Disparities in the Reporting and Treatment of Health Conditions in Children: An Analysis of the Medical Expenditure Panel Survey

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Objectives. To determine whether racial and ethnic disparities in health care use differ for physical and behavioral health conditions.

Data Sources. Secondary analysis of the 1996–1997 Medical Expenditure Panel Survey.

Study Design. Retrospective cohort study of children aged 2–18 years old who were members of participating households. Children were categorized as Hispanic, black, or white. Differences in caregiver-reported behavioral and physical health conditions and services use were compared, and estimates were weighted to reflect the complex sampling scheme.

Principal Findings. Of eligible children weighted to represent over 44 million in each year, 13–15 percent were Hispanic, 14 percent black, and 68–70 percent white. After adjusting for potential confounding, Hispanic and black children were less likely to report externalizing behavioral conditions than white children. Black but not Hispanic children were more likely than white children to report asthma. In addition, Hispanic and black children were less likely to report ambulatory visits, and black children were less likely to report receiving a prescription medication than white children. There were no differences in reported emergency room visits or hospitalizations. Interactions between race and various health conditions, health status, insurance, and income were not significant.

Conclusions. In this nationally representative sample, we identified racial and ethnic disparities in the reporting of health conditions and the use of discretionary health services. Disparities differed between those with behavioral conditions and those with physical conditions. These disparities were not explained by traditional measures including the presence of health conditions, health status, insurance, and family income, and suggest that national surveys such as Medical Expenditure Panel Survey may benefit from the inclusion of additional explanatory measures.

Key Words. Disparities, mental health disorders, health care services, children

The existence of racial and ethnic disparities in health care has gained increasing recognition in part because of the Institute of Medicine report *Unequal Treatment* (Smedley, Stith, and Nelson 1999). Recent research suggests significant racial disparities in the use of mental health services and treatment (Garland et al. 2000). For example, black youth and their families are less likely to seek and use mental health treatment (Hoberman 1992; Cooper-Patrick et al. 1999; Diala et al. 2000). Once in treatment, they are more likely to have negative experiences (Diala et al. 2000) and have shorter courses of treatment (Bui and Takeuchi 1992; Cuffe et al. 1996). Several studies have found that black patients have different probabilities of receiving various psychiatric diagnoses compared with whites (DelBello et al. 2001), including schizophrenia (Strakowski et al. 1995), substance abuse (Strakowski et al. 1995), organic psychosis (Kilgus, Pumariega, and Cuffe 1995), mood disorders (Kilgus, Pumariega, and Cuffe 1995), and autism (Mandell et al. 2002). For a number of disorders, including attention deficit (Bussing, Zima, and Belin 1998), conduct (Wu et al. 1999), and depressive disorders (Wu et al. 2001), black youth may also be undertreated compared with white youth (Cuffe et al. 1996; Flisher et al. 1997). While the majority of research in this area has focused on differences between black and white youth, some research has found differences for Hispanic youth as well (Chabra, Chavez, and Harris 1999).

Research has also suggested disparities in health care for youth with physical health conditions. For example, black and Hispanic children have worse asthma status, use fewer preventive medications, and are significantly more likely to have an emergency room visit or be hospitalized for asthma than white children (Lieu et al. 2002; Boudreaux et al. 2003). There are no studies, however, in which the extent of disparities in the use of services for both behavioral and physical health conditions has been examined simultaneously. If disparities in service use vary between behavioral and physical

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conditions, it may be that the mechanisms associated with those disparities are different for different problems, and associated interventions should be tailored accordingly. The primary objective of the current study was to determine whether disparities in diagnoses and related service use among ethnic and racial groups vary as a function of the type of health condition, physical or behavioral. A secondary objective was to identify factors associated with any observed disparities. Based on a review of the literature, we hypothesized that Hispanic and black children would be less likely to be diagnosed with a behavioral condition but equally or more likely to be diagnosed with a physical condition than white children. We further postulated that Hispanic and black children would be less likely to use nonemergent discretionary health services for both behavioral and physical conditions than white children.

METHODS

Setting

The 1996 and 1997 Medical Expenditure Panel Survey (MEPS), a nationally representative survey of the U.S. civilian noninstitutionalized population, constituted the dataset for analysis (Cohen, S. 1997, 2000). MEPS has been conducted annually by the Agency for Healthcare Research and Quality and the National Center for Health Statistics since 1996 in order to obtain national estimates of health services use and expenditures. MEPS uses an overlapping panel design in which participating households are enrolled annually and followed for 2 consecutive years of data collection. Thus, the 1997 MEPS includes respondents from the 1996 MEPS as well as newly recruited respondents. MEPS comprises four components: the Household Component (HC), the Medical Provider Component (MPC), the Insurance Component (IC), and the Nursing Home Component (NHC) (Cohen, J. 1997). The HC is the core survey, and includes data on demographic characteristics, health status and conditions, use of medical services, health insurance coverage, and family income among eligible individuals and their households. Using computer-assisted personal interviewing technology, data on medical expenditures and service use for each calendar year were collected from an adult respondent in each household. The MPC sample includes all hospitals, hospital- and office-based physicians, home health agencies, and pharmacies reported in the HC. Information collected through the MPC from a sample of medical providers and pharmacies is linked back to respondent reports to supplement and validate reported information on medical care events

including diagnoses, procedures, and prescription medications. The IC includes data on health insurance plans obtained through employers, unions, and other sources of private health insurance. Data from the first sampling frame are linked back to data provided by the HC respondents. All identifying information on subjects is removed prior to public release of MEPS data files. As the sample size in MEPS is relatively small, we selected 2 consecutive years of data to assess the consistency of our findings and to limit the potential consequences of sampling biases that may occur from 1 year to the next.

The 1996–1997 MEPS drew respondents from the 1995–1996 National Health Interview Surveys (Cohen, S. 1997, 2000). There were 21,571 subjects in the 1996 MEPS and 32,636 subjects in the 1997 MEPS, which represents a response rate of 70.2 percent in 1996 and 66.4 percent in 1997. MEPS oversampled Hispanics and blacks, individuals with disabilities, and poor families. Person-level weights for each year accounted for an individual's probability of selection in the sample and for nonresponse, and were used to generate a national probability sample. This study received an exemption from review by the institutional review board at the Children's Hospital of Philadelphia.

Subjects

Children aged 2–18 years old who were civilian noninstitutionalized members of participating survey households during 1996 and 1997 were eligible for inclusion in the study. We identified eligible children using the full year consolidated data files of the 1996 and 1997 HC (Agency for Healthcare Research and Quality 2000a, b). In each survey year, adult respondents in each household were interviewed three times. The full year files contain their responses to questions from all three rounds of interviewing concerning the race/ethnicity, age, sex, family income, health conditions, health status, health insurance and access, and health services use and expenditures for each eligible child.

We identified children with behavioral and physical health conditions using the medical conditions files of the 1996 and 1997 HC (Agency for Healthcare Research and Quality 1996, 2001). Adult respondents were asked whether household members had any health conditions at each round of interviewing, when the condition began, and whether treatment was sought or not. Health conditions were recorded verbatim by interviewers and then assigned fully specified International Classification of Diseases, Ninth Revision (ICD-9) codes by professional coders. Most ICD-9 codes were then truncated at three digits to preserve subject confidentiality in the medical conditions files. The MPC was not used to verify conditions. We merged the full year

consolidated files with the medical conditions files for each year using unique subject identifiers to obtain an analytic file.

Measures

The main outcomes for analysis were categories of health conditions and health service use during each year of analysis. We selected the most prevalent behavioral and physical health conditions that could be specified using truncated ICD-9 codes. We selected the following six behavioral conditions: affective psychoses (ICD-9 code 296), anxiety (ICD-9 code 300), depression (ICD-9 code 311), conduct disorder (ICD-9 code 312), oppositional-defiant disorder (ICD-9 code 313), and attention-deficit/hyperactivity disorder (ADHD, ICD-9 code 314). Similarly, we selected the following three physical conditions: asthma (ICD-9 code 493), diabetes (ICD-9 code 250), and epilepsy (ICD-9 code 345). As sample sizes were relatively small for individual conditions, we grouped similar health conditions to improve the precision of our estimates. We categorized affective psychoses, anxiety, and depression as internalizing behavioral conditions. We categorized conduct disorder, oppositional-defiant disorder, and ADHD as externalizing behavioral conditions. We grouped diabetes and epilepsy separately from asthma because of the relatively greater prevalence of asthma.

We categorized health service use into ambulatory visits, emergency room visits, inpatient hospital stays, and prescription medication fills. Ambulatory visits included all nonemergent discretionary visits to office-based providers and hospital outpatient clinics. Inpatient stays included both short- and long-term admissions to medical and psychiatric inpatient units. Inpatient stays also included emergency room visits if they were associated with the admission. For the purposes of analysis, we considered any use during the year.

The main independent variable was the race/ethnicity of the child. Children were classified as Hispanic, black non-Hispanic, Asian/Pacific Islander, American Indian, Alaskan/Aleutian, white, and other either by adult respondent report or by their relationship to other family members. We excluded children from Asian/Pacific Islander, American Indian, Alaskan/Aleutian, or other racial categories because of their small numbers.

Analysis

We compared differences in the proportion of children with health conditions and service use within race/ethnicity categories. To account for a subject's

probability of selection and nonresponse, we weighted analyses using the person level weights provided by MEPS (Cohen, DiGaetano, and Goksel 1999). We estimated standard errors by a Taylor series approach with replacement using the corresponding strata and primary sampling units provided by MEPS. We assessed differences in dichotomous outcomes using the Pearson χ^2-test and differences in continuous outcomes using the Wald test. We examined differences in age, sex, family size, health insurance, family income, health status, health condition, and service use by race/ethnicity. Because of concerns about type II errors owing to multiple comparisons, we assigned a *p*-value of less than .025 as indicative of statistical significance. We used logistic regression to estimate the odds of health conditions for Hispanic and black children compared with white children while adjusting for age, sex, insurance (public, private, uninsured), family income (poor/near poor versus middle/upper income), family size, and mental or general health status (fair/poor, good/excellent). We fit separate models by year for each category of behavioral and physical condition. To identify factors that may account for disparities in diagnoses, we examined all race by insurance, income, and health status interactions. We also used logistic regression to estimate the odds of service use for Hispanic and black children compared with white children while controlling for behavioral and physical conditions and all previous covariates specified above. We fit separate models by year for each service category. To identify whether disparities in service use were different for behavioral and physical conditions, we included race by health condition interaction terms as well as race by insurance, income, and health status interactions. In subgroup analyses, we stratified service use by behavioral and physical conditions to evaluate whether service use was proportionately similar across subgroups of Hispanic, black, and white children. Analyses were conducted using the survey module in *Stata 8* (Stata Corporation, College Station, TX).

RESULTS

We identified 3,955 eligible children in 1996 and 5,933 eligible children in 1997. The sample was weighted to represent over 44 million children in the U.S. in each year. In 1996, 13.5 percent of the weighted sample were Hispanic, 14.1 percent non-Hispanic black, 68.2 percent white, 3.3 percent Asian/Pacific Islander, and 1.0 percent American Indian, Aleutian, or other. These numbers were similar in 1997, except that the proportion of those identified as

Hispanic increased slightly to 14.8 percent. We excluded 4.3 percent in 1996 and 0.7 percent in 1997 who were Asian, American Indian, Aleutian, or other. Of those identified as Hispanic, the majority were Mexican (9.1 percent), followed by Puerto Rican (1.9 percent), Cuban (0.4 percent), and other Hispanic (2.2 percent). The majority of Hispanic children resided in the west (45 percent) or south (30 percent), whereas most black children resided in the south (55 percent).

In both years, Hispanic children were slightly younger and lived in larger families than either white or black children (Table 1). The majority of Hispanic and black children were poor or near poor, whereas white children were predominately from families with higher income levels. Hispanic children were more likely to have no health insurance than white or black children. In addition, Hispanic and black children were more likely to receive publicly funded health insurance than white children. In spite of these differences in health insurance coverage, most children had a usual source of care in 1996, although there were small differences among racial groups in the proportion with a usual source of care. Finally, Hispanic and black children were more likely than white children to report poor or fair general health status.

Table 1:   Sample Characteristics by Race/Ethnicity*

	Hispanic		Black		White		p-Value	
Characteristic	*1996* $N = 13.5\%$	*1997* $N = 14.8\%$	*1996* $N = 14.1\%$	*1997* $N = 14.1\%$	*1996* $N = 68.2\%$	*1997* $N = 70.4\%$	*1996*	*1997*
Age (mean years)	8.9	8.8	9.6	9.1	9.7	9.3	.001	.02
Male (%)	51.1	51.8	52.9	51.9	51.0	51.5	.45	.59
Family size (mean)	4.8	4.7	4.2	4.2	4.2	4.3	$<.001$	$<.001$
Family income (%)								
Poor/near poor	70.2	68.0	64.8	62.0	29.7	28.9	$<.001$	$<.001$
Middle/upper	29.8	32.0	35.2	38.0	70.3	71.1		
Insurance (%)								
Private	43.4	45.9	51.7	51.3	81.9	80.8	$<.001$	$<.001$
Public	37.1	35.1	37.2	41.2	10.7	10.9		
Uninsured	19.5	19.1	11.1	7.6	7.4	8.3		
Health status (%)								
Poor/fair general	9.7	7.1	4.4	6.4	2.6	3.6	$<.001$	$<.001$
Poor/fair mental	4.0	3.9	4.5	4.3	2.3	2.3	.05	.02

*Children aged 2–18 years were weighted to reflect the complex sampling scheme. Percentiles represent percent of column totals for each year. Children of Asian/Pacific Islander, American Indian/Aleutian, or other race were dropped.

Table 2:   Prevalence of Caregiver-Reported Health Conditions by Race/Ethnicity*

Condition	Hispanic		Black		White		p-Value	
	1996 N= 13.5%	1997 N= 14.8%	1996 N= 14.1%	1997 N= 14.1%	1996 N= 68.2%	1997 N= 70.4%	1996	1997
Behavioral[†]								
Any	4.7	5.1	6.1	5.5	7.8	7.7	.27	.02
Internalizing	2.7	2.7	1.1	1.9	2.7	2.2	.36	.71
Externalizing	2.0	2.6	4.0	3.8	5.3	6.0	.003	<.001
Physical[‡]								
Any	9.4	9.8	13.3	14.3	6.3	8.4	<.001	<.001
Asthma	8.7	9.2	13.2	13.9	6.1	7.9	<.001	<.001
Diabetes/epilepsy	0.7	0.6	0.2	0.4	0.2	0.5	.50	.98

*Children aged 2–18 years were weighted to reflect the complex sampling scheme. Numbers represent percent of column totals for each year. Children of Asian/Pacific Islander, American Indian/Aleutian, or other race were dropped.

[†]Behavioral conditions consisted of internalizing, externalizing, and miscellaneous disorders.

[‡]Physical conditions consisted of asthma, diabetes, and epilepsy.

Table 2 presents the unadjusted prevalence of caregiver-reported health conditions by race and ethnicity. Relatively few children (7 percent) had behavioral conditions. Hispanic and black children were less likely than white children to have a behavioral condition, especially an externalizing condition. A slightly greater proportion of children (8 percent) reported physical conditions than behavioral conditions. Here, too, disparities were noted in that black children had a greater prevalence of asthma than white or Hispanic children.

Table 3 presents the results of the logit models of health conditions by year. Black and Hispanic children had odds similar to white children of internalizing conditions in 1997, while black children had lesser odds of internalizing conditions in 1996. Older age, female gender, and fair or poor mental health status were consistently associated with internalizing conditions in both years. Disparities were evident among those with externalizing conditions. Hispanic children were 68 percent less likely to report an externalizing condition than white children in both years. Black children were less likely to report externalizing conditions than white children, but the difference in 1996 was marginally significant ($p = .08$). Other factors associated with externalizing conditions included older age, male gender, and fair or poor mental health status. There were no significant interactions involving race and insurance, income, or health status.

Table 3:   Logit Results for Models of Reported Health Conditions by Year

	1996		1997	
*Regression Parameter**	*Odds Ratio*	*95% CI*	*Odds Ratio*	*95% CI*
Internalizing disorders				
Black	0.31	(0.13, 0.74)	0.71	(0.32, 1.57)
Hispanic	0.93	(0.48, 1.81)	1.36	(0.81, 2.29)
Age (years)	1.19	(1.13, 1.25)	1.18	(1.13, 1.23)
Male	0.63	(0.39, 0.99)	0.65	(0.45, 0.94)
Family size	0.90	(0.76, 1.08)	0.81	(0.66, 0.99)
Poor/near poor	0.88	(0.68, 1.14)	0.87	(0.46, 1.63)
Uninsured	0.47	(0.15, 1.49)	0.74	(0.38, 1.46)
Public insurance	0.84	(0.35, 2.01)	0.99	(0.43, 2.32)
Poor/fair mental health status	23.86	(12.29, 46.31)	27.68	(16.25, 47.17)
Externalizing disorders				
Black	0.55	(0.29, 1.05)	0.44	(0.27, 0.70)
Hispanic	0.32	(0.18, 0.57)	0.32	(0.20, 0.51)
Age (years)	1.04	(1.01, 1.07)	1.07	(1.05, 1.10)
Male	3.02	(1.96, 4.64)	3.80	(2.72, 5.30)
Family size	1.00	(0.88, 1.14)	0.92	(0.82, 1.03)
Poor/near poor	1.12	(0.96, 1.30)	1.26	(0.86, 1.85)
Uninsured	0.53	(0.23, 1.20)	0.99	(0.56, 1.76)
Public insurance	2.06	(1.07, 3.95)	1.40	(0.88, 2.23)
Poor/fair mental health status	8.49	(5.06, 14.23)	7.84	(4.84, 12.70)
Asthma				
Black	2.04	(1.34, 3.10)	1.57	(1.14, 2.16)
Hispanic	1.10	(0.75, 1.61)	0.99	(0.72, 1.37)
Age (years)	1.01	(0.98, 1.04)	1.00	(0.98, 1.03)
Male	1.88	(1.42, 2.48)	1.58	(1.23, 2.05)
Family size	0.91	(0.83, 1.01)	0.99	(0.90, 1.10)
Poor/near poor	1.05	(0.89, 1.24)	0.87	(0.64, 1.19)
Uninsured	1.09	(0.64, 1.86)	0.87	(0.54, 1.41)
Public insurance	1.77	(1.12, 2.80)	1.65	(1.16, 2.33)
Poor/fair general health status	6.74	(4.50, 10.10)	5.47	(3.85, 7.76)
Diabetes/epilepsy				
Black	0.71	(0.06, 8.05)	0.65	(0.14, 3.01)
Hispanic	1.86	(0.49, 7.13)	0.88	(0.34, 2.24)
Age (years)	1.02	(0.90, 1.17)	1.05	(0.96, 1.15)
Male	0.68	(0.21, 2.21)	1.43	(0.61, 3.35)
Family size	1.37	(1.10, 1.72)	1.18	(0.84, 1.66)
Poor/near poor	1.33	(0.83, 2.14)	0.71	(0.30, 1.66)
Uninsured[†]	—	—	—	—
Public insurance	1.97	(0.36, 10.84)	1.42	(0.54, 3.71)
Poor/fair general health status	14.65	(4.10, 52.38)	11.70	(5.21, 26.23)

*Reference group consisted of white female children of middle to upper income with commercial insurance reporting good/excellent mental health.

[†]Uninsured predicted failure perfectly and was dropped from model of diabetes/epilepsy in 1996 and 1997.

CI, confidence interval.

Table 4:   Health Service Use by Race/Ethnicity*

Condition	Hispanic		Black		White		p-Value	
	1996 N= 13.5%	1997 N= 14.8%	1996 N= 14.1%	1997 N= 14.1%	1996 N= 68.2%	1997 N= 70.4%	1996	1997
Ambulatory visits	70.4	71.3	70.8	66.5	81.0	81.7	<.001	<.001
Emergency room visits	13.3	15.1	11.7	16.3	15.2	14.2	.01	.20
Inpatient discharges	3.9	2.5	2.8	3.6	2.3	2.5	.23	.08
Prescription fills	57.8	60.5	57.2	57.7	64.3	65.4	.006	.002

*Children aged 2–18 years were weighted to reflect the complex sampling scheme. Percentiles reflect the proportion of each race/ethnicity with any reported service use in each year.

Next, we examined logit models of physical health conditions by year (Table 3). Black children were more likely than white children to have care-giver-reported asthma across both years. Hispanic children were not significantly different from white children in their odds of having asthma. Male gender, public insurance, and fair or poor general health status were also associated with asthma. There were no racial disparities in the reporting of diabetes and epilepsy. Only fair or poor health status was associated with these conditions. There were no significant interactions involving race and insurance, income, or health status for any physical condition.

Table 4 presents the unadjusted prevalence of health services use by race and ethnicity. Hispanic and black children were less likely to make a non-emergent ambulatory care visit or receive a prescription medication than white children. In addition, black children were less likely to make an emergency department visit in 1996 but not in 1997. There were no differences in inpatient discharges among the three groups.

Table 5 presents the results of the logit models of health services use by year. Hispanic children had 30 percent lower odds and black children had 34–54 percent lower odds of making an ambulatory visit than white children in both years after adjusting for potentially confounding factors. Older age, large family size, poor or near poor income status, and lack of health insurance were consistently associated with a lower odds of making an ambulatory visit, while having a behavioral condition or fair or poor health status were associated with an increased odds of making an ambulatory visit. There were no significant interactions involving race and

Table 5:   Logit Results for Models of Reported Health Service Use by Year

Regression Parameter*	1996		1997	
	Odds Ratio	*95% CI*	*Odds Ratio*	*95% CI*
Ambulatory visits				
Black	0.66	(0.50, 0.88)	0.46	(0.35, 0.59)
Hispanic	0.70	(0.55, 0.91)	0.70	(0.56, 0.89)
Age (years)	0.92	(0.91, 0.94)	0.94	(0.93, 0.96)
Male	0.97	(0.81, 1.15)	0.97	(0.81, 1.16)
Family size	0.91	(0.85, 0.98)	0.89	(0.82, 0.96)
Poor/near poor	0.74	(0.58, 0.93)	0.56	(0.44, 0.70)
Uninsured	0.45	(0.32, 0.63)	0.55	(0.42, 0.71)
Public insurance	0.78	(0.58, 1.04)	1.34	(1.03, 1.75)
Any behavioral condition	2.01	(1.23, 3.27)	2.05	(1.44, 2.92)
Any physical condition	1.55	(1.02, 2.37)	1.41	(0.95, 2.09)
Poor/fair general health status	2.95	(1.58, 5.52)	1.79	(1.13, 2.84)
Emergency room visits				
Black	0.65	(0.48, 0.89)	1.01	(0.77, 1.32)
Hispanic	0.79	(0.58, 1.06)	0.96	(0.75, 1.22)
Age (years)	0.98	(0.96, 1.00)	0.99	(0.97, 1.01)
Male	1.28	(1.04, 1.56)	1.05	(0.88, 1.26)
Family size	0.94	(0.86, 1.02)	0.96	(0.90, 1.03)
Poor/near poor	0.92	(0.71, 1.20)	1.34	(1.07, 1.68)
Uninsured	0.87	(0.56, 1.33)	0.85	(0.59, 1.21)
Public insurance	1.41	(0.98, 2.02)	0.98	(0.76, 1.27)
Any behavioral condition	1.23	(0.84, 1.81)	0.98	(0.67, 1.42)
Any physical condition	1.54	(1.09, 2.17)	1.65	(1.23, 2.20)
Poor/fair general health status	1.89	(1.23, 2.89)	1.79	(1.13, 2.83)
Inpatient discharges				
Black	0.83	(0.43, 1.62)	1.23	(0.74, 2.03)
Hispanic	1.23	(0.64, 2.36)	0.97	(0.61, 1.54)
Age (years)	1.05	(0.99, 1.11)	1.00	(0.94, 1.05)
Male	0.96	(0.60, 1.54)	1.12	(0.73, 1.73)
Family size	0.89	(0.75, 1.06)	1.04	(0.91, 1.20)
Poor/near poor	1.36	(0.77, 2.41)	1.13	(0.75, 1.73)
Uninsured	0.99	(0.40, 2.46)	0.15	(0.06, 0.37)
Public insurance	1.94	(1.00, 3.79)	0.98	(0.60, 1.59)
Any behavioral condition	1.71	(0.86, 3.40)	0.90	(0.45, 1.79)
Any physical condition	2.00	(1.04, 3.84)	2.59	(1.58, 4.25)
Poor/fair general health status	2.36	(1.17, 4.76)	2.84	(1.45, 5.57)
Prescription fills				
Black	0.78	(0.61, 0.99)	0.70	(0.56, 0.87)
Hispanic	0.84	(0.66, 1.06)	0.92	(0.76, 1.12)
Age (years)	0.92	(0.90, 0.94)	0.94	(0.93, 0.96)
Male	0.96	(0.81, 1.12)	0.86	(0.74, 0.99)
Family size	0.95	(0.90, 1.02)	0.92	(0.87, 0.99)
Poor/near poor	0.78	(0.63, 0.95)	0.68	(0.56, 0.83)
Uninsured	0.59	(0.44, 0.78)	0.66	(0.50, 0.87)

Table 5.   *Continued*

| | 1996 | | 1997 | |
Regression Parameter*	Odds Ratio	95% CI	Odds Ratio	95% CI
Public insurance	0.85	(0.67, 1.08)	1.23	(0.98, 1.54)
Any behavioral condition	3.05	(2.15, 4.33)	3.87	(2.71, 5.51)
Any physical condition	3.79	(2.49, 5.75)	3.46	(2.55, 4.70)
Poor/fair general health status	3.39	(2.07, 5.56)	2.83	(1.87, 4.30)

*Reference group consisted of white female children of middle to upper income with commercial insurance reporting good/excellent general health without reported behavioral or physical conditions.

CI, confidence interval.

health condition, insurance, income, or health status for models of ambulatory visits.

For emergency room use and inpatient discharges, there were no racial disparities observed after adjusting for other potentially confounding factors. Having a physical condition and reporting fair or poor health status were consistently associated with increased odds of having an emergency room visit or inpatient discharge. Again, there were no significant interactions involving race and health condition, insurance, income, or health status.

For prescription medication fills, there were racial disparities in use. Black children had 22–30 percent lower odds of receiving a prescription medication than white children after adjusting for potentially confounding factors, while Hispanic children were not different from white children. Older age, poor or near poor income category, and uninsured status were consistently associated with lower odds of prescription medication use, while having a behavioral or physical condition and fair or poor health status were consistently associated with greater odds of prescription medication use. We observed a significant race by health condition interaction for 1997 but not for 1996. Since this interaction was not present across both years, we did not report models with interaction terms in the table. In addition, there were no significant interactions involving race and insurance, income, or health status for prescription medications.

Subgroup Analyses

To assess whether observed disparities in service use differed among children with behavioral or physical health conditions relative to children without such conditions, we stratified use by health condition category (behavioral,

physical, or neither). In 1996, Hispanic and black children without health conditions were less likely to use ambulatory care services (68 and 70 percent, respectively, versus 80 percent) than white children. Meanwhile, children with physical and behavioral conditions were more likely to use ambulatory services than those without health conditions, but racial disparities persisted among those with physical conditions (82 and 72 percent versus 91 percent, respectively) and among black children with behavioral conditions (88 and 74 percent versus 88 percent, respectively). Similarly, Hispanic and black children without health conditions were less likely to receive prescription medications (54 and 52 percent, respectively, versus 61 percent) than white children. Again, Hispanic and black children with health conditions were more likely to receive prescription medications than those without conditions, but racial disparities persisted among those with behavioral conditions (73 and 78 percent versus 82 percent) and physical conditions (85 and 78 percent versus 90 percent). Results from 1997 were consistent with those presented here for 1996.

DISCUSSION

Using a nationally representative dataset, we identified racial disparities in the reporting of behavioral and physical health conditions and related service use. We found that parents of Hispanic and black children were less likely to report externalizing behavioral conditions than those of white children, and parents of black but not Hispanic children were more likely to report asthma. In addition, Hispanic and black children were less likely to use nonemergent ambulatory services than white children, and black but not Hispanic children were less likely to receive a prescription medication. The extent of these disparities was similar among those with behavioral and physical conditions. There were no racial differences in nondiscretionary services such as emergency room visits or hospitalizations. Factors traditionally thought to contribute to differences in health services and that were available in MEPS, e.g., income, insurance, and health status, did not help explain these observed disparities.

It is not clear from epidemiological studies whether there are differences in the prevalence of behavioral disorders by race, because of heterogeneity across studies in methods and populations (Roberts, Attkisson, and Rosenblatt 1998). For instance, the Great Smoky Mountains Study of Youth was conducted in the Southeastern United States and enrolled 1,015 children ages 9,

11, and 13 years (Costello et al. 1996). The study reported no differences by race in the prevalence of externalizing disorders; however, few Hispanic children participated. Overall, 20.3 percent of the children had any behavioral disorder of which 6.6 percent had any externalizing disorder. The Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) study was conducted in four distinct geographic areas of the U.S. and enrolled 1,285 children 9–17 years old (Wu et al. 1999). This study reported a disproportionately high prevalence of externalizing disorders among blacks and a disproportionately low prevalence among Hispanics. In this study, 21 percent had any behavioral disorder of which 10.3 percent had any externalizing disorder. A comparison with our findings suggests two points. First, behavioral conditions in our study were recognized or reported less frequently by caregivers across racial groups than epidemiologic data would suggest. Second, black and Hispanic caregivers recognized or reported externalizing disorders less frequently than white caregivers. It is not clear whether this is due to cultural differences in the recognition and interpretation of symptoms, differences in the willingness to report these symptoms, or a difference in the community prevalence, although some epidemiologic data would argue against this last interpretation.

It has become more acceptable to use caregiver report to estimate the epidemiological prevalence of asthma and other physical conditions among populations. For example, the Centers for Disease Control (CDC) in the U.S. have conducted random-digit-dial telephone surveys among adult respondents. Findings have shown a greater overall prevalence of asthma among children than among adults in this survey (CDC 2002). Findings have also shown that non-Hispanic blacks report a higher prevalence of asthma (9.3 percent) than whites (7.6 percent) or Hispanics (5.0 percent) (CDC 2004). Our data with regard to racial differences in childhood asthma are consistent with these data, but it is not entirely clear whether the burden of asthma is disproportionately greater among black children or whether white and Hispanic children are undertreated.

Our findings with respect to services use mirror that of other investigators. For example, Olfson et al. (2003a, b) found that Hispanic and black children had lower reported rates of office visits for ADHD and depression than white children. In addition, Hispanic and black children reported receiving fewer psychotropic and nonpsychotropic prescription medicines than white children (Hahn 1995). Findings with respect to disparities were similar among studies examining outcomes of care in usual practice settings (Zito et al. 1998; DosReis et al. 2001).We found disparities in the use of nonemergent

services but similar use for emergency department and hospitalization use. The disparities in discretionary service use persisted even though we accounted for behavioral and physical health conditions that tend to drive service use. Factors identified a priori as possibly contributing to disparities in use, e.g., insurance, health status, and family income, did not explain these differences.

Our study has several limitations. First, MEPS data on health conditions, health status, and service use are based on respondent information and may be subject to recall bias. In addition, MEPS relies on caregiver report, and it is not clear how caregivers report conditions compared with providers and other independent measures. Our data suggest that the prevalence of health conditions using caregiver report may be less than that predicted by epidemiologic studies. Second, although MEPS data are nationally representative, our sample was too small and certain conditions too infrequent to adequately evaluate disparities for specific conditions. We accounted for this limitation by grouping similar 3-digit conditions into diagnostic categories. Third, we were not able to capture the use of mental health services separately. MEPS does not separate mental health from physical health visits.

Despite these limitations, there are important policy implications related to these findings. First, our data show that parents of minority children were less likely to report behavioral conditions but as or more likely to report physical conditions than those of white children. This suggests that mechanisms underlying the reporting of health conditions may differ for behavioral and physical health conditions. Second, our data show that minority children were less likely to have an ambulatory visit or prescription medication than white children regardless of whether they reported a health condition. Measures such as insurance or income that have traditionally been used to explain differences in service use did not explain the disparities in our study. To better understand disparities, Horn and Beal (2004) have proposed a framework to evaluate their root causes. This framework entails the inclusion of measures at multiple levels ranging from the individual and health system to the community and society. Such a research agenda may be enhanced if large nationally representative surveys such as MEPS include additional measures at these levels.

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REFERENCES

Agency for Healthcare Research and Quality. 1996. "MEPS HC-006R: 1996 Medical Conditions" [March 27, 2004]. Available at http://www.meps.ahrq.gov

———. 2000a. "MEPS HC-012: 1996 Full Year Consolidated Data File" [March 27, 2004]. Available at http://www.meps.ahrq.gov

———. 2000b. "MEPS HC-020: 1997 Full Year Consolidated Data File" [March 27, 2004]. Available at http://www.meps.ahrq.gov

———. 2001. "MEPS HC-018: 1997 Medical Conditions File" [March 27, 2004]. Available at http://www.meps.ahrq.gov

Boudreaux, E. D., S. D. Edmond, S. Clark, and C. A. Carmargo. 2003. "Race/Ethnicity and Asthma among Children Presenting to the Emergency Department: Differences in Disease Severity and Management." *Pediatrics* 111: e615–21.

Bui, K., and D. Takeuchi. 1992. "Ethnic Minority Adolescents and the Use of Community Mental Health Care Services." *American Journal of Community Psychology* 20 (4): 403–17.

Bussing, R., B. T. Zima, and T. R. Belin. 1998. "Variations in ADHD Treatment among Special Education Students." *Journal of the American Academy of Child and Adolescent Psychiatry* 37 (9): 968–76.

CDC. 2002. "Surveillance for Asthma—United States, 1980–1999." *Morbidity Mortality Weekly Report* 51 (SS-1): 1–6.

CDC. 2004. "Asthma Prevalence and Control Characteristics by Race/Ethnicity—United States, 2002." *Morbidity Mortality Weekly Report* 53 (7): 145–8.

Chabra, A., G. F. Chavez, and E. S. Harris. 1999. "Mental Illness in Elementary-School-Aged Children." *Western Journal of Medicine* 170: 28–34.

Cohen, J. 1997. "Design and Methods of the Medical Expenditure Panel Survey Household Component." In *MEPS Methodology Report No.1. AHCPR Pub. No. 97-0026.* Rockville, MD: Agency for Health Care Policy and Research.

Cohen, S. 1997. "Sample Design of the 1996 Medical Expenditure Panel Survey Household Component." In *MEPS Methodology Report No. 2. AHCPR Pub. No. 97-0027.* Rockville, MD: Agency for Health Care Policy and Research.

———. 2000. "Sample Design of the 1997 Medical Expenditure Panel Survey Household Component." In *MEPS Methodology Report 11, AHRQ Pub. No. 01-0001.* Rockville, MD: Agency for Healthcare Research and Quality.

Cohen, S. B., R. DiGaetano, and H. Goksel. 1999. "Estimation Procedures in the 1996 Medical Expenditure Panel Survey Household Component." In *Methodology*

Report 5, AHCPR Pub. No. 99-0027. Rockville, MD: Agency for Health Care Policy and Research.

Cooper-Patrick, L., J. Gallo, N. Powe, D. Steinwachs, W. Eaton, and D. Ford. 1999. "Mental Health Service Utilization by African Americans and Whites: The Baltimore Epidemiologic Catchment Area Follow-Up." *Medical Care* 37 (10): 1034–45.

Costello, E. J., A. Angold, B. J. Burns, D. K. Stangl, D. L. Tweed, A. Erkanli, and C. M. Worthman. 1996. "The Great Smoky Mountains Study of Youth: Goals, Design, Methods, and the Prevalence of DSM-III-R Disorders." *Archives of General Psychiatry* 53: 1129–36.

Cuffe, S., J. Waller, M. Cuccaro, A. Pumariega, and C. Garrison. 1996. "Race and Gender Differences in the Treatment of Psychiatric Disorders in Young Adolescents." *Journal of the American Academy of Child and Adolescent Psychiatry* 34 (11): 1536–43.

DelBello, M. P., M. P. Lopez-Larson, C. A. Soutullo, and S. M. Strakowski. 2001. "Effects of Race on Psychiatric Diagnosis of Hospitalized Adolescents: A Retrospective Chart Review." *Journal of Child and Adolescent Psychopharmacology* 11 (1): 95–103.

Diala, C., C. Muntaner, C. Walrath, K. Nickerson, T. LaVeist, and P. J. Leaf. 2000. "Racial Differences in Attitudes toward Professional Mental Health Care and in the Use of Services." *American Journal of Orthopsychiatry* 70 (4): 455–64.

DosReis, S., J. M. Zito, D. J. Safer, and K. L. Soeken. 2001. "Mental Health Services for Youths in Foster Care and Disabled Youths." *American Journal of Public Health* 91 (7): 1094–9.

Flisher, A. J., R. A. Kramer, R. C. Grosser, M. Alegria, H. R. Bird, K. H. Bourdon, S. H. Goodman, S. Greenwald, S. M. Horwitz, R. E. Moore, W. E. Narrow, and C. W. Hoven. 1997. "Correlates of Unmet Need for Mental Health Services by Children and Adolescents." *Psychological Medicine* 27 (5): 1145–54.

Garland, A. F., R. L. Hough, J. A. Landsverk, K. M. McCabe, M. Yeh, W. C. Ganger, and B. J. Reynolds. 2000. "Racial and Ethnic Variations in Mental Health Care Utilization among Children in Foster Care." *Child Services* 3 (3): 133–46.

Hahn, B. A. 1995. "Children's Health: Racial and Ethnic Differences in the Use of Prescription Medications." *Pediatrics* 95: 727–32.

Hoberman, H. 1992. "Ethnic Minority Status and Adolescent Mental Health Services Utilization." *Journal of Mental Health Administration* 19 (3): 246–67.

Horn, I. B., and A. C. Beal. 2004. "Child Health Disparities: Framing a Research Agenda." *Ambulatory Pediatrics* 4: 269–75.

Kilgus, M., A. Pumariega, and S. Cuffe. 1995. "Influence of Race on Diagnosis in Adolescent Psychiatric Inpatients." *Journal of the American Academy of Child and Adolescent Psychiatry* 34 (1): 67–72.

Lieu, T. A., P. Lozano, J. A. Finkelstein, F. W. Chi, N. G. Jensvold, A. M. Capra, C. P. Quesenberry, J. V. Selby, and H. J. Farber. 2002. "Racial/Ethnic Variation in Asthma Status and Management Practices among Children in Managed Medicaid." *Pediatrics* 109: 857–65.

Mandell, D. S., J. Listerud, S. E. Levy, and J. A. Pinto-Martin. 2002. "Race Differences in the Age of Diagnosis among Medicaid-Eligible Children with Autism." *Journal of the American Academy of Child and Adolescent Psychiatry* 41 (12): 1447–53.

Olfson, M., M. J. Gameroff, S. C. Marcus, and P. S. Jensen. 2003a. "National Trends in the Treatment of Attention Deficit Hyperactivity Disorder." *American Journal of Psychiatry* 160: 1071–7.

Olfson, M., M. J. Gameroff, S. C. Marcus, and B. D. Waslick. 2003b. "Outpatient Treatment of Child and Adolescent Depression in the United States." *Archives of General Psychiatry* 60: 1236–42.

Roberts, R. E., C. C. Attkisson, and A. Rosenblatt. 1998. "Prevalence of Psychopathology among Children and Adolescents." *American Journal of Psychiatry* 155: 715–25.

Smedley, B. D., A. Y. Stith, and A. R. Nelson (eds.). 2002. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care.* Washington, DC: National Academies Press.

Strakowski, S. M., H. Lonczak, K. Sax, S. West, A. Crist, and R. Mehta. 1995. "The Effects of Race on Diagnosis and Disposition from a Psychiatric Emergency Service." *Journal of Clinical Psychiatry* 56 (3): 101–7.

Wu, P., C. W. Hoven, H. Bird, R. Moore, P. Cohen, M. Alegria, M. K. Dulcan, S. H. Goodman, S. M. Horwitz, J. H. Lichtman, W. E. Narrow, D. S. Rae, D. A. Regier, and M. T. Roper. 1999. "Depressive and Disruptive Disorders and Mental Health Service Utilization in Children and Adolescents." *Journal of the American Academy of Child and Adolescent Psychiatry* 38 (9): 1081–90.

Wu, P., C. W. Hoven, P. Cohen, X. Liu, R. Moore, and Q. Tiet. 2001. "Factors Associated with Use of Mental Health Services for Depression by Children and Adolescents." *Psychiatric Services* 52 (2): 189–95.

Zito, J. M., D. J. Safer, S. DosReis, and M. A. Riddle. 1998. "Racial Disparity in Psychotropic Medications Prescribed for Youths with Medicaid Insurance in Maryland." *Journal of the American Academy of Child and Adolescent Psychiatry* 37: 179–84.