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Racial and Ethnic Disparities in the Health and Health Care of Children

Glenn Flores and THE COMMITTEE ON PEDIATRIC RESEARCH

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Technical Report—Racial and Ethnic Disparities in the Health and Health Care of Children

Glenn Flores, MD, THE COMMITTEE ON PEDIATRIC RESEARCH

KEY WORDS
health care disparities, ethnic groups, Hispanic Americans, African Americans, Asian Americans, Indians, North American

ABBREVIATIONS
CDC—Centers for Disease Control and Prevention
CI—confidence interval
AAP—American Academy of Pediatrics
AA—African American
API—Asian/Pacific Islander
AI/AN—American Indian/Alaska Native
ALL—acute lymphoblastic leukemia
ED—emergency department
SCHIP—State Children's Health Insurance Program
ADHD—attention-deficit/hyperactivity disorder
SES—socioeconomic status

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abstract

OBJECTIVE: This technical report reviews and synthesizes the published literature on racial/ethnic disparities in children's health and health care.

METHODS: A systematic review of the literature was conducted for articles published between 1950 and March 2007. Inclusion criteria were peer-reviewed, original research articles in English on racial/ethnic disparities in the health and health care of US children. Search terms used included "child," "disparities," and the Index Medicus terms for each racial/ethnic minority group.

RESULTS: Of 781 articles initially reviewed, 111 met inclusion criteria and constituted the final database. Review of the literature revealed that racial/ethnic disparities in children's health and health care are quite extensive, pervasive, and persistent. Disparities were noted across the spectrum of health and health care, including in mortality rates, access to care and use of services, prevention and population health, health status, adolescent health, chronic diseases, special health care needs, quality of care, and organ transplantation. Mortality-rate disparities were noted for children in all 4 major US racial/ethnic minority groups, including substantially greater risks than white children of all-cause mortality; death from drowning, from acute lymphoblastic leukemia, and after congenital heart defect surgery; and an earlier median age at death for those with Down syndrome and congenital heart defects. Certain methodologic flaws were commonly observed among excluded studies, including failure to evaluate children separately from adults (22%), combining all nonwhite children into 1 group (9%), and failure to provide a white comparison group (8%). Among studies in the final database, 22% did not perform multivariable or stratified analyses to ensure that disparities persisted after adjustment for potential confounders.

CONCLUSIONS: Racial/ethnic disparities in children's health and health care are extensive, pervasive, and persistent, and occur across the spectrum of health and health care. Methodologic flaws were identified in how such disparities are sometimes documented and analyzed. Optimal health and health care for all children will require recognition of disparities as pervasive problems, methodologically sound disparities studies, and rigorous evaluation of disparities interventions. *Pediatrics* 2010;125:e979–e1020

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INTRODUCTION

Racial/ethnic disparities in health and health care recently have received considerable attention. The Agency for Healthcare Research and Quality has issued an annual national health care disparities report since 2003.[1,2] Reduction and elimination of disparities is one of the major goals of *Healthy People 2010*,[3] part of the strategic plan of the Eunice Kennedy Shriver National Institute of Child Health and Human Development,[4] and part of the strategic imperatives of the Centers for Disease Control and Prevention (CDC).[5] A separate National Institutes of Health center devoted to minority health and health disparities (the National Center for Minority Health and Health Disparities) was founded in 2000.[6] The Institute of Medicine released a landmark monograph on disparities,[7] and a federal bipartisan bill targeting health care disparities recently was introduced.[8]

Little attention has been paid, however, to racial/ethnic disparities in the health and health care of children. For example, only 5 of 103 studies in the Institute of Medicine's extensive review of the literature on health care disparities specifically addressed racial/ethnic disparities in children's health care.[7] The purpose of this technical report, therefore, is to review and synthesize the published literature on racial/ethnic disparities in children's health and health care. The report begins with definitions of key terms and an overview of sociodemographic trends in minority children. Specific minority groups, the importance of racial/ethnic subgroups, studies of interventions to reduce racial/ethnic disparities, and methodologic issues are then reviewed.

DEFINITIONS

"Race/ethnicity" is defined as the child's racial or ethnic group (including "multiracial"), as designated by the parent and/or child. "Minority" will be the term used for children of nonwhite race/ethnicity. Although multiple definitions have been proposed for the term "disparities," the Health Resources and Services Administration definition of disparities was used, which defines disparities as "population-specific differences in the presence of disease, health outcomes, or access to care."[9]

METHODS

Only statistically significant disparities are reported herein (ie, those with either a *P* value of less than .05 or 95% confidence intervals [CIs] that are nonoverlapping with non-Latino white children). The only exception to this rule was inclusion of certain crude outcome rates in large population-based samples in which the differences were considered quantitatively or clinically significant (ie, when there was at least a 50% difference in rates between a specific racial/ethnic minority group and the white population). Only studies that examined racial/ethnic disparities in the context of comparisons to white children were included in the literature review. Notation was made of whether disparities included adjustment for relevant covariates. When appropriate data were available, secular trends for specific disparities are described. Unless otherwise noted, the reference group for any racial/ethnic disparity is non-Latino white children.

LITERATURE SEARCH

The scope of published literature on racial/ethnic disparities is broad. In addition, although racial/ethnic disparities in neonatal and infant mortality rates[10] and dental care[11] have been fairly well described, relatively little has been published on racial/ethnic disparities in children and adolescents. The terms that have been used to describe disparities also have been neither standardized nor consistent. As a consequence, the literature search was limited to only those studies that specifically examined racial/ethnic disparities for US children and adolescents, to ensure a focus on disparities and a body of literature in urgent need of a systematic review. Thus, articles on racial/ethnic disparities in neonatal and infant mortality and dental care were excluded, because disparities in these domains have comparatively been more well described, and articles on pediatric workforce diversity, an area that was addressed in a recent American Academy of Pediatrics (AAP) policy statement,[12] also were excluded.

The database used for the literature search was Ovid Medline; the search encompassed the years 1950 through the first week of March 2007. The initial search strategy included the terms "child" and "disparities" (both as medical subject heading terms and key words), which yielded 666 citations. To ensure that no relevant citations were missed, individual searches also were performed by using "disparities," "child," and Index Medicus terms for each racial/ethnic minority group, which yielded the following children's disparities references: "African continental ancestry group," $n = 35$; "Asian continental ancestry group," $n = 5$; "Pacific Islanders," $n = 2$; "Indians, North American," $n = 17$; "multiracial," $n = 1$; and "Hispanic Americans," $n = 55$. The initial total of all citations was, therefore, 781 articles. To ensure the consistency and reproducibility of this literature search, additional secondary references were not included from the citation lists of the primary articles included in the database.

Abstracts for all 781 articles were reviewed. Because the focus of the literature review was original, peer-reviewed articles in English on racial/ethnic disparities in the health and

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health care of US children, review articles, editorials, commentaries, perspective pieces, theoretical or conceptual pieces, transcripts of speeches, letters to the editor, dental care articles, articles that addressed adults or the elderly, articles without analysis of racial/ethnic disparities, articles on neonatal or infant mortality issues, articles on workforce diversity, articles that did not examine disparities in the health of US children, and duplicate citations were excluded. Application of these exclusion criteria yielded 227 articles. The full print versions of these remaining 227 articles were reviewed, and reapplication of the exclusion criteria yielded a final database of 111 articles, 2 of which examined interventions aimed at reducing racial/ethnic disparities (and were considered separately).

SOCIODEMOGRAPHICS OF MINORITY CHILDREN IN THE UNITED STATES

The United States is experiencing a demographic surge in minority children (Fig 1). There are 31.4 million children (younger than 18 years old) of nonwhite race/ethnicity in the United States,[13] comprising 43% of children, and representing an 11% increase since 2000[14] and a 58% increase since 1990.[15] Since 2000, minorities have represented more than half of the population of the nation's 100 largest cities, and 42 of the 100 largest US cities are "minority majority" (defined as populations in which racial/ethnic minorities outnumber the white population).[16] In California, the largest state in the nation, minorities have outnumbered whites since 2000, and currently represent 57% of the state's population.[17,18] Conservative estimates indicate that minorities will constitute half of US children by 2040.[19]

Latinos are the largest and fastest-growing minority group of US children (Fig 1), representing 20% of children in America (equivalent to 15 million).[13,20] African Americans (AAs) are the second-largest minority group of US children, representing 15% of children in America (equivalent to 10.9 million)[13]; between 1990 and 2006, their population proportion slightly decreased. Asians/Pacific Islanders (APIs) are the third-largest minority group of US children, representing 4% of children in America (equivalent to 3 million)[13]; between 2000 and 2006, their population proportion grew by 14% (1990 US Census data are not available on API children). American Indians/Alaska Natives (AIs/ANs) represent 1% of children in America (equivalent to ~661 000)[13]; between 1990 and 2006, their population proportion decreased by 18%. The number of multiracial children in the United States (ie, self-designated by the caregiver as belonging to 2 or more races) in 2006 was 2.9 million, representing 4% of the US population of children,[13] a proportion that has not changed since 1990.

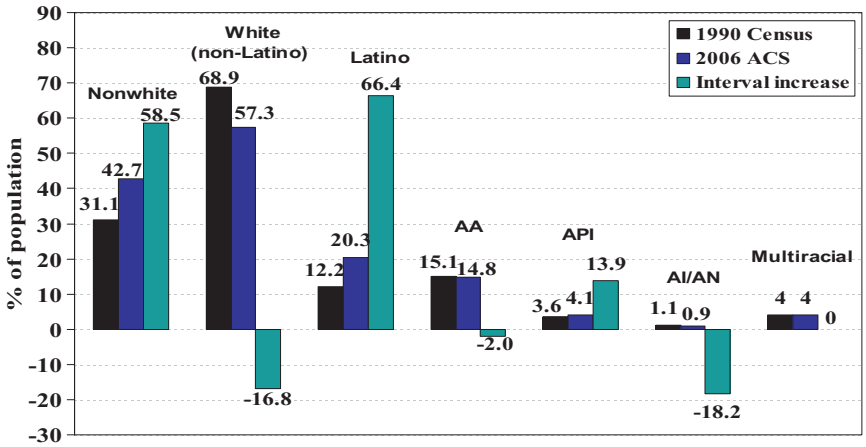

FIGURE 1
Growth of racial/ethnic minority population of US children between 1990 and 2006. ACS indicates American Community Survey. Data were unavailable for APIs for the 1990 US Census, so data depicted are from the 2000 US Census.

HEALTH AND HEALTH CARE DISPARITIES IN SPECIFIC RACIAL/ETHNIC GROUPS OF CHILDREN

African Americans

The vast majority of articles (94 of 109 [86%]) addressed disparities in AA children (Table 1).

Mortality

Eight articles documented AA/white disparities in mortality rates. Overall childhood mortality rates were found to be consistently higher for AA children; national data for a 43-year period revealed marked crude mortality-rate disparities in young children 1 to 4 years of age (twice that of white children) and older children 5 to 14 years of age and increases in the mortality-disparity ratio in the most recent 10-year period. Two other studies that adjusted for relevant covariates documented significantly higher mortality rates for AA children versus white children in the Detroit tri-county area for boys and older girls (10–19 years old) and among children without congenital anomalies in the state of Michigan. AA children also experience higher risks of death from drowning in a swimming pool, especially in public pools, with the drowning rate in hotel/motel pools disproportionately higher. Significant disease-specific mortality-rate disparities were identified for acute lymphoblastic leukemia (ALL), median age at death for Down syn-

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TABLE 1 Disparities in the Health and Health Care of AA Children

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Access to care				
Lower accessibility to pediatric primary care providers Neighborhood AA race more strongly associated with access to pediatric primary care providers than neighborhood income	Analysis of spatial accessibility to pediatric primary care providers in Washington, DC	US Census data on all children and American Medical Association/American Osteopathic Association data on concentration of all pediatric primary care providers in Washington, DC	Not adjusted for covariates	27
Double the adjusted odds of having no usual source of care Double the adjusted odds of no health professional/doctor visit in past year	Analysis of household component of 1996 and 2000 MEPS	AA: $n = 2189$; Latino: $n = 4091$; Asian: $n = 325$; white: $n = 6362$	Adjusted for 8 covariates; double the adjusted odds of dissatisfaction with quality of care in 1996 but not 2000	28
Higher adjusted odds of appendicitis rupture	Cross-sectional analysis of full-year samples of hospital discharge records for acute appendicitis from California and New York children 4–18 y of age	California: AA, $n = 297$; Latino, $n = 4304$; API, $n = 459$; white, $n = 4017$; New York: AA, $n = 342$; Latino, $n = 444$; API, $n = 80$; white, $n = 2379$	Adjusted for 7 covariates	29
Higher adjusted proportion in fair or poor health among new SCHIP enrollees in Florida Lower adjusted proportion had usual source of care before SCHIP among new SCHIP enrollees in New York	Analysis of CHIRI data on new SCHIP enrollees in 4 states (<18 y old in Alabama, Kansas, and New York, and 11.5–17.9 y old in Florida)	Total sample: $n = 8975$[b]	Adjusted for 10 covariates	30
Before enrollment in SCHIP Lower adjusted rate of having usual source of care Higher adjusted rate of having unmet needs for health care	Interviews of parents in New York State at the time of SCHIP enrollment of their child (baseline) and 1 y after enrollment	Total sample: $N = 2644$[b] (baseline) and $N = 2290$ (1-y follow-up)	Adjusted for 12 covariates; 1 unadjusted quality-of-care disparity was noted but not adjusted for	31
Greater adjusted odds of not being referred to specialist by health care provider	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	AA: $n = 477$; Latino: $n = 817$; white: $n = 718$	Adjusted for 9 covariates	32
Adolescents				
Higher likelihood of fair to poor health among adolescents recently enrolled in SCHIP Less likely to use doctor's offices as their usual source of care among adolescents recently enrolled in SCHIP	Analysis of CHIRI telephone interview data of adolescents newly enrolled in SCHIP in Florida and New York (and their parents)	Total sample: $N = 2036$[b]	No multivariable adjustments performed	33
Significantly lower adjusted odds of use of substance abuse services among adolescents Significantly older age at first use of substance abuse services AA girls at particular risk of underuse of substance abuse services, with only 1 in 25 AA female teenaged substance abusers accessing substance abuse services	Analysis of 5 y of Tennessee Medicaid (TennCare) enrollment, encounter, and claims data for substance abuse services use by adolescents 12–17 y of age	AA: $n = 60\ 104$; white: $n = 110\ 552$	Adjusted for 4 covariates	34
Female adolescents: higher risk of skipping breakfast, obesity, lacking health insurance, needing but not getting medical care, any sexually transmitted disease, perpetrating violence, and being a victim of violence	Analysis of Add Health (waves 1 and 2), a nationally representative school-based study of youths in grades 7–12, with follow-up into adulthood	AA: $n = 3038$; Latino: $n = 2340$; API: $n = 1021$; AI/AN: $n = 136$; white: $n = 7728$	Prevalence in published tables was not adjusted; authors stated that adjustments for income and parental education had minimal influence on findings; significant disparities were identified by using 95% CIs that did not overlap with measure for white children; no formal statistical evaluation of disparities were provided in article	35

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Male adolescents: higher risk of perpetrating violence and being victim of violence				
Live birth rate for 15- to 17 y-old girls was >3 times higher	1990–1998 natality files from the National Vital Statistics system	Not provided	Expressed as rates per 1000; rates were not adjusted for any covariates	36
Birth rate for 15- to 17 y-old girls was 4–5 times higher AA/white disparity ratio worsened by 23% between 1990 and 1998	Analysis of vital records from the Illinois and Chicago departments of public health	Not provided	Not adjusted for covariates	37
Birth rate for 15- to 19-y-old girls more than twice as high	Birth certificate data reported to CDC National Center for Health Statistics	Not provided	Not adjusted for covariates; no *P* values or 95% CIs	38
Greater adjusted odds of alcohol testing among female adolescents admitted to EDs for traumatic injury	Analysis of data from the National Trauma Data Bank (includes 64 US institutions) on adolescents 12–17 y of age admitted to EDs with traumatic injury	AA: $n = 1760$; Latino: $n = 396$; white: $n = 5584$	Adjusted for 7 covariates	39
Asthma and allergies				
Highest asthma prevalence of any racial/ethnic group (26% higher vs white children) Highest asthma-attack prevalence of any racial/ethnic group (44% higher vs white children) Disparity vs white children has widened progressively over 16-y period, from 15% higher prevalence to 26% higher prevalence vs white children Higher asthma office-visit rate Triple the rate of asthma ED visits Triple the rate of hospital outpatient visits for asthma Ambulatory asthma-visit rate (all outpatient visit types) 1.6 times higher Hospitalization rate 3.6 times higher Hospitalization rate increased at more than double the rate of white children Highest asthma mortality rate of any racial/ethnic group, 4.6 times higher than that of white children Asthma mortality rate increased over 19 y (vs remained the same in white children)	Trends in asthma over time for children 0–17 y of age using data from 5 National Center for Health Statistics sources: National Health Interview Survey, National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, National Hospital Discharge Survey, and mortality component of the National Vital Statistics system	Not provided	No statistical comparisons performed or 95% CIs provided; only unadjusted rates were presented	40
Greater likelihood of current asthma Greater likelihood of ED visit for asthma in past year	National database (NHIS)	AA: $n = 14\,487$; white: $n = 49\,042$	Adjusted for 8 covariates	41
Greater adjusted odds (adjusted odds ratio, 2.5 [95% CI: 1.3–4.8]) of physician-diagnosed asthma, even after adjustment for family income	Rhode Island Health Interview Survey	AA: $n = 142$; Latino: $n = 353$; white: $n = 1274$	Adjusted for 7 covariates	42

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Higher adjusted odds of asthma Lower adjusted odds of ambulatory visits Lower adjusted odds of prescriptions filled	Secondary analysis of 2 y of MEPS data on children 2–18 y of age	Total 1996 MEPS sample size: $N = 3955$; total 1997 MEPS sample size: $N = 5933$	Adjusted for 6–8 covariates; in 1 survey year but not the other, significantly lower adjusted odds of ED visits and internalizing and externalizing behavioral conditions	43
Higher asthma mortality rate, both for underlying cause and any mention	Analysis of 12 y of data from the multiple cause-of-death files from the National Center for Health Statistics	Total sample: $N = 4091$[a,b]	Unadjusted rates, not adjusted for SES or insurance coverage; asthma mortality rate also higher than that of Latino and API children	44
Higher adjusted odds of an asthma ED visit or hospitalization	Analysis of data from parent-response questionnaires administered in 26 randomly selected New York City public elementary schools	Total sample: $N = 5250$[b]	Adjusted for 4 covariates	45
Higher diagnosed asthma prevalence (18%) Higher total potential asthma burden (diagnosed plus possible but undiagnosed asthma)	Cross-sectional analysis of parent-report questionnaire data from 14 low-income, diverse Chicago public elementary schools	AA: $n = 2938$; Latino: $n = 6002$; white: $n = 1560$	Not adjusted for covariates	46
More than double the adjusted odds of having a current asthma diagnosis	Analysis of NHANES III on children 1–16 y of age	Total sample: $N = 11\,181$[b]	Adjusted for 14 covariates; sample size of those with asthma was not provided	47
Worse asthma physical health scores Lower adjusted odds of daily anti-inflammatory use for asthma	Cross-sectional study using parental telephone interviews and electronic records for Medicaid-insured children 2–16 y of age with asthma in 5 managed care organizations in California, Washington, and Massachusetts	AA: $n = 636$; Latino: $n = 313$; white: $n = 512$	Adjusted for SES, health status, age, gender, and other sociodemographic variables	48
Higher adjusted odds of cockroach allergen sensitivity Higher adjusted odds of dust mite allergen sensitivity Higher adjusted odds of mold allergen sensitivity	Cross-sectional analysis of children 6–16 y of age who participated in allergen testing in the NHANES III	AA: $n = 1502$; Mexican American: $n = 1546$; white: $n = 1116$	Adjusted for 8 covariates	49
Higher adjusted odds of asthma Higher adjusted odds of need for urgent medical care for asthma in past 12 mo	Analysis of data from the Los Angeles County Health Survey on children <18 y of age	AA: $n = 566$; Latino: $n = 3675$; API: $n = 361$; white: $n = 1278$	Adjusted for 8 covariates	50
Lower adjusted odds of use of β_2-agonists Lower adjusted odds of use of inhaled steroids	Analysis of data from the Childhood Asthma Severity Study, which used a 12-mo, retrospective, parent-reported questionnaire on asthma in a community sample of children <13 y of age and residing in Connecticut and Massachusetts	AA: $n = 139$; Latino: $n = 255$; white: $n = 549$	Adjusted for 9 covariates	51
Higher adjusted prevalence of asthma overall Among children with family income less than half the federal poverty level, higher prevalence of asthma	Analysis of NHIS data on children 0–17 y of age		Adjusted for 8 covariates; stratified analyses suggested disparities only for poorest children, but sample sizes for other strata may not have been adequate (and not indicated in study)	52

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Breastfeeding				
Lower proportion of children ever breastfed Lower proportion of children who received any human milk at 6 mo of age Lower proportion of children exclusively breastfed at 4 mo of age	Analysis of breastfeeding data on children 12–71 mo of age in the NHANES III (1988–1994)	AA: $n = 1845$; Mexican American: $n = 2118$; white: $n = 1869$	Not adjusted for any covariates	53
Cardiovascular and hypertension				
Higher relative risk of all strokes Higher relative risk of intracerebral hemorrhage Higher relative risk of subarachnoid hemorrhage Higher relative risk of ischemic stroke after exclusion of sickle cell disease	Analyses of databases of the Office of Statewide Health Planning and Development of California for 10 y on all admissions to nonfederal hospitals in California	Not provided	Not adjusted for covariates (except sickle cell disease)	54
Health status				
Lower adjusted odds of being in excellent/very good health	Analysis of cross-sectional data on children 0–19 y of age from the California Health Interview Survey	Total sample: $N = 19\,485$[b]	Adjusted for 4 covariates; higher adjusted odds of making a physician visit in the previous year	55
Higher adjusted likelihood of fair or poor health Higher adjusted likelihood of activity limitations Higher adjusted likelihood of school limitations	Analysis of NHIS data	AA: $n = 5776$; API: $n = 1088$; Latino: $n = 4785$; white: $n = 20\,717$	Not adjusted for family income or health insurance coverage (adjusted only for age, gender, and parental education); lower adjusted likelihood of acute respiratory illness and injuries; interactions noted between race/ethnicity and parental education for selected outcomes in selected groups	56
Greater adjusted scores of global stress in previous month among adolescents	Cohort of adolescents in grades 7–12 in 1 suburban Midwestern public school district	AA: $n = 550$; white: $n = 659$	Adjusted for 7 covariates; interaction noted between race and college education; stress related to racism not examined	57
Higher adjusted odds of poor, fair, or good health status (vs excellent/very good)	Analysis of data from National Survey of Early Childhood Health on children 4–35 mo of age	Total sample: $N = 2068$[b]	Adjusted for 8 covariates	58
Greater adjusted odds of not being in excellent or very good health	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	AA: $n = 477$; Latino: $n = 817$; white: $n = 718$	Adjusted for 9 covariates	32
HIV/AIDS				
Represent largest percentages of new HIV/AIDS diagnoses in every age group of children and adolescents and in perinatal transmission Number of new HIV/AIDS diagnoses in every age group of children and adolescents and in perinatal transmission exceed those of all other racial/ethnic groups combined Among females, percentages of new pediatric HIV/AIDS diagnoses are 4–9 times that for white females Among males, percentages of new pediatric HIV/AIDS diagnoses are 2–7 times that for white males	Diagnoses of HIV/AIDS reported to the CDC in 2001–2004 by 33 states that used confidential, name-based reporting of HIV/AIDS cases for at least 4 y	AA: $n = 11\,554$; Latino: $n = 3249$; white: $n = 3707$[a]	No 95% CIs or P values presented; not adjusted for SES or other covariates	59
Longer adjusted length of hospital stay for HIV-infected children	Cohort study of pediatric patients with HIV at 4 sites specializing in the care of pediatric HIV-infected patients	AA: $n = 390$; Latino: $n = 112$; white: $n = 66$	Adjusted for 8 covariates; inpatient length-of-stay data available on only 79 patients	60

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Hospitalizations				
Higher hospitalization rates for ACSCs Higher proportion of all hospital discharges attributable to ACSCs Asthma comprised much higher proportion of all ACSCs	Analysis of 6 y of data on children 1–14 y of age from National Hospital Discharge Surveys, US Census, and the NHIS	AA: $n = 17\,599$; white: $n = 66\,270$	Not adjusted for covariates; only examined 6 ACSCs White race category included all those with missing race	61
Immunization				
For children <48 mo old, lowest rate of being up-to-date on 4:3:1:3:3 immunization series Substantially greater delay and later mean age for all immunization categories and doses	Retrospective cohort study based on Chicago public schools' computerized immunization database on all children completing kindergarten in a 2-y period	Total sample: $N = 66\,556$[b]	Not adjusted for covariates	62
Infectious diseases (other than HIV/AIDS)				
Higher rate ratio of invasive pneumococcal disease among all 3 age groups analyzed (<2, 2–4, and 5–17 y of age)	Analysis of age- and race-specific pneumococcal disease incidence rates from the Active Bacterial Core Surveillance/Emerging Infections Program Network, an active, population-based surveillance system in 7 states, using data from between January 1, 1998, and December 31, 2002	Not stated for children	Not adjusted for covariates	63
Higher incidence rate of tuberculosis	Analysis of 8 y of data on children <15 y of age from the North Carolina Tuberculosis Information Management System database	AA: $n = 114$; Latino: $n = 33$; API: $n = 12$; white: $n = 21$	Not adjusted for any covariates	64
Injuries				
Firearm injury rate >13 times higher	Analysis of data from Minnesota Department of Health's Minnesota Trauma Data Bank on firearm injuries in children 0–19 y of age	Total sample: $N = 175$[b]	Not adjusted for covariates	65
Higher adjusted odds of not putting up stair gate Higher adjusted odds of not installing safety latches or locks on cabinets Higher adjusted odds of not turning down hot-water thermostat setting	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	AA: $n = 477$; Latino: $n = 817$; white: $n = 718$	Adjusted for 9 covariates	66
Mental health and behavioral/developmental issues				
Lower adjusted odds of receiving treatment for depression from a mental health specialist	Analysis of National Longitudinal Survey of Youth and the Child/Young Adult supplement, a nationally representative sample of 7- to 14-y-old children	Total sample: $N = 2482$[b]	Adjusted for 28 covariates; no differences for any visit or behavior problem visit	67
Lower adjusted odd of being diagnosed with ADHD without a learning disability Lower adjusted odd of being diagnosed with ADHD with a learning disability Lower adjusted odds among those with ADHD of receiving any prescription medication	Analysis of 5 y of the NHIS	AA: $n = 3562$; Latino: $n = 5552$; white: $n = 11\,287$	Adjusted for birth weight, income, and health insurance coverage	68

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted odds of any mental health service use Lower adjusted odds of outpatient mental health service use Lower adjusted odds of informal mental health service use (self-help groups, peer counseling, clergy counseling, or alternative healers)	Analysis of outcomes for a random sample of 6- to 18-y-old youths receiving services in ≥1 of 5 San Diego County public sectors of care (alcohol and drug abuse, child welfare, juvenile justice, mental health, and public school education services) over a 1.5-y period	AA: $n = 282$; Latino: $n = 332$; API: $n = 88$; white: $n = 554$	Parents and children with limited English proficiency were excluded; adjustment for 12 covariates	69
Among those with autism, receive diagnosis 1.4 y later than white children (after adjustment) Among those with autism, in mental health treatment an average of 13 mo longer than white children before receiving diagnosis of autism (after adjustment)	Analysis of 7 y of Philadelphia County Medicaid claims data for children and adolescents with autism	AA: $n = 242$; Latino: $n = 33$; white: $n = 118$	Adjusted for 3 covariates; Latino children did not significantly differ from AA children for any finding, but no direct Latino-white comparison made	70
Higher proportion of parents with children with ADHD had negative expectations about ADHD treatment (ie, thought treatment could not help) Among those with ADHD or at high risk for ADHD Lower adjusted odds of receiving professional evaluation for ADHD Lower adjusted odds receiving ADHD diagnosis Lower adjusted odds of currently receiving treatment for ADHD	District-wide stratified random sample of 1615 elementary-school children (kindergarten through 5th grade) in north central Florida public school; included telephone contacts, home visits, and teacher symptom-screening questionnaire	AA: $n = 201$; white: $n = 188$	Adjusted for 8 covariates, except parent-reported barriers, which were unadjusted	71
Higher adjusted odds of use of state-funded mental health services	Analysis of New York City data on receipt of services from state-funded mental health care facilities	Total sample: $N = 78\,085$ (including adults)[b]	Adjusted for 7 covariates	72
Higher adjusted odds of developmental delays (based on parental concerns)	Analysis of data from National Survey of Early Childhood Health on children 4–35 mo of age	Total sample: $N = 2068$[b]	Adjusted for 8 covariates	58
Lower adjusted odds of use of specialty mental health services among children for whom an investigation of abuse or neglect had been opened by the child welfare system	Analysis of data from the National Survey of Child and Adolescent Well-being on use of specialty mental health services for 1 y after contact with child welfare among a cohort of children 2–14 y of age	AA: $n = 899$; Latino: $n = 487$; white: $n = 1208$	Adjusted for 11 covariates and 2 interaction terms	73
Lower adjusted odds of receipt of psychotropic medications Lower adjusted odds of receipt of stimulant medications Lower adjusted odds of receipt of antidepressants Lower adjusted odds of receipt of neuroleptics	Cross-sectional analysis of computerized claims for children 2–19 y of age continuously enrolled in a mid-Atlantic state Medicaid program for 1 y	AA: $n = 112\,488$; white: $n = 56\,858$	Adjusted for 3 covariates; disparities persisted across 4 categories of Medicaid eligibility (SCHIP, Temporary Assistance to Needy Families [TANF], foster care, and Supplemental Security Income [SSI])	74
Higher adjusted odds of child's meals not being at the same time daily Higher adjusted odds of family eating lunch or dinner together less often than every day Higher adjusted odds of family never eating lunch or dinner together Watch an adjusted mean of 45 min more of television daily Higher adjusted odds of reading to child less often than every day Lower adjusted mean number of children's books in home	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	AA: $n = 477$; Latino: $n = 817$; white: $n = 718$	Adjusted for 9 covariates	66

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Mortality				
Higher adjusted rates of drowning in a swimming pool Higher adjusted rates of drowning in public pools, especially hotel/motel pools	Analysis of 4 y of national data from the Consumer Products Safety Commission on drowning deaths of children 5–24 y of age from death certificates, medical examiner reports, and newspaper clippings	AA: $n = 316$; Latino: $n = 81$; AI/AN: $n = 18$; white: $n = 222$	Adjusted for income; values expressed as rate ratios and 95% CIs, but no P values provided	75
Higher adjusted child mortality rate among boys in the Detroit tri-county area Higher adjusted child mortality rate among 10- to 19-y-old girls in the Detroit tri-county area	Combined death-certificate and census data on childhood mortality in 3 major metropolitan areas: Chicago, Detroit, and New York	AA: $n = 13\,744$; white: $n = 54\,846$	Adjusted for age, gender, and census tract income; no consistent adjusted disparities observed for other 2 cities analyzed (New York and Chicago)	76
Median age at death for those with Down syndrome substantially lower (25 vs 50 y among white individuals) Substantially lower average increase in median age at death for those with Down syndrome between 1968 and 1997 (0.7 vs 1.9 in white individuals)	Analysis of data from multiple-cause mortality files on all deaths with a diagnostic code for Down syndrome	Not indicated	Not adjusted for covariates; included in this analysis because Down syndrome customarily viewed as primarily a pediatric entity	77
Mortality from congenital heart defects 19% higher and declined more slowly over 18-y period Infant mortality rate for ventricular septal defect higher and persistently higher over 18-y period Lower increase of average age at death from congenital heart defects over time Average age at death from congenital heart defects 3–6 times lower About half the average age at death vs white individuals for 5 specific congenital heart defects: transposition of the great arteries, tetralogy of Fallot, ventricular septal defect, pulmonary valve anomalies, and single ventricle	Analysis of data from multiple-cause mortality files compiled by the National Center for Health Statistics from all death certificates filed in the United States with any mention of a congenital heart defect	Not indicated	Not adjusted for covariates; small sample sizes for children 1–4 y	78
Almost twice the mortality rate for children 1–4 y of age between 1950 and 1993 Black/white disparity ratio in mortality rate for children 1–4 y of age increased somewhat during the most recent 10-y period examined Approximately 50% higher mortality rate for children 5–14 y of age between 1950 and 1993 Black/white disparity ratio in mortality rate for children 5–14 y of age increased somewhat during most recent 10-y period examined	Analysis of 43 y of data on children 5–14 y of age from the National Vital Statistics System, the National Longitudinal Mortality Study, and the Area Resource File	Not indicated (except for two 3-y intervals)	Not adjusted for covariates; presented only as population rates; no statistical comparisons or 95% CIs	79
Higher adjusted relative risk of death among children without congenital anomalies	Retrospective cohort study of linked birth and death files for state of Michigan over 6-y period	Total mortality sample: $N = 8362$[b]	Adjusted for 4 covariates; no mortality disparities among children with congenital anomalies	80

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Higher adjusted risk of death among those with ALL	Analysis of 9 population-based registries of the National Cancer Institute's Surveillance, Epidemiology, and End Results program	AA: $n = 356$; Latino: $n = 504$; NA: $n = 61$; API: $n = 410$; white: $n = 3621$	Adjusted for 3 covariates; did not adjust for SES or insurance coverage	81
Higher adjusted odds of in-hospital death after congenital heart surgery	Analysis of data from the KID 2000 of the HCUP, limited to 19 states with adequate race/ethnicity data	AA: $n = 860$; Latino: $n = 1835$; white: $n = 4134$	Adjusted for 8 covariates	82
Nephrology				
Among those with end-stage renal disease, 2.4 times more likely to be on hemodialysis rather than peritoneal dialysis	Analysis of data from Medicare End-Stage Renal Disease registry on all Medicare-eligible children 0–19 y of age undergoing renal replacement therapy in the United States	AA: $n = 368$; white: $n = 870$	Adjusted for 10 covariates	83
Lower adjusted hemodialysis dose Four to 5 times greater adjusted likelihood of inadequate hemodialysis dose	Children and adolescents <18 y old within the North American Pediatric Renal Transplant Cooperative Study registry who began maintenance hemodialysis during a 6.5-y period and who received at least 6 consecutive mo of hemodialysis	AA: $n = 65$; white: $n = 46$	Adjusted for 6 covariates	84
Among children with end-stage renal disease, lower adjusted likelihood to be activated on the kidney transplant waiting list	National longitudinal cohort study using data from US Renal Data System on children 0–18 y of age with end-stage renal disease	AA: $n = 1122$; white: $n = 2162$	Adjusted for 5 covariates; stratified Kaplan-Meier analyses suggested that racial disparities may vary by SES, with significant differences in lowest but not highest SES quartile	85
Obesity, physical activity, and nutrition				
Select larger body size for ideal adult body size and ideal opposite-gender adult body size Less personal and family/peer concern about weight Significantly fewer trying to lose weight	Cross-sectional survey of random sample of all 4th- and 6th-graders in South Carolina public schools	AA: $n = 749$; white: $n = 848$	Adjusted for 2–3 covariates	86
Lower adjusted aerobic fitness level	Progressive treadmill protocol evaluation of aerobic fitness ($\dot{V}0_{2peak}$) of Los Angeles children 7–14 y of age, adjusting for gender, maturational stage, and body composition	AA: $n = 19$; Latino: $n = 36$; white: $n = 18$	Adjusted for 3 covariates but did not include SES	87
Higher adjusted odds of overweight	Analysis of height and weight data collected during 3 mo of physical fitness testing of students in grades 5, 7, and 9 in the Los Angeles County public school system	Total sample: $N = 281\,630$[b]	Adjusted for 4 covariates	88
Higher adjusted likelihood of insulin resistance (cross-sectional assessment)	Analysis of 3 y of longitudinal data from the Princeton School District Study of 5th- to 12th-graders in 1 suburban Midwestern public school district	AA: $n = 542$; white: $n = 625$	Adjusted for 9 covariates; no significant association with change in insulin resistance over time	89
Higher prevalence of overweight in boys among 8th-graders (35%) and 10th-graders (35%) Higher prevalence of overweight in girls among 8th-graders (32%), 10th-graders (34%), and 12th-graders (28%) (highest prevalence among all racial/ethnic groups studied) Lower likelihood of eating breakfast regularly	Analysis of 10–17 y of data from Monitoring the Future, a nationally representative sample of students in the 8th, 10th, and 12th grades	Total sample: $N =$ 4800–17 074 per study interval, depending on grade and year[a]	Not adjusted for covariates	90

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Less likely to regularly exercise vigorously among girls Higher number of hours of television-viewing on average weekday Higher prevalence of overweight and obesity among girls (highest of any racial/ethnic group) More likely to consume >30% of calories as fat and >10% of calories as saturated fat (highest of any racial/ethnic group) Lower calcium intake	Cross-sectional survey of adolescents 11–18 y of age in 31 public schools in the Minneapolis, St Paul, and Osseo school districts of Minnesota	Total sample: $N = 4746$[b]	Not adjusted for covariates, but the authors stated that stratified analyses adjusting for grade and SES were performed but not reported, because they generally showed patterns similar to those of unadjusted analyses	91
Higher mean BMI Higher BMI percentile Lower mean consumption of fiber per 1000 kcal Lower mean scores on self-administered health knowledge questionnaire	Cross-sectional survey and weight and height measurements of all children in 5th grade in 2 middle schools in Scott County, Mississippi	AA: $n = 121$; Latino: $n = 70$; white: $n = 12$	Not adjusted for covariates; unclear what proportion of potential participants refused to participate	92
Higher prevalence of overweight Higher prevalence of overweight among 6- to 11-y-olds Higher prevalence of overweight among 12- to 19-y-olds Higher prevalence of overweight among girls Higher prevalence of overweight among 6- to 11-y-old girls Higher prevalence of overweight among 12- to 19-y-old girls Higher prevalence of at risk of overweight or overweight Higher prevalence of at risk of overweight or overweight among 12- to 19-y-olds Higher prevalence of at risk of overweight or overweight among girls Higher prevalence of at risk of overweight or overweight among 12- to 19-y-old girls	Analysis of NHANES data on children 2–19 y of age from 1999–2000 and 2001–2002	AA: $n = 1274$; Latino: $n = 1475$; white: $n = 1094$	Not adjusted for covariates	93
Higher adjusted odds of overweight Slower adjusted 1-mile run/walk time	Cross-sectional sample of California public school 5th, 7th, and 9th-graders (10–15 y of age)	AA: $n = 58\,491$; Latino: $n = 330\,758$; Asian: $n = 63\,292$; Pacific Islanders: $n = 7977$; Filipino: $n = 22\,598$; NA: $n = 7977$; white: 275 722	Adjusted for 2 covariates and stratified according to age	94
Ophthalmology				
Lower adjusted odds of being diagnosed with any eye or vision condition Lower adjusted odds of being diagnosed with an eye or vision condition other than conjunctivitis	Analysis of 6 y of data for children 0–17 y of age in the MEPS	Total sample: $N = 2813$[b]	Adjusted for 13 covariates; the authors concluded that disparities indicate possible underdiagnosis, undertreatment, or both	95
Orthopedic issues				
For treatment of supracondylar humerus fractures, more likely to undergo closed reduction with internal fixation (percutaneous pinning)	Retrospective examination of selected pediatric fractures in the KID of the HCUP	AA: $n = 207$; Latino: $n = 659$; white: $n = 1478$	Not adjusted for covariates; no disparities for femur or forearm fractures	96
Quality				
Lower adjusted odds of receiving any counseling during well-child visits	Cross-sectional analysis of 10 y of data on children 0–18 y of age from the National Ambulatory Medical Care Survey	Total sample: $N = 2892$[b]	Adjusted for 7 covariates	97

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted odds of receiving any screening during well-child visits				
Lower adjusted likelihood of meeting recommended number of well-child visits	Analysis of 3 y of data for children 0–17 y of age in the MEPS	AA: $n = 5137$; API: $n = 890$; Latino: $n = 9392$; white: $n = 14\,041$	Adjusted for 10 covariates	98
Children with cardiovascular disease had bidirectional Glenn surgery at significantly older median age (11 vs 6 mo of age among white infants) Children with cardiovascular disease had Fontan procedure at significantly older median age (60 vs 36 mo of age among white children)	Review of surgical database at Duke University Medical Center of all children who underwent bidirectional Glenn or Fontan stages of single-ventricle palliation over a 4-y period	AA: $n = 20$; white: $n = 47$	Although not adjusted for covariates, no significant differences found between AA and white children in median family income for either measure	99
Lower primary care provider strength-of-affiliation scores (unadjusted and adjusted) Lower primary care provider interpersonal relationship scores (unadjusted and adjusted [if required by managed care organization to stay in network])	Telephone survey of parents of random sample of 413 children attending elementary school in 3 suburban communities in San Bernardino County, California	AA: $n = 100$; API: $n = 91$; Latino: $n = 84$; white: $n = 102$	Adjusted for 11 covariates	100
Lower adjusted scores for timeliness of care Lower adjusted scores for health insurance plan service Lower adjusted scores for getting needed medical care	Analysis of parental survey data on children 0–17 y of age from the national CAHPS Benchmarking Database 1.0 administered by Medicaid sponsors comprising 33 health maintenance organizations from Arkansas, Kansas, Minnesota, Oklahoma, Vermont, and Washington	AA: $n = 1344$; Latino: $n = 842$; API: $n = 291$; AI/AN: $n = 330$; white: $n = 6328$	Adjusted for 4 covariates	101
Lower adjusted scores for comprehensiveness of primary care	Cross-sectional survey of parents of children in 228 classes, from kindergarten through 6th grade, at 18 elementary schools in a large urban school district in California	AA: $n = 458$; API: $n = 1158$; Latino: $n = 1292$; white: $n = 479$	Adjusted for 5 covariates	102
Greater adjusted odds of child being assigned to health care provider Greater adjusted odds of health care provider never/only sometimes understanding how parent prefers to rear child Greater adjusted odds of discussing violence in the community, smoking in the household, use of alcohol or drugs in household, trouble paying for child's needs, and spouse/partner supportive of parenting efforts	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	AA: $n = 477$; Latino: $n = 817$; white: $n = 718$	Adjusted for 9 covariates	32
Special health care needs				
Lower adjusted odds of receiving adequate time and information from child's health care provider, among children with special health care needs	Analysis of National Survey of Children With Special Health Care Needs	Total sample: $N = 38\,866$[b]	Adjusted for 6 covariates; no disparities in any unmet need or problem with specialty referral	103
Among children with special health care needs Higher adjusted odds of not identifying a regular clinician Lower adjusted odds of usual source of care being doctor's private office or health maintenance organization Average 2 fewer doctor visits per year	Analysis of data on children 0–17 y of age with special health care needs in the NHIS on disability	AA: $n = 1762$; Latino: $n = 1777$; white: $n = 6365$	Adjusted for 9–10 covariates	104
Among children with special health care needs Higher adjusted odds of child having no physician or nurse Higher adjusted odds of dissatisfaction with care	Analysis of data on children 0–17 y of age from National Survey of Children with Special Health Care Needs	Not indicated	Adjusted for 6 covariates	105

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Among children with special needs Greater adjusted odds of problems with ease of using health care services	Analysis of data on special needs children 0–17 y of age from the National Survey of Children With Special Health Care Needs	AA: $n = 3820$; Latino: $n = 3210$; white: $n = 28\,916$	Adjusted for 13 covariates	106
Surgery				
For those hospitalized for appendicitis Longer time to operation (regardless of disease severity) Longer length of stay (regardless of disease severity) Higher hospital charges (regardless of disease severity) Higher adjusted odds of perforation or other complicating factors Lower adjusted odds of a laparoscopic procedure	Analysis of data on children 1–17 y of age with appendicitis from the Nationwide Inpatient Sample and the KID	Total sample: $N = 428\,463$[b]	Not adjusted for covariates for time to operation, length of stay, or hospital charges; other outcomes include adjustment for 6 covariates	107
Transplantation				
Lower proportion (0%) received preemptive transplants Fewer living transplants and more cadaveric transplants in most recent time period Cause of end-stage renal disease more likely to be acquired and less likely to be congenital or metabolic	Retrospective analysis of transplant database at Cincinnati Children's Hospital	AA: $n = 37$; white: $n = 192$	Relatively small sample size of AA children; not adjusted for covariates	108
Approximately double the adjusted odds of heart transplantation graft failure Lower 5-y heart transplant graft survival rate Median heart transplant graft survival rate (5.3 y) ~6 y lower than that for white children (11.0) Median age at heart transplant (8 y) 5 y older than that for white children (3 y) More likely to have HLA mismatch	Analysis of 18 y of data from the United Network for Organ Sharing, including annual follow-up of transplant recipients	AA: $n = 717$; white: $n = 3510$	Adjustment for 13 covariates	109
Use of health services				
Reduced physician visits under mandatory enrollment in managed care among those with Medicaid	Difference-in-difference analysis of pre/post impact of mandatory enrollment in managed care for Medicaid beneficiaries in 2 unnamed counties in an unnamed Midwestern state	AA: $n = 4891$; white: $n = 4460$	Adjusted for 3 covariates (all subjects enrolled in Medicaid, so no SES adjustment); no differences observed in hospitalizations or ED use	110
Higher adjusted likelihood of medically unnecessary EMS transports	Analysis of linked EMS and ED billing records for all EMS-to-hospital transports of children 0–17 y old originating in 3 counties in South Carolina over 27 mo	AA: $n = 4331$; Latino: $n = 75$; other: $n = 48$; white: $n = 1239$	Adjusted for 4 covariates	111
Greater adjusted odds of ≥1 y since last physician visit Lower adjusted number of physician visits in previous 12 mo Double the odds of suboptimal health status	Analysis of 3 y of NHIS data on children 0–17 y old	AA: $n = 17\,324$; Latino: $n = 12\,765$; API: $n = 2516$; AI/AN: $n = 1067$; white: $n = 62\,572$	Adjusted for 4 covariates	112
Among those hospitalized for pneumonia Higher adjusted risk ratio of admission through EDs Lower adjusted odds of bronchoscopy Lower adjusted odds of mechanical ventilation Shorter adjusted length of stay Higher adjusted charges	Analysis of 3 y of data on children 0–17 y of age hospitalized for pneumonia from the National Inpatient Sample of the HCUP	AA: $n = 17\,095$; Latino: $n = 15\,152$; API: $n = 2050$; white: $n = 43\,180$	Adjusted for 6–7 covariates	113

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TABLE 1 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Among Medicaid-covered children	Analysis of data on North Carolina Medicaid-covered children 1–4 y of age from linked Medicaid, WIC service, and birth certificate data	AA: $n = 9288$; white: $n = 11\,351$[c]	Adjusted for 8–9 covariates	114
Lower adjusted odds of well-child care visit in previous year (at 1, 2, and 4 y of age)				
Lower adjusted odds of diagnosis and treatment for otitis media				
Lower adjusted odds of diagnosis and treatment for upper respiratory infections				
Lower adjusted odds of diagnosis and treatment for lower respiratory infections				
Lower adjusted odds of diagnosis and treatment for gastroenteritis				
Higher adjusted odds of diagnosis and treatment for asthma				
Lower adjusted outpatient Medicaid expenditures				
Lower adjusted ED Medicaid expenditures (for 3- and 4-y-olds)				
Lower adjusted prescription drug Medicaid expenditures				
Lower adjusted mean number of calls to doctor's office in past year	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	AA: $n = 477$; Latino: $n = 817$; white: $n = 718$	Adjusted for 9 covariates	32
Greater adjusted odds of at least 1 ED visit in previous year				

MEPS indicates Medical Expenditure Panel Survey; CHIRI, Child Health Insurance Research Initiative; Add Health, National Longitudinal Study of Adolescent Health; NHIS, National Health Interview Survey; NHANES, National Health and Nutrition Examination Survey; ACSC, ambulatory-care–sensitive condition; 4:3:1:3:3, combined series composed of ≥4 doses of diphtheria and tetanus toxoids and pertussis/diphtheria and tetanus toxoids/diphtheria and tetanus toxoids and acellular pertussis vaccine, ≥3 doses of poliovirus vaccine, ≥1 dose of measles-containing vaccine, ≥3 doses of *Haemophilus influenzae* type b vaccine, and ≥3 doses of hepatitis B vaccine; $\dot{V}O_2$, oxygen consumption per unit time; KID, Kid's Inpatient Database; HCUP, Healthcare Cost and Utilization Project; CAHPS, Consumer Assessment of Health Plans Study; EMS, Emergency Medical Services; WIC, Supplemental Nutrition Program for Women, Infants, and Children.

[a] Sample sizes include those 0 to 24 y of age, because those 15 to 24 y of age were grouped together.

[b] Sample sizes were not disaggregated in article according to race/ethnicity.

[c] Sample sizes for initial cohort (1-y-olds)

drome, congenital heart defects (both in terms of the fatality rate and a lower average age at death), and in-hospital death after congenital heart surgery.

Access to Care and Use of Services

Multiple noteworthy disparities were documented in access to health care and use of health services (Table 1). Disparities in access to care include higher rates than those of white children of unmet health care needs, lower rates of access to primary care providers (including race being more strongly associated with this outcome than income), a higher likelihood of having no usual source of care, greater odds of not being referred to a specialist by the health care provider, higher hospitalization rates for ambulatory care–sensitive conditions, and higher odds of appendicitis rupture (considered an access indicator, because it indicates failed access to timely, appropriate care early in the course of appendicitis). Disparities in the use of health services include lower physician-visit rates and higher odds of going 1 year or longer from the last physician visit, a higher rate of emergency department (ED) visits, greater likelihood of medically unnecessary Emergency Medical Services transports, fewer calls to physicians' offices, and, among those with Medicaid coverage, lower odds of well-child care and diagnosis and treatment for various pediatric conditions, and lower expenditures for outpatient and ED care and for prescriptions.

Prevention and Population Health

Disparities were identified in breastfeeding, immunization rates, injuries, obesity, physical activity, and nutrition (Table 1). Breastfeeding is significantly less likely among AA versus white infants, whether measured by ever being breastfed, the proportion exclusively breastfed, or the proportion receiving any human milk. AA children have the

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lowest immunization rates for the primary immunization series and have substantially greater delays and a later mean age for multiple immunization categories and doses. They have a substantially higher firearm injury rate and, as young children, have higher odds of living in households without stair gates, cabinet safety latches or locks, or hot-water thermostat settings that have been turned down.

Studies consistently document higher rates of obesity and overweight in AA children (Table 1). One study also revealed selection of larger body size when asked to identify ideal adult body size; less personal, family, and peer concern about weight; and fewer children trying to lose weight. Disparities also have been identified in lower aerobic fitness levels, slower 1-mile run/walk time, lower likelihood of vigorous exercise in females, and higher numbers of television-viewing hours. Nutritional disparities include a higher likelihood of consuming more calories as fat and saturated fat, lower mean consumption of fiber and calcium, and lower likelihood of eating breakfast regularly.

Adolescent Health Issues

AA female adolescents have higher risks versus white female adolescents of skipping breakfast, being obese, lacking health insurance, needing but not getting medical care, having any sexually transmitted disease, perpetrating violence, and being a victim of violence (Table 1). Several studies have also documented live birth rates that are 2 to 5 times higher than for white female adolescents, and the disparity ratio has worsened over time. AA female adolescents also have greater adjusted odds of alcohol testing when seen in the ED for traumatic injury and are particularly at high risk of underusing substance abuse services. Male AA adolescents have a higher risk of perpetrating violence and being a victim of violence. For AA adolescents of both genders, higher risks were identified for underuse of substance abuse services, older age at first use of substance abuse services, and suboptimal health status and lower use of physicians' offices as the usual source of care among those recently enrolled in a State Children's Health Insurance Program (SCHIP).

Health Status

Multiple studies have documented health-status disparities for AA children, whether analyzing global health status or the prevalence of specific conditions (Table 1). Three studies revealed that AA children have higher adjusted odds of fair or poor health and lower odds of excellent or very good health. Higher rates of activity limitations, school limitations, and global stress also were noted. Significantly higher crude rates than in white children have been seen for all stroke categories (both hemorrhagic and ischemic), invasive pneumococcal disease, and tuberculosis. HIV/AIDS disparities are substantial, and include the largest percentages and numbers of new diagnoses in every age group of children and adolescents and via perinatal transmission, as well as longer adjusted lengths of stay for those who are hospitalized.

Asthma, Mental Health Care, and Special Health Care Needs

A particularly extensive body of literature is available on disparities for 3 specific issues: asthma, mental health care (including behavioral and developmental issues), and special health care needs (Table 1).

Several studies have documented that AA children have the highest asthma prevalence of any racial/ethnic group, and this prevalence is substantially higher than that for white children (Table 1). Secular-trend data indicate that this disparity has widened over time. Compared with white children, AA children also experience substantially higher rates of asthma mortality, hospitalizations, ED visits, and office visits, and the disparities in asthma mortality and hospitalizations have widened over time. Additional asthma disparities include higher attack prevalence; lower rates of filled prescriptions; higher potential disease burden (diagnosed plus possible but undiagnosed disease); worse asthma physical health scores; lower odds of use of β_2-agonists, inhaled steroids, and daily anti-inflammatory medication; and higher odds of sensitivities to cockroach, dust mite, and mold allergens.

Several key disparities were noted in mental health care and behavioral/developmental disorders. Most study results have indicated lower use of mental health services, including lower adjusted odds of any mental health service use, outpatient service use, informal service use (such as self-help and peer counseling), receiving treatment for depression from mental health specialists, and receipt of psychotropic, stimulant, antidepressant, or neuroleptic medications (Table 1). One study, however, found higher odds of use of state-funded mental health services in New York City. Higher adjusted odds of developmental delays have been noted, but underdiagnosis, undertreatment, and other disparities for attention-deficit/hyperactivity disorder (ADHD) were found in other studies, including lower adjusted odds of evaluation, receiving a diagnosis, and receiving medication or treatment, and higher proportions of parents with negative expectations about treatment helpfulness. AA children also were found to receive a diagnosis of autism 1.4 years later than white children and to be in mental health treatment an average of 13 months

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longer than white children before receiving the autism diagnosis.

National data reveal several disparities for AA children with special health care needs (Table 1), including higher odds of having no regular health care provider, averaging fewer physician visits, being dissatisfied with care, encountering problems with ease of use of services, and not receiving adequate time and information from children's health care providers.

Quality

Numerous disparities were identified in quality of care (Table 1). Lower adjusted odds versus white children were noted for meeting the recommended number of well-child visits and receiving any counseling or screening during well-child visits. Lower adjusted scores were observed for timeliness of care, health insurance plan service, getting needed medical care, primary care comprehensiveness, primary care provider strength of affiliation, and primary care provider interpersonal relationships. Greater adjusted odds were found for the child being assigned to the health care provider; the provider never/only sometimes understanding how the parent prefers to rear the child; and the provider discussing violence in the community, smoking in the household, using alcohol or drugs in household, trouble paying for child's needs, and spouse/partner support of parenting efforts.

Among those with end-stage renal disease, AA children are substantially less likely than white children to be activated on the kidney transplant waiting list but are significantly more likely to receive hemodialysis rather than peritoneal dialysis and to receive an inadequate hemodialysis dose. AA children have lower odds than white children of being diagnosed with any eye or vision condition, are more likely to undergo closed reduction with internal fixation of supracondylar humerus fractures, undergo bidirectional Glenn and Fontan procedures at significantly older ages among those with cardiovascular disease, and have longer time to operation and lengths of stay, higher hospital charges, higher odds of perforation and other complications, and lowers odds of laparoscopic procedures among those with appendicitis. AA patients who have a heart transplant have double the odds of graft failure, lower graft survival rates, a median graft survival time that is 6 years lower, a median age at heart transplant that is 5 years greater, and a higher likelihood of HLA mismatch. AA children are less likely to receive preemptive kidney transplants, and they receive fewer living transplants and more cadaveric transplants.

Asians/Pacific Islanders

There were 24 articles (24 of 109 [22%]) that addressed disparities in API children (Table 2).

Mortality

Only 1 study (Table 2) examined mortality among APIs; it revealed that native Hawaiian children have a higher crude mortality rate than that of white children.

Access to Care and Use of Services

Several studies found disparities for API versus white children in access to health care and use of health services (Table 2). API children have greater adjusted odds of having no usual source of care, having made no visit to a physician or other health care provider in the past year, and going more than 1 year since the last physician visit, as well as a lower adjusted number of physician visits in the past year. Higher adjusted odds of appendicitis rupture also were noted. Among children with cancer, Pacific Islanders had significantly greater odds of death, untimely treatment, not completing treatment as recommended, and loss to follow-up.

Prevention and Population Health

Disparities were identified in injuries, lead intoxication, obesity, and nutrition (Table 2). Data from the state of Minnesota revealed triple the crude firearm injury rate of that in white children. API children were found to have the highest proportion of elevated blood lead concentrations in the state of Rhode Island and are the only racial/ethnic group whose rate increased over time. Higher adjusted odds of overweight occur among Pacific Islander, Filipino, and Asian children, and slower adjusted 1-mile run/walk times were noted for most age groups of API children. API children also have a lower calcium intake—the lowest of any racial/ethnic group.

Adolescent Health Issues

Compared with white adolescents, API adolescents were found to have lower adjusted odds of seatbelt use, sunscreen use, and weekly physical activity and greater adjusted daily hours of television/video-game screen time (Table 2).

Health Status

APIs have a higher adjusted likelihood than that of whites to have fair or poor health status (Table 2). Data from the state of Hawaii revealed that Filipino and Chinese boys have the highest rates of leukemia, and Chinese boys have the highest ALL rate.

Mental Health Care

API children have been found to have lower adjusted odds of any mental health service use, outpatient mental health service use, and 24-hour-care service use (ie, inpatient, residential, group-home, or alcohol/drug abuse treatment) (Table 2). New York City data, however, indicate higher ad-

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TABLE 2 Disparities in the Health and Health Care of API Children

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Access to care				
Double to triple adjusted odds of having no usual source of care Double to triple adjusted odds of no health professional/doctor visit in previous year	Analysis of household component of the 1996 and 2000 MEPS	Asian: $n = 325$; AA: $n = 2189$; Latino: $n = 4091$; white: $n = 6362$	Adjusted for 8 covariates; 5 times the adjusted odds of dissatisfaction with quality of care in 2000 but not 1996	28
Higher adjusted odds of appendicitis rupture	Cross-sectional analysis of full-year samples of hospital discharge records for acute appendicitis from California and New York children 4–18 y of age	California: API, $n = 459$; AA, $n = 297$; Latino, $n = 4304$; white, $n = 4017$; New York: API, $n = 80$; AA, $n = 342$; Latino, $n = 444$; white, $n = 2379$	Adjusted for 7 covariates	29
Among children with cancer, compared with Hawaiian residents, Pacific Islanders had significantly greater odds of death, untimely treatment, not completing treatment as recommended, and loss to follow up	Retrospective case-comparison study	Pacific Islander: $n = 100$; Hawaiian residents: $n = 100$	Not adjusted for covariates	115
Adolescents				
Lower adjusted odds of seat belt use Lower adjusted odds of sunscreen use Lower adjusted odds of weekly physical activity Greater adjusted daily hours of television/video-game screen time	Analysis of California Health Interview Survey data on adolescents 12–17 y of age	API: $n = 376$; Latino: $n = 1515$; white: $n = 3263$	Adjusted for 5 covariates; interactions noted with generational status for certain outcomes	116
Cancer				
Among Hawaiian racial/ethnic groups, Filipino and Chinese boys have highest rates of leukemia, and Chinese boys have highest ALL rate	Tumor registry analysis	Total cancer cases: $N = 1237$	Adjusted only for age	117
Health status				
Higher adjusted likelihood of fair or poor health	Analysis of NHIS data	API: $n = 1088$; AA: $n = 5776$; Latino: $n = 4785$; white: $n = 20\,717$	Adjusted for 3 covariates (but not family income or health insurance coverage) Interactions between race/ethnicity and parental education for selected outcomes in selected groups	56
Injuries				
Triple the firearm injury rate	Analysis of data from Minnesota Department of Health's Minnesota Trauma Data Bank on fatal and nonfatal firearm injuries in children 0–19 y of age	Total sample: $N = 175$[a]	Not adjusted for covariates	65
Lead intoxication				
API children have the highest proportion of elevated blood lead levels (23%) in Rhode Island and are only group whose proportion increased over time	Rhode Island Department of Health Surveillance Data	Not stated	Not adjusted for SES or other covariates	118
Mental health and behavioral/developmental issues				
Lower adjusted odds of any mental health service use	Analysis of outcomes for random sample of 6- to 18-y-old youths receiving services in ≥1 of 5 San Diego County public sectors of care (alcohol and drug abuse, child welfare, juvenile justice, mental health, and public school education services) over 1.5-y period	API: $n = 88$; AA: $n = 282$; Latino: $n = 332$; white: $n = 554$	Parents and children with limited English proficiency were excluded	69

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TABLE 2 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted odds of outpatient mental health service use			Adjusted for 12 covariates	
Lower adjusted odds of 24-h-care service use (inpatient, residential group home, or alcohol/drug abuse treatment)				
Higher adjusted odds of use of state-funded mental health services	Analysis of New York City data on receipt of services from state-funded mental health care facilities	Total sample: $N = 78\,085$ (including adults)[a]	Adjusted for 7 covariates	72
Mortality				
Approximately 50% higher mortality rate for children 1–4 y of age	Analysis of 43 y of data on children 5–14 y of age from the National Vital Statistics System, the National Longitudinal Mortality Study, and the Area Resource File	Hawaiian residents: $n = 142$; white: 67 200	Not adjusted for covariates; presented only as population rates; no statistical comparisons or 95% CIs; small sample sizes for Hawaiian residents	79
Almost 50% higher mortality rate for children 5–14 y of age				
Obesity, physical activity, and nutrition				
Higher adjusted odds of overweight among Pacific Islander children	Analysis of height and weight data collected during 3 mo of physical fitness testing of students in grades 5, 7, and 9 in the Los Angeles County public school system	Total sample: $N = 281\,630$[a]	Adjusted for 4 covariates; Asians (as opposed to Pacific Islanders) had lower adjusted odds (vs white children) of overweight	88
Lower calcium intake (lowest of any racial/ethnic group)	Cross-sectional survey of adolescents 11–18 y of age in 31 public schools in the Minneapolis, St Paul, and Osseo school districts of Minnesota	Total sample: $N = 4746$[a]	Not adjusted for covariates; the authors stated that stratified analyses adjusting for grade and SES were performed but not reported because they generally showed patterns similar to those of unadjusted analyses	91
Higher adjusted odds of overweight in Filipinos, Pacific Islanders, and Asians (but only in males for Asians)	Cross-sectional sample of California public school 5th-, 7th-, and 9th-graders (10–15 y of age)	Asian: $n = 63\,292$; Pacific Islander: $n = 7977$; Filipino: $n = 22\,598$; AA: $n = 58\,491$; Latino: $n = 330\,758$; NA: $n = 7977$; white: 275 722	Adjusted for 2 covariates and stratified according to age; API children stratified as Asian, Filipino, and Pacific Islander; run/walk time differences not significant for certain specific age strata for Asian (2), Filipino (4), and Pacific Islander (7)	94
Slower adjusted 1-mile run/walk time				
Quality				
Lower quality of primary care (according to parental assessment)	Cross-sectional survey of parents of elementary-school children 5–12 y of age in 1 school district, using Primary Care Assessment Tool	API: $n = 96$; AA: $n = 106$; Latino: $n = 96$; white: $n = 105$	Adjusted for 12 covariates; smaller sample size ($n = 135$) for full multivariable analysis may have had limited power to detect other disparities	119
Lower primary care provider interpersonal relationship scores (unadjusted and adjusted)	Telephone survey of parents of random sample of 413 children attending elementary school in 3 suburban communities in San Bernardino County, California	API: $n = 91$; AA: $n = 100$; Latino: $n = 84$; white: $n = 102$	Adjusted for 11 covariates	100
Among those in which the primary language spoken at home is a language other than English Lower adjusted scores for timeliness of care Lower adjusted scores for provider communication Lower adjusted scores for staff helpfulness	Analysis of parental survey data on children 0–17 y of age from the national CAHPS Benchmarking Database 1.0 administered by Medicaid sponsors comprising 33 health maintenance organizations from Arkansas, Kansas, Minnesota, Oklahoma, Vermont, and Washington	API: $n = 291$; AA: $n = 1344$; Latino: $n = 842$; AI/AN: $n = 330$; white: $n = 6328$	Adjusted for 4 covariates; no disparities for API children in households in which English is primary language; survey was administered only in English and Spanish	101

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TABLE 2 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted scores for health insurance plan service				
Lower adjusted scores for getting needed medical care				
Lower adjusted ratings of child's health care				
Lower adjusted overall quality of primary care scores	Cross-sectional survey of parents of children in 228 classes, from kindergarten through 6th grade, at 18 elementary schools in a large urban school district in California	API: $n = 1158$; AA: $n = 458$; Latino: $n = 1292$; white: $n = 479$	Adjusted for 5 covariates	102
For those interviewed in English				
Lower adjusted scores on timely and convenient access to primary care				
Lower adjusted scores on how well primary care physician listens and explains during interactions				
Lower adjusted scores for comprehensiveness of primary care				
Lower adjusted scores on coordination of primary care				
Among those hospitalized for pneumonia	Analysis of 3 y of data on children 0–17 y of age hospitalized for pneumonia from the National Inpatient Sample of the HCUP	API: $n = 2050$; AA: $n = 17\,095$; Latino: $n = 15\,152$; white: $n = 43\,180$	Adjusted for 6–7 covariates	113
Lower adjusted odds of bronchoscopy				
Lower adjusted odds of mechanical ventilation				
Longer adjusted length of stay				
Higher adjusted charges				
Lower adjusted scores for interpersonal relationship with primary care provider	Telephone surveys on primary care experiences of children by using a random, cross-sectional sample of parents of elementary school children 5–12 y of age in a school district in San Bernardino, CA	API: $n = 88$; AA: $n = 94$; Latino: $n = 84$; white: $n = 92$	Adjusted for 9 covariates; findings held true regardless of whether there was patient/provider racial/ethnic concordance	120
Lower adjusted scores for specific primary care services available to child				
Use of health services				
Lower adjusted odds of being in excellent/very good health	Analysis of cross-sectional data on children 0–19 y of age from the California Health Interview Survey	Total sample: $N = 19\,485$	Adjusted for 7 covariates	55
Lower adjusted odds of making a physician visit in the previous year	Analysis of 3 y of data for children 0–17 y of age in the MEPS	API: $n = 890$; AA: $n = 5137$; Latino: $n = 9392$; white: $n = 14\,041$	Adjusted for 10 covariates	98
Lower adjusted likelihood of meeting recommended number of well-child visits	Analysis of 3 y of NHIS data on children 0–17 y of age	API: $n = 2516$; AA: $n = 17\,324$; Latino: $n = 12\,765$; AI/AN: $n = 1067$; white: $n = 62\,572$	Adjusted for 4 covariates	112
Greater adjusted odds of ≥1 y since last physician visit				
Lower adjusted number of physician visits in previous 12 mo				
Greater adjusted odds of suboptimal health status				

MEPS indicates Medical Expenditure Panel Survey; NHIS, National Health Interview Survey; HCUP, Healthcare Cost and Utilization Project; CAHPS, Consumer Assessment of Health Plans Study.

[a] Sample sizes were not disaggregated in article according to race/ethnicity.

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justed odds of use of state-funded mental health services.

Quality

Several studies have documented API disparities in primary care quality, including lower overall quality of primary care scores, lower primary care provider interpersonal relationship scores, and lower scores for specific primary care services available to the child (Table 2). Lower adjusted primary care quality scores have been found for 4 elements of care among API parents interviewed in English and 6 elements of care among API parents for whom the primary language spoken at home is not English. Among those hospitalized for pneumonia, API children have lower adjusted odds of bronchoscopy and mechanical ventilation, a longer adjusted length of stay, and higher adjusted charges.

Latinos

There were 66 articles (67 of 109 [61%]) that addressed disparities in Latino children (Table 3).

Mortality

Puerto Rican children 1 to 4 years of age were found to have a higher crude mortality rate than their white counterparts (Table 3). A higher drowning rate in neighborhood pools for Latinos also was found, along with higher swimming pool drowning rates in general for Latino male adolescents. Higher adjusted risks of death exist among Latinos (versus whites) with ALL and after congenital heart surgery.

Access to Care and Use of Services

Multiple studies have documented a wide range of disparities in access to care and use of services for Latino children (Table 3). In comparison with white children, Latino children have greater adjusted odds of being uninsured, having no usual source of care or health care provider, having made no physician visit in the past year, having gone 1 year or more since the last physician visit, making fewer physician visits in the past year, making fewer calls to physicians' offices, not being referred to a specialist, having a perforated appendicitis, and never or only sometimes getting medical care without long waits, getting timely routine care or telephone help, and getting brief wait times for medical appointments. Similar findings were noted in studies that focused on Latinos before or at the time of enrollment in SCHIP and among Mexican American children.

Prevention and Population Health

Disparities were identified in breastfeeding, injuries, obesity, physical activity, and nutrition (Table 3). Compared with white infants, a lower crude proportion of Mexican-American infants are ever breastfed. Latino households with children 4 to 35 months of age have lower adjusted odds than do white households of putting up stair gates. Multiple studies have documented significantly higher adjusted odds of overweight and obesity, including 2 studies that showed that Latinos have the highest adjusted rates of overweight and obesity of any racial/ethnic group. Physical-activity disparities included lower adjusted aerobic fitness, slower 1-mile run/walk times, higher average number of television-viewing hours on the average weekday, and lower regular vigorous physical activity among females. Lower calcium intake has been noted, as has as a higher likelihood of consumption of more than 10% of calories as saturated fat.

Adolescent Health Issues

Latina adolescents have a higher risk than do white adolescents of not having health insurance, perpetrating violence, and being a victim of violence. Disparities for male adolescents include a higher risk of no health insurance, going more than 2 years since the last physical examination, and being a victim of violence (Table 3). Latino adolescents recently enrolled in SCHIP have a higher crude likelihood of fair or poor health and are less likely to use physician's offices as their usual source of care. Latina adolescents 15 to 19 years of age have a crude birth rate 3 times higher than their white counterparts and the highest of any racial/ethnic group. Latino adolescents have a lower adjusted odds of being treated in the ED for sexually transmitted diseases, but male Latino adolescents with traumatic injuries have a higher adjusted odds of alcohol testing in the ED. Latino adolescents also have lower adjusted odds of bicycle helmet and sunscreen use.

Health Status

National data reveal a higher adjusted likelihood of fair or poor health in Latinos (Table 3). Compared with whites, Latinos also have twice the percentage of new HIV/AIDS diagnoses among those younger than 13 years old, in perinatal transmission, and among other pediatric cases. They also have a higher crude incidence rate of tuberculosis. In terms of Latino subgroups, both Mexican American and Puerto Rican children have higher adjusted odds of fair or poor health status.

Asthma, Mental Health Care, and Special Health Care Needs

An analysis of national data revealed that Latinos have a higher asthma prevalence than do whites, and there has been a substantial increase in Latino asthma prevalence over time (Table 3). Several studies have documented a particularly high asthma prevalence among Puerto Ricans. Other asthma disparities include higher adjusted odds of asthma ED visits, hospitalizations, activity limitations, and the need for urgent care in

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TABLE 3 Disparities in the Health and Health Care of Latino Children

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Access to care				
Triple the adjusted odds of having no usual source of care Double the adjusted odds of no health professional/doctor visit in previous year	Analysis of Household Component of 1996 and 2000 MEPS	Latino: $n = 4091$; AA: $n = 2189$; Asian: $n = 325$; white: $n = 6362$	Adjusted for 8 covariates; double the adjusted odds of dissatisfaction with quality of care in 1996 but not 2000	28
Lower adjusted odds of having a regular source of care Lower adjusted odds of surety of accessing health care among adolescents Lower adjusted odds of being in excellent/very good health	Analysis of cross-sectional data on children 0–19 y of age from the California Health Interview Survey	Total sample: $N = 19\,485$	Adjusted for 7 covariates	55
Among Mexican American children Lower adjusted odds of always/usually obtaining appointment for regular or routine care Lower adjusted odds of always/usually obtaining care for illness or injury Lower adjusted odds of always/usually obtaining advice/help over telephone Higher adjusted odds of always/usually having a long wait in doctor's office	Cross-sectional, population-based, random-digit-dialing survey of parents/guardians of children 3–18 y of age residing in 111 counties in west Texas using 4 items from the CAHPS	Mexican American: $n = 2052$; white: $n = 2655$	Adjusted for 17 covariates; same finding when Mexican American children stratified by language spoken at home	121
Higher adjusted odds of appendicitis rupture in California	Cross-sectional analysis of full-year samples of hospital discharge records for acute appendicitis from California and New York children 4–18 y of age	California: Latino, $n = 4304$; API, $n = 459$; AA, $n = 297$; white, $n = 4017$; New York: API, $n = 80$; AA, $n = 342$; Latino, $n = 444$; white, $n = 2379$	Adjusted for 7 covariates; nonsignificant trend observed in New York	29
Higher adjusted proportion in fair or poor health among new SCHIP enrollees in Florida and New York Lower adjusted proportion had preventive care visits before SCHIP among new SCHIP enrollees in Florida and New York Lower adjusted proportion had usual source of care before SCHIP among new SCHIP enrollees in Florida and New York	Analysis of CHIRI data on new SCHIP enrollees in 4 states (<18 y old in Alabama, Kansas, and New York, and 11.5–17.9 y of age in Florida)	Total sample: $N = 8975$[b]	Adjusted for 10 covariates	30
Before enrollment in SCHIP Lower adjusted rate of having usual source of care Higher adjusted rate of having unmet needs for health care	Interviews of parents in New York State at the time of SCHIP enrollment of their child (baseline) and 1 y after enrollment	Total sample: $N = 2644$ (baseline) and $N = 2290$ (1-y follow-up)[b]	Adjusted for 12 covariates; 1 unadjusted quality-of-care disparity noted	31
Lower adjusted odds of always getting timely medical care without waits Lower adjusted odds of always getting timely telephone help for medical care	Analysis of CAHPS data on cross-sectional cohort from the MEPS	Latino: $n = 1236$; AA: $n = 700$; white: $n = 2184$	Adjusted for 6 covariates	122

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted odds of brief wait times for medical appointments Higher adjusted odds of never/only sometimes getting medical care without long waits Higher adjusted odds of never/only sometimes getting timely routine care Higher adjusted odds of never/only sometimes getting timely telephone help Higher adjusted odds of never/only sometimes getting brief wait times for medical appointments				
Greater adjusted odds of being uninsured Greater adjusted odds of not being referred to specialist by health care provider	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	Latino: $n = 817$; AA: $n = 477$; white: $n = 718$	Adjusted for 9 covariates	32
Adolescents				
Female adolescents: higher risk of no health insurance, perpetrating violence, and being a victim of violence Male adolescents: higher risk of no health insurance, last physical examination >2 y ago, and being a victim of violence	Analysis of Add Health (waves 1 and 2), a nationally representative school-based study of youths in grades 7–12, with follow-up into adulthood	Latino: $n = 2340$; AA: $n = 3038$; API: $n = 1021$; AI/AN: $n = 136$; white: $n = 7728$	Prevalence in published tables was not adjusted; the authors stated that adjustments for income and parental education had minimal influence on findings; significant disparities were identified by using 95% CIs that did not overlap with measure for white adolescents; no formal statistical evaluation of disparities was provided in article	35
Lower adjusted odds of bicycle helmet use Lower adjusted odds of sunscreen use	Analysis of California Health Interview Survey data on adolescents 12–17 y of age	Latino: $n = 1515$; API: $n = 376$; white: $n = 3263$	Adjusted for 5 covariates; interactions noted with generational status for certain outcomes	116
Live birth rate for adolescent girls 15–17 y of age >3 times higher (and highest for any racial/ethnic group)	1990–1998 natality files from the National Vital Statistics System	Not provided	Expressed as rates per 1000; rates not adjusted for any covariates	36
Higher likelihood of fair-to-poor health among adolescents recently enrolled in SCHIP Less likely to use doctor's offices as their usual source of care among adolescents recently enrolled in SCHIP	Analysis of CHIRI telephone interview data of adolescents newly enrolled in SCHIP in Florida and New York (and their parents)	Total sample: $N = 2036$[b]	Not adjusted for covariates	33
Lower adjusted odds of being treated for sexually transmitted infections in the ED	Analysis of 7 y of data from the National Hospital Ambulatory Medical Care Survey on children 12–19 y of age	Latino: $n = 1710$; AA: $n = 8170$; white: $n = 8930$	Adjusted for 4 covariates	123
Birth rate for 15- to 19-y-old girls almost 3 times as high	Birth certificate data reported to CDC National Center for Health Statistics	Not provided	Not adjusted for covariates; no *P* values or 95% CIs	38
Greater adjusted odds of alcohol testing among male adolescents admitted to EDs for traumatic injury	Analysis of data from the National Trauma Data Bank (includes 64 US institutions) on adolescents 12–17 y of age admitted to EDs with traumatic injury	Latino: $n = 396$; AA: $n = 1760$; white: $n = 5584$	Adjusted for 7 covariates	39

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Asthma and allergies				
Puerto Rican children have significantly higher adjusted odds of having current asthma (and are only racial/ethnic minority group with higher odds after adjustment for income and neighborhood factors)	Cross-sectional parental survey of 26 randomly selected New York City public elementary schools	Latino: $n = 2058$; AA: $n = 1171$; white: $n = 798$; Asian: $n = 646$	Adjusted for 4 covariates; Asian children had significantly lower adjusted odds of having current asthma (vs white children)	124
Higher adjusted odds of an asthma ED visit or hospitalization Higher adjusted odds of an asthma ED visit or hospitalization among Puerto Ricans, Dominicans, and "other Latinos" but not Mexicans	Analysis of data from parent-response questionnaires administered in 26 randomly selected New York City public elementary schools	Total sample: $N = 5250$[b]	Adjusted for 4 covariates	45
Higher diagnosed asthma prevalence among Puerto Rican children (22%) Higher total potential asthma burden (diagnosed plus possible but undiagnosed asthma) among Puerto Rican children	Cross-sectional analysis of parent-report questionnaire data from 14 low-income, diverse Chicago public elementary schools	Latino: $n = 6002$ (Puerto Rican: $n = 473$); AA: $n = 2938$; white: $n = 1560$	Not adjusted for covariates	46
Higher asthma prevalence Substantial rise in asthma prevalence over 11-y period (more than doubled)	Trends in asthma over time for children 0–17 y of age using data from 5 National Center for Health Statistics sources: National Health Interview Survey, National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, National Hospital Discharge Survey, and Mortality Component of National Vital Statistics System	Not provided	Only unadjusted rates were presented; no differences or lower rate of asthma attack prevalence vs white children; no statistical comparisons performed or 95% CIs provided	40
Lower adjusted odds of daily anti-inflammatory use for asthma	Cross-sectional study using parental telephone interviews and electronic records for Medicaid-insured children 2–16 y of age with asthma in 5 managed care organizations in California, Washington, and Massachusetts	Latino: $n = 313$; AA: $n = 636$; white: $n = 512$	Adjusted for SES, health status, age, gender, and other sociodemographic variables	48
Higher adjusted odds of cockroach allergen sensitivity among Mexican American children Higher adjusted odds of dust mite allergen sensitivity among Mexican American children	Cross-sectional analysis of children 6–16 y of age who participated in allergen testing in the NHANES III	Mexican American: $n = 1546$; AA: $n = 1502$; white: $n = 1116$	Adjusted for 8 covariates; Mexican American children were the only Latino children examined	49
Higher adjusted odds of asthma-associated activity limitations Higher adjusted odds of need for urgent medical care for asthma in past 12 mo	Analysis of data from the Los Angeles County Health Survey on children <18 y of age	Latino: $n = 3675$; AA: $n = 566$; API: $n = 361$; white: $n = 1278$	Adjusted for 8 covariates	50
Lower adjusted odds of use of inhaled steroids Lower adjusted odds of use of inhaled steroids among those cared for in private practices	Analysis of data from the Childhood Asthma Severity Study, which used a 12-mo, retrospective, parent-reported questionnaire on asthma in a community sample of children <13 y of age residing in Connecticut and Massachusetts	Latino: $n = 255$; AA: $n = 139$; white: $n = 549$	Adjusted for 9 covariates	51

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
For Puerto Rican children, higher adjusted odds of physician-diagnosed asthma	Analysis of NHIS data on 3- to 17-y-olds currently symptomatic with wheezing	Puerto Rican: $n = 40$; Mexican: $n = 122$; AA: $n = 174$; white: $n = 610$	Adjusted for 10 covariates	125
Breastfeeding				
Lower proportion of children ever breastfed among Mexican American children	Analysis of breastfeeding data on children 12–71 mo of age in the NHANES III (1988–1994)	Mexican American: $n = 2118$; AA: $n = 1845$; white: $n = 1869$	Not adjusted for any covariates	53
Health status				
Higher adjusted likelihood of fair or poor health	Analysis of 3 y of NHIS data on children 0–17 y of age	Latino: $n = 12\,765$; API: $n = 2516$; AA: $n = 17\,324$; AI/AN: $n = 1067$; white: $n = 62\,572$	Adjusted for 4 covariates	112
HIV/AIDS				
Approximately twice the percentage of new HIV/AIDS diagnoses vs white children for those <13 y of age, perinatal transmission, and other pediatric cases Number of new HIV/AIDS diagnoses exceeds that for white children for those <13 y of age, perinatal transmission, and other pediatric cases Although Latino children constitute 14% of US children, number of new HIV/AIDS diagnoses among those 0–24 y of age[a] ($n = 3249$) almost equal to that of white individuals of same age ($n = 3707$)	Diagnoses of HIV/AIDS reported to the CDC in 2001–2004 by 33 states that used confidential, name-based reporting of HIV/AIDS cases for at least 4 y	Latino: $n = 3249$; AA: $n = 11\,554$; white: $n = 3707$[a]	No 95% CIs or P values presented for children; not adjusted for covariates	59
Infectious diseases (other than HIV/AIDS)				
Higher incidence rate of tuberculosis	Analysis of 8 y of data on children <15 y of age from North Carolina Tuberculosis Information Management System database	Latino: $n = 33$; AA: $n = 114$; API: $n = 12$; white: $n = 21$	Not adjusted for any covariates	64
Injuries				
Higher adjusted odds of not putting up stair gate	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	Latino: $n = 817$; AA: $n = 477$; white: $n = 718$	Adjusted for 9 covariates	66
Mental health and behavioral/developmental issues				
Significantly lower adjusted odds of externalizing behavioral disorders Significantly lower adjusted odds of ambulatory visits	Secondary analysis of 2 y of MEPS data on children 2–18 y of age	Total 1996 MEPS sample size: $N = 3955$; total 1997 MEPS sample size: $N = 5933$	Adjusted for 7–9 covariates	43
Lower adjusted likelihood of mental health services use among Medicaid-eligible adolescents in substance abuse treatment	Analysis of Oregon's substance abuse treatment database (Client Processing Monitoring System) for adolescents 12–17 y of age admitted to publicly funded treatment for a substance use disorder during a 9-y period	Total sample: $N = 25\,813$[b]	Adjusted for 17 covariates	126
Lower adjusted odds of receiving treatment for any condition from a mental health specialist	Analysis of National Longitudinal Survey of Youth and the Child/Young Adult supplement, a nationally representative sample of 7- to 14-y-old children	Total sample: $N = 2482$[b]	Adjusted for 28 covariates	67

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted odds of receiving treatment for behavior problems from a mental health specialist Lower adjusted odds of receiving treatment for depression from a mental health specialist				
Triple the adjusted odds of unmet need for mental health care	Cross-sectional analyses of data on children 3–17 y of age from the NHIS, the National Survey of American Families, and the Community Tracking Survey	Latino: $n = 695$; AA: $n = 867$; white: $n = 3049$	Adjusted for 8 covariates	127
Within 6 mo of a new episode of depression Lower adjusted odds of filling an antidepressant prescription Lower adjusted odds of any mental health visit Lower adjusted odds of any mental health visit or antidepressant prescription filled (combined)	Analysis of Washington state Medicaid claims for children 5–18 y of age	Latino: $n = 90$; AI/AN: $n = 154$; white: $n = 1048$	Adjusted for 5 covariates	128
Higher rate of unmet need for mental health services (no services among children with identified need)	Analysis of data from National Survey of America's Families for children 6–17 y of age	Latino: $n = 6022$; AA: $n = 6371$; white: $n = 31\,240$	Not adjusted for covariates	129
Higher adjusted odds of use of state-funded mental health services	Analysis of New York City data on receipt of services from state-funded mental health care facilities	Total sample: $N = 78\,085$ (including adults)[b]	Adjusted for 7 covariates	72
Substantially lower adjusted odds of receiving an ADHD diagnosis during outpatient primary care provider visits Substantially lower adjusted odds of receiving a stimulant prescription during outpatient primary care provider visits Substantially lower adjusted odds of receiving an ADHD diagnosis or stimulant prescription during outpatient primary care provider visits	Analysis of 6 y of data on children 3–18 y of age from National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey	Latino: $n = 4117$; AA: $n = 5074$; white: $n = 16\,406$	Adjusted for 3 covariates	130
Higher adjusted odds of developmental delays (based on parental concerns)	Analysis of data from National Survey of Early Childhood Health on children 4–35 mo of age	Total sample: $N = 2068$[b]	Adjusted for 8 covariates	58
Lower adjusted odds of use of specialty mental health services among children for whom an investigation of abuse or neglect had been opened by the child welfare system	Analysis of data from the National Survey of Child and Adolescent Well-being on use of specialty mental health services for 1 y after contact with child welfare among a cohort of children 2–14 y of age	Latino: $n = 487$; AA: $n = 899$; white: $n = 1208$	Adjusted for 11 covariates and 2 interaction terms; no longer significant adjusted odds in 1 of 3 models (when provider supply, linkage variables, and interactions added)	73
Higher adjusted odds of family never eating lunch or dinner together Higher adjusted odds of reading to child less than every day	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	Latino: $n = 817$; AA: $n = 477$; white: $n = 718$	Adjusted for 9 covariates	66

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Lower adjusted mean number of children's books in home				
Mortality				
Higher swimming pool drowning rates for adolescent boys Higher rates of drowning in neighborhood pools, including community shared apartment and housing complex pools	Analysis of 4 y of national data from the Consumer Products Safety Commission on drowning deaths of children 5–24 y of age from death certificates, medical examiner reports, and newspaper clippings	Latino: $n = 81$; AA: $n = 316$; AI/AN: $n = 18$; white: $n = 222$	Adjusted for income; values expressed as rate ratios and 95% CIs, but no *P* values were provided	75
Higher mortality rate for Puerto Rican children 1–4 y of age	Analysis of 6 y of data on children 5–14 y of age from the National Vital Statistics System, the National Longitudinal Mortality Study, and the Area Resource File	Puerto Rican: $n = 265$; white: $n = 67\ 200$	Not adjusted for covariates; presented only as population rates; no statistical comparisons or 95% CIs; small sample sizes in 1979–1981 interval	79
Higher adjusted risk of death among those with ALL	Analysis of 9 population-based registries of the National Cancer Institute's Surveillance, Epidemiology, and End Results program	Latino: $n = 504$; AA: $n = 356$; AI/AN: $n = 61$; API: $n = 410$; white: $n = 3621$	Adjusted for 3 covariates; did not adjust for SES or insurance coverage	81
Higher adjusted odds of in-hospital death after congenital heart surgery	Analysis of data from the 2000 KID of the HCUP, limited to 19 states with adequate race/ethnicity data	Latino: $n = 1835$; AA: $n = 860$; white: $n = 4134$	Adjusted for 8 covariates; in full model, *P* value for Latino ethnicity was .05	82
Obesity, physical activity, and nutrition				
Significantly lower adjusted aerobic fitness level	Progressive treadmill protocol evaluation of aerobic fitness ($\dot{V}0_{2peak}$) of Los Angeles children 7–14 y of age, adjusting for gender, maturational stage, and body composition	Latino: $n = 36$; AA: $n = 19$; white: $n = 18$	Adjusted for 3 covariates but not SES	87
Double the adjusted odds of overweight Highest overweight prevalence of any racial/ethnic group	Analysis of height and weight data collected in 3 mo of physical fitness testing of students in grades 5, 7, and 9 in the Los Angeles County public school system	Total sample: $N = 281\ 630$[b]	Adjusted for 4 covariates	88
Higher prevalence of overweight in boys among 8th-graders (35%), 10th-graders (40%), and 12th-graders (30%) (highest prevalence among all racial/ethnic groups studied) Higher prevalence of overweight in girls among 8th-graders (27%), 10th-graders (32%), and 12th-graders (19%) (highest prevalence among all racial/ethnic groups studied) Lower likelihood of eating breakfast regularly Less likely to regularly exercise vigorously among girls Higher number of hours of television-viewing on average weekday	Analysis of 10–17 y of data from Monitoring the Future, a nationally representative sample of students in the 8th, 10th, and 12th grades	Total sample: $N = 4800$–$17\ 074$ per study interval, depending on grade and year[b]	Not adjusted for covariates	90

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Higher prevalence of overweight and obesity Boys more likely to consume >10% of calories as saturated fat Lower calcium intake	Cross-sectional survey of adolescents 11–18 y of age in 31 public schools in the Minneapolis, St Paul, and Osseo school districts of Minnesota	Total sample: $N = 4746$[b]	Not adjusted for covariates, but stratified analyses adjusting for grade and SES were performed but not reported because generally showed patterns similar to those of unadjusted analyses	91
Among Mexican Americans Higher prevalence of overweight Higher prevalence of overweight among 6- to 11-y-olds Higher prevalence of overweight among 12- to 19-y-olds Higher prevalence of overweight among boys (and highest of all racial/ethnic groups analyzed) Higher prevalence of overweight among 6- to 11-y-old boys (and highest of all racial/ethnic groups analyzed) Higher prevalence of overweight among 12- to 19-y-old boys Higher prevalence of overweight among girls Higher prevalence of at risk of overweight or overweight (and highest of all racial/ethnic groups analyzed) Higher prevalence of at risk of overweight or overweight among 6- to 11-y-olds Higher prevalence of at risk of overweight or overweight among 12- to 19-y-olds Higher prevalence of at risk of overweight or overweight among boys (and highest of all racial/ethnic groups analyzed) Higher prevalence of at risk of overweight or overweight among 6- to 11-y-old boys (and highest of all racial/ethnic groups analyzed) Higher prevalence of at risk of overweight or overweight among 12- to 19-y-old boys (and highest of all racial/ethnic groups analyzed) Higher prevalence of at risk of overweight or overweight among girls Higher prevalence of at risk of overweight or overweight among 12- to 19-y-old girls	Analysis of NHANES data on children 2–19 y old from 1999–2000 and 2001–2002	Latino: $n = 1475$; AA: $n = 1274$; white: $n = 1094$	Not adjusted for covariates; Mexican Americans only Latino group analyzed	93
Higher adjusted odds of overweight and highest adjusted odds of any racial/ethnic group Slower adjusted 1-mile run/walk time	Cross-sectional sample of California public school 5th, 7th, and 9th-graders (10–15 y old)	Latino: $n = 330\,758$; AA: $n = 58\,491$; Asian: $n = 63\,292$; Pacific Islander: $n = 7977$; Filipino: $n = 22\,598$; AI/AN: $n = 7977$; white: $n = 275\,722$	Adjusted for 2 covariates and stratified according to age	94

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Orthopedics				
For treatment of supracondylar humerus fractures, more likely to undergo closed reduction with internal fixation (percutaneous pinning)	Retrospective examination of selected pediatric fractures in the KID of the HCUP	Latino: $n = 659$; AA: $n = 207$; white: $n = 1478$	Not adjusted for covariates; no disparities seen for femur or forearm fractures	96
Quality				
Lower adjusted odds of receiving any counseling during well-child visits Shorter well-child visit duration	Cross-sectional analysis of 10 y of data on children 0–18 y of age from the National Ambulatory Medical Care Survey	Total sample: $N = 2892$[b]	No multivariable adjustments performed for visit duration; counseling findings were adjusted for 7 covariates	97
Lower primary care provider strength-of-affiliation scores (unadjusted and adjusted) Lower primary care provider interpersonal relationship scores (unadjusted and adjusted [if required by managed care organization to seek referral and to stay in network])	Telephone survey of parents of random sample of 413 children attending elementary school in 3 suburban communities in San Bernardino County, California	Latino: $n = 84$; AA: $n = 100$; API: $n = 91$; white: $n = 102$	Adjusted for 11 covariates	100
Among those in which the primary language spoken at home is a language other than English Lower adjusted scores for timeliness of care Lower adjusted scores for provider communication Lower adjusted scores for staff helpfulness Lower adjusted scores for health insurance plan service Lower adjusted ratings of child's personal doctor Lower adjusted ratings of specialist Lower adjusted ratings of health plan	Analysis of parental survey data on children 0–17 y of age from the national CAHPS Benchmarking Database 1.0 administered by Medicaid sponsors comprising 33 health maintenance organizations from Arkansas, Kansas, Minnesota, Oklahoma, Vermont, and Washington	Latino: $n = 842$; AA: $n = 1344$; API: $n = 291$; AI/AN: $n = 330$; white: $n = 6328$	Adjusted for 4 covariates; no disparities noted for Latino children in households in which English is primary language	101
Among those seen in the ED for acute gastroenteritis Lower adjusted likelihood to undergo >2 diagnostic tests Lower adjusted likelihood of having undergone radiography	All patients seen in the ED over a 6-mo period with a discharge diagnosis of acute gastroenteritis as identified through a computerized patient log	Latino: $n = 143$; AA: $n = 122$; white: $n = 132$	Adjusted for 7 covariates	131
Lower mean participatory decision-making score for child's physician	Cross-sectional, population-based, random-digit-dialing survey of parents/guardians of children 3–18 y of age residing in 111 counties in west Texas	Latino: $n = 1720$; white: $n = 2156$	Adjusted for 11 covariates	132
Lower adjusted scores for comprehensiveness of primary care	Cross-sectional survey of parents of children in 228 classes, from kindergarten through 6th grade, at 18 elementary schools in a large urban school district in California	Latino: $n = 1292$; API: $n = 1158$; AA: $n = 458$; white: $n = 479$	Adjusted for 5 covariates	102

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Among those hospitalized for pneumonia Higher adjusted risk ratio of admission through EDs Lower adjusted odds of bronchoscopy Lower adjusted odds of mechanical ventilation Longer adjusted length of stay Higher adjusted charges	Analysis of 3 y of data on children 0–17 y of age hospitalized for pneumonia from the National Inpatient Sample of the HCUP	Latino: $n = 15\,152$; API: $n = 2050$; AA: $n = 17\,095$; white: $n = 43\,180$	Adjusted for 6–7 covariates	113
Greater adjusted odds of child being assigned to health care provider Greater adjusted odds of parent being not very likely to recommend child's well-child care provider Greater adjusted odds of health care provider never/only sometimes understanding how parent prefers to rear child Greater adjusted odds of health care provider never/only sometimes understanding child's specific needs Greater adjusted odds of discussing violence in the community, and use of alcohol or drugs in household	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	Latino: $n = 817$; AA: $n = 477$; white: $n = 718$	Adjusted for 9 covariates	32
Special health care needs				
Among children with special health care needs Higher adjusted odds of being uninsured Higher adjusted odds of having no usual source of care Higher adjusted odds of not identifying a regular clinician Higher adjusted odds of not being satisfied with care Higher adjusted odds of being unable to get needed medical care Lower adjusted odds of usual source of care being doctor's private office or health maintenance organization Higher adjusted odds of not having seen doctor in previous 12 mo Average 2 fewer doctor visits per year	Analysis of data on children 0–17 y of age with special health care needs in the NHIS on disability	Latino: $n = 1777$; AA: $n = 1762$; white: $n = 6365$	Adjusted for 9–10 covariates	104
Lower adjusted odds of receiving adequate time and information from child's health care provider	Analysis of National Survey of Children With Special Health Care Needs	Total sample: $N = 38\,866$[b]	Adjusted for 6 covariates; no disparities in any unmet need or problem with specialty referral	103
Among children with special health care needs Higher adjusted odds of having no usual source of care Higher adjusted odds of having difficulty receiving referrals for specialty care	Analysis of data on children 0–17 y of age from the National Survey of Children With Special Health Care Needs	Not indicated	Adjusted for 6 covariates	105

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TABLE 3 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Higher adjusted odds of dissatisfaction with care				
Higher adjusted odds of family members having to reduce or stop employment because of child's condition				
Among children with special health care needs	Analysis of data on children 0–17 y of age from the National Survey of Children With Special Health Care Needs	Latino: $n = 3424$; API: $n = 197$; AA: $n = 3833$; white: $n = 28\,967$	Adjusted for 6 covariates	133
Higher adjusted odds of not receiving family-centered care				
Higher adjusted odds of parents experiencing employment consequences as a result of child's condition				
Among children with special needs	Analysis of data on special-needs children 0–17 y of age from the National Survey of Children With Special Health Care Needs	Latino: $n = 3210$; AA: $n = 3820$; white: $n = 28\,916$	Adjusted for 13 covariates	106
Greater adjusted odds of problems with ease of using health care services				
Surgery				
For those hospitalized for appendicitis	Analysis of data on children 1–17 y of age with appendicitis from the Nationwide Inpatient Sample and the KID	Total sample: $N = 428\,463$[b]	Not adjusted for covariates for time to operation, length of stay, or hospital charges; other outcomes include adjustment for 6 covariates	107
Longer time to operation (regardless of disease severity)				
Longer length of stay (regardless of disease severity)				
Higher hospital charges (regardless of disease severity)				
Higher adjusted appendicitis rate				
Higher adjusted odds of perforation or other complicating factors				
Use of health services				
Greater adjusted odds of ≥1 y since last physician visit	Analysis of 3 y of NHIS data on children 0–17 y of age	Latino: $n = 12\,765$; AA: $n = 17\,324$; API: $n = 2516$; AI/AN: $n = 1067$; white: $n = 62\,572$	Adjusted for 4 covariates	112
Lower adjusted number of physician visits in previous 12 mo				
Greater adjusted odds of suboptimal health status				
Greater adjusted odds among Puerto Rican children of suboptimal health status				
Mexican American children had greater adjusted odds of suboptimal health status and ≥1 y since last physician visit and made a lower adjusted number of physician visits in the previous year				
Lower adjusted mean number of calls to doctor's office in previous year	Analysis of data on children 4–35 mo of age from the National Survey of Early Childhood Health	Latino: $n = 817$; AA: $n = 477$; white: $n = 718$	Adjusted for 9 covariates	32

MEPS indicates Medical Expenditure Panel Survey; CHIRI, Child Health Insurance Research Initiative; Add Health, National Longitudinal Study of Adolescent Health; NHIS, National Health Interview Survey; NHANES, National Health and Nutrition Examination Survey; KID, Kid's Inpatient Database; HCUP, Healthcare Cost and Utilization Project; CAHPS, Consumer Assessment of Health Plans Study; $\dot{V}O_2$, oxygen consumption per unit time.

[a] Sample sizes includes those 0 to 24 years of age, because the CDC grouped those 15 to 24 years of age together.

[b] Sample sizes were not disaggregated in article according to race/ethnicity.

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the previous 12 months, as well as a higher potential asthma burden (diagnosed plus possible but undiagnosed asthma). Latinos have lower adjusted odds of use of inhaled steroids and of daily anti-inflammatory medications. Disparities among Latino subgroups (compared with white children) include higher adjusted odds of asthma ED visits and hospitalizations among Puerto Ricans, Dominicans, and "other Latinos" (except Mexican Americans) and higher adjusted odds of cockroach and dust mite allergen sensitivity among Mexican Americans.

Eleven studies documented Latino disparities in mental health care and behavioral/developmental issues (Table 3). Disparities included significantly higher unmet need for mental health care, and lower odds of any mental health visit, outpatient visits, antidepressant prescriptions, and receiving treatment from a mental health specialist for any condition, behavior problems, or depression. Latinos have higher odds of developmental delays but lower odds of being diagnosed with externalizing behavioral disorders. Lower odds were noted for use of mental health services among children being investigated for possible abuse or neglect and among Medicaid-eligible teenagers in substance abuse treatment, although 1 study found higher odds of use of state-funded mental health services in New York City. Latinos have substantially lower adjusted odds of receiving an ADHD diagnosis or receiving stimulant prescriptions during outpatient primary care visits. Young Latino children have higher adjusted odds of being read to less than every day, of having fewer numbers of children's books in the household, and of the family never eating lunch or dinner together.

Many disparities have been documented for Latino children with special health care needs, including higher adjusted odds of being uninsured, having no usual source of care, parental dissatisfaction with care, having unmet medical care needs, not having seen the physician in the past year, not receiving adequate time and information from the health care provider, averaging fewer doctor visits per year, experiencing difficulties receiving specialty referrals, having family members reduce or stop employment because of the child's condition, not receiving family-centered care, and experiencing problems with ease of use of health care services.

Quality

Compared with white children, Latino children have higher adjusted odds of being assigned to a health care provider and lower adjusted scores for comprehensiveness of primary care and primary care provider strength of affiliation, interpersonal relationship, and participatory decision-making (Table 3). Latino children have a shorter average well-child visit duration, lower adjusted odds of receiving any counseling during well-child visits, and greater adjusted odds of the parent not being very likely to recommend the child's health care provider, of the health care provider never or only sometimes understanding the child's specific needs and how the parent prefers to rear the child, and of the provider discussing violence in the community and use of alcohol or drugs in the household. Similar disparities in the quality of primary care were noted for Latino children living in households in which English is not the primary language spoken (in comparison with white children).

Among those seen in the ED with acute gastroenteritis, Latino children had lower adjusted odds than white children of undergoing 2 or more diagnostic tests and of having undergone radiography (Table 3). Among children with supracondylar humerus fractures, Latinos were more likely to undergo closed reduction with internal fixation.

American Indians and Alaska Natives

Sixteen articles (15%) addressed disparities in AI/AN children, which is the fewest articles for any racial/ethnic group (Table 4).

Mortality

AI/AN children have a higher age-specific crude mortality rate compared with that of white children, both in national and urban samples (Table 4). A higher adjusted risk of death also has been documented for AI/AN children with ALL.

Use of Health Services

AI/AN children have higher adjusted odds than white children of going 1 year or longer since their last physician visit (Table 4).

Prevention and Population Health

Data from the state of Minnesota reveal a firearm injury rate for AI/AN children that is more than 7 times higher than that for their white counterparts (Table 4). Several studies have documented higher adjusted odds of overweight and obesity among AI/AN children. Other studies have shown a slower adjusted 1-mile run/walk time and lower calcium intake among AI/AN boys.

Adolescent Health Issues

Female AI/AN adolescents have higher risks than their white counterparts of needing but not getting medical care and of perpetrating violence (Table 4). Male AI/AN adolescents have a higher risk than their white counterparts of skipping breakfast, having poor/fair health status, and perpetrating violence. National data from 2 studies revealed that the birth rate for AI/AN fe-

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TABLE 4 Disparities in the Health and Health Care of AI/AN Children

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Adolescents				
Female adolescents: higher risks of needing but not getting medical care and perpetrating violence Male adolescents: higher risk of skipping breakfast, poor/fair health status, and perpetrating violence	Analysis of Add Health (waves 1 and 2), a nationally representative school-based study of youths in grades 7–12, with follow-up into adulthood	AI/AN: $n = 136$; AA: $n = 3038$; API: $n = 1021$; Latino: $n = 2340$; white: $n = 7728$	Prevalence in published tables not adjusted, but authors stated that adjustments for income and parental education had minimal influence on findings; significant disparities were identified by using 95% CIs that did not overlap with measure for white adolescents; no formal statistical evaluation of disparities provided	35
Live birth rate for adolescent girls 15–17 y of age >2 times higher	1990–1998 natality files from the National Vital Statistics System	Not provided	Expressed as rates per 1000; not adjusted for covariates	36
Birth rate for 15–19 y-old girls almost 3 times as high	Birth certificate data reported to the CDC National Center for Health Statistics	Not provided	Not adjusted for covariates; no *P* values or 95% CIs	38
Injuries				
Firearm injury rate >7 times higher	Analysis of data from Minnesota Department of Health's Minnesota Trauma Data Bank on fatal and nonfatal firearm injuries in children 0–19 y of age	Total sample: $N = 175$[a]	Not adjusted for covariates	65
Mental health and behavioral/developmental issues Lower adjusted likelihood of mental health services use among Medicaid-eligible and non–Medicaid-eligible adolescents in substance abuse treatment	Analysis of Oregon's substance abuse treatment database (Client Processing Monitoring System) for adolescents 12–17 y of age admitted to publicly funded treatment for a substance use disorder during a 9-y period	Total sample: $N = 25\,813$[a]	Adjusted for 17 covariates	126
Within 6 mo of a new episode of depression Lower adjusted odds of filling an antidepressant prescription Lower adjusted odds of any mental health visit or antidepressant prescription filled	Analysis of Washington State Medicaid claims for children 5–18 y of age	AI/AN: $n = 154$; Latino: $n = 90$; white: $n = 1048$	Adjusted for 5 covariates	128
Mortality				
Significantly higher age-specific mortality rate among 1- to 14-y-old urban children (vs urban white children)	Vital statistics data for 10 y from King County, Washington	Not stated for this outcome	Not adjusted for covariates	134
Approximately 50% higher mortality rate for children 1–4 y of age Higher mortality rate for children 5–14 y of age	Analysis of 6 y of data on children 5–14 y of age from the National Vital Statistics System, the National Longitudinal Mortality Study, and the Area Resource File	AI/AN: $n = 1336$; white: $n = 67\,200$	Not adjusted for covariates; presented only as population rates; no statistical comparisons or 95% CIs	79
Higher adjusted risk of death among those with ALL	Analysis of 9 population-based registries of the National Cancer Institute's Surveillance, Epidemiology, and End Results program	AI/AN: $n = 61$; AA: $n = 356$; API: $n = 410$; Latino: $n = 504$; white: $n = 3621$	Adjusted for 3 covariates; not adjusted for SES or insurance coverage	81
Obesity physical activity and nutrition				
Higher adjusted odds of overweight	Analysis of height and weight data collected in 3 mo of physical fitness testing of students in grades 5, 7, and 9 in the Los Angeles County public school system	Total sample: $N = 281\,630$[a]	Adjusted for 4 covariates	88

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TABLE 4 Continued

Disparity (vs White Children)	Study Design	Sample Size(s)	Notes	Ref No.
Higher prevalence of overweight and obesity (highest prevalence of any racial/ethnic group for boys) Lower calcium intake among boys	Cross-sectional survey of adolescents 11–18 y of age in 31 public schools in the Minneapolis, St Paul, and Osseo school districts of Minnesota	Total sample: $N = 4746$[a]	Not adjusted for covariates, but authors stated that stratified analyses adjusting for grade and SES were performed but not reported because they generally showed patterns similar to those of unadjusted analyses	91
Higher adjusted odds of overweight Slower adjusted 1-mile run/walk time	Cross-sectional sample of California public school 5th-, 7th-, and 9th-graders (10–15 y old)	AI/AN: $n = 7977$; AA: $n = 58\,491$; Asian: $n = 63\,292$; Filipino: $n = 22\,598$; Latino: $n = 330\,758$; Pacific Islander: $n = 7977$; white: 275 722	Adjusted for 2 covariates and stratified according to age; run/walk times not significantly different for 2 older strata for both genders	94
Ophthalmology				
Lower adjusted odds of being diagnosed with any eye or vision condition	Analysis of 6 y of data for children 0–17 y of age in the MEPS	Total sample: $N = 2813$[a]	Adjusted for 13 covariates; the authors concluded that disparities indicated possible underdiagnosis, undertreatment, or both; no disparities in being diagnosed with an eye or vision condition other than conjunctivitis	95
Quality				
Lower adjusted scores for timeliness of care Lower adjusted scores for provider communication Lower adjusted scores for health insurance plan service Lower adjusted ratings of child's personal doctor Lower adjusted ratings of health plan	Analysis of parental survey data on children 0–17 y of age from the CAHPS Benchmarking Database 1.0 administered by Medicaid sponsors comprising 33 health maintenance organizations from Arkansas, Kansas, Minnesota, Oklahoma, Vermont, and Washington	AI/AN: $n = 330$; AA: $n = 1344$; API: $n = 291$; Latino: $n = 842$; white: $n = 6328$	Adjusted for 4 covariates	101
Use of health services				
Greater adjusted odds of ≥1 y since last physician visit More than double the adjusted odds of suboptimal health status and highest prevalence of any racial/ethnic group	Analysis of 3 y of NHIS data on children 0–17 y of age	AI/AN: $n = 1067$; API: $n = 2516$; AA: $n = 17\,324$; Latino: $n = 12\,765$; white: $n = 62\,572$	Adjusted for 4 covariates	112

MEPS indicates Medical Expenditure Panel Survey; Add Health, National Longitudinal Study of Adolescent Health; NHIS, National Health Interview Survey; CAHPS, Consumer Assessment of Health Plans.

[a] Sample sizes were not disaggregated in article according to race/ethnicity.

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male adolescents is 2 to 3 times higher than that of white adolescents.

Health Status

AI/AN children have higher adjusted odds than do white children of being in poor or fair health and the highest prevalence of these suboptimal health ratings of any racial/ethnic group (Table 4).

Mental Health Care

Within 6 months of a new episode of depression, AI/AN children have lower adjusted odds than white children of any mental health visit or antidepressant prescription being filled. AI/AN youth in treatment for substance abuse also have a lower adjusted likelihood of mental health services use.

Quality

Compared with the parents of white children, the parents of AI/AN children gave lower adjusted scores for their child's health care timeliness, health care provider communication, and health insurance plan service, and lower adjusted ratings for their child's personal doctor and health plan (Table 4). National data also reveal lower adjusted odds of being diagnosed with any eye or vision condition.

Multiracial Children

The search terms did not yield any articles on disparities among multiracial children.

DISPARITIES AMONG RACIAL/ETHNIC SUBGROUPS

Fifteen studies (14%) included analyses of disparities in 1 or more racial/ethnic subgroup (in comparison with white children). Five studies of APIs (21% of all studies of APIs) and 10 studies of Latinos (15% of all studies of Latinos) examined racial/ethnic subgroup disparities; none of the analyses for AA or AI/AN children included subgroup analyses.

STUDIES EVALUATING INTERVENTIONS TO REDUCE DISPARITIES

The search terms yielded only 2 studies that evaluated interventions to reduce racial/ethnic disparities (Table 5). A quasi-experimental evaluation of a school-based Internet and video intervention that focused on health snacks and gym labs resulted in significant reductions in dietary fat intake among all 3 minority groups as well as among those in the white group, and significant increases in physical activity among low-income children in all 3 minority groups and white children. It was unclear, however, what the control group received, there was no overall difference between intervention and control children in fat-intake reduction, and participants in

TABLE 5 Results of Studies Evaluating Interventions to Reduce Disparities in the Health and Health Care of Minority Children

Disparity Targeted	Findings	Study Design	Sample Size(s)	Notes	Ref No.
Nutrition and exercise in middle-school children	Dietary fat intake significantly reduced in intervention-group girls for AA, Latino, AI/AN, and white children; significantly increased physical activity among those with lowest income among AA, Latino, Asian, and white children	Quasi-experimental evaluation of a 4-session Internet and video intervention with healthy snack and gym labs; intervention occurred in 2 urban, low- to middle-income middle schools (gym lab in 1) in the Midwest	AA: $n = 58$; white: $n = 47$; Asian: $n = 9$; Latino: $n = 4$; AI/AN: $n = 4$	Small sample sizes from only 2 schools; unclear what control group received (if anything); unclear when postintervention evaluation occurred; no overall difference between intervention and control children in fat intake reduction; both groups actually decreased their amount of physical activity	135
Immunization rates among 0- to 2-y-olds	No statistically significant differences (vs white children) in postintervention population immunization rates for 24-mo-olds among AA and Latino children; no statistically significant difference (vs white children) in postintervention population immunization rate for Latino (but not AA) 12-mo-olds	Prepopulation/postpopulation study in Monroe County, New York, of impact of community-wide reminder, recall, and outreach system for childhood immunizations administered by lay outreach workers in 8 practices (expanded to 10 after 4 y). Outcomes were monitored in a 10% random sample selected from suburban practices and a 25% random sample from urban practices.	Total sample: $N = 20\,132$[a]	9%–74% of cohort (depending on study region) did not receive intervention; immunization rates unadjusted (not adjusted for any potential confounders)	136

[a] Sample sizes were not disaggregated in article according to race/ethnicity.

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both the intervention and control groups decreased their amount of physical activity.

A preintervention and postintervention study in an upstate New York county of the effects of a community-wide reminder, recall, and outreach system for childhood immunizations resulted in no statistically significant differences from 24-month-old white children in postintervention immunization rates for 24-month-old AA and Latino children, and no statistically significant difference between only Latino and white 12-month-old children in postintervention immunization rates. Up to 74% of the cohort, however, did not receive the intervention in some county regions, and the immunization rates were not adjusted for confounders.

METHODOLOGIC ISSUES

Failure to evaluate children separately from adults was the most common reason for exclusion of studies from the final database, accounting for 27 (22%) of the excluded studies. Another commonly encountered methodologic issue was the combination of all nonwhite children into 1 group, which occurred in 11 (9%) of the excluded studies. An additional 10 studies (8%) failed to provide a white comparison group. Among the 109 studies in the final database, 27 (22%) did not perform multivariable or stratified analyses to ensure that racial/ethnic disparities persisted after adjustment for socioeconomic status (SES) and other potential confounders.

IMPLICATIONS

Extensiveness and Pervasiveness of Disparities

A comprehensive review of the literature revealed that racial/ethnic disparities in children's health and health care are quite extensive, pervasive, and persistent. Disparities were noted across the spectrum of health and health care, including in mortality rates, access to care and use of services, prevention and population health, health status, adolescent health, chronic diseases, special health care needs, quality of care, and organ transplantation. In addition, the data indicate that racial/ethnic disparities are persisting or worsening over time, at least in the few areas for which data from secular-trend studies are available, such as overall mortality rates, elevated blood lead concentrations, and asthma prevalence, mortality, and hospitalizations.

Mortality and Chronic Disease

Although racial/ethnic disparities in adult mortality[21] and chronic disease[22] rates have received much attention, little attention has been paid to these issues in children (other than for infant mortality). Nevertheless, review of the literature identified disparities in mortality rates for all 4 major racial/ethnic groups of US children. The extent and diversity of these mortality-rate disparities are concerning: these disparities include substantially greater risks than for white children of all-cause mortality; death from drowning, from ALL, from congenital heart defects, and after congenital heart defect surgery; and an earlier median age at death for those with Down syndrome and congenital heart defects. Additional research is needed to determine whether other racial/ethnic disparities exist in childhood mortality rates, the causes of these disparities, and interventions that are effective in reducing or eliminating mortality-rate disparities.

Extensive childhood disparities were found for chronic diseases, including asthma, cancer, eye disorders, HIV/AIDS, kidney disease, mental health, special health care needs, and stroke. In particular, multiple studies have been conducted on disparities in asthma, mental health, and special health care needs. Nevertheless, many gaps exist in the literature, and further study is needed to determine the etiology of and effective interventions for disparities in childhood chronic diseases.

Disparities as a Quality Issue

It has been suggested that a useful approach to addressing racial/ethnic disparities in children's health care is to frame disparities as a quality-of-care issue.[23] This review of the literature identified multiple racial/ethnic disparities in the quality of children's health care, including inequalities in the quality of primary care, asthma care, cardiovascular surgery, mental health care, pneumonia hospitalizations, ophthalmologic care, orthopedic conditions, and care of children with end-stage renal disease. Additional study is warranted, not only of the etiology and pervasiveness of disparities in the quality of pediatric care, but also of interventions that would be effective in achieving quality improvement among racial/ethnic minority children.

Research Implications

In the course of reviewing the disparities literature, certain key methodologic and research issues were identified. Attention to these issues has the potential to advance the field and enhance the rigor of studies. A total of 48 studies were excluded from the database because they combined all minority children into a nebulous "nonwhite" category, failed to include a comparison group consisting of white children, or did not perform separate analyses with children disaggregated from adults.

Occasionally, there may be statistically legitimate reasons to not compare study findings for specific minority racial/ethnic groups with those of white children (such as when there truly are

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small sample sizes for specific minority groups in the study population). The recurrent findings in the literature, however, of combining minority children into a "nonwhite group" and failure to collect data for specific, populous minority groups of children raise several key issues. It is critical that current and future pediatric research be relevant, meaningful, and generalizable for all children. The explosive growth in racial/ethnic diversity of US children makes it imperative that pediatric research funding not ignore specific questions or populations. In addition, as new interventions, practices, and technologies are evaluated, it is important to consider translational research on the application of these innovations to diverse populations and settings.

Almost one-quarter of the excluded studies did not use multivariable or stratified analyses to adjust for covariates that might confound disparities findings. For several domains, such as mental health, asthma, and vision disorders, there is an unresolved issue that warrants further investigation; it is unclear whether (1) a general quality issue exists for minority children of underdiagnosis and undertreatment of certain conditions, (2) there is a lower prevalence of these conditions in certain groups, (3) racial/ethnic differences occur in access or treatment preferences, or (4) some combination of these phenomena apply.

More disparities research is needed on API and AI/AN children, because a paucity of studies on these groups was identified. The few studies that examined relevant subgroups of racial/ethnic minority children identified noteworthy racial/ethnic disparities. More research is needed on childhood disparities among black subgroups (such as AAs versus Caribbean blacks versus recent African immigrants), Latinos (such as Mexican Americans, Puerto Ricans, and Cuban Americans), AIs/ANs (such as major tribal groups), and APIs (such as Chinese Americans versus Vietnamese versus Hmong). Our call for more studies on racial/ethnic subgroup disparities echoes a recommendation published 15 years ago by the AAP Task Force on Minority Children's Access to Pediatric Care that more attention be paid to the heterogeneity of API populations.[24]

Limitations

Certain limitations of this literature review should be noted. The literature search consisted of studies from 1950 through March 2007, so studies after March could not be included. Because the search strategies only identified published citations with "disparities" as a key word, studies that reported disparities or disparities interventions but did not use this key word would have been missed; in particular, research from earlier years before the "disparities" term enjoyed wider usage would have been overlooked. The focus was on racial/ethnic disparities, so studies that documented a lack of disparities were not reviewed. Only 21 studies, however, were excluded that found no significant differences according to race/ethnicity, equivalent to 9% of the database of full-print studies examined, and 17% of all exclusions.

Interventions to Reduce Disparities

This literature review identified only 2 studies that evaluated interventions to reduce racial/ethnic disparities in children's health and health care and that also compared the minority group to a white group, and none was a randomized, controlled trial. These findings suggest that there is a need for rigorous evaluations of interventions aimed at reducing childhood disparities, especially in light of the substantial number of studies identified that documented a wide variety of racial/ethnic disparities in children's health and health care.

Only articles that examined racial/ethnic disparities in the context of comparisons to white children were included in the literature review. For certain health outcomes for which racial/ethnic disparities are well documented, published studies may only have focused on disparities interventions limited to a single minority group. Because the literature-search inclusion criteria required comparison between a minority group and a white group, successful disparities-intervention studies limited to a single minority group were excluded, by necessity, from this technical report, such as recent randomized trials of interventions to insure uninsured Latino children and prevent HIV in AA girls.[25,26]

CONCLUSIONS

This technical report documents that racial/ethnic disparities in children's health and health care are extensive, pervasive, and persistent. Disparities were noted across the spectrum of health and health care, including in mortality rates, access to care and use of services, prevention and population health, health status, adolescent health, chronic diseases, special health care needs, quality of care, and organ transplantation. Methodologic flaws were identified in how such disparities are documented and analyzed. Without recognition of child health disparities as pervasive problems, sound methodologies to assess the magnitude of disparities, and rigorous evaluation of disparities interventions, the pediatric community will not be able to realize the vision of the AAP to attain optimal physical, men-

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tal, and social health and well-being of all infants, children, adolescents, and young adults.

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STAFF

William L. Cull, PhD

*Contributing author
†Lead author

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