Abstract

Background: Disparities in health service use and access to service remain critical issues for improving minority health. Although some investigations report the health service use of children and adolescents, almost no studies report the health service use of multiracial young adults. Most studies on multiracial groups are cross-sectional and thus focus on a single time point, so it is difficult to establish how health indicators change for multiracial groups over time. This study employs epidemiological methods to investigate the health service use of self-identified multiracial (two or more race) young adults.

Methods: Weighted survey data from the National Longitudinal Study of Adolescent Health (N = 20,774) in-home sample taken during the period 1994-2008 were used to examine factors related to multiracial health service use.

Results Using multivariate logistic regression differences were found in the rates of health care service utilization when comparing specific multiracial groups to the monoracial majority. Compared to monoracial White young adults, Black-White multiracial e (odds ratio [*OR*] = 0.46, 95% confidence interval [CI] [0.24-0.89]) and Black-Native American multiracial (*OR* = 0.29, 95% CI [0.11-0.80]) young adults are less likely to report primary care service use.

Conclusions: These findings contribute to the wider understanding of health service use and barriers to access for vulnerable populations and assist in identifying salient mechanisms of health disparities over the life course. These results also demonstrate the importance of critically examining self-reported racial categories and patterns as related to health services.

Keywords: Health Services, Multiracial, Mixed-Race, Oral Health, Primary Care, Disparities

Background

An enduring finding is that some racial and ethnic minority groups are less likely to use health services, including preventive care, than Whites. This finding spans nearly 40 years when Sue, McKinney, Allen, and Hall first reported that African Americans and Asian Americans do not seek treatment for their mental health problems and, when they do, they frequently drop out after one session [1, 2]. Subsequent studies suggested that mental health service use among racial and ethnicity minority groups is associated with differential use of outpatient and emergency services [3, 4] and differing rates of mental health service use [5-7]. An Institute of Medicine report, *Unequal Treatment*, found that significant racial and ethnic disparities in health care exist even after adjusting for age, income, and health insurance [8]. Weinick, Zuvekas, and Cohen (2000) found that from 1977 to 1996 there were differences among Black, White, and Hispanic Americans in terms of having a usual source of health care[9]. A third documented disparity is oral health service use. Racial and ethnic minority disparities in oral health are largely related to access to care. Counterintuitively, Black and Hispanic adults are less likely to self-report difficulties in access to dental care compared with Whites [10]. Despite the number of well-documented patterns of health service use, there is a dire need to better understand access to and use of medical, oral, and mental health services as related to racial disparities in health.

Although this racial and ethnic pattern of health service use is consistent over time, it is not quite clear whether multiracial Americans (self-identified individuals of more than one racial group) are more likely to follow the trend of minority or majority Americans in their use of health services. Little is known about the help-seeking behaviors of Multiracial Americans. Few studies have examined multiracial American patterns of service use, and these studies have concentrated on the health and health outcomes of children [11-13]. In this paper, I test two

hypotheses related to access to care and service utilization. First, self-identified multiracial young adults will report less service utilization compared with monoracial young adults. Second, self-identified multiracial young adults will report less service utilization when service-related barriers are taken into account. This paper explores monoracial-multiracial differences in service use for a sample of American young adults. Furthermore, this paper accounts for some of the heterogeneity in the multiracial population by examining findings for specific multiracial subgroups.

Literature Review

The majority of research on multiracial health and service use has focused on multiracial children and adolescents. A population-based epidemiological study on children's health reported that multiracial children, when compared with monoracial children, used fewer services and had less access to medical care, dental care, and health insurance [11]. In fact, multiracial children experienced higher odds for several problems, including suboptimal teeth condition, emotional difficulties, and respiratory problems, compared with White children [11]. Asthma and lung disease are health problems that multiracial children experienced more than White children [11, 14]. Despite these health problems, the study found that multiracial children visited health care providers less frequently than monoracial children and were more likely to be overweight. It is notable that multiracial children are prescribed medications six times more than monoracials; thus, examining access and use of health care may help us explain this trend [11]. Flores and Tomany-Korman (2008) also found that multiracial children were at the greatest risk for unmet health needs due to access-related barriers. For example, children were not able to access care because providers did not accept a particular health insurance and the likelihood of experiencing this barrier was six times higher for multiracial children than for White children. Hestlin and

colleagues (2006) performed an analysis of cross-sectional national survey data and found stark disparities in the rates of unmet need for vision care; their results indicated that multiracial children had the highest rate of unmet need (14.3%) compared with White (4.1%), African American (8.9%), and Latino (10%) children. Unfortunately, other than research focusing on children, there have been few studies that have examined primary care, mental health care, and oral health care service use by multiracial Americans. In fact, the early-adult age cohort across all ethnicities is underrepresented in health services research.

In the research on health service utilization there are three major foci in the literature: medical care (most typically primary care), mental health care, and oral health care. Primary care is a particular concern for all young adults. This age cohort is the least likely to have a routine prevention regime or primary care provider. The transition from pediatric care to adult primary care is a concern for individuals transitioning into adulthood. Health care utilization is also a major concern for individuals with chronic illness and/or disability from childhood. For example, several studies found that multiracial children and young adults report higher rates of asthma [11, 14] than do monoracial individuals in the same age categories. Complications from asthma can be devastating and have long-term effects such as emergency room visits, sleep disturbances, and even death. In general, the delay to seek treatment can be costly if conditions are treated only when they are at their worst. Studies find that young adults are not consistent in locations of usual care. This age group in particular reports a high use of emergency room care [15]. In 2009 the rate of emergency room visits over 12 months was 22%—second only to the elderly population age 65 and up, with a 24.9% rate for emergency room visits (National Center for Health Statistics [NCHS], 2012).

Mental health service utilization is associated with medical care service utilization [16]. Mental health care is clearly an area where gaps in care are evident for Americans during early adulthood. Notably, nearly three quarters of all lifetime cases of diagnosable mental health conditions will occur by age 24. Accordingly, data from a national comorbidity study (National Comorbidity Survey Replication) showed results on mental health care utilization by young adults aged 18-29, who are the least likely to receive health care treatment but are more likely to receive health care treatment than all age cohorts of people 60 and older [17]. Furthermore, the young adult population aged 18-29 found nonhealth care treatments (e.g., human services or self-help) to be adequate forms of care [17]. Harris et al. (2005) examined nationally representative data and discovered multiracial Americans were statistically more likely than Whites to have at least one or more mental health symptoms. Multiracial respondents were more likely than Whites to have serious mental illness; however, covariates substantially diminished this relationship [6]. The caveat to this study is that it used nationally representative data for Americans aged 18 and up and was not restricted to a young adult sample. Some studies found that multiracial Americans do not seek regular mental health care as often as monoracial Americans.

Last, oral health is an important, often overlooked, health factor. Oral health disparities can be costly, especially when emergency rooms are used for dental care. In 2007, Lewis and colleagues presented national findings of the trends of oral health by race. One interesting finding is that multiracial children were more likely than White children to have dental insurance. Only 17% of multiracial children in the sample did not have health insurance. Yet despite higher rates of insurance, multiracial children were less likely than Whites to have an annual preventive dental visit [13]. Dental insurance is associated with increased likelihood to seek care and use preventive dental services in the United States.

Access-Related Barriers

Insurance is one of the greatest barriers to seeking and obtaining care for the young adult age group. There are differences in the rates of insurance by race and age. In particular 18.2% of multiracial Americans did not have insurance in 2009 compared with 17% of White Americans and 16.2% of Asian Americans (NCHS, 2012). Since 1984, insurance rates have been highest among the young adult cohort relative to ages birth-64 years old. In 2009 nearly one third (32.8%) of adults aged 19-25 did not have insurance (NCHS, 2012). The lack of insurance is attributed to the transition to adulthood and loss of parents' insurance [18, 19]. Past studies found that the lack of insurance alone does not account for all disparities in health care utilization but is related to certain types of visits such as ambulatory care [20]. Young adults without insurance are likely to forego services when they need them. The lack of insurance is also associated with the number of missed appointments [18, 21]. A similar pattern of differences has been observed in the self-report of service utilization for a variety of health services. In sum, there are documented disparities by race in access to care and utilization of health care services.

Racial Differences in Health Care Utilization

Several competing explanations account for differences in the use of health services by racial and ethnicity. At least two rationales are used in explaining racial and ethnic disparities in health care utilization. First, it is possible that racial and ethnic minorities may have a higher prevalence of health problems. Smedley and Smedley (2012) posited that the burden of disease carried by racial and ethnic minority populations is multifactorial. One of the strongest predictors of health and wellness is socioeconomic status (SES), and subsequently there is a pronounced gradient in health by wealth that adversely affects low income racial and ethnic minorities. In an American context there is an intersection between race/ethnicity and SES. Minority groups are

disproportionately found to have lower SES and greater experience of adverse health outcomes. The factors associated with lower SES and adverse health are well documented. Racial segregation is an example of one of these factors. Residents of racially segregated and isolated communities experience a greater incidence of diseases such as diabetes and at the same time do not have access to adequate quality services. Racial bias is another factor often connected to the differences in service use. Patients who perceive bias are less likely to adhere to medical treatment. Past studies confirm that providers hold bias toward racial and ethnic minority patients [22]. As scholars have noted, there is an association between race and access to care including place of usual care [23]. One approach to reducing health disparities is establishing regular care with health providers as opposed to using the emergency room for treatment or avoiding treatment when needed. Multiracial young adults might be less likely to have established a health provider relationship and more likely to use the emergency room as a usual source of care. Additionally, a barrier to establishing care is the ability to pay. Young adults are the most likely age group to avoid care when needed, often due to inability to pay, including lack of insurance [18].

Second, racial and ethnic minorities may not have health insurance, which might explain some of the observed variation in service use. The pathways to accessing health services are best understood by examining the variations in insurance status [24]. In 2007, just over 16% of U.S. adults aged 18-65 were uninsured (Collins & Nicholson, 2010). The prevalence rate of uninsured young adults is the highest of all age categories. A report from the Commonwealth Fund states that 13.7 million adults aged 19-29 were uninsured in 2008 [25]. According to past studies, there are significant differences in insurance status by race: Black and Hispanic young adults are less likely to have insurance compared with White young adults[26].

Research Aims and Hypotheses

The aims of this study are (a) to determine whether multiracial American young adults use health services at the same rate as monoracial majority or monoracial minority groups and (b) to determine whether differences in utilization persist when access-related barriers to services are taken into account. Thus two hypotheses are tested:

H1: Self-identified multiracials will report less service utilization compared with monoracial groups. Furthermore, the difference will remain after adjusting for health problems and health behaviors.

H2: Self-identified multiracials will report less service utilization even when service-related barriers are taken into account.

The central aim of this study is to provide evidence toward a better understanding of how multiracial Americans interact with our current health care system and the implications for health policy and practice in a multiracial society.

Methods

Sample

This study makes use of a standard set of questions from a longitudinal study of adolescents conducted in the United States and includes comprehensive demographic measures in addition to health behaviors, biological measures, and social factors. The data used in this study are from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative school-based probability sample of Americans. Researchers began collecting data on social and behavioral factors for Add Health, a study of youth, in 1994. The details of the sample design have been described elsewhere (Harris, 2011). The sample was taken from a stratified probability sample of 132 schools in the United States. The original sample included

more than 90,118 students, and some respondents were selected for in-home interviews with youth and their parents. In the Add Health sample, 20,774 respondents were included in the in-home interview. The response rate was 79%. Data for the present study were drawn from Waves 1, 3, and 4 of Add Health. Wave 1 (n = 20,745) was collected in 1994, Wave 3 (n = 15,197) was collected in 2002, and Wave 4 (n = 15,701) was collected in 2008. For this study, I used a subset of Wave 4 non-Hispanic respondents from all three waves. Due to my interest in population estimates, I excluded respondents whose Wave 4 sampling weights were unavailable. I also excluded those with missing data for any of the independent and control variables, which leaves a remaining sample of 7,861when weights are applied.

Dependent Variable Measures

The dependent variable measures in this study are intended to capture health care service utilization and include the following: (a) routine annual physical exam, (b) annual oral health exam, and (c) mental health counseling session. The dependent measures were drawn from Wave 4, which had respondents aged 24 to 33 years old. The annual physical exam question (*How long ago did you last have a routine check-up?* Responses were categorical, ranging from less than 3 months to more than 2 years) is coded as a dichotomous variable (0 = no, more than 12 months; 1 = yes, less than or equal to 12 months). The annual oral health exam question (*In the past 12 months have you had a dental examination by a dentist or dental hygienist*?) is coded as a dichotomous variable (0 = no, 1 = yes). The mental health counseling question (*In the past 12 months have you received psychological or emotional counseling*?) is coded as a dichotomous variable (0 = no, 1 = yes).

Independent Variable Measures

The main independent variable is a composite variable of race taken from Waves 1 and 3. Since Add Health's beginnings in 1994, respondents have had the option of selecting one or more racial group (What is your race? You may give more than one answer.). Those reporting more than one race were asked to then select a single-best race category (*Which one category best describes your racial background?*). Additionally, interviewers were asked to assign race for each respondent from observation alone. Respondents who self-categorized more than one race are considered multiracial. The race categories include the following: White (reference), Black, American Indian, Asian, Other Race, and Multiracial.

Covariate Measures

The remaining covariate measures are grouped into sociodemographic characteristics, health status and health behaviors, and access-related barriers.

Demographic Controls

The sociodemographic characteristics include mean age, gender, education, parents' education, partner status, and nativity. Age is a continuous measure that ranges from 24 to 33 years. Studies on the access to health services and service utilization found that there are differences among ethnic groups and across age groups. Gender is a dichotomous measure taken from Wave 1, coded as 1 = male and 2 = female. Male is the reference group. Parents' education is taken from the parent survey in Wave 1, specifically the responses of the female caregiver who was present at the time of the survey and completed the interview. Responses are coded as 1 = less than high school, 2 = high school diploma, 3 = college degree or more.

Health and Health Behaviors

Health status is captured using three measures of health. Functional impairment (use of cane, walker, or wheelchair) at the time of the interview is presented as limited abilities (0 = no,

1 = yes). Past studies have found varying rates of health utilization by adverse health conditions and disability status. Gum disease or tooth decay are a 30-day measure (*Have you had gum disease* [gingivitis, periodontal disease] *or tooth loss because of cavities in the last 4 weeks?*) and is coded as a dichotomous measure (0 = no, 1 = yes). Depression is a self-report measure (*Has a doctor, nurse, or other health care provider ever told you that you have or had depression?*) and is dichotomous (0 = no, 1 = yes). Approximately 15% of the full sample answered yes to the depression question. The health behaviors included are heavy alcohol use (five drinks for men and four drinks for women in one day, a 30-day measure) and substance use (any illicit drug use in a 30-day period).

Access-Related Barriers to Care

The access-related barriers to care are captured using insurance status, sporadic insurance coverage, and care seeking. Insurance coverage is taken from Wave 4 of the data (*Which of the following best describes your current health insurance situation?*) and is a dichotomous measure (0 = no insurance or don't know and 1 = yes, insured). Sporadic insurance is used to capture gaps in insurance over a 1-year period (*Over the past 12 months, how many months did you have health insurance?*); responses less than 12 months are coded as sporadic insurance (0 = no, 1 = yes). Gaps in coverage are documented and associated with reduced service use. Last, care seeking is measured using a question from Wave 4 (*Has there been a time in the past 12 months when you thought you should get medical care, but you did not?*) and coded as 0 = no, 1 = yes.

Analyses

Univariate analysis will be used to describe demographic and health status characteristics. Multivariate logistic regression will be used to find variations in health service utilization. All analyses were conducted using STATA software version SE 10.1 (Stata Corp., College Station,

TX). Given the sampling frame I used Wave 4 grand sampling weights by Stata's "svy" command to account for the general population in 2008, when respondents were aged 24-33 years old. This weighting technique accounts for the sampling technique (oversampling) and inconsistencies in response across four waves of data. Racial differences among the dependent variables were tested using univariate and multivariate analyses. My analysis proceeds in three steps. First, I will provide sample characteristics by racial group. Second, I will provide the prevalence estimates of health service utilization and need for services (including physical/primary care, oral health, and mental health). Third, I will present multivariate logistic regression models that will reveal whether differences in health care utilization are explained by health status, health behaviors, and access-related barriers. A p value less than .05 is considered significant in this study. I used a design-based Wald test to account for significance.

Ethics Approval

Add Health study procedures were approved by the Human Subjects Review Committee at the University of North Carolina, Chapel Hill. The present study was approved by the Center for Studies in Demography and Ecology at the University of Washington under contractual agreement from the Carolina Population Center at the University of North Carolina, Chapel Hill.

Results

Univariate Analysis

Table 1 reports the sample sociodemographic characteristics. The average age of respondents in the sample was 27 years of age. The difference in age by race was not significant (p = .42). There were not significant differences in the distribution of gender by race (p = .14). There were significant differences by race on the proportions of mothers who achieved each level of education. For example, mothers of Asian respondents reported the highest proportion

(42%) of college attainment ($p < .001$). The majority of respondents were employed, yet no significant racial differences were found ($p = .35$). There were differences in nativity by race in that 50% of Asian respondents and 16% of Other Race respondents were foreign born ($p < .001$). There were significant differences by race in the proportions of educational attainment. Those who reported less than a high school education varied across racial groups: 19% Native American, 13% Multiracial, and 13% Black. The proportion of college graduates by race were 40% Asian, 30% Other, 28% Multiracial, 17% Black, and 5% Native American respondents. Partner status was different in proportion by race: 37% Native American, 32% Multiracial, 31% White, 22% Black, 21% Asian, and 13% Other were in a cohabitating relationship. There were differences in the proportion of limited abilities, with Native Americans (14%) and multiracials (5%) reporting limited ability more often than respondents of other races. There were differences found in the proportion of respondents with gum disease or tooth loss, with Native Americans (9%) and Multiracials (6%) reporting these conditions most.

Multivariate Analysis

Table 2 presents findings from the multivariate logistic regression. This analysis was used to test two hypotheses related to health care service use. First, I sought to learn whether multiracial respondents reported less service use compared with monoracial respondents. As found in Table 2, Model 1 examines the association between race and three measures of health services use while controlling for demographic factors. In Model 1 there is not a statistically significant difference between the single multiracial group and monoracial White respondents for use of primary care, oral health, or mental health care. However, a closer examination of specific multiracial categories reveals that differences do exist for some multiracial subgroups. In Model 1 Black-White multiracial young adults are less likely to report primary care service use (odds

ratio [*OR*] = 0.46, 95% confidence interval [CI] [0.24-0.89]) compared with White monoracial respondents. Additionally, Black-Native American multiracial young adults are less likely to report primary care service use (*OR* = 0.29, 95% CI [0.11-0.80]) compared with White monoracial young adults. Model 1 also reveals statistical significant differences for three monoracial minority groups in that Black and Native American young adults are less likely to report an annual oral exam and Black and Asian young adults are less likely to report mental health service use.

Model 2 yields a similar set of results. At first examination of the multiracial group there were not statistically significant differences for primary, mental health, and oral health service use compared with White respondents. A more specific examination of multiracial categories reveals that, similar to Model 1, Black-White respondents were less likely to have a routine physical exam (*OR* = 0.49, 95% CI [0.29-0.91]), and differences remained after adjusting for health status and health behaviors. Black-Native American respondents were also less likely to have a routine physical compared with White respondents, and differences remained after adjusting for health status and health behaviors (*OR* = 0.29, 95% CI [0.11-0.81]). In Model 2 the differences remain where Black and Native American monoracial young adults were less likely to report oral health care compared with White monoracial adults. Asian young adults were less likely (*OR* = 0.39, 95% CI [0.16-0.94]) to report mental health service use compared with monoracial White young adults.

Second, I proposed an additional hypothesis positing that access-related barriers to care might explain some of the differences in health care services utilization. To test this hypothesis I included health insurance status (Model 3) and care seeking (Model 4) in my analysis. When health insurance is included in the analysis the effect sizes remain similar. Multiracial young

adults as a group are not statistically significantly different compared with White monoracial young adults. However, when examining specific multiracial subgroups, Black-White multiracial young adults (*OR* = 0.41, 95% CI [0.19-0.90]) and Black-Native American young adults (*OR* = 0.24, 95% CI [0.09-0.63]) are less likely to report a routine check-up compared with White monoracial young adults. Additionally in Model 3, after accounting for insurance, the patterns remain and the Black monoracial young adults (*OR* = 0.70, 95% CI [0.62-0.82]) and Native American monoracial young adults (*OR* = 0.26, 95% CI [0.09-0.78]) are less likely to report an annual oral health exam compared with White monoracial young adults. I also found that Asian monoracial young adults are less likely than White monoracial young adults to report mental health service use (*OR* = 0.38, 95% CI [0.16-0.92]) after accounting for health insurance.

Table 3 shows the source of usual care reported in the sample. There were statistically significant differences based on where respondents obtained care: design-based $F(13.70, 1753.74) = 7.4085$, $p < .001$. Private doctor offices were the prime service location in these proportions for young adults of different races: Other Race (64%), Multiracial (48%), White (54%), Asian (43%), Black (34%), and Native American (16%). In contrast, 29% of Black, 13% of Multiracial, 10% of White, 6% of Native American, and 4% of Other Race young adults obtained their usual care in hospital emergency rooms (see Figure 1).

Discussion

To my knowledge, there is no published, comprehensive analysis of the disparities that young adult multiracial Americans experience in medical, oral health, and mental health service utilization and access-related barriers to care. In this study I analyzed nationally representative data to investigate health service utilization for young adults living in the United States. The results generally were consistent and add to past studies showing that there are racial differences

in health insurance status for American young adults [6, 18, 27]. Notably, I did not find significant differences when multiracial respondents were compared as a single group with White young adults. However, when I examined specific multiracial groups I did find differences between Black-White and Black-Native American young adults compared with White young adults. In the first model I found that Black monoracial and Asian monoracial reported less mental health service use than White monoracial young adults. I did not find differences for multiracial young adults compared with White monoracial respondents. These findings also align with current research suggesting low rates of mental health service use for African Americans and Asian Americans compared with White Americans [6]. In the fully adjusted model I found significant differences in the frequency routine medical exams for some specific multiracial subgroups compared with White monoracial young adults. Therefore, this study complements the existing literature through direct comparisons of monoracial to specific multiracial groups of young adults, which has not been made in the past.

My second hypothesis posited that multiracial young adults would report less service use when access-related barriers were taken into account. Accordingly, I examined racial differences in access-related barriers to care and service utilization in a nationally representative sample of young adults in the United States. Access to preventive and treatment services including primary, mental, and oral health are of particular importance for the growing number of young adults in the United States. In my analyses I accounted for insurance coverage, sporadic insurance, and care seeking. I did not find that inclusion of these factors explained the differences in effect. After accounting for these factors, differences remained for specific multiracial subgroups compared with White monoracial young adults. Recent studies found that lack of insurance is a determinant of health care utilization for adults in the United States [21, 28]. Future studies could

investigate the pathways in which insurance might affect health care service use for multiracial adults in the United States. This analysis also found that there are differences by race for young adults not seeking care when they need it [18]. Future studies could include specific multiracial categories to see whether there are differences for specific groups in terms of not using care when needed. Last, this illustrates that research on health care utilization of young adults in the United States has not kept pace with the changing demographic transition and implications for multicultural practice settings.

Limitations

There are several limitations in this investigation that should be acknowledged. First, the data in this study are all self-reported. A recent study on Add found that nearly one in five of the respondents in the sample met the criteria for hypertension using measurement of systolic and diastolic blood pressure; whereas, the proportion of the sample that reported a past diagnosis of hypertension was only 11% overall. Second, I do not have medical records or clinical data to confirm health care service use or insurance status over the 12-month period. Third, data were drawn from a school-based, stratified probability sample. Therefore, this study only captures respondents who were once enrolled in school.

Conclusions

Differences in access to care and utilization of health services remain one of the most alarming health disparities. Despite this distinction, little evidence identifies the rates of service use and access to care for young adults in the United States. This study makes a contribution to existing literature by providing findings on the health of an age cohort of young adults. Data provided on the health of young adults are often grouped with those of older adults. A series of studies on health during young adulthood has concentrated on a cohort aged 18-52. Future

studies are needed to examine the patterns of adult service use and insurance status across the age distribution. Furthermore, this study provides an in-depth analysis of the health service use of multiracial Americans with the introduction of specific multiracial subgroups. Given recent trends in American demography and increases in multiple race self-categorizations, multiracial young adults are a significant population of interest. Now more than ever we need to take multiracial patterns of health care utilization and barriers to service use into account. Future research on multiracial young adults should examine the role of self-categorization over time and implications for service use.

Competing Interests

The author declares that they have no competing interests.

Author Contribution

KT designed and carried out the study including writing of the manuscript and conducting analyses.

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Table 1

Selected Characteristics of Add Health Sample According to Race (N = 7,296)

Characteristic	**Sample Mean or Weighted Proportion for Each Racial Group**						***p***
	White	Black	Native	Asian	Other	Multiracial	
Mean age, y	27.88	27.87	27.87	28.40	28.39	27.77	.42
Male gender	49%	49%	70%	55%	51%	53%	.14
Mother's Highest Education							<.001
Less than high school	13%	21%	30%	29%	31%	21%	
High school	58%	57%	56%	29%	45%	54%	
College	29%	22%	14%	42%	24%	25%	
Respondents Highest Education							<.001
Less than high school diploma	7%	13%	19%	2%	5%	13%	
High school	15%	22%	51%	10%	3%	18%	
Some college	9%	10%	9%	8%	8%	10%	
Vocational training	33%	32%	14%	28%	48%	32%	
College graduate	28%	17%	5%	40%	30%	22%	
Graduate or professional degree	7%	4%	1%	10%	7%	5%	
Partner Status Wave 4							<.001
Not married or cohabitating	69%	78%	64%	79%	86%	67%	
Married or cohabitating	31%	22%	37%	21%	13%	32%	
Nativity							<.001
U.S. born	99%	99%	98%	50%	84%	99%	
Not U.S. born	1%	1%	2%	50%	16%	1%	
Health & Health Behaviors							
Has limited abilitie	3%	3%	14%	2%	2%	5%	<.02
Gum disease/tooth loss (30 day)	3%	3%	9%	2%	2%	6%	<.01
Depression	19%	8%	8%	9%	12%	21%	<.0001
Substance use	28%	5%	12%	16%	10%	25%	<.0001
Heavy alcohol	16%	7%	43%	8%	6%	18%	<.0001
Insured for 12 months	80%	71%	71%	84%	76%	72%	<.0001
Sporadically insured in past year	70%	57%	57%	74%	64%	62%	<.0001
Did not seek care when needed	23%	29%	19%	24%	15%	32%	<.01

Figure 1

Table 2

Multivariate Logistic Regression, Health Service Use of Primary, Oral, and Mental Health Services Among Young Adults in the United States, Add Health Sample 1994-2008

	Model 1			**Model 2**			**Model 3**			**Model 4**		
	Medical *OR* 95% CI	**Oral** *OR* 95% CI	**Mental** *OR* 95% CI	**Medical** *OR* 95% CI	**Oral** *OR* 95% CI	**Mental** *OR* 95% CI	**Medical** *OR* 95% CI	**Oral** *OR* 95% CI	**Mental** *OR* 95% CI	**Medical** *OR* 95% CI	**Oral** *OR* 95% CI	**Mental** *OR* 95% CI
Variables												
Single Race												
White	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Black	0.51*** 0.42-0.63	0.69*** 0.59-0.81	0.51*** 0.36-0.73	0.56*** 0.46-.67	0.64*** 0.55-0.75	0.80 0.54-1.20	0.49*** 0.40-0.60	0.70*** 0.60-0.82	0.85 0.56-1.27	0.48*** 0.39-0.59	0.72*** 0.61-0.84	0.84 0.55-1.27
Native American	1.36 0.55-3.39	0.34** 0.15-0.79	0.78 0.32-1.87	1.38 0.53-3.59	0.29** 0.11-0.76	1.27 0.60-2.67	1.42 0.56-3.60	0.26* 0.09-0.78	1.27 0.57-2.80	1.46 0.54-3.91	0.26** 0.09-0.72	1.28 0.59-2.80
Asian	0.99 0.71-1.38	0.94 0.66-1.35	0.30*** 0.14-0.68	1.01 0.72-1.41	0.90 0.63-1.28	0.39* 0.16-0.94	1.05 0.73-1.52	0.86 0.59-1.24	0.38* 0.16-0.92	1.04 0.72-1.50	0.87 0.60-1.25	0.37* 0.15-0.90
Other	1.09 0.48-2.50	0.85 0.41-1.79	0.41 0.10-1.75	1.17 0.51-2.70	0.82 0.39-1.72	0.51 0.10-2.69	1.10 0.48-2.53	0.89 0.42-1.89	0.54 0.10-2.85	1.12 0.48-2.61	0.88 0.41-1.85	0.54 0.10-2.86
All multiracial	0.87 0.65-1.15	0.87 0.64-1.16	1.23 0.83-1.83	0.88 0.66-1.18	0.83 0.62-1.11	1.21 0.80-1.84	0.84 0.63-1.13	0.85 0.63-1.15	1.21 0.79-1.84	0.82 0.61-1.11	0.87 0.64-1.18	1.20 0.79-1.82
Specific Multiracial												
Black-White	0.46* 0.24-0.89	0.81 0.43-1.52	1.03 0.44-2.43	0.49* 0.29-0.91	0.81 0.43-1.53	1.19 0.49-2.92	0.41* 0.19-0.90	0.93 0.46-1.90	1.22 0.49-3.01	0.40* 0.17-0.90	0.95 0.46-1.97	1.20 0.49-2.95
Native American-White	1.02 0.72-1.45	0.88 0.61-1.27	1.42 0.90-2.24	1.04 0.73-1.48	0.83 0.58-1.19	1.38 0.81-2.34	1.04 0.73-1.48	0.82 0.56-1.19	1.40 0.83-2.36	1.01 0.70-1.44	0.84 0.57-1.24	1.37 0.81-2.32
Asian-White	1.32 0.58-3.00	0.72 0.37-1.39	1.00 .38-2.65	1.34 .61-2.93	.75 .38-1.47	.72 .25-2.09	1.23 .52-2.94	.85 .45-1.59	.36 .21-1.90	1.24 0.53-2.90	0.85 0.45-1.60	0.65 0.22-1.95
Other-White	0.24 0.02-2.96	0.86 0.13-5.74	1.49 0.18-12.68	0.21 0.02-2.60	0.90 0.13-6.40	1.04 0.14-7.55	0.21 0.02-2.05	0.85 0.10-7.56	1.05 0.18-6.22	0.22 0.02-2.25	0.80 0.09-6.95	1.08 0.18-6.48
Black-Native American	0.29* 0.11-0.80	1.07 0.51-2.26	0.50 0.13-1.92	0.29* 0.11-0.81	0.93 0.41-2.10	0.98 0.25-3.83	0.24** 0.09-0.63	1.06 0.47-2.39	1.00 0.26-3.92	0.23*** 0.09-0.63	1.05 0.47-2.37	1.01 0s.26-3.94

Table 2
Multivariate Logistic Regression, Health Service Use of Primary, Oral, and Mental Health Services Among Young Adults in the United States, Add Health Sample 1994-2008

Demographic Factors												
Gender	0.39*** 0.34-0.45	1.36 1.21-1.54	1.75*** 1.41-2.18	0.42*** 0.37-0.49	1.42*** 1.25-1.61	1.26* 1.01-1.56	0.43*** 0.37-0.50	1.36*** 1.19-1.56	1.23 0.99-1.52	0.43*** 0.37-0.49	1.37*** 1.19-1.56	1.23 0.99-1.53
Age	0.98 0.94-1.03	1.06 1.02-1.10	1.02 0.96-1.09	0.99 0.95-1.03	1.06*** 1.02-1.11	1.03 0.96-1.11	1.00 0.96-1.05	1.05* 1.01-1.10	1.03 0.96-1.11	1.00 0.96-1.05	1.05* 1.01-1.10	1.03 0.96-1.17
Mother's education	1.10 0.99-1.22	1.19 1.08-1.31	1.02 0.84-1.25	1.10 .99-1.22	1.20*** 1.09-1.32	1.01 0.82-1.25	1.14* 1.02-1.27	1.17*** 1.06-1.29	.99 0.80-1.23	1.14* 1.02-1.28	1.17*** 1.06-1.29	0.99 0.80-1.24
Education	0. 92*** 0.88-0.97	1.26 1.20-1.33	1.01 0.92-1.12	0.93 0.88-0.98	1.26*** 1.19-1.33	1.09 0.99-1.20	1.01 0.95-1.06	1.16*** 1.10-1.23	1.06 0.96-1.17	1.01 0.96-1.06	1.16*** 1.10-1.23	1.06 0.96-1.17
Nativity	0.88 0.59-1.32	0.94 0.58-1.53	1.01 0.39-2.59	0.87 0.57-1.31	0.94 0.57-1.53	1.13 0.40-3.19	0.94 0.63-1.42	0.84 0.50-1.40	1.06 0.37-3.02	0.94 0.63-1.41	0.84 0.51-1.40	1.06 0.37-3.01
Partner status	0.90 0.78-1.04	0.96 0.82-1.13	0.93 0.74-1.18	0.91 0.79-1.05	0.95 0.81-1.11	0.91 0.71-1.17	0.93 0.80-1.07	0.93 0.79-1.09	0.89 0.69-1.15	0.92 0.80-1.07	0.93 .80-1.09	0.89 0.69-1.14
Health & Health Behaviors												
Ability status				0.76 0.53-1.09	1.52* 1.09-2.13	1.20 .74-1.93	0.78 0.55-1.11	1.46* 1.02-2.09	1.21 0.75-1.95	0.77 0.54-1.10	1.48* 1.03-2.14	1.20 0.74-1.94
Gum disease				1.06 0.72-1.56	2.43*** 1.60-3.69	0.82 0.42-1.60	0.96 0.65-1.42	3.02*** 1.94-4.71	0.91 0.47-1.76	0.90 0.61-1.35	3.23*** 2.03-5.14	0.88 0.45-1.70
Depression				0.81* 0.66-0.99	0.74*** 0.64-0.87	8.15*** 6.37-10.42	0.78** 0.64-0.95	0.76*** 0.66-0.87	8.35*** 6.54-10.68	0.75** 0.61-0.92	0.78*** 0.68-0.90	8.23*** 6.41-10.5
Heavy alcohol use				1.36** 1.1-1.69	1.03 0.87-1.22	0.78 0.54-1.11	1.36** 1.08-1.70	1.06 0.89-1.25	0.79 0.55-1.12	1.34** 1.07-1.68	1.07 0.90-1.27	0.78 0.55-1.12
Drug use				1.33*** 1.13-1.56	0.82** 0.70-0.96	1.59*** 1.19-2.12	1.21* 1.03-1.42	0.91 0.78-1.07	1.68*** 1.27-2.23	1.19* 1.01-1.40	0.93 0.79-1.09	1.67*** 1.25-2.21

Table 2

Multivariate Logistic Regression, Health Service Use of Primary, Oral, and Mental Health Services Among Young Adults in the United States, Add Health Sample 1994-2008

Access-Related Barriers												
Insurance status							2.09*** 1.67-2.60	0.57*** 0.46-0.70	0.92 0.63-1.34	2.10*** 1.68-2.62	0.57*** 0.46-70	0.93 0.64-1.35
Insured <12 mo.							1.41*** 1.13-1.75	0.54*** 0.46-0.63	0.66* 0.47-0.92	1.32** 1.06-1.65	0.57*** 0.49-0.67	0.63** 0.45-0.90
Did not seek care										1.34*** 1.16-1.56	0.75*** 0.65-0.86	1.14 0.88-1.48

Note. $N = 7{,}296$; $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Table 3
Health Care Service Use Add Health Sample (N = 7,296)

Use of Service in Past 12 Months	**Weighted Proportion for Each Racial Group**						***p***
	White	Black	Native	Asian	Other	Multiracial	
Usual Care							<.001
No need—not sick	6%	5%	0%	8%	3%	6%	
Hospital clinic	13%	15%	27%	21%	4%	14%	
Hospital emergency room	10%	29%	6%	6%	7%	12%	
Community health center	9%	8%	45%	9%	13%	11%	
HMO	2%	2%	0%	8%	5%	4%	
Private doctor	54%	34%	16%	43%	63%	47%	
School, work, or military clinic	4%	3%	2%	3%	4%	4%	
Other place	2%	2%	4%	3%	1%	2%	
Routine physical (12 month)	43%	30%	57%	45%	46%	58%	<.001
Mental health care (12 month)	11%	6%	8%	4%	5%	13%	<.001
Dental visit (12 month)	58%	46%	24%	59%	55%	51%	<.001