

Rural American Indian Medicaid Health Care Services Use and Health Care Costs in California

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Disparities in Medicaid payments for American Indians/Alaska Natives compared with those for non-Indians raise issues of whether American Indians/Alaska Natives are receiving all Medicaid-funded services to which they are entitled and whether the services received are appropriately billed by providers and paid by Medicaid. In states with substantial populations of American Indians/Alaska Natives, Medicaid per capita costs of medical care services for American Indians/Alaska Natives are two thirds those of the services for the eligible population as a whole.^{1,2} American Indians/Alaska Natives, however, generally have a lower health status than Whites and are expected to have a higher volume of service use and costs.²⁻⁷

Medicaid is of growing importance to American Indians/Alaska Natives who are eligible for health care through the Indian Health Service (IHS).^{8,9} American Indians/Alaska Natives in the IHS system currently receive only half the per capita health care funding needed, as determined by actuaries.^{4,10} IHS services are available to members (or descendants of members) of federally recognized tribes who live on or near Indian lands where there are either IHS direct services or tribal providers of IHS-funded services.^{7,11} Any American Indians/Alaska Natives who meet Medicaid financial eligibility requirements of the state in which they reside, however, are entitled to Medicaid coverage whether or not they are also eligible for IHS-funded services. For American Indians/Alaska Natives who use the IHS system, Medicaid is considered the primary payer, and IHS is considered the payer of last resort. Although there are financial incentives for providers to bill Medicaid for services that eligible American Indians/Alaska Natives receive, it is possible that the IHS may pay for some ambulatory visit or prescription drug services for American Indians/Alaska Natives eligible for Medicaid; this is considered an inefficient use of declining IHS funds.²

Objectives. We determined differences in Medicaid service use and health care costs in a rural Indian Health Service (IHS) user population of American Indians and Alaska Natives as compared with Whites.

Methods. California Medicaid eligibility and claims files were linked to IHS user files to obtain a sample of Medicaid-eligible American Indian/Alaska Native users (n=7910). A random sample of Whites was matched for age, gender, aid category, length of eligibility, and county of residence (n=15075). We used generalized linear models to compare risk-adjusted use of resources—ambulatory visits, prescriptions, emergency room visits, hospitalizations, and costs—both adjusting and stratifying for dominant source of ambulatory visits.

Results. American Indians/Alaska Natives had significantly lower use of Medicaid-paid ambulatory visits, prescriptions, emergency room visits, and hospitalizations and lower associated costs than Whites. Medicaid-paid total costs and use of services were lower for those who predominantly used Indian health program clinics, as well as for those who predominantly used other sources of ambulatory care.

Conclusions. Barriers to receiving Medicaid services and payments exist for American Indians/Alaska Natives in the rural IHS-user population. If American Indians/Alaska Natives are to have Medicaid resources comparable to those of Whites, these barriers must be reduced. (*Am J Public Health.* 2006;96:362–370. doi:10.2105/AJPH.2004.050880)

Neither Medicaid nor IHS information alone can be used to compare American Indian/Alaska Native (AIAN) service use and costs with those of Whites. Race/ethnicity is not reliably indicated on Medicaid eligibility records, leaving little information on the eligibility or utilization of Medicaid services by American Indians/Alaska Natives.¹² Medicaid services used outside the IHS provider system are not included in IHS records.⁹ Additionally, most of the 12 administrative IHS areas consist of parts or all of multiple states. Thus, Medicaid utilization and costs in most IHS areas are determined by multiple state Medicaid regulations. Linking Medicaid and IHS information for the AIAN user population in a single state that is also a single IHS administrative area makes it possible to investigate disparities in Medicaid utilization and costs. California is 1 of 2 IHS areas that consist of 1 state and is also 1 of 22 states in which per capita costs for Medicaid-eligible persons identified as AIAN in rural and urban eligibility

files are less than two thirds (60%) those of Medicaid-eligible persons as a whole.¹

We present a study that linked Medicaid and IHS information to compare California Medicaid service use and costs in the IHS user population with those in the White population. Because all areas of the IHS system have commonalities and differences, no single area is necessarily representative.¹³ We therefore briefly provide background on the California area IHS user population and its IHS-funded services compared with those of other areas of the IHS system.

BACKGROUND

California has more American Indians/Alaska Natives and a larger IHS service population than any other single state; the state has at least 107 of the more than 550 federally recognized tribes.^{4,13,14} About 95% of the American Indians/Alaska Natives who are in the IHS user population use tribal (rural)

Indian health programs, and only 5% are enrolled in urban Indian health programs.⁴ Nationally, there has been large growth in tribal ownership and operation of facilities for the IHS user population as a result of the Indian Self-Determination and Education Assistance Act.¹⁵ Nationally, by 1996 the IHS was operating only 113 of 492 ambulatory health programs and 37 of 49 hospitals.^{2,8} In California, tribes own and operate all the Indian health programs, and there are no Indian hospitals. These programs operate through contracts with the IHS to provide services to all or part of 37 counties. They offer services to members of their own tribes and to American Indians/Alaska Natives from federally recognized tribes throughout the United States.^{4,6,11,16–18} Non-Indians can also use the clinics if approved by the tribal boards but are not eligible for IHS-funded services provided by the clinics.² The 27 tribal health programs operate primary care clinics and offer limited public health services.⁶ Most clinics do not have full-time physicians staffing their clinics and rely heavily on other health professionals (e.g., nurse practitioners). Approximately half the programs have pharmacies that fill prescriptions for certain drugs at no cost to American Indians/Alaska Natives.^{4,14} There are limited IHS funds to pay for specialty care and hospitalizations.^{13,19} Only about 100 of the more than 4000 hospitalizations that occur annually are paid for with IHS funds.^{6,13}

Medicaid is important in expanding revenues for tribal health programs and access to care for American Indians/Alaska Natives. About a third of the AIAN users of the tribal programs are also eligible for Medicaid.² For services such as ambulatory visits and prescriptions that the Indian clinics regularly provide, however, there is concern that there are barriers to Medicaid billing and payment. Clinics may face difficulties in collecting payments for services and drugs provided to Medicaid-eligible American Indians/Alaska Natives because low budgets and remote locations lead to numerous personnel and information technology issues that could make it difficult for Medicaid claims to be submitted with all information correct and complete so that they are not suspended or denied. In addition, tribal pharmacies find it particularly

burdensome to become Medicaid-certified pharmacies with state regulations and a state formulary of drugs when they already have to meet and keep federal regulations and have to deal with the federal formulary of drugs. They find they have to operate 2 parallel pharmacies with low funding of their costs of operation. As a result, IHS funds may be used to pay for Medicaid-eligible services such as ambulatory visits and prescriptions. Such funding substitution reduces IHS resources available for uninsured American Indians/Alaska Natives.

For services that the rural Indian health clinics do not provide, including specialty care ambulatory visits, emergency room visits, and hospitalizations, there is concern that there are greater barriers to the use of private and public sector providers for American Indians/Alaska Natives than for Whites.⁸ Both these types of barriers (billing and use) may result in less use of Medicaid for health care and lower health care costs in American Indians/Alaska Natives than in Whites in the user population.

We examined whether there was less Medicaid service use and lower costs for the IHS user population in rural California compared with Whites after adjustment for age, gender, Medicaid aid category, length of eligibility, county of residence, and health risks. We then examined whether there were risk-adjusted disparities for both Medicaid services that the IHS regularly funds (ambulatory visits at Indian clinics and prescription drugs), and Medicaid services that the IHS rarely funds (ambulatory visits with other providers, emergency room visits, and hospitalizations). If there was less use of services that the IHS funds, then there was potential substitution of IHS-funded services that were already underfunded for services that Medicaid should fund. If there was less use of services rarely paid for by the IHS and lower costs, the results also would be consistent with potential barriers in access to Medicaid services.

METHODS

Study Design

We conducted a retrospective analysis of paid claims for Medicaid in California (Medi-Cal), focusing on 1996 Medicaid users because

Medicaid managed care (which made data acquisition more difficult) had made little penetration into rural areas of California by that time. Using a matched cohort design, we compared health care resource use (medical service use and costs) for American Indians/Alaska Natives who were Medicaid eligible in the IHS user population to a sample of non-Indian Whites who were Medicaid eligible.

Study Population

The study samples of Medicaid users were subgroups of matched eligible persons. The California Department of Health Services (DHS) first linked the IHS user file of American Indians/Alaska Natives who had at least 1 IHS paid service in federal fiscal year 1995 or 1996 by Social Security numbers to Medicaid eligibility files for federal fiscal year 1996 (14 565). Of these IHS users, 91% (43 482) had a validated Social Security number. Then the DHS restricted the subgroup of American Indians/Alaska Natives to the 13 counties with at least 300 Medicaid-eligible persons for a sample of 9863 eligible American Indians/Alaska Natives younger than 65 years. The matched population of non-Indian Whites was prepared from the same Medicaid eligibility files for the 13 counties after excluding records for those “Whites” who turned out to be IHS users in the record linkage process. Two Whites were matched with every American Indian/Alaska Native for county, age, gender, Medicaid aid category, and length of eligibility for a sample of 19 679 eligible Whites younger than 65 years. Users were defined as eligible persons whose paid claims totaled more than \$1. Users within the highest 1% of total costs were excluded as outliers.²⁰ The Medicaid user study samples were 7910 American Indians/Alaska Natives and 15 075 Whites.

Measures of Service Use and Costs

Resource use measures were developed for 4 services (ambulatory visits, filled prescriptions, emergency visits, and hospitalizations), and 1 cost (total payments for all medical services). The mean annual amount per person was determined for all 5 types of resources (costs in dollars, ambulatory visits, filled prescriptions, emergency room visits, and hospital days of stay), and then the percentage of

Medicaid users who had at least 1 prescription filled (any prescription), at least 1 emergency room visit (any emergency room visit), and at least 1 hospitalization (any hospitalization) was also determined.

Measure of Health Risks

Diagnostic codes on the claims records were used to assign each user to 1 of 93 different risk groups (adjusted clinical groups [ACGs]), which have assigned benchmark relative weights according to The Johns Hopkins University ACG case mix adjustment system.^{20,21} The ACG risk adjustment was chosen because the ACG groups and weights were designed and validated to explain variation in ambulatory visits and total costs^{20,22} and have been successfully applied to Medicaid paid claims data to predict utilization and costs.²³ For this study, we used the White reference group (whose case mix risks were 1.79 times those of the benchmark group) to rescale the benchmark weights.²¹ Case mix risks of the Medicaid-eligible American Indians/Alaska Natives were 1.07 times higher than those of the White Medicaid-eligible reference group.

Measure of Dominant Source of Ambulatory Care

To classify Medicaid users by their dominant source of ambulatory care (SOC), 5 types of providers of ambulatory visits were identified by vendor code (Indian health program clinics, non-Indian federally qualified health clinic [FQHCs], physicians' offices, hospital outpatient clinics, and other organized clinics). Visits were classified by provider using vendor and procedure codes according to instructions given by the DHS.^{24,25} Users receiving more than 50% of their ambulatory visits from 1 of the provider types were assigned to that provider for their SOC.^{20,26} Users with at least 1 visit, but no provider type meeting the dominant source criterion were assigned to *no dominant SOC*. Users who had claims but no ambulatory visits were assigned to the *no ambulatory visit* group.

Analyses

We first used bivariate analyses to compare the 8 resource use measures for AIAN and

White Medicaid users. We then conducted multivariate analyses of the 5 outcome measures with generalized linear models,²⁷ to test whether the differences were significant after adjustment for potentially confounding variables. For the dependent variables *ambulatory visits* and *costs*, AIAN resource use was expressed as the proportion of the mean use of Whites determined from the exponential of the parameter comparing American Indians/Alaska Natives and Whites in the models.²⁷ For the dichotomous dependent variables *any emergency room visit*, *any prescription*, and *any hospitalization*, we used the exponential of the parameter in logit models to express AIAN use as the relative odds of the resource use of Whites.²⁷ Adjustment variables were (1) demographic and Medicaid eligibility characteristics, (2) ACG health risks, and (3) dominant SOC. Finally, a set of models adjusted for characteristics and health risks and stratified by the SOC were analyzed to determine if there were differences in resource use for users whose dominant SOC was Indian clinics only or for other providers as well.

RESULTS

Characteristics of the Users of Services

Of the demographic and Medicaid eligibility characteristics, only the months of eligibility of those who were eligible for less than the full year differed significantly for the AIAN and White users (Table 1). Fewer American Indians/Alaska Natives (10.0%) were eligible for less than 6 months than Whites (11.5%; $P < .001$). AIAN and White users also differed significantly in their dominant SOC (Table 1). The largest SOC for American Indians/Alaska Natives was the Indian clinics (37.7%), whereas for Whites it was private physicians' offices (32.7%). Nearly one sixth of American Indians/Alaska Natives and one third of Whites used non-Indian clinics (FQHCs) as their dominant SOC. Only 1.1% of Whites predominantly used Indian clinics, and 16.5% of American Indians/Alaska Natives predominantly used physicians' offices. Proportionately more of the American Indians/Alaska Natives (8.9%) than Whites (4.8%) had no dominant SOC, presumably because they were sporadic users of Indian clinics that cannot provide

specialty care, whereas the Whites may use a variety of physicians' offices that can provide specialty care. Whites had a higher proportion of users who had no ambulatory visits than American Indians/Alaska Natives (22.1% vs 15.0%).

Unadjusted Disparities in Service Use and Costs

The unadjusted mean annual number of filled prescriptions and percentage of people with any emergency room visits was lower for AIAN users than for Whites, but higher for total ambulatory visits and hospital days (Table 2). For prescriptions, both the mean number (15.7 AIAN vs 22.1 White; $P < .001$) and the percentage of users who had a prescription filled (23.1 vs 32.7; $P < .001$) were lower for American Indians/Alaska Natives than for Whites. For emergency room visit use, the percentage of American Indians/Alaska Natives with an emergency room visit was lower than that of Whites (34.7 vs 36.3; $P < .05$), and there was no difference in the mean number of emergency room visits. For ambulatory visits, the mean number was higher in American Indians/Alaska Natives than in Whites (4.1 vs 3.7; $P < .001$). For hospital use, both the mean length of stay (0.21 vs 0.20 days; $P < .001$) and the percentage of people with a hospitalization (7.1 vs 5.9; $P < .001$) was higher in American Indians/Alaska Natives than in Whites. Mean total costs for American Indians/Alaska Natives were not significantly different from those for Whites.

Among those who predominantly used an Indian clinic, for services that the IHS would fund for an American Indian/Alaska Native in an Indian clinic (ambulatory visits and prescriptions), unadjusted use was lower for American Indians/Alaska Natives than for Whites. Mean annual total ambulatory visits were lower for American Indians/Alaska Natives than for Whites (4.7 vs 5.6 visits; $P < .05$), and the percentage of American Indians/Alaska Natives with any prescription was lower than that of Whites (15.1% vs 25.8%; $P < .001$).

The percentage of American Indians/Alaska Natives with any filled prescription was lower not only for American Indians/Alaska Natives whose dominant SOC was

TABLE 1—Distribution of American Indians/Alaska Natives and Whites Younger Than 65 Years Who Were Medicaid Eligible and Who Used Services, by Demographics, Eligibility, and Ambulatory Care Characteristics: California, 1996

	Eligible Persons		Users		P ^a
	AIANs No. (%)	Whites No. (%)	AIANs No. (%)	Whites No. (%)	
Entire Sample	9863 (100)	19 679 (100)	7910 (100)	15 075 (100)	...
Age, y					
0-18	5931 (60.1)	11 769 (59.8)	4775 (60.4)	8947 (59.3)	...
19-44	3306 (33.5)	6662 (33.9)	2619 (33.1)	5105 (33.9)	...
45-64	626 (6.3)	1248 (6.3)	516 (6.5)	1023 (6.8)	.32
Gender					
Male	4321 (43.8)	8658 (44.0)	3298 (41.7)	6269 (41.6)	...
Female	5542 (56.2)	11 021 (56.0)	4612 (58.3)	8806 (58.4)	.87
Region					
North, inland, metro ^b	720 (7.3)	1400 (7.1)	614 (7.8)	1125 (7.5)	...
North, inland, no metro	2905 (29.5)	5741 (29.2)	2393 (30.3)	4577 (30.4)	...
North, coastal, no metro	3289 (33.3)	6581 (33.4)	2738 (34.6)	5235 (34.7)	...
South, inland, metro	2000 (20.3)	4004 (20.3)	1466 (18.5)	2729 (18.1)	...
South, coastal, metro	949 (9.6)	1953 (9.9)	699 (8.8)	1409 (9.3)	.61
Eligibility category					
Public assistance families	6091 (61.8)	12 047 (61.2)	5018 (63.4)	9452 (62.7)	...
Medically indigent child	459 (4.7)	917 (4.7)	343 (4.3)	673 (4.5)	...
Medically needy families	1937 (19.6)	3867 (19.7)	1491 (18.8)	2825 (18.7)	...
Aged/blind/disabled	1039 (10.5)	2079 (10.6)	887 (11.2)	1739 (11.5)	...
Other ^c	337 (3.4)	769 (3.9)	171 (2.2)	386 (2.6)	.34
Months of eligibility					
1-5	1692 (17.2)	3897 (19.8)	789 (10.0)	1734 (11.5)	...
6-12	2495 (25.3)	4558 (23.2)	1973 (24.9)	3407 (22.6)	...
12	5676 (57.5)	11 224 (57.0)	5148 (65.1)	9934 (65.9)	<.001
Dominant source of ambulatory care					
Indian clinic	NA	NA	2982 (37.7)	167 (1.1)	...
Non-Indian clinic (FQHC)	NA	NA	1277 (16.1)	4525 (30.0)	...
Physicians' office	NA	NA	1307 (16.5)	4927 (32.7)	...
Hospital outpatient clinic	NA	NA	286 (3.6)	945 (6.3)	...
Other organized clinic	NA	NA	167 (2.1)	457 (3.0)	...
No dominant source	NA	NA	706 (8.9)	723 (4.8)	...
No ambulatory visit	NA	NA	1185 (15.0)	3331 (22.1)	<.001

Note. AIAN = American Indian/Alaska Native; FQHC = federally qualified health clinic.

^aχ² test comparing distributions of AIAN and White users.

^bMetro designates county groups that contain part of a large metropolitan statistical area.

^cIncludes medically indigent adults.

Indian clinics but also for those whose dominant SOC was non-Indian clinics (26.9% vs 30.8%; *P*<.01) and physicians' offices (27.7% vs 32.3%; *P*<.01). In addition, proportionately fewer American Indians/Alaska Natives who had no dominant SOC had prescriptions (21.8% vs 29.3%; *P*<.01). Moreover, the mean annual number of prescriptions was

lower for these American Indians/Alaska Natives than for Whites (17.5 vs 36.6; *P*<.001) and American Indians/Alaska Natives with no ambulatory visit also had lower mean annual numbers of prescriptions than Whites (9.5 vs 12.5; *P*<.05).

For services that the IHS rarely funds in California (emergency room visits and

hospitalizations), unadjusted results varied by the dominant SOC. Ambulatory visits were higher than those of Whites for American Indians/Alaska Natives seen predominantly in physicians' offices (4.7 vs 4.1; *P*<.01) or with no dominant SOC (4.9 vs 4.4, *P*<.05). A higher percentage of American Indians/Alaska Natives than Whites whose SOC was physicians' offices had an emergency room visit (37.3% vs 34.4%; *P*<.05); the same was true of those without any ambulatory visit (37.8% vs 33.7%; *P*<.05). The mean number of emergency room visits was also higher than that of Whites for American Indians/Alaska Natives using physicians' offices (0.8 vs 0.7; *P*<.01). Hospital utilization by American Indians/Alaska Natives whose dominant SOC was non-Indian clinics or physicians' offices was higher than that by Whites. For American Indians/Alaska Natives predominantly using non-Indian clinics, both the length of stay (0.22 vs 0.15 days; *P*<.001) and the proportion of users with a hospitalization (8.2% vs 5.3%; *P*<.001) were higher than those for Whites. Similarly, for American Indians/Alaska Natives using physicians' offices, both the length of stay (0.31 vs 0.21 days; *P*<.001) and the proportion hospitalized (9.7% vs 6.7%; *P*<.001) were higher than those for Whites. For American Indians/Alaska Natives with no dominant SOC, the length of stay was higher than that for Whites (0.24 vs 0.21 days; *P*<.001). Mean total costs were higher than those for Whites for American Indians/Alaska Natives who predominantly used non-Indian clinics (\$1480 vs \$1203; *P*<.01) or physicians' offices (\$1363 vs \$1020; *P*<.001) or who had no ambulatory visit (\$769 vs \$608; *P*<.05).

Adjusted Disparities in Service Use and Costs

After adjustment for user characteristics and ACG for risks, AIAN resource use was lower for all the service use and cost outcomes except ambulatory visits (Table 3, Model 2), which was not lower until also adjusted for SOC (Model 3). This lower use was for both services that IHS regularly funds (ambulatory visits and prescriptions) and rarely funds (emergency room visits and hospitalizations), and total costs were lower. Adjustment for SOC tended to reduce

TABLE 2—Unadjusted Health Care Resource Use, by Dominant Source of Ambulatory Care Visits of American Indians/Alaska Natives and Whites: California, 1996

	All Sources		Indian Clinic		Non-Indian Clinic (FQHC)		Physicians' Office		Hospital Outpatient Clinic		Other Organized Clinic		No Dominant Source		No Ambulatory Visit	
	AIAN	White	AIAN	White	AIAN	White	AIAN	White	AIAN	White	AIAN	White	AIAN	White	AIAN	White
	Mean annual amount															
Total costs, \$ ^a	1191	1030	1089	1346	1480**	1203	1363**	1020	1574	1392	903	917	1397	1500	769*	608
Total ambulatory visits ^a	4.1***	3.7	4.7*	5.6	5.7	5.7	4.7***	4.1	3.6	3.7	3.7	3.7	4.9*	4.4	0.0	0.0
Filled prescriptions ^b	15.7***	22.1	9.5	14.0	21.5	21.6	24.1	24.8	30.7	37.0	23.9	16.2	17.5***	36.6	9.5*	12.5
Emergency room visits ^b	0.7	0.7	0.5	0.6	0.8	0.8	0.8**	0.7	1.3	1.1	0.7	0.8	1.0	1.2	0.6	0.5
Hospital days ^b	0.21***	0.20	0.16	0.19	0.22***	0.15	0.31***	0.21	0.31	0.23	0.15	0.21	0.24***	0.21	0.2	0.1
	Percentage of American Indians/Alaska Natives or Whites who ever used^c															
Any prescription	23.1***	32.7	15.1***	25.8	26.9**	30.8	27.7**	32.3	29.0	35.1	29.3	22.1	21.8**	29.3	32.5**	37.6
Any emergency room visit	34.7*	36.3	28.5	31.7	34.6	35.4	37.3*	34.4	50.4	50.2	35.3	37.9	44.6	49.2	37.8*	33.7
Any hospitalization	7.1***	5.9	5.3	8.4	8.2***	5.3	9.7***	6.7	9.4	7.4	6.7	5.3	9.1	9.4	6.2**	4.3

Note. AIAN = American Indian/Alaska Native; FQHC = federally qualified health clinic.

^aT test used for comparing average use between American Indians/Alaska Natives and Whites.

^bLinear rank statistics using Wilcoxon scores used for testing differences of location and scale of resource use between American Indians/Alaska Natives and Whites.

^c χ^2 test used for comparing percentage of ever use of the resource between American Indians/Alaska Natives and Whites.

*P<.05; **P<.01; ***P<.001.

TABLE 3—Health Care Resource Use of American Indians/Alaska Natives Compared With That of Whites After Adjustment for Matching Variables, Health Risks (ACGs), and Source of Ambulatory Care: California, 1996

Models	Total Costs, % (95% CI)	Total Ambulatory Visits, % (95% CI)	Any Prescription, OR (95% CI)	Any Emergency Room Visit, OR (95% CI)	Any Hospitalization, OR (95% CI)
1. AIAN; characteristics	119*** (115, 123)	112*** (109, 115)	0.61*** (0.57, 0.65)	0.93* (0.88, 0.98)	1.26*** (1.13, 1.41)
2. AIAN; characteristics, ACG	88*** (85, 91)	99 (96, 102)	0.62*** (0.58, 0.67)	0.75*** (0.70, 0.79)	0.78** (0.69, 0.89)
3. AIAN; characteristics, ACG, SOC	85*** (82, 88)	93** (90, 96)	0.81*** (0.75, 0.86)	0.83*** (0.78, 0.89)	0.85* (0.73, 0.98)

Note. AIAN = American Indian/Alaska Native relative to Whites; SOC = dominant source of ambulatory care visits and the group who had no ambulatory care; ACG = adjusted clinical groups for relative health risks; OR = odds ratio; CI = confidence interval; % = relative percentage. Generalized linear models were used. Poisson distribution was specified for total ambulatory visits and the gamma distribution for total costs. Persons whose annual total ambulatory visits or charges were in the top 1% were excluded. Characteristics include age, gender, Medi-Cal eligibility group, months of Medi-Cal eligibility (1-5, 6-11, 12), and location of county of residence. Model 3 did not include Medi-Cal user group with no ambulatory visits because the outcome variable was zero for the entire group.

*P<.05; **P<.01; ***P<.001.

the disparities in resource use between American Indians/Alaska Natives and Whites, except with the use of ambulatory visits, which became significantly lower only after adjustment for SOC (93%; 95% confidence interval [CI]=90, 96; P<.01) (Model 3). After adjustment, the odds of American Indians/Alaska Natives having a prescription filled were 0.81 (95% CI=0.75, 0.86; P<.001) those of Whites. The odds of an emergency room visit were 0.83 (95% CI=0.78, 0.89; P<.001), and the odds of a hospitalization were 0.85

(95% CI=0.73, 0.98; P<.05). Costs for American Indians/Alaska Natives were 85% (95% CI=82%, 88%; P<.001) those of Whites.

American Indians/Alaska Native users relying predominantly on Indian clinics had lower risk-adjusted Medicaid resource use not only for ambulatory visits and prescriptions but also for all outcomes (Table 4). American Indians/Alaska Natives had lower use of medical services and lower total costs than Whites in the majority of cases. Service use and total costs for American Indians/Alaska

Natives were significantly higher than those for Whites in only 1 case: a higher percentage of AIAN users of organized clinics other than Indian clinics and non-Indian FQHCs had a prescription filled (OR=1.63; 95% CI=1.05, 2.54; P<.05). American Indians/Alaska Natives relying on physicians' offices had significantly lower total costs and lower use of all services but ambulatory visits and hospitalizations. AIAN users of hospital outpatient clinics had lower costs and fewer ambulatory visits, whereas AIAN users of other organized clinics had only significantly fewer

TABLE 4—Adjusted Medicaid Resource Use by American Indians/Alaska Natives Compared With That by Whites in Stratified Models for Each Dominant Source of Ambulatory Care and Adjustment for Eligibility Characteristics and Health Risks

Health Service Resource	Indian Clinic	Non-Indian FQHC	Physicians' Office	Hospital Outpatient Clinic	Other Organized Clinic	No Dominant Source of Care	No Ambulatory Visit
AIAN use compared with that of Whites, % (95% CI)^a							
Total costs	57*** (49, 65)	88*** (73, 98)	81*** (75, 86)	70*** (60, 81)	76** (64, 92)	83*** (75, 92)	97 (88, 106)
Total ambulatory visits	79*** (70, 90)	89*** (84, 95)	99 (94, 104)	86* (76, 97)	86 (74, 101)	107 (98, 116)	NA
AIAN use compared with that of Whites, OR (95% CI)^b							
Any prescription	0.61** (0.42, 0.88)	0.82** (0.71, 0.95)	0.81*** (0.71, 0.93)	0.75 (0.55, 1.01)	1.63* (1.05, 2.54)	0.71** (0.56, 0.91)	0.90 (0.77, 1.04)
Any emergency room visit	0.68* (0.48, 0.96)	0.73*** (0.63, 0.84)	0.85* (0.74, 0.98)	0.80 (0.60, 1.06)	0.69 (0.45, 1.06)	0.66*** (0.53, 0.83)	1.08 (0.94, 1.25)
Any hospitalization	0.35*** (0.19, 0.66)	0.95 (0.72, 1.27)	0.91 (0.71, 1.18)	0.61 (0.34, 1.10)	0.37 (0.12, 1.12)	0.49** (0.30, 0.79)	1.02 (0.73, 1.42)

Note. NA = not applicable; OR = odds ratio; CI = confidence interval. The user group with no ambulatory visit cannot have visits as a dependent variable.

^aModel variables and distributions as in model series 2 of Table 3. Poisson distribution was specified.

^bModel variables and distributions as in model series 2 of Table 3.

* $P < .05$; ** $P < .01$; *** $P < .001$.

ambulatory visits. AIAN users with no dominant SOC had lower use of all resources except ambulatory visits. AIAN users with no ambulatory visits had no differences in outcomes compared with Whites.

DISCUSSION

This study provides empirical evidence of disparities in Medicaid service use and costs for an IHS user population of American Indians/Alaska Natives; these disparities are consistent with both barriers in access to Medicaid-paid services and substitution of IHS paid services for services covered by Medicaid. Medicaid-eligible American Indians/Alaska Natives are not receiving the same volume of services as Medicaid-eligible Whites, and Medicaid is not paying as much for services for American Indians/Alaska Natives seen predominantly in Indian clinics as for Whites seen in the same clinics. In either case, the disparities are costly for American Indians/Alaska Natives and their IHS-funded providers. Any reduced use of services could directly contribute to higher morbidity or mortality rates in American Indians/Alaska Natives. Any use of IHS funds for services provided to Medicaid-eligible American Indians/Alaska Natives (a substitution) reduces the availability of IHS funds for American Indians/Alaska Natives not eligible for Medicaid. Because health care per capita funding for American Indians/Alaska Natives

in the IHS user population is already less than half of that calculated to meet their health needs, it is critical that IHS funds not be substituted for Medicaid funds.¹⁰

The evidence suggests lower use of Medicaid paid services because American Indians/Alaska Natives have lower Medicaid service use than Whites regardless of whether the service is one that could be paid for by IHS and whether the dominant SOC is an Indian health program. If the disparities were only because of substitution of IHS-paid services for Medicaid-paid services, there would not be disparities in emergency room visit or hospital use, because IHS funds rarely pay for these services for American Indians/Alaska Natives in California. However, the disparities between American Indians/Alaska Natives and Whites in any emergency room visit or hospital use were substantial, and the disparities in IHS-funded services (ambulatory visits and prescriptions) were not significantly larger. The disparities in Medicaid costs for all medical services suggest a reduced use of Medicaid-paid care as well. Risk-adjusted Medicaid per capita costs remained lower for American Indians/Alaska Natives than for Whites even after adjustment for differences in the dominant SOC.

The evidence does not rule out the possibility that limited IHS funds are being used to pay for ambulatory visits of and prescriptions for Medicaid-eligible American Indians/Alaska Natives. The lowest Medicaid costs

and the lowest number of Medicaid-funded ambulatory visits and filled prescriptions were observed for American Indians/Alaska Natives whose dominant SOC was an Indian clinic. The disparity in the number of Medicaid-funded ambulatory visits, for example, is 79% among American Indians/Alaska Natives who predominantly use an Indian clinic, whereas for those who predominantly use another source of ambulatory care, the significant differences range from 86% to 89%. For an American Indian/Alaska Native whose dominant SOC is Indian clinics, the relative odds of having a prescription filled is 61% that of Whites whose dominant SOC is Indian clinics, 71% to 82% for those with some SOCs, not significant for others, and actually significantly higher (163%) for those whose SOC is non-Indian and hospital outpatient clinics. Thus, it is possible that Medicaid-eligible American Indians/Alaska Natives make ambulatory visits and have prescriptions filled, and either they are not billed to Medicaid or they are billed but not paid. An alternative possibility is that Whites whose dominant SOC is an Indian clinic may differ from American Indians/Alaska Natives who use the Indian clinics in a way that is unlike the way Whites and American Indians/Alaska Natives whose dominant SOC is not an Indian clinic differ. Further research with a larger sample is needed to choose conclusively between the possibilities.

Limitations of the study arise because the AIAN sample is a subset of the IHS user population in the 37-county IHS administrative area. Although only the 13 counties with the highest numbers of Medicaid-eligible persons could be included, they accounted for 75% of the Medicaid-eligible IHS user population in the area. Although a deterministic linkage of IHS user records to Medicaid eligibility records was performed, only 9% of the user records were missing the Social Security number necessary for linkage. Probabilistic linkages were not used because they increased linked records by only 1%. In the study sample, one third of the California IHS user population was found to be Medicaid eligible; this is comparable to IHS national figures of 26%.²⁸ Because of differences in Medicaid programs from state to state, care must be taken when generalizing from any single IHS area to any other area.

In recent years, the federal government has developed a number of policies to promote the use of Medicaid by IHS and tribal providers.⁸ The growing role of Medicaid in coverage of American Indians/Alaska Natives is important because Medicaid is an entitlement program whereas the IHS relies on budgetary appropriations competing with all other governmental programs. The federal government will pay 100% of Medicaid charges for care provided by the IHS direct and contract health service providers regardless of the usual federal participation rate for a state.² Determination of whether disparities in service use and payments are attributable to systemic breakdowns in AIAN Medicaid billing and payment, external barriers experienced by American Indians/Alaska Natives in obtaining services, or individual choices of American Indians/Alaska Natives, all need further quantification before making specific recommendations on policies to be changed. State Medicaid programs are working to provide care for Medicaid-eligible American Indians/Alaska Natives through managed care plans.² In California, tribal organizations have started a tribal plan (Turtle Health Plan), and most of the rural Indian health programs already have members enrolled. The primary challenge is to ensure that the health plan is implemented such

that Medicaid-eligible American Indians/Alaska Natives receive needed health care. If disparities in costs reflect barriers in access to Medicaid paid care and substitution reflects inefficient use of limited IHS funds, then it becomes important to identify and reduce the barriers and the substitution of IHS funds. ■

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Contributors

S. T. Wong performed the preliminary analyses and contributed to the writing. C. Kao constructed the actual models used, performed all the final statistical analyses, and drafted the original methods and results sections. J. A. Crouch had the original idea for this study and obtained the data and funding for the analyses. C. C. Korenbrot directed all analyses and completed the original draft of the article. All authors helped to conceptualize ideas, interpret findings, and review drafts of the article.

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Human Participant Protection

The linkage phase of the project was approved by the committee for the protection of human subjects of the California Health and Human Service Agency, Project No. 01–08–01. Analysis of data files stripped of linkage information at University of California, San Francisco was certified exempt by the committee on human research of the University of California, San Francisco.

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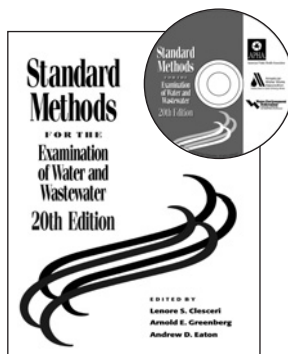
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