Racial Disparities in Access to Health Care and Preventive Services between Asian Americans/Pacific Islanders and Non-Hispanic Whites

Xiao-Jun Wen, MD; Lina Balluz, ScD, MPH

Objective: Large-scale comparison and comprehensive estimate on the access to health care and preventive services between Asian Americans/Pacific Islanders (AAPIs) and Non-Hispanic Whites (NHWs) has not been available. This study examines the racial disparities in access to health care and preventive services between AAPIs and NHWs in the USA.

Methods: Cross-sectional study of access to health care and preventive services among AAPIs compared to NHWs, using data from Behavioral Risk Factor Surveillance System 2005 to 2007 among 908,154 respondents aged ≥18 years.

Results: The percentages of AAPIs (aged ≥18 years) who reported having a personal healthcare provider, a Pap test (women aged ≥18), a fecal occult blood test (aged ≥50) a sigmoidoscopy/colonoscopy (aged ≥50), a PSA test (men aged ≥40), blood cholesterol checked (aged ≥18 yrs), and pneumococcal vaccination (aged ≥65 yrs) were 76.7%, 83.1%, 27.5%, 47.5%, 35.5%, 74.2%, and 51.2%, respectively. Compared to NHWs, AAPIs were significantly less likely to have a personal health care provider (adjusted odds ratio: 0.69 [95% confidence interval: 0.63–0.75]), a Pap test (0.18 [0.13–0.28]), a fecal occult blood test (0.50 [0.39–0.63]), a sigmoidoscopy/colonoscopy (0.64 [0.50–0.81]), a PSA test (0.35 [0.26–0.47]), blood cholesterol checked (0.71 [0.64–0.80]), and pneumococcal vaccination (0.52 [0.42–0.65]).

Conclusion: This study suggests that disparities exist between AAPIs and NHWs in 1 of 4 selected health care access indicators and 6 of 8 selected preventive services. (*Ethn Dis*. 2010;20:290–295)

Key Words: Health Disparity, Access to Health Care, Access to Preventive Services, Asian Americans and Pacific Islanders

From Northrop Grumman Information Technology/Business Computer Applications, Centers for Disease Control and Prevention Information Technology Support (XJW) and Behavior Surveillance Branch, National Center for Chronic Disease Prevention, Division of Adult and Community Health, Centers for Disease Control and Prevention (LB).

Address correspondence to Xiao-Jun Wen, MD; Epidemiologist; 1600 Clifton Road, NE, MS-E46; Atlanta, GA 30329-2013; 404-639-3455; 404-639-8640 (fax); tzw4@cdc.gov

Introduction

Based on the US Census Bureau population estimates for 2005 through 2007, Asian Americans or Pacific Islanders (AAPIs) number about 15.3 million, about 5.2% of the total US population.[1] They are the third largest minority group in the United States. The AAPI group is extremely diverse in ethnicity, representing more than 60 different ethnic groups that speak more than 100 different languages.[2]

Health disparities are preventable differences in the burden of disease, injury, and violence, or opportunities to achieve optimal health experienced by socially disadvantaged racial, ethnic, and other populations and communities.[3] In the United States, there have been many studies on disparities in access to health care among African Americans and Hispanic Americans.[4–10] Although there also have been many studies on the health disparities among AAPIs,[11–16] they were mainly small scale or focused studies among specific subpopulations[17,18] of AAPIs on disparities in the presence of disease,[15] health outcomes,[15] or access to health care[12,14,16] and prevention services.[11,19] Updated large scale comparisons and comprehensive estimates on the access to health care and preventive services between AAPIs and non-Hispanic Whites (NHWs) have not been available. Our objective was to examine if there was any racial disparity in access to health care and prevention services between AAPIs and NHWs.

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Methods

The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based, random-digit-dialed telephone survey of the US civilian, noninstitutionalized population aged ≥18 years. Trained interviewers collect data on a monthly basis using an independent probability sample of households with landline telephones. The characteristics and advanced survey design of the BRFSS and random sampling have been described elsewhere.[20–23]

Assessment of the Access to Selected Healthcare Indicators

The measurement of healthcare coverage was done by asking "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?"

Having a personal care provider was assessed by asking, "Do you have one person you think of as your personal doctor or healthcare provider?"

No access to medical care at some point during the preceding 12 months was estimated by asking, "Was there a time in the past 12 months when you needed medical care, but could not get it?"

Having a routine checkup (a general physical exam, not an exam for a specific injury, illness, or condition) within last 2 years was assessed by asking, "About how long has it been since you last visited a doctor for a routine checkup?"

The above questions were part of the core questionnaires and the sample included all 50 states, DC, Puerto Rico and the Virgin Islands for all 3 years.

Assessment of Selected Preventive Services

Screening for breast cancer among women aged ≥40 years was assessed by asking, "A mammogram is an x-ray of each breast to look for breast cancer. Have you ever had a mammogram?" In the year 2005 and 2007, this question was asked in an optional module where only 12 states or US territories participated. In 2006, it was asked in the core questionnaire where all 50 states, DC, and Puerto Rico participated in the survey. All of the above data were used for this analysis variable.

Screening for cervical cancer by a Pap test among women aged ≥18 years was assessed by asking, "A Pap test is a test for cancer of the cervix. Have you ever had a Pap test?" In 2005 and 2007, it was asked in an optional module where only a few states participated and in 2006, in the core questionnaire where all 50 states, DC, Puerto Rico, and the Virgin Islands participated. All of the above data were used for this analysis variable. Women who had had a hysterectomy were excluded from our study.

Screening for colorectal cancer among adults aged ≥50 years was assessed by asking the following 2 questions: "A blood stool test is a test that may use a special kit at home to determine whether the stool contains blood. Have you ever had this test using a home kit?" and "Sigmoidoscopy and colonoscopy are exams in which a tube is inserted in the rectum to view the colon for signs of cancer or other health problems. Have you ever had either of these exams?" In 2005 and 2007, the 2 questions were asked in an optional module where only 9 states or U.S territories in 2005 and 10 in 2007 participated. In 2006, the 2 questions were asked in the core questionnaire where all 50 states, DC, and Puerto Rico participated in the survey. All of the above data were used for this analysis variable.

Screening for prostate cancer among men aged ≥40 years was assessed by asking, "A Prostate-Specific Antigen test, also called a PSA test, is a blood test used to check men for prostate cancer. Have you ever had a PSA test?" In 2005 and 2007, this question was asked in an optional module where only 2 states in 2005 and 5 in 2007 participated. In 2006, it was asked in the core questionnaire where all 50 states, DC, and Puerto Rico participated in the survey. All of the above data were used for this analysis variable.

Blood cholesterol checkup was assessed by asking respondents aged ≥18 years, "Blood cholesterol is a fatty substance found in the blood. Have you EVER had your blood cholesterol checked?" This question was asked among respondents from all 50 states, DC, and Puerto Rico in 2005 and 2007, but not in 2006. The 2005 and 2007 data were used this analysis variable.

Pneumococcal vaccination was assessed among adults aged ≥65 years from all 50 states, DC, and Puerto Rico in all 3 years by asking, "A pneumonia shot or pneumococcal vaccine is usually given only once or twice in a person's lifetime and is different from the flu shot. Have you ever had a pneumonia shot?" All of the above data were used for this analysis variable.

Influenza vaccination was assessed among adults aged ≥65 years from all 50 states, DC, and Puerto Rico in all 3 years by asking the following 2 questions: "A flu shot is an influenza vaccine injected into your arm. During the past 12 months, have you had a flu shot?" and "During the past 12 months, have you had a flu vaccine that was sprayed in your nose? The flu vaccine sprayed in the nose is also called FluMist™." Respondents were considered to have received the influenza vaccination if they responded "yes" for either one of the two questions. All of the above data were used for this analysis variable.

Data analysis

Sample weighting was conducted each year by age, sex, and race for each state with the census population estimates of the corresponding year.[24] A final weight was assigned for each record based on the weighting as described above. In this study, some of the final weights were recalculated for those variables that were in optional modules where the same variable might not have data for all 3 years in most of the participating states. In that case, the final weights were divided by 3 for the states with 3-year data and by 2 for the states with 2-year data for the same variable in our calculations of the weighted percentages and odds ratios.

Weighted percentages of access to healthcare and preventive services among AAPIs were then compared with that of NHWs. All percentages were adjusted for age and education by race based on the census population estimations from 2005 through 2007.[25] To adjust the percentage for the age and education by race, a new variable was created with categories by the age, education level and race and then each category was assigned an adjustment factor based on the population estimates from 2005 through 2007 for each category.

Crude and adjusted odds ratios (CORs and AORs) were obtained from univariate and multivariate logistic regression analyses. Adjusted odds ratios were adjusted for age, sex, education, marital status, and employment in our regression models with both sexes as study populations and adjusted for age, education, marital status and employment in the models with females or males only. Because of the complex sampling design in the BRFSS, we used the statistical analysis package SUDAAN, version 9.1 (Software for the Statistical Analysis of Correlated Data;

Table 1. Characteristics of U.S adults among Asian American and Pacific Islanders (AAPIs) and Non-Hispanic White (NHWs) Behavioral Risk Factor Surveillance System, 2005–2007

		AAPI	NHW
		% (95% CI)	% (95% CI)
	Sample Size (n=908,154)*	*n*=20,214	*n*=887,940
Sex			
Men	349,758	55.0 (53.5, 56.6)	48.8 (47.9, 48.3)
Women	558,396	45.0 (43.4, 46.5)	51.9 (51.7, 52.1)
Age group			
18–24	32,840	13.9 (12.5,15.4)	10.7 (10.5, 10.9)
25–34	94,506	24.1 (22.8, 25.5)	15.8 (15.6, 16.0)
35–44	147,267	24.4 (23.2, 25.7)	19.2 (19.0, 19.3)
45–54	189,555	17.8 (16.6, 18.9)	19.7 (19.6, 19.9)
55–64	184,174	10.5 (9.6,11.4)	15.1 (15.0, 15.2)
≥65	259,812	9.4 (8.5, 10.3)	19.5 (19.4, 19.6)
Education			
<High school	70,016	5.5 (4.7, 6.4)	7.2 (7.1, 7.3)
High school grad	275,106	14.8 (13.7, 16.0)	29.2 (29.0, 29.4)
Attended college or technical school	242,188	20.2 (18.8, 21.6)	27.4 (27.2, 27.5)
College degree or higher	319,198	59.5 (57.9, 61.1)	36.2 (36.0, 36.4)
Marital status			
Married	530,968	68.2 (66.6, 69.8)	64.1 (63.9, 64.3)
Previously married	278,988	9.6 (8.8, 10.5)	20.5 (20.3, 20.6)
Never married	95,998	22.2 (20.7, 23.7)	15.4 (15.2, 15.6)
Employment status			
Employed	501,116	67.4 (65.9, 68.9)	61.2 (61.0, 61.4)
Unemployed	28,566	5.7 (5.0, 6.5)	3.9 (3.8, 4.0)
Homemaker/student	87,640	16.0 (14.9, 17.3)	11.8 (11.7, 12.0)
Retired	239,867	9.1 (8.3, 10.1)	18.6 (18.5, 18.8)
Unable to work	48,805	1.8 (1.4, 2.3)	4.4 (4.3, 4.4)

n - unweighted sample size; % - weighted percentage; CI, confidence interval.
* sample size varies for each variable due to the missing values.

Research Triangle Institute, Research Triangle Park, NC) to calculate the weighted percentage, CORs, AORs, and 95% confidence intervals (CI).

RESULTS

There were 20,214 AAPI and 887,940 NHW respondents in the study. Compared to NHW, AAPI respondents were significantly younger and had a higher level of education. About 46% NHW and 62% AAPI participants were aged ≤44 years. Sixty-four percent NHWs and 80% AAPIs reported they attended college or technical school or had a college degree or higher. Other characteristics of the respondents by race are listed in detail in Table 1.

Table 2 shows that 3 out of 4 indicators for the healthcare access were similar for AAPIs and NHWs. They are healthcare coverage, being unable to obtain medical care with last 12 months and having routine checkup within last 2 years. However, only 76.7% AAPI respondents reported having a personal doctor, nurse, other health care provider, compared to 82.7% of NHWs ($P<.01$). The AAPIs reported significantly lower rates of utilization for 6 out of 8 prevention services when compared to NHWs ($P<.01$). (Table 2)

There were strong statistical associations between race and access to health care and prevention services among some selected indicators (Table 3). The COR for AAPIs compared to NHWs was 0.85 (95% CI, 0.76–0.94) for healthcare coverage and 0.61 (95% CI, 0.56–0.66) for having a personal doctor or healthcare provider.

We found that, compared to NHWs, AAPIs had substantially lower percentages of utilizing 6 out of 8 selected prevention services…

DISCUSSION

Our study provided a large scale nationwide assessment of access to health care and prevention services among

Table 2. Adjusted percentage of the access to health care and prevention services among Asian American and Pacific Islanders (AAPIs), compared to the non-Hispanic Whites (NHWs) – Behavioral Risk Factor Surveillance System, 2005–2007

	AAPI	NHW
	%* (CI)	%* (CI)
A. Access to health care		
1. Healthcare coverage	86.3 (85.1–87.5)	86.5 (86.3–86.7)
2. Having a personal healthcare provider	76.7 (75.1–78.2)	82.7 (82.6–83.0) †
3. Needed but unable to obtain medical care within previous 12 months	11.5 (10.4–12.6)	12.7 (12.5–12.8)
4. Having routine checkup within last 2 years	82.5 (81.2–83.7)	79.8 (79.6–79.9)
B. Preventive health services		
1. Ever had a mammography among women aged ≥40 years	86.2 (82.8–89.1)	89.0 (88.6–89.5)
2. Ever had a pap test among women aged ≥18 years with an intact uterus	83.1 (80.1–85.7)	94.4 (94.0–94.7) †
3. Ever had a fecal occult blood test among adults aged ≥50 years	27.5 (22.9–32.6)	41.3 (40.8–41.8) †
4. Ever had a sigmoidoscopy or colonoscopy among adults aged ≥50 years	47.5 (42.5–52.6)	55.9 (55.4–56.4) †
5. Ever had a PSA test among men aged ≥40 years	35.5 (31.5–39.7)	57.2 (56.6–57.9) †
6. Ever had blood cholesterol checked among adults aged ≥18 years	74.2 (72.5–76.0)	79.1 (78.8–79.3) †
7. Influenza vaccination in previous year among adults aged ≥65 years	72.1 (66.2–77.4)	68.9 (68.6–69.2)
8. Ever had pneumococcal vaccination among adults aged ≥65 years	51.2 (44.0–56.3)	68.0 (67.6–68.3) †

* percentage adjusted for age and education by race; CI = 95% Confidence Interval.
† $P<.01$.

AAPIs. In this study we found that, compared to NHWs, AAPIs had substantially lower percentages of utilizing 6 out of 8 selected prevention services including: 1) Pap test among women aged ≥18 years; 2) fecal occult blood test among adults aged ≥50 years; 3) sigmoidoscopy or colonoscopy among adults aged ≥50; 4) a PSA test among men aged ≥40 years; 5) blood cholesterol checked among adults aged ≥18; and 6) pneumococcal vaccination among adults aged ≥65 years. AAPIs were also 22% less likely to have healthcare coverage and 31% less likely to have a personal healthcare provider than NHWs. Our findings suggest that significant disparities in use of prevention services and to some extent in access to health care exist between AAPIs and NHWs in the United States.

Potential barriers to the use of health services among ethnic minorities can occur at the patient level, provider level and system level.[26] At the patient level, more than 20 potential barriers have been reported [26] including age,[27,28] sex,[28–30] marital status,[30–32] education,[31,33] social class and economic status,[28,32,34] culture,[35] language skills[28,31,35] and many more.[26] However, the relatively lower

Table 3. Odds ratio and adjusted odds ratio for the access to health care and prevention services among Asian American and Pacific Islanders

	COR % (CI)	AOR % (CI)
A. Access to health care coverage		
1. Health care coverage	0.85 (0.76–0.94)	0.78 (0.69–0.88) * ‡
2. Having a personal health care provider	0.61 (0.56–0.66)	0.69 (0.63–0.75) * ‡
3. Needed but unable to obtain medical care within previous 12 months	0.96 (0.86–1.06)	1.09 (0.98–1.22) *
4. Having routine checkup within last 2 years	1.04 (0.96–1.13)	1.20 (1.10–1.31)*
B. Preventive health services		
1. Ever had a mammography among women aged ≥40 years	0.67 (0.50–0.91)	0.60 (0.44–0.82)† ‡
2. Ever had a Pap test among women aged ≥18 years with an intact cervix	0.26 (0.20–0.35)	0.18 (0.13–0.28)† ‡
3. Ever had a fecal occult blood test among adults aged ≥50 years	0.52 (0.41–0.66)	0.50 (0.39–0.63)* ‡
4. Ever had a sigmoidoscopy or colonoscopy among adults aged ≥50 years	0.71 (0.57–0.88)	0.64 (0.50–0.81)* ‡
5. Ever had a PSA test among men aged ≥40 years	0.35 (0.27–0.44)	0.35 (0.26–0.47) † ‡
6. Ever had blood cholesterol checked among adults aged ≥18 years	0.65 (0.59–0.71)	0.71 (0.64–0.80)* ‡
7. Influenza vaccination in previous year among adults aged ≥65 years	1.02 (0.80–1.28)	0.97 (0.77–1.24)*
8. Ever had pneumococcal vaccination among adults aged ≥65 years	0.51 (0.41–0.62)	0.52 (0.42–0.65)* ‡

AOR - adjusted odds ratio; COR - crude odds ratio. All the CORs and AORs were calculated using non-Hispanic White as the referent in our logistic regression models. CI = 95% Confidence Interval.
* AOR adjusted for age, sex, education, marital status and employment.
† AOR adjusted for age, education, marital status and employment.
‡ COR or AOR with statistical significance ($P<.01$).

access to healthcare services among the AAPIs cannot be explained by the language barriers and education level because the AAPIs in this particular study were English-proficient and highly educated; almost 60% of them had a college degree or higher which was significantly higher than NHW respondents (36%). It may be more appropriate to explain the disparities by other obstacles such as cultural differences between them and their healthcare provider and the administrative complexity of health plans among other barriers. Such obstacles might place AAPIs at increased risk for diseases by not being able to obtain preventive services and good quality of care.

Since AAPIs in our study included many race/ethnic groups with extreme diversity in cultures and languages, barriers to the use of health services may differ greatly among different ethnic groups. For example, language may be a main obstacle for new immigrant Asian Americans with limited English skills for access to health care and prevention services while it may not be true for Native Americans from the Pacific Islands and US-born AAPIs with English as their native languages. Therefore, the extent of the health disparities and their causes may be different among the different ethnic groups of AAPIs. To identify such differences, studies with further analysis by subgroups of race/ethnicity are needed.

There are some limitations in our study. First, our survey was done in English, and any non-English speaking AAPIs were excluded, which created sampling bias. One of the direct results of this bias was the over sampling of the AAPIs with higher education level because they were more likely to have better English skills and hence had higher likelihood being interviewed in our survey. Almost 60% of AAPI respondents had a college degree or higher compared to about 44% to 48% in the census population estimates for the same time frame(from 2005 to 2007).[25] Since low education level is one of the barriers of the access to health care or services,[31,33] our estimates of the percentage of AAPIs who have access to health care and utilize preventive services may be overestimated. Although we adjusted for age and education level by race based on the census population estimates from 2005 through 2007,[25] overestimation could still exist due to this sampling bias. Therefore, access to health care and utilization of the preventive services among AAPIs could be overestimated and the actual gaps between the AAPIs and NHWs could be much larger.

Additionally, BRFSS is a landline telephone-based survey, so individuals with no telephones or with mobile telephones only were excluded, which may also result in sampling bias. Further, all of the data in the survey were self-reported and may be subject to recall bias. In spite of these limitations, our study has the following strengths: 1) reliable and valid estimates, which were demonstrated by very narrow ranges of the 95% confidence intervals among all the percentage, CORs and AORs; and 2) standardized data collections across time and among all states.

In summary, compared to NHWs, disparities existed with statistical significance in 1 of 4 selected indicators for the access to health care and 6 of 8 selected preventive services among AAPIs. This study suggests the need for appropriate measures to be implemented to improve AAPIs' access to health care and preventive services. Those measures might include using culturally appropriate programs to advise AAPIs about the importance of screening, adapting intervention programs proven to be effective with other populations, and targeting specific barriers to care such as poverty and healthcare professionals lack of knowledge about how best to encourage them to use those preventive services that are available.

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REFERENCES

1. US Census Bureaus. ACS demographic and housing estimates: 2005-2007. Available at: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2007_3YR_G00_DP3YR5&-ds_name=&-_lang=en&-redoLog=false&-format. Last accessed July 15, 2009.
2. Nelson A. Unequal treatment: confronting racial and ethnic disparities in health care. *J Natl Med Assoc*. 2002;94(8):666–668.
3. Centers for Disease Control and Prevention. Health disparities among racial/ethnic populations. April 9, 2008. Available at: http://www.cdc.gov/NCCDPHP/DACH/chaps/disparities/. Last accessed June 01, 2009.
4. National Center for Health Statistics. Lack of health insurance coverage and type of coverage. Available at: http://interdev2.nchs.cdc.gov/nchs/data/nhis/earlyrelease/200806_01.pdf. Last accessed July 15, 2009.
5. National Center for Health Statistics. Receipt of pneumococcal vaccination. Available at: http://www.cdc.gov/nchs/data/nhis/earlyrelease/200806_05.pdf. Last accessed July 15, 2009.
6. National Health Interview Survey, National Center for Health Statistics, Centers for Disease Control and Prevention. Receipt of influenza vaccination. Available at: http://www.cdc.gov/nchs/data/nhis/earlyrelease/200806_04.pdf. Last accessed July 15, 2009.
7. den Exter A. Access to health care. Solidarity and justice. *Med Law*. 2008;27(3):iii–v.
8. McGibbon E, Etowa J, McPherson C. Healthcare access as a social determinant of health. *Can Nurse*. 2008;104(7):22–27.
9. Roehr B. Americans are finding it harder to access health care. *BMJ*. 2008;337:a627.
10. Rooks RN, Simonsick EM, Klesges LM, Newman AB, Ayonayon HN, Harris TB. Racial disparities in health care access and cardiovascular disease indicators in Black and White older adults in the Health ABC Study. *J Aging Health*. 2008;20(6):599–614.
11. Chen JY, Diamant AL, Kagawa-Singer M, Pourat N, Wold C. Disaggregating data on Asian and Pacific Islander women to assess cancer screening. *Am J Prev Med*. 2004;27(2):139–145.
12. Choe JH, Taylor VM, Yasui Y, et al. Health care access and sociodemographic factors associated with hepatitis B testing in Vietnam-

ese American men. *J Immigr Minor Health*. 2006;8(3):193–201.
13. Chow JC, Jaffee K, Snowden L. Racial/ethnic disparities in the use of mental health services in poverty areas. *Am J Public Health*. 2003; 93(5):792–797.
14. Chui SY, Lyerly HK. Disparities in breast carcinoma treatment in Asian/Pacific Islander women. A challenge to the provider. *Cancer*. 2002;95(11):2257–2259.
15. Esperat MC, Inouye J, Gonzalez EW, Owen DC, Feng D. Health disparities among Asian Americans and Pacific Islanders. *Annu Rev Nurs Res*. 2004;22:135–159.
16. Hoffman C, Paradise J. Health insurance and access to health care in the United States. *Ann N Y Acad Sci*. 2008;1136:149–160.
17. Mays VM, Yancey AK, Cochran SD, Weber M, Fielding JE. Heterogeneity of health disparities among African American, Hispanic, and Asian American women: unrecognized influences of sexual orientation. *Am J Public Health*. 2002;92(4):632–639.
18. Kao TS. Ask the expert. Sexual health education disparities in Asian American adolescents. *J Spec Pediatr Nurs*. 2006;11(1): 57–60.
19. Ma GX, Tan Y, Toubbeh JI, et al. Asian Tobacco Education and Cancer Awareness Research Special Population Network. A model for reducing Asian American cancer health disparities. *Cancer*. 2006;107(8 Suppl): 1995–2005.
20. Mokdad AH, Stroup DF, Giles WH. Public health surveillance for behavioral risk factors in a changing environment. Recommendations from the Behavioral Risk Factor Surveillance Team. *MMWR Recomm Rep*. 2003;52 (RR-9):1–12.
21. Remington PL, Smith MY, Williamson DF, Anda RF, Gentry EM, Hogelin GC. Design, characteristics, and usefulness of state-based Behavioral Risk Factor Surveillance: 1981–87. *Public Health Rep*. 1988;103(4):366–375.
22. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. Available at: http://www.cdc.gov/brfss/index.htm. Last accessed July 15, 2009.
23. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System - historic questions. Available at: http://apps.nccd.cdc.gov/brfssQuest/. Last accessed July 15, 2009.
24. Centers for Disease Control and Prevention. BRFSS Annual Survey Data - survey data and documentation - BRFSS weighting formula. Available at: http://www.cdc.gov/brfss/technical_infodata/weighting.htm. Last accessed July 15, 2009.
25. U.S. Census Bureau. Current Population Survey. Available at: http://www.census.gov/population/www/socdemo/educ-attn.html. Last accessed July 15, 2009.
26. Scheppers E, van Dongen E, Dekker J, Geertzen J. Potential barriers to the use of health services among ethnic minorities: a review. *Fam Pract*. 2006;23(3):325–348.
27. Byrd TL, Mullen PD, Selwyn BJ, Lorimor R. Initiation of prenatal care by low-income Hispanic women in Houston. *Public Health Rep*. 1996;111(6):536–540.
28. Garrett CR, Treichel CJ, Ohmans P. Barriers to health care for immigrants and nonimmigrants: a comparative study. *Minn Med*. 1998;81(4):52–55.
29. Acheson D. Inequalities in health. Report on inequalities in health did give priority for steps to be tackled. *BMJ*. 1998;317(7173):1659.
30. McCormick KA, Cohen E, Reed M, Sparks S, Wasem C. Funding nursing informatics activities. Internet access to announcements of government funding. *Comput Nurs*. 1996;14(6):315–322.
31. Flores G, Vega LR. Barriers to health care access for Latino children: a review. *Fam Med*. 1998;30(3):196–205.
32. Jenkins CN, Le T, McPhee SJ, Stewart S, Ha NT. Health care access and preventive care among Vietnamese immigrants: do traditional beliefs and practices pose barriers? *Soc Sci Med*. 1996;43(7):1049–1056.
33. Smith MW, Kreutzer RA, Goldman L, Casey-Paal A, Kizer KW. How economic demand influences access to medical care for rural Hispanic children. *Med Care*. 1996;34(11):1135–1148.
34. Jones ME, Cason CL, Bond ML. Access to preventive health care: is method of payment a barrier for immigrant Hispanic women? *Womens Health Issues*. 2002;12(3): 129–137.
35. Smith GD, Shaw M, Mitchell R, Dorling D, Gordon D. Inequalities in health continue to grow despite government's pledges. *BMJ*. 2000;320(7234):582.