employment were dropped from the full CHIS sample for this population ($N = 11\ 358$).

TABLE 1 Weighted Descriptive Statistics for California Children Aged 0 to 11 ($N = 11\ 343$)

	Proportion
Dependent variables	
Has USOC other than emergency department	96.5
Flu shot within previous 12 mo	26.5 ^a
Well-child visit within previous 12 mo	70.5
No doctor visit within previous year	5.8
Delayed needed prescription within previous 12 mo	4.2
Delayed needed medical care within previous 12 mo	5.3
Explanatory variables	
Insurance status	
Private insurance all year	53.9
Medicaid all year	28.5
SCHIP all year	5.2
Uninsured 1–4 mo	3.1
Uninsured 5–11 mo	3.6
Uninsured all year	2.6
Other/combined insurance	2.9
Health status	
Fair/poor health	6.3
Current asthma	8.5
Activity limitations	5.2
Child demographics	
Age group: older children (6–11 y of age)	50.4
Girl	48.9
Race/ethnicity	
White	40.0
Black	6.8
Latino	38.2
Asian/Pacific Islander	11.1
Other	3.9
Family characteristics	
Poverty level	
<100% federal poverty level	22.2
100%–199% federal poverty level	22.2
200%–299% federal poverty level	13.0
≥300% federal poverty level	42.5
Parent education	
Less than high school	19.5
High school graduate	23.7
Some college	24.2
College graduate	22.1
More than college	10.5
Citizenship	
Child and parent are citizens	72.9
Child citizen, parent noncitizen	22.6
Child and parent are noncitizens	4.5
1-parent household	23.7
Parent unemployed	31.8
Urban residence	88.6

^a Restricted sample for those aged 6 months to 11 years ($N = 10\ 915$).

health care utilization for children, controlling for health status and sociodemographic characteristics. Weights adjust for differential probabilities of sample selection, nonresponse bias, and noncoverage bias using a raking procedure.^{22†} Because the main regression results only provide comparisons between each insurance group and

†Raking is an adjustment procedure that, unlike poststratification, allows for the use of more auxiliary information to help control for nonresponse bias and noncoverage bias. The raked weights in the 2005 CHIS use information from the 2004 and 2005 California Department of Finance Population Estimates, the 2004 American Community Survey, and the Census 2000 Summary File 1 for California.

TABLE 2 Bivariate Comparisons of Access and Utilization Measures According to Insurance Status

	Private Insurance All Year (N = 7393), %	Medicaid All Year (N = 2128), %	SCHIP All Year (N = 536), %	Other and Combined Insurance (N = 398), %	Uninsured 1–4 Mo (N = 281), %	Uninsured 5–11 Mo (N = 305), %	Uninsured All Year (N = 302), %
Has USOC other than emergency department	98.9	96.1 ^a	97.2	97.2	89.1 ^b	85.5 ^a	75.0 ^a
Well-child visit within previous 12 mo	71.9	71.6	66.7	77.5 ^b	72.2	62.2 ^c	40.0 ^a
Flu shot within previous 12 mo	25.9	29.4 ^c	25.6	27.0	22.7	18.4 ^c	24.5
No doctor visit within previous 12 mo	5.5	4.1 ^b	6.3	5.8	9.6	10.4 ^b	18.9 ^a
Delayed needed medical care within previous 12 mo	3.4	5.9 ^a	6.3 ^b	7.7 ^c	12.4 ^a	15.9 ^a	11.7 ^a
Delayed needed prescription within previous 12 mo	3.2	5.1 ^c	4.0	4.8	5.5	9.5 ^a	5.5

Adjusted Wald tests were conducted to test significant differences relative to those with private insurance all year.

^a $P < .01$.

^b $P < .10$.

^c $P < .05$.

the omitted reference category, we also conducted Wald tests to provide comparisons across all of the insurance groups. Outcome variables included whether, in the previous 12 months, the child had (1) a USOC other than the emergency department, (2) a well-child checkup, (3) a flu shot, (4) no doctor visit at all, (5) a delay in seeking needed medical care, and (6) a delay in obtaining needed prescription medication.

The explanatory variable of interest, insurance status, included indicators for the following categories: (1) privately insured all year (reference), (2) Medicaid‡ all year, (3) State Children's Health Insurance Program (SCHIP)§ all year, (4) uninsured for 1 to 4 months, (5) uninsured for 5 to 11 months, (6) uninsured all year, and (7) other insurance/combined insurance all year. The last category combined children with continuous coverage from some other source, such as the military, with those who were continuously insured with more than 1 type of insurance. The 3 categories for those who were uninsured part or all of the year were chosen based on the distribution of a variable measuring the number of months of uninsurance during the year. Sensitivity analyses were also performed to ensure that the findings of interest were robust to the specification of these categories. The other independent variables (Table 1) included:

1. Health status: indicators for fair/poor health (relative to good, very good, or excellent health), any limitations in age-appropriate activities, and parent-reported current asthma.
2. Child demographics: age, gender, and race/ethnicity.
3. Family characteristics: family income relative to the federal poverty level, parent education, child and parent citizenship status, and indicators for whether the

child lived in a 1-parent household and whether the parent respondent was currently unemployed.

4. Urban residence: indicator for whether the family lived in an urban area.||

RESULTS

Nearly three fourths of the children in our analytic sample had received a well-child visit and just over one fourth had received a flu shot during the previous year (Table 1). The vast majority (97%)¶ had a USOC and few experienced problems with access to care. Between 4% and 6% did not visit the doctor, experienced a delay in needed medical care, or experienced a delay in needed prescription drugs. Over half had continuous private insurance, one third had continuous coverage through either Medicaid or SCHIP, and approximately one tenth of children were uninsured for part (7%) or all of the year (3%).#

Bivariate analyses indicate that those with any period of uninsurance generally have worse access to health care than the privately insured and that most of these differences are statistically significant (Table 2). Moreover, for 3 of the outcomes (has USOC, well-child visit, no doctor visit within the previous year), as the period of uninsurance increases, access to care decreases.

In the multivariate analyses, any period of uninsurance significantly decreases the odds that a child has a USOC (Table 3). Relative to the privately insured, the odds ratios (ORs) of having a USOC range from 0.21 (95% confidence interval [CI]: 0.10–0.44) for those un-

||The indicator for urban comprises the following 3 categories defined by Claritas, Inc: urban (more than 4250 persons per square mile in a population center), second-city (between 1000 and 4250 persons per square mile in a population center), and suburban (at least 1000 persons per square mile and not in an urban or second-city population center).

¶One likely explanation for the higher percentage of those with a USOC in our sample relative to national studies is that California has an extensive safety net system.²³

#The lower rate of uninsurance among children in California relative to national surveys likely results from California's extensive safety net,²³ more aggressive outreach efforts to enroll eligible children in public programs,²⁴ and methodologic differences in state and national surveys.¹

‡In California, the Medicaid program is called Medi-Cal.

§In California, SCHIP is called Healthy Families.

TABLE 3 Multivariate Logistic Regressions Examining Children's USOC and Preventive Care According to Insurance Status (*N* = 11 343)

	Has USOC Other Than Emergency Department		Well-child Visit Within Previous 12 Mo ^a		Flu Shot Within Previous 12 Mo ^a	
	OR	95% CI	OR	95% CI	OR	95% CI
Medicaid all year ^b	0.79	0.43–1.43	1.17	0.92–1.49	1.05	0.81–1.37
SCHIP all year ^b	0.64	0.25–1.63	1.05	0.75–1.46	0.94	0.64–1.38
Uninsured 1–4 mo ^b	0.21 ^c	0.10–0.44	1.16	0.76–1.77	0.81	0.52–1.26
Uninsured 5–11 mo ^b	0.12 ^c	0.06–0.25	0.70	0.44–1.09	0.55 ^d	0.34–0.90
Uninsured all year ^b	0.08 ^c	0.04–0.15	0.29 ^c	0.18–0.46	0.87	0.51–1.48
Other/combined insurance ^b	0.72	0.26–2.01	1.44 ^e	1.00–2.09	0.98	0.68–1.42
Fair/poor health	0.57	0.28–1.17	1.07	0.77–1.50	1.32 ^e	0.97–1.80
Current asthma	2.30 ^e	0.89–5.92	1.16	0.89–1.51	3.00 ^c	2.34–3.84
Activity limitations	1.40	0.60–3.29	1.21	0.88–1.67	0.90	0.64–1.25
Age group (1 = 6–11)	0.58 ^d	0.36–0.94	0.27 ^c	0.24–0.32	0.33 ^c	0.29–0.39
Girl	0.90	0.57–1.42	0.77 ^c	0.67–0.89	0.93	0.80–1.07
Black ^f	1.33	0.60–2.96	1.15	0.83–1.60	1.03	0.74–1.43
Latino ^f	0.91	0.52–1.59	1.13	0.92–1.37	1.17	0.96–1.43
Asian/Pacific Islander ^f	0.61	0.30–1.25	0.72 ^c	0.57–0.90	2.08 ^c	1.67–2.59
Other race/ethnicity ^f	1.14	0.41–3.20	1.33	0.92–1.93	0.85	0.58–1.25
One-parent household	0.38 ^c	0.23–0.63	0.92	0.75–1.11	1.02	0.82–1.27
Family income 100%–199% federal poverty level ^g	1.28	0.76–2.18	1.19	0.93–1.53	1.12	0.86–1.44
Family income 200%–299% federal poverty level ^g	1.39	0.70–2.75	1.10	0.82–1.48	1.08	0.77–1.52
Family income ≥ 300% federal poverty level ^g	1.44	0.75–2.77	1.18	0.88–1.58	1.01	0.74–1.37
Parent: high school graduate ^h	1.21	0.62–2.38	1.42 ^c	1.10–1.83	0.94	0.72–1.22
Parent: some college ^h	1.52	0.79–2.92	1.48 ^c	1.14–1.92	0.82	0.62–1.08
Parent: college graduate ^h	1.41	0.65–3.09	1.80 ^c	1.36–2.38	0.97	0.73–1.29
Parent: more than college ^h	1.28	0.54–3.06	2.40 ^c	1.75–3.30	1.14	0.83–1.56
Child citizen, parent noncitizen ⁱ	1.01	0.52–1.99	1.07	0.86–1.32	1.24 ^d	1.01–1.52
Child noncitizen ⁱ	0.37 ^d	0.18–0.79	0.96	0.63–1.46	1.15	0.79–1.66
Urban residence	1.39	0.79–2.45	1.21 ^d	1.00–1.47	1.35 ^c	1.10–1.66
Parent unemployed	0.74	0.45–1.20	1.12	0.95–1.32	1.04	0.88–1.23

^a Restricted sample for those aged 6 months to 11 years (*N* = 10 915).^b Omitted reference: continuous private coverage.^c *P* < .01.^d *P* < .05.^e *P* < .10.^f Omitted reference: white.^g Omitted reference: family income <100% federal poverty level.^h Omitted reference: parent—less than high school degree.ⁱ Omitted reference: child and parent citizens.

insured for 1 to 4 months to 0.08 (95% CI: 0.04–0.15) for those who are uninsured for the duration of the year. We also conducted adjusted Wald tests (Table 4) to compare the 3 uninsured groups to one another and to children with continuous public coverage. Results suggest that any period of uninsurance is associated with significantly lower odds of having a USOC relative to those enrolled in Medicaid (*P* < .01) and SCHIP (*P* < .05). Moreover, those who are uninsured all year are significantly less likely to have a USOC than those who are only uninsured for 1 to 4 months (*P* = .02). Finally, those with Medicaid and SCHIP coverage do not have statistically different odds of having a USOC relative to the privately insured.

Longer periods of uninsurance are also negatively associated with receiving preventive care (Table 3). Relative to the privately insured, children who are uninsured all year have 0.29 (95% CI: 0.18–0.46) times the odds of receiving a well-child visit, and children who are uninsured 5 to 11 months have 0.55 (95% CI: 0.34–0.90) times the odds of receiving a flu shot. Adjusted Wald tests (Table 4) further reveal that those who are

uninsured all year are significantly less likely to receive a well-child visit than all other groups (*P* < .01). Finally, relative to the privately insured, children with Medicaid and SCHIP coverage do not have statistically different odds of receiving these preventive services.

Insurance status also plays a significant role in whether children obtain needed medical care and prescription drugs (Table 5). Children who are uninsured all year have significantly higher odds than those with private insurance of not having a doctor's visit within the previous year (OR: 3.44 [95% CI: 2.03–5.83]). Adjusted Wald tests (Table 4) also indicate that children who are uninsured all year are less likely to have a doctor's visit than every other group except those who are uninsured 5 to 11 months. Finally, children with Medicaid and SCHIP coverage do not differ statistically from those with private insurance in their likelihood of visiting a doctor.

Even more striking, however, are the results examining the relationship between insurance status and whether a child experienced a delay in needed medical care (Table 5). Relative to continuous private coverage, any period of uninsurance is associated with at least 3

TABLE 4 Adjusted Wald Tests Comparing Insurance Groups From Multivariate Logistic Regressions

	SCHIP All Year, F value	Other and Combined Insurance, F value	Uninsured 1–4 Mo, F value	Uninsured 5–11 Mo, F value	Uninsured All Year, F value
USOC other than emergency department					
Medicaid all year	0.17	0.03	10.13 ^a	25.04 ^a	40.32 ^a
SCHIP all year	—	0.04	4.32 ^b	10.58 ^a	18.61 ^a
Other/combined	—	—	4.46 ^b	9.96 ^a	16.73 ^a
Uninsured 1–4 mo	—	—	—	1.53	5.70 ^b
Uninsured 5–11 mo	—	—	—	—	1.62
Well-child visit previous year					
Medicaid all year	0.40	1.04	0.00	4.86 ^b	35.20 ^a
SCHIP all year	—	1.83	0.17	2.33	23.61 ^a
Other/combined	—	—	0.63	6.53 ^b	32.09 ^a
Uninsured 1–4 mo	—	—	—	2.91 ^c	21.98 ^a
Uninsured 5–11 mo	—	—	—	—	8.07 ^a
Flu shot previous year					
Medicaid all year	0.32	0.12	1.28	6.11 ^b	0.48
SCHIP all year	—	0.03	0.27	3.14 ^c	0.05
Other/combined	—	—	0.48	3.75 ^c	0.15
Uninsured 1–4 mo	—	—	—	1.42	0.05
Uninsured 5–11 mo	—	—	—	—	1.66
No doctor visit previous year					
Medicaid all year	0.65	2.25	4.59 ^b	7.61 ^a	35.44 ^a
SCHIP all year	—	0.46	1.61	2.97 ^c	14.21 ^a
Other/combined	—	—	0.31	0.92	7.23 ^a
Uninsured 1–4 mo	—	—	—	0.16	3.81 ^c
Uninsured 5–11 mo	—	—	—	—	2.61
Delayed needed medical care previous year					
Medicaid all year	0.02	0.84	9.70 ^a	10.34 ^a	6.82 ^a
SCHIP all year	—	0.39	4.65 ^b	6.39 ^b	3.40 ^c
Other/combined	—	—	2.29	3.49 ^c	1.33
Uninsured 1–4 mo	—	—	—	0.18	0.14
Uninsured 5–11 mo	—	—	—	—	0.60
Delayed needed prescription previous year					
Medicaid all year	0.11	0.04	0.69	4.40 ^b	0.84
SCHIP all year	—	0.01	0.12	2.59	0.27
Other/combined	—	—	0.23	3.00 ^c	0.39
Uninsured 1–4 mo	—	—	—	1.64	0.05
Uninsured 5–11 mo	—	—	—	—	0.87

The adjusted Wald tests are calculated based on the regression results presented in Tables 3 and 5.

^a $P < .01$.

^b $P < .05$.

^c $P < .10$.

times the odds of experiencing a delay in needed medical care ($P < .01$). Adjusted Wald tests further reveal that any period of uninsurance is significantly associated with a delay in care relative to those with Medicaid and SCHIP coverage (Table 4). All of these 2-way comparisons between those with periods of uninsurance and those with continuous public coverage are significant at the .05 level, with the one exception being the comparison between SCHIP coverage and uninsured all year, which has a P value of .07. Interestingly, there are no significant differences among the 3 uninsured groups in their likelihood of experiencing a delay in needed care. When examining delays in filling needed prescriptions, children who are uninsured for 5 to 11 months have 2.8 (95% CI: 1.37–5.54) times the odds of experiencing a delay relative to the privately insured. Finally, children with Medicaid or SCHIP coverage are not significantly more likely to experience delays in care or in receive needed medication than the privately insured.

The 3 categories for those with some period of uninsurance were initially chosen based on the distribution of a variable measuring the number of months that a child was uninsured during the previous year. Two sets of sensitivity analyses were performed to ensure that the findings associated with insurance status were robust to the specification of these 3 categories. The first set of sensitivity analyses recategorized the uninsured as those without coverage for (1) 1 to 3 months, (2) 4 to 10 months, and (3) 11+ months, and the second set recategorized the uninsured as those without coverage for (1) 1 to 2 months, (2) 3 to 10 months, and (3) 11+ months. The results from the sensitivity analyses are qualitatively and quantitatively similar to the results from the main analyses. It is particularly noteworthy that even a 1- to 2-month period of uninsurance is associated with lower odds of having a USOC (OR: 0.37 [95% CI:

TABLE 5 Multivariate Logistic Regressions Examining Children's Access to Medical Care and Prescription Drugs According to Insurance Status (N = 11 343)

	No Doctor Visit Within Previous 12 Mo		Delayed Needed Medical Care Within Previous 12 Mo		Delayed Needed Prescription Within Previous 12 Mo	
	OR	95% CI	OR	95% CI	OR	95% CI
Medicaid all year ^a	0.70	0.42–1.15	1.43	0.86–2.38	1.16	0.65–2.08
SCHIP all year ^a	0.92	0.49–1.73	1.50	0.78–2.91	1.32	0.65–2.70
Uninsured 1–4 mo ^a	1.58	0.79–3.16	3.49 ^b	1.90–6.41	1.54	0.80–2.96
Uninsured 5–11 mo ^a	1.90 ^c	0.94–3.81	4.08 ^b	2.18–7.62	2.75 ^b	1.37–5.54
Uninsured all year ^a	3.44 ^b	2.03–5.83	3.06 ^b	1.65–5.68	1.71	0.77–3.78
Other/combined insurance ^a	1.23	0.63–2.38	1.94 ^d	1.05–3.59	1.25	0.65–2.42
Fair/poor health	0.70	0.37–1.32	1.84 ^d	1.14–2.99	2.04 ^b	1.29–3.23
Current asthma	0.24 ^b	0.09–0.65	0.91	0.56–1.47	1.92 ^b	1.30–2.84
Activity limitations	0.58 ^c	0.31–1.09	2.54 ^b	1.46–4.42	1.60 ^c	0.99–2.57
Age group (1 = 6–11)	5.42 ^b	3.82–7.68	0.89	0.67–1.19	0.51 ^b	0.36–0.73
Girl	1.35 ^d	1.03–1.76	1.07	0.81–1.40	0.93	0.68–1.27
Black ^e	1.18	0.64–2.18	0.70	0.38–1.29	1.78	0.86–3.69
Latino ^e	0.86	0.58–1.26	0.97	0.65–1.45	0.75	0.50–1.12
Asian/Pacific Islander ^e	1.02	0.69–1.52	0.63	0.34–1.18	0.36 ^b	0.20–0.65
Other race/ethnicity ^e	0.93	0.46–1.86	1.06	0.55–2.04	1.17	0.53–2.54
One-parent household	1.55 ^b	1.14–2.11	0.79	0.52–1.19	1.23	0.82–1.85
Family income 100%–199% federal poverty level ^f	1.18	0.71–1.93	1.41 ^c	0.96–2.08	1.19	0.70–2.02
Family income 200%–299% federal poverty level ^f	1.39	0.80–2.41	1.38	0.82–2.32	0.64	0.36–1.16
Family income 300%+ federal poverty level ^f	1.12	0.60–2.09	0.82	0.48–1.40	0.79	0.48–1.29
Parent: high school graduate ^g	0.68	0.40–1.16	0.77	0.47–1.26	0.49 ^b	0.30–0.79
Parent: some college ^g	0.67	0.40–1.11	1.21	0.76–1.91	0.68	0.41–1.13
Parent: college graduate ^g	0.81	0.46–1.41	0.92	0.55–1.54	0.88	0.47–1.63
Parent: more than college ^g	0.42 ^b	0.23–0.79	0.63	0.35–1.16	1.20	0.41–3.49
Child citizen, parent noncitizen ^h	0.82	0.53–1.26	0.83	0.54–1.27	1.07	0.60–1.94
Child noncitizen ^h	1.55	0.88–2.72	1.21	0.67–2.19	0.96	0.46–2.00
Urban residence	0.81	0.59–1.12	1.84 ^b	1.30–2.61	0.87	0.59–1.26
Parent unemployed	1.08	0.80–1.47	1.10	0.81–1.49	0.84	0.60–1.16

^a Omitted reference: continuous private coverage.

^b $P < .01$.

^c $P < .10$.

^d $P < .05$.

^e Omitted reference: white.

^f Omitted reference: family income $<100\%$ federal poverty level.

^g Omitted reference: parent—less than high school degree.

^h Omitted reference: child and parent citizens.

0.13–1.08] $P = .07$) and higher odds of experiencing a delay in care (OR: 2.33 [95% CI: 1.02–5.34]).

DISCUSSION

Our findings suggest that any period of uninsurance is associated with an increased likelihood of experiencing a delay in needed medical care and a lower likelihood of having a USOC. Furthermore, those who experience a more substantial period of uninsurance are less likely to have a well-child visit, flu shot, or doctor visit in the previous year, and are more likely to have a delay in receiving prescription medications. For 3 of the outcomes (USOC, well-child visit, no doctor visit), longer periods of uninsurance are associated with worse access and utilization. The differences among the 3 uninsured groups are all significant in the regression examining receipt of a well-child visit. On the other hand, only the comparison between the full-year uninsured and those who are uninsured for 1 to 4 months differs significantly

in the regressions examining access to a USOC and no doctor visit.

Interestingly, those who were uninsured for 5 to 11 months generally experienced similar if not worse problems with access to care than those who were uninsured for the entire year, in terms of delay in needed medical care, delay in prescription, and flu shot. These findings are consistent with those reported by Olson et al,¹⁸ in which for many of the outcomes they examined, children with partial-year insurance coverage were worse off than those who were uninsured for the entire year. One possible explanation is that parents have a greater incentive to enroll their children in private or public coverage if their children have or develop greater health needs, suggesting that the differences between these 2 groups may be due in part to unmeasured differences in underlying health status. Indeed, when comparing the primary reason cited for uninsurance, 8% of those in the uninsured all year group lacked coverage because their

parent believed there was no need because of the child's good health, compared with only 1% of those who were uninsured for 5 to 11 months.

There are other differences in the primary reasons cited for uninsurance across these 3 groups. Many children who were uninsured for 1 to 4 months were experiencing transitions in coverage for various reasons: 19% were uninsured because of a delay in switching between insurance companies, 17% had lost coverage because their parent had changed or lost their job, and 9% had lost public coverage.** However, the lack of affordability was the most commonly cited reason for uninsurance among those without coverage for 5 to 11 months (30%) and for the entire year (34%), compared with only 14% of those who were uninsured for 1 to 4 months. Among children who were uninsured for 5 to 11 months, experiencing a delay in switching between insurance companies was the second most commonly cited reason (9%), followed by loss of public coverage (8%), and parent changing employment or losing job (6%). Finally, among children who were uninsured for the duration of the year, ineligibility because of citizenship status was the second most commonly cited reason for uninsurance (14%), compared with only 2% of those who were uninsured for 5 to 11 months and 1% of those who were uninsured for 1 to 4 months.

Our findings suggest that public policies ensuring continuity of insurance coverage may benefit children by increasing their access to and use of appropriate health care. The importance of public coverage for children was recently highlighted by the US Census Bureau, which reported that the primary reason for the 7% decrease in the number of uninsured children between 2006 and 2007 was because of an increase in the number of children covered by public programs.¹ Because affordability was cited as one of the most common barriers to coverage, policy makers should consider additional expansions of income eligibility requirements to further reduce the rate of uninsurance among this population. States should also continue to improve the public insurance take-up rates for eligible children through greater outreach efforts and reductions in the administrative burden of enrollment.²⁴⁻²⁶ Finally, improved retention efforts would reduce churning into and out of Medicaid and SCHIP that can result in periods of uninsurance for reasons unrelated to the child's eligibility.²⁷⁻²⁹

This study has several potential limitations. First, because this study uses cross-sectional data, it is difficult to account for selection effects that may bias the results. Specifically, there may be unobservable characteristics that make it especially necessary for some families to obtain or maintain their insurance coverage. If selection effects of this nature are not accounted for, the effects of discontinuous coverage may have been overestimated. Another limitation of the study is the 25.2% response rate for the child portion of the survey.³⁰ Importantly, sample weights used in the analyses help to adjust for

**These percentages are presented for those whose parent provided a reason for their child's period of uninsurance. The response rates were 99.3% for children who were uninsured for 1 to 4 months, 99.7% for children who were uninsured for 5 to 11 months, and 92.4% for children who were uninsured for the entire year.

nonresponse bias, and a methodologic study have shown that differences in the sociodemographic characteristics, disability status, and political beliefs of respondents and nonrespondents to the 2005 CHIS were very small.³¹ Recent research also suggests that surveys with lower response rates do not necessarily result in biased findings.³²⁻³⁵ Finally, the results are only generalizable to children in California and may be different for children in other states. However, the direction and significance of many of the associations found in this study are consistent with those reported in studies that have used nationally representative data.¹⁸ Thus, these findings bolster the growing body of evidence that periods of uninsurance have detrimental effects on the access to and utilization of services among this population.

CONCLUSIONS

Findings from this study provide additional evidence of the importance of public insurance programs in ensuring access to needed health services for children. In our study, children with continuous enrollment in Medicaid and SCHIP had access to care that was comparable to those with continuous private coverage. Because affordability was a commonly cited barrier to insurance, policy makers should consider expanding public insurance income eligibility requirements, particularly for children living in poverty. In addition, it is important for policy-makers to improve enrollment and retention efforts for those who are eligible, because even very short periods of uninsurance can have adverse consequences for children's health care access and utilization.

ACKNOWLEDGMENTS

Support for this research was provided by the California Endowment and the California Wellness Foundation.

We are grateful for the helpful comments and suggestions of Ninez Ponce, Michelle Ko, and 3 anonymous reviewers.

REFERENCES

1. DeNavas-Walt C, Proctor BD, Smith JC. *Income, Poverty, and Health Insurance Coverage in the United States: 2007*. Washington, DC: US Census Bureau; 2008. Report No. P60-235
2. Duderstadt KG, Hughes DC, Soobader MJ, Newacheck PW. The impact of public insurance expansions on children's access and use of care. *Pediatrics*. 2006;118(4):1676-1682
3. Kenney G. The impacts of the State Children's Health Insurance Program on children who enroll: findings from ten states. *Health Serv Res*. 2007;42(4):1520-1543
4. Kogan MD, Alexander GR, Teitelbaum MA, Jack BW, Kotelchuck M, Pappas G. The effect of gaps in health insurance on continuity of a regular source of care among preschool-aged children in the United States. *JAMA*. 1995;274(18):1429-1435
5. Newacheck PW, Hughes DC, Stoddard JJ. Children's access to primary care: differences by race, income, and insurance status. *Pediatrics*. 1996;97(1):26-32
6. Newacheck PW, Stoddard JJ, Hughes DC, Pearl M. Health insurance and access to primary care for children. *N Engl J Med*. 1998;338(8):513-519
7. Selden TM, Hudson JL. Access to care and utilization among children: estimating the effects of public and private coverage. *Med Care*. 2006;44(suppl 5):I19-I26

8. Kempe A, Beaty BL, Crane LA, et al. Changes in access, utilization, and quality of care after enrollment into a state child health insurance plan. *Pediatrics*. 2005;115(2):364–371
9. Lave JR, Keane CR, Lin CJ, Ricci EM, Amersbach G, LaVallee CP. Impact of a children's health insurance program on newly enrolled children. *JAMA*. 1998;279(22):1820–1825
10. Newacheck PW, Hughes DC, Hung YY, Wong S, Stoddard JJ. The unmet health needs of America's children. *Pediatrics*. 2000; 105(4 pt 2):989–997
11. Stoddard JJ, St Peter RF, Newacheck PW. Health insurance status and ambulatory care for children. *N Engl J Med*. 1994; 330(20):1421–1425
12. Davidoff A, Kenney G, Dubay L. Effects of the State Children's Health Insurance Program expansions on children with chronic health conditions. *Pediatrics*. 2005;116(1). Available at: www.pediatrics.org/cgi/content/full/116/1/e34
13. Mayer ML, Skinner AC, Slifkin RT. Unmet need for routine and specialty care: data from the National Survey of Children With Special Health Care Needs. *Pediatrics*. 2004;113(2). Available at: www.pediatrics.org/cgi/content/full/113/2/e109
14. Tang SF, Olson LM, Yudkowsky BK. Uninsured children: how we count matters. *Pediatrics*. 2003;112(2). Available at: www.pediatrics.org/cgi/content/full/112/2/e168
15. Czajka J. *Analysis of Children's Health Insurance Patterns: Findings From the SIPP*. Washington, DC: Mathematical Policy Research, Inc; 1999
16. Robert Wood Johnson Foundation. A survey of surveys: what does it take to obtain accurate estimates of the uninsured? In: *State Coverage Initiatives*. Princeton, NJ: Robert Wood Johnson Foundation; 2002:5–8
17. US Census Bureau, Current Population Survey. *People With or Without Health Insurance Coverage by Selected Characteristics: 2005 and 2006*. Washington, DC: US Census Bureau; 2006
18. Olson LM, Tang SF, Newacheck PW. Children in the United States with discontinuous health insurance coverage. *N Engl J Med*. 2005;353(4):382–391
19. Aiken KD, Freed GL, Davis MM. When insurance status is not static: insurance transitions of low-income children and implications for health and health care. *Ambul Pediatr*. 2004;4(3): 237–243
20. Halterman JS, Montes G, Shone LP, Szilagyi PG. The impact of health insurance gaps on access to care among children with asthma in the United States. *Ambul Pediatr*. 2008;8(1):43–49
21. California Health Interview Survey. *CHIS 2005 Methodology Series: Report 4—Response Rates*. Los Angeles, CA: UCLA Center for Health Policy Research; 2007
22. California Health Interview Survey. *CHIS 2005 Methodology Series: Report 5—Weighting and Variance Estimation*. Los Angeles, CA: UCLA Center for Health Policy Research; 2007
23. Schacht J. *The Future of Community Clinics and Health Centers in California's Safety Net: A Blueprint for Action. 2007 Update*. Oakland, CA: Schacht & Associates; 2007
24. Kincheloe J, Frates J, Brown ER. Determinants of children's participation in California's Medicaid and SCHIP programs. *Health Serv Res*. 2007;42(2):847–866
25. Selden TM, Banthin JS, Cohen JW. Medicaid's problem children: eligible but not enrolled. *Health Aff (Project Hope)*. 1998;17(3):192–200
26. Selden TM, Hudson JL, Banthin JS. Tracking changes in eligibility and coverage among children, 1996–2002. *Health Aff (Project Hope)*. 2004;23(5):39–50
27. Ketsche P, Adams EK, Snyder A, Zhou M, Minyard K, Kellenberg R. Discontinuity of coverage for Medicaid and S-CHIP children at a transitional birthday. *Health Serv Res*. 2007;42(6 pt 2):2410–2423
28. Sommers BD. The impact of program structure on children's disenrollment from Medicaid and SCHIP. *Health Aff (Project Hope)*. 2005;24(6):1611–1618
29. Sommers BD. From Medicaid to uninsured: drop-out among children in public insurance programs. *Health Serv Res*. 2005; 40(1):59–78
30. Cervantez IM, Brick JM, Edwards WS. *CHIS 2005 Methodology Series: Report 4, Response Rates*. Los Angeles, CA: UCLA Center for Health Policy Research; 2007
31. Lee S, Brown ER, Grant D, Belin T, Brick JM. *Exploring Nonresponse Bias in a Random Digit Dialing Telephone Survey Using Neighborhood Characteristics From Census Data*. Los Angeles, CA: UCLA Center for Health Policy Research; 2008
32. Groves R. Nonresponse rates and nonresponse bias in household surveys. *Public Opin Q*. 2006;70(4):646–675
33. Keeter S, Kennedy C, Dimock M, Best J, Craighill P. Gauging the impact of growing nonresponse on estimates from a national RDD telephone survey. *Public Opin Q*. 2006;70(5): 759–779
34. Keeter S, Kohut A, Miller A, Groves R. Consequences of reducing nonresponse in a large national telephone survey. *Public Opin Q*. 2000;64(2):125–148
35. State Health Access Data Assistance Center, University of Minnesota School of Public Health. Are lower response rates hazardous to your health survey? *Issue Brief*. 2008;13. Available at: www.shadac.org/files/shadac/publications/IssueBrief13.pdf. Accessed June 12, 2008

The Effects of Varying Periods of Uninsurance on Children's Access to Health Care

Janet R. Cummings, Shana Alex Lavarreda, Thomas Rice and E. Richard Brown
Pediatrics 2009;123:e411-e418
DOI: 10.1542/peds.2008-1874

Updated Information & Services

including high-resolution figures, can be found at:
<http://www.pediatrics.org/cgi/content/full/123/3/e411>

References

This article cites 22 articles, 12 of which you can access for free at:
<http://www.pediatrics.org/cgi/content/full/123/3/e411#BIBL>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):

Office Practice

http://www.pediatrics.org/cgi/collection/office_practice

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.pediatrics.org/misc/Permissions.shtml>

Reprints

Information about ordering reprints can be found online:
<http://www.pediatrics.org/misc/reprints.shtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

