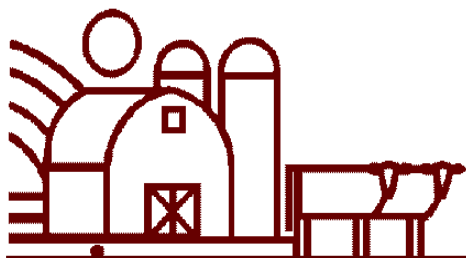


**Hypertension, Diabetes, Cholesterol, Weight, and
Weight Control Behaviors
Among Non-Metro Minority Adults**



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Hypertension, Diabetes, Cholesterol, Weight, and Weight Control Activities Among Non-metro Minority Adults

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Executive Summary

The 1998 National Health Interview Survey (NHIS) included a detailed examination of preventive health problems and behaviors. This report uses data from the 1998 NHIS to examine the prevalence of selected problems among rural populations, with an emphasis on rural minorities. “Rural” was defined, following NHIS guidelines, as living in a non-MSA county.

Self Reported Prevalence of Health Problems

Hypertension: Rural residents of all racial / ethnicity groups were more likely to report having been told they have hypertension than were metropolitan residents. The highest rates of reported hypertension were found among rural African Americans, one third of whom (34%) reported having high blood pressure.

Diabetes: Across non-metro residents, about seven percent of African Americans and seven percent of “other” race adults reported that they had diabetes.

Cholesterol: As a measure of the degree to which non-metro residents obtain needed clinical preventive services, we examined self-reported receipt of cholesterol screening.

Reported Weight and Weight Control Activities

Non-metro adults were more likely to be overweight or obese than were urban populations. Two thirds of non-metro African Americans were overweight or obese, and African Americans were more likely than all other racial / ethnicity groups to be severely obese. These conclusions are drawn from self-reported weight and height, which generally *underestimate* actual weight.

Across all race / ethnicity groups, non-metro residents were less likely to meet recommendations for regular, vigorous physical activity than were urban residents. Fewer than one in six non-metro African American (15%) or Hispanic (17%) adults meet the vigorous activity recommendations of the CDC and ACSM.

Three quarters of non-metro African American adults (74%), and seven of every ten Hispanic adults (69%), are sedentary. Within non-metro residents, minorities were more likely to be sedentary than were whites and, with the exception of adults of the “other” race, less likely to meet vigorous activity requirements.

Policy Recommendations

- The Secretary of the Department of Health and Human Services should direct the Community Preventive Services Task Force of the Centers for Disease Control and Prevention to explicitly assess the effectiveness of interventions directed at physical activity and nutrition among rural and minority populations. A rural sub-committee should be added to the Task Force for this purpose.
- The Secretary of Department of Health and Human Services should direct the Centers for Disease Control and Prevention to include rural, minority populations among priority groups targeted for prevention and intervention grants pertaining to nutrition and physical activity.

- The Secretary, DHHS, should provide incentives to all non-metro federal Community Health Centers (CHCs) to design and implement methods for clinical and community based interventions to promote screening and detection of hypertension, diabetes and hyperlipidemia. The Bureau of Primary Care, Health Resources and Services Administration, should include this criterion when assessing applications for new and expanded CHCs.

Recommendations for Further Research

- Targeted research is needed to define and demonstrate effective interventions for non-metro and minority communities. Most research into the effectiveness of weight loss and physical activity promotion programs takes place in urban settings.
- Additional research is needed to identify community screening and education programs for hypertension and hyperlipidemia that are effective in reaching rural, minority populations.
- Research is needed into the availability of physical education for grades K-12 in rural areas. Cutbacks in “optional” programming in financially stressed rural school districts may impair the access rural children have to age-appropriate physical activity promotion. Relatedly, small rural schools may not be able to offer a full range of team and life-style sports training. Identifying areas at highest risk for failing to provide appropriate physical education in schools is the first step in defining appropriate interventions.
- Research has shown that rural primary care practitioners are less likely to include clinical preventive services in a routine office visit than are urban physicians (e.g., *Probst, Moore, et al 2002*). Additional research is needed to identify office and clinic practices, such as use of nurses and other professionals that enhance the ability of rural physicians to provide these services.

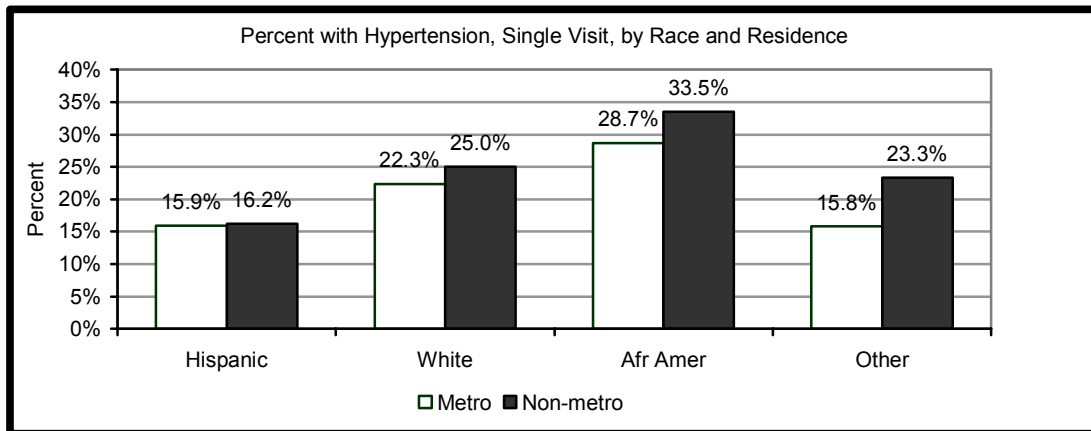
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Chapter One

HYPERTENSION

Rural residents were more likely to report having been told they have hypertension than were metropolitan residents. The highest rates of reported hypertension were found among rural African Americans, one third of who reported high blood pressure. Educational, screening and intervention efforts targeting this population are clearly needed. Educational efforts will need to reflect rural geography and cultural values for each population.



Persons with hypertension are at increased risk for coronary artery disease, congestive heart failure, transient ischemic stroke, stroke, renal failure, and retinopathy (*"The Sixth Report," 1997*). Heart disease and stroke continue to be the first and third leading causes of death, respectively, in the United States and impose an enormous financial burden (*"The Sixth Report," 1997*). The continued high prevalence of hypertension in the nation, the Southeast in particular, contributes to the cardiovascular disease burden (*"The Sixth Report," 1997*).

Numerous studies have identified socioeconomic status and other risk factors correlated with high blood pressure. Lower SES is strongly associated with the prevalence of high blood pressure among African Americans (*Levin et al, 2001; Basset et al, 2002; Dressler et al, 1998*). In addition, risk factors for many causes of mortality have long been documented to vary geographically (*Levin et al, 2001; Liff et al, 1991; Dressler et al, 1998; Kuller et al, 1970*). Past research has found the South and the Southeastern portion of the United States to suffer a significantly higher burden of many different disease morbidities and mortality; including

Hypertension (*Hajjar et al, 2003; Obisesan et al, 2000*). The information in this chapter, from the 1998 National Health Interview Survey, confirms several of these trends.

Hypertension Among African Americans

The percentage of persons reporting hypertension was higher among African American adults than among any other race/ethnic group (29.4%, or 6.4 million persons).¹ Non-metropolitan African American adults suffer a higher prevalence of high blood pressure than do their metropolitan counterparts (non-metro 33.5%, metropolitan 28.7%; Table 1A).

Hypertension Among Hispanics

Over 15% of all adult Hispanics (16%, or 3.1 million persons) reported having been told they have high blood pressure. The self-reported prevalence of hypertension was similar in urban and rural areas (metropolitan 15.9%, non-metro 16.2%; Table 1A).

Hypertension Among Adults of the “Other” Race

About 17% of adults of the “other” race (16.8%, or 1,2 million persons) reported being told that they had High Blood Pressure. Self-reported high blood pressure was more common among non-metropolitan adults of the “other” race (non-metro 23.3%, metropolitan 15.8%; Table 1A). In this case, geographic and racial / ethnic variation may both contribute to differences in hypertension prevalence. While the metropolitan “other” race category is 85.3% Asian / Pacific Islander and only 8.5% Native American, the non-metro population is majority Native American 56.7% and 44.3% Asian / Pacific Islander. See *Appendix A* and *Table 2A* for a clearer description of persons characterized as “other” race.

Hypertension Among Whites

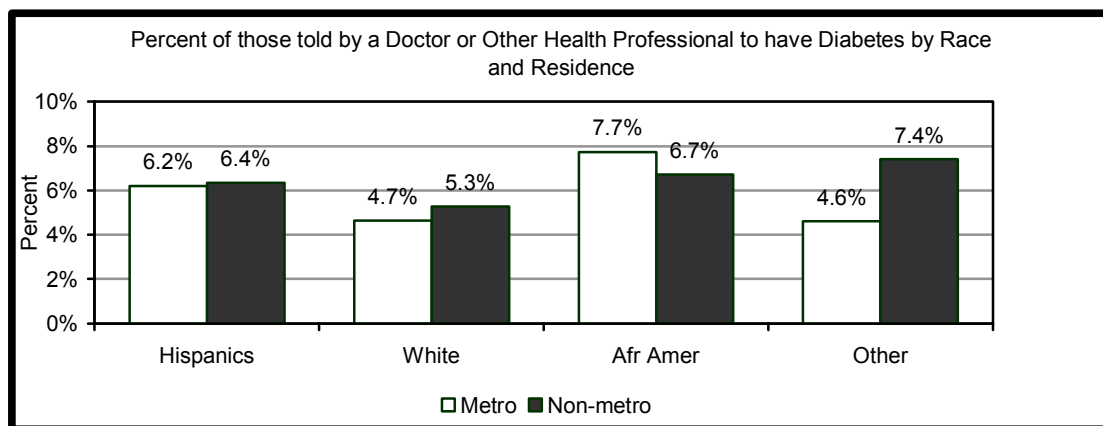
Just under a fourth of all adult whites (23%, or 33.9 million persons) reported being told they were hypertensive. Self-reported hypertension was more common among rural residents (metropolitan, 22.3%; non-metro 25.0; Table 1A).

¹ The NHIS asks about hypertension in two ways. First, it asks if the individual has ever been told he or she has high blood pressure. This is the **broadest** possible definition of persons with high blood pressure. Those who answer “yes” are then asked whether they have been told this on two or more occasions. Nationally, 83.7% of those who have “ever” been told they have hypertension have heard this more than once. This is a more conservative definition. For this report, the **broadest** definition is used, as hypertension is generally believed to be under-diagnosed. However, data using both definitions are presented in Table 1A.

Chapter Two

DIABETES

Self-reported diabetes was more prevalent among African Americans than among any other racial / ethnic group. Among African Americans, diabetes was more likely to be reported by metropolitan residents; among all other ethnic groups, diabetes was more common in rural areas. Among rural residents, persons of the “other” race reported the highest prevalence of diabetes.



The prevalence of diabetes in the U.S. has been increasing, from 26 per 1,000 population in 1988-90 to 31 per 1,000 in 1994-96 (*“Progress Review,” 1999*). The American Diabetes Association (ADA) estimates 17 million people have diabetes (*“Facts & Figures,” n.d.*). Between 90 and 95 percent of all diabetics have Type II, which has been associated with obesity and lack of exercise (*“Facts & Figures,” n.d.*). A major public health concern is the estimated 5.9 million Americans, one-third of all diabetics, who are unaware that they have diabetes (*“Facts & Figures,” n.d.*).

The sequelae of diabetes include peripheral neuropathy, kidney failure and blindness, as well as stroke and ischemic heart disease (*“Closing the gap,” 1985; Williams et al, 1997*). Diabetes is responsible for the majority of new cases of blindness among adults between the ages of 20 and 74 (*“Facts & Figures,” n.d.*). Costs associated with directly treating diabetics combined with loss of work productivity are estimated to be \$98 billion annually (*“Facts & Figures,” n.d.*). The cost associated with treating undiagnosed diabetics is difficult to ascertain. If per capita use of health care services is greater for people with undiagnosed diabetes than for

people with diabetes, the health care costs attributable to diabetes will be underestimated (*Hogan et al, 2003*).

Because diabetes is more prevalent in certain racial groups, racial and ethnic concerns for intervention and policy must be addressed. The information presented in this chapter is based on an analysis of self-reported diabetes from the 1998 National Health Interview Survey. Because not all persons with diabetes are aware that they have the condition, estimates may be lower than actual prevalence.

Diabetes Among African Americans

African American respondents were more likely than those of other racial / ethnic groups to report that a doctor or other health professional had told them that they had diabetes (7.6%, or 1.6 million persons). This is consistent with the ADA estimate 10.8% of all African Americans have diabetes; with one-third being unaware they have it (*"Facts & Figures," n.d.*).

A larger percentage of metropolitan than non-metro African Americans reported having diabetes or "sugar diabetes" (metropolitan 7.7%, non-metro 6.7%; Table 3A).

Diabetes Among Hispanics

More than 6% of all adult Hispanics had been told by a doctor or other health professional that they had diabetes or "sugar diabetes" (6.2%, or 1.2 million persons). Reported prevalence was just slightly higher in rural areas (non-metro 6.4%, metropolitan 6.2%; Table 3A). Previous research by (*Baxter et al, 1993*), which discovered an excess incidence of diabetes in rural Hispanics, supports this finding.

Diabetes Among Persons of the "Other" Race

In 1998, five percent of all adults of the "other" race reported having been told by a doctor or other health professional that they had diabetes (5%, or 379,809 persons). A greater percentage of non-metropolitan "other" race adults reported diabetes (non-metro 7.4%, metropolitan 4.6%; Table 3A). This value is lower than the ADA estimate that 12.2% of all Native Americans over age 19 have Type II diabetes (*"Facts & Figures," n.d.*), but the "other" category includes many racial / ethnic groups.

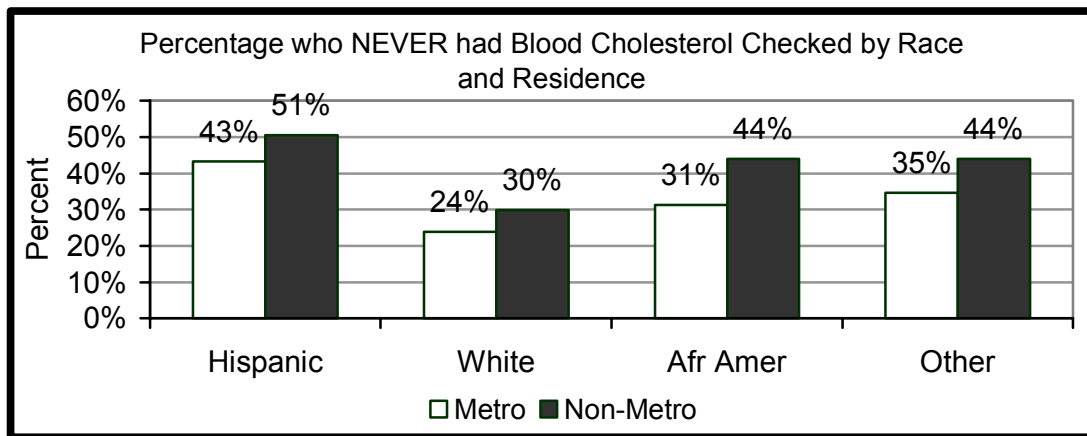
Diabetes Among Whites

Fewer than 5% adult whites have been told by a doctor or other health professional that they have diabetes (4.8%, or 7.1 million persons). Non-metropolitan whites were more likely to report diabetes (non-metro 5.3%, metropolitan 4.7%; Table 3A).

Chapter Three

Cholesterol Screening

*Across all racial groups, a larger percentage of non-metropolitan adults compared to urban adults have **never** had their blood cholesterol levels checked. Lack of cholesterol screening was highest among the non-metro Hispanic population.*



Cardiovascular disease is the number one killer in America (*“Morbidity & Mortality Chartbook,” 2002*). Around 12 million Americans have Coronary Heart Disease (CHD), which accounts for a large proportion of the total cardiovascular disease figures (*“Morbidity & Mortality Chartbook,” 2002*). A major risk factor for CHD is high blood cholesterol. Research has found that more than 50 million American adults require the attention of a medical professional because of high blood cholesterol (*Sempos et al, 1993*). A total cholesterol level less than 200mg/dL is considered desirable by the National Heart, Lung and Blood Institute (NHLBI), a total blood cholesterol between 200 and 239 mg/dL is borderline high, while 240 mg/dL and up is considered high. In addition, smoking, high blood pressure, low HDL, family history of heart disease, and age (*men 45 years and older; women 55 years and older*) all contribute to the potential for developing heart disease (*“National Cholesterol Education Program,” 2001*). Cholesterol levels can only be determined through medical screening. For this reason, we used cholesterol screening as a measure of the degree to which metro and non-metro populations were likely to receive the screening necessary to detect hypertension, diabetes, obesity and physical inactivity.

Screening For High Cholesterol Among African Americans

A third of all adult African Americans have never had their cholesterol checked (33.1%, or 6.6 million persons). A larger percentage of non-metropolitan adult African Americans have never had their cholesterol checked (non-metro 43.9%, metropolitan 31.3%; Table 4A).

Screening For High Cholesterol Among Hispanics

Among all adult Hispanics, four out of every ten have never had their blood cholesterol levels checked (43.9%, or 8.1 million persons). An amazing half of all non-metropolitan Hispanic adults have never had their blood cholesterol levels checked (non-metro 50.6%, metropolitan 43.2%; Table 4A).

Screening For High Cholesterol Among Adults of the “Other” Race

Over one-third of all “other” adults have never had their blood cholesterol levels checked (36%, or 2.4 million persons). Lack of cholesterol screening was more common among non-metropolitan adults of the “other” race than among their rural counterparts (non-metro 43.9%, metropolitan 34.7%; Table 4A). Based on sampled “others” (*See Appendix A & Table 2A*), four out of every ten rural Native American has never had their blood cholesterol levels checked, while one out of every three urban Asians has never had their levels checked.

Screening For High Cholesterol Among Whites

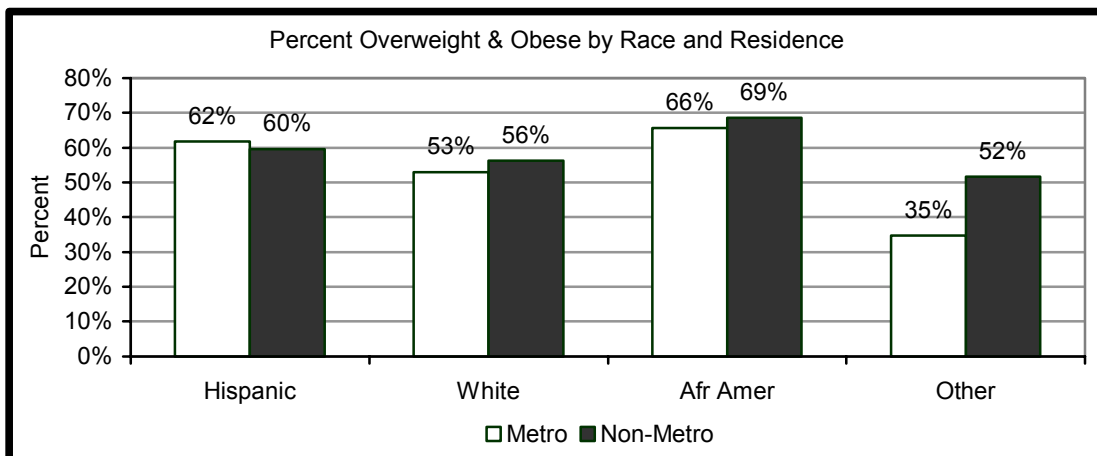
One in every four adult Whites have never had their blood cholesterol levels checked (25.3%, or 35 million persons). In addition, nearly a third of non-metropolitan adult Whites have never had their blood cholesterol levels checked (non-metro 29.9%, metropolitan 23.8%; Table 4A).

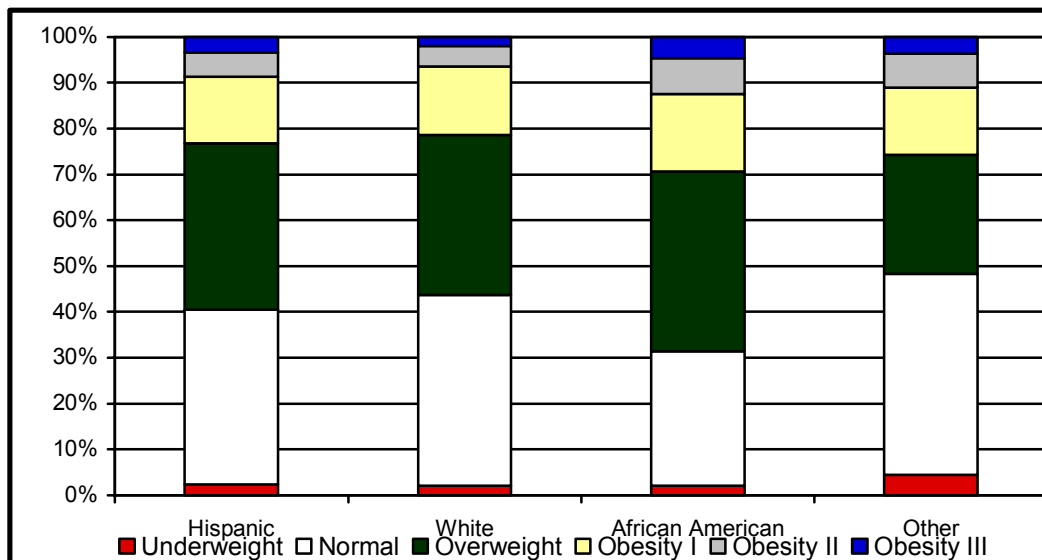
Chapter Four

Weight and Weight Control Behaviors

Non-metro adults in general, and minority adults in particular, were more likely to be overweight or obese than were urban populations. Two thirds of non-metro African Americans were overweight or obese, and African Americans were more likely than others to be severely obese. Non-metro Hispanics were the only racial/ethnic group with a higher prevalence of these problems in urban areas.

While overweight and obesity were more common in non-metro areas for most ethnic groups, weight control activities were less common. Research is needed to clarify sources of rural/urban disparities, which could include lower rates of preventive counseling by rural health care providers, fewer opportunities for exercise, or reduced food choices in local stores.





Weight

“Overweight” is defined as a body mass index (BMI) of 25 to 29.9 kg/m², while “obesity” is defined as a body mass index of ≥ 30 kg/m². Adults are considered at risk of developing complications and/or morbid conditions if they have a BMI ≥ 25 (Hill *et al*, 1999). Obesity is classified in three levels: Obesity I, BMI 30.0 or more but less than 35.0; obesity II, BMI 35.0 or more but less than 40.0; and obesity III, any BMI of 40.0 or higher.

Excess weight and obesity increase the likelihood that an individual will suffer from a number of chronic and acute diseases, including cardiovascular disease, type 2 diabetes mellitus, hypertension, stroke, dyslipidemia, osteoarthritis, and some cancers (Must *et al*, 1999; Burton *et al*, 1985). Physical and functional health have also been affected by obesity (Jensen *et al*, 2002). Decreases in functional capacity and physical ability have been shown to correlate with lower levels of health status (Millen *et al*, 2001). A recent study estimated that being overweight is associated with a 14.5% increase in adult medical spending, and being obese is associated with a 37.4% increase. The total excess costs incurred annually by those who are overweight and obese are estimated at between \$51.5B and \$78.5B (1996-1998) (Finkelstein *et al*, 2003). Overweight or obese individuals are also prone to social discrimination or stigma (Lewis *et al*, 1997), broadening the impact of obesity from biological and physical health to mental health.

Overweight is an epidemic condition among adults, as indicated by the preceding graphs and Table 5A. With exception of adults of the “other” race, more than half of all adults in all ethnic groups are overweight or obese. For African Americans, whites, and persons of the “other” race, the problem is more prevalent in non-metro areas.

BMI Among African Americans

African Americans nationally, and non-metropolitan African Americans in particular, had the highest prevalence of overweight and obesity. Six in every ten adult African Americans were overweight or obese (overweight 36.9%, or 7.8 million persons; obese 29.2%, or 6.2 million persons; Table 5A). In rural areas, two of every three African American adults were overweight or obese (68.6%). Further, non-metropolitan African Americans were likely to be severely obese. While only (6%) of the rural white population falls at obesity II or higher, (12.0%) of the non-metropolitan African American population does so.

BMI Among Hispanics

Rates of overweight and obesity among adult Hispanics parallel those found among African Americans. Just fewer than six of every ten adult Hispanics was overweight or obese (overweight 36.6%, or 7 million persons; obese 24.9%, or 4.7 million persons; Table 5A). A slightly larger percentage of urban Hispanics were overweight and obese versus rural (61.7% among metro residents, 59.6% among non-metropolitan residents; Table 5A). As was the case among African Americans, obesity among non-metropolitan Hispanics was more severe than obesity among whites, with a greater proportion falling at obesity II or higher (8.7% among Hispanics versus 6.4% among whites; Table 5A).

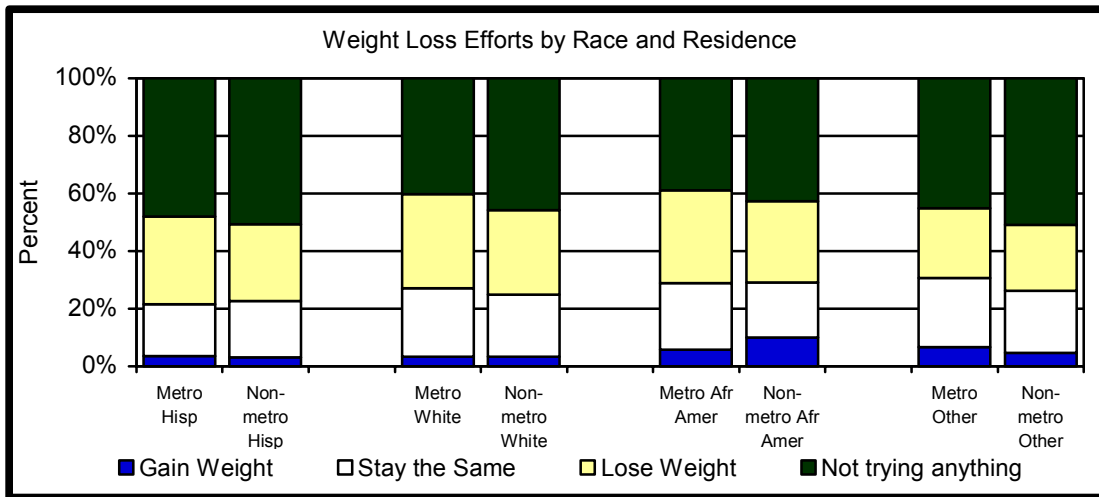
BMI Among Adults of the “Other” Race

Roughly similar levels of metro and non-metropolitan adults of the “other” race were overweight (25.7% metropolitan, 26% non-metro; Table 5A). However, the prevalence of obesity was more than double among non-metropolitan persons of the “other” race (9.1% metropolitan versus 25.7% non-metropolitan; Table 4A). Severe obesity, obesity II or above, was also more prevalent among non-metro “other” adults (3.8% metropolitan, 10.9% non-metro; Table 5A).

BMI Among Whites

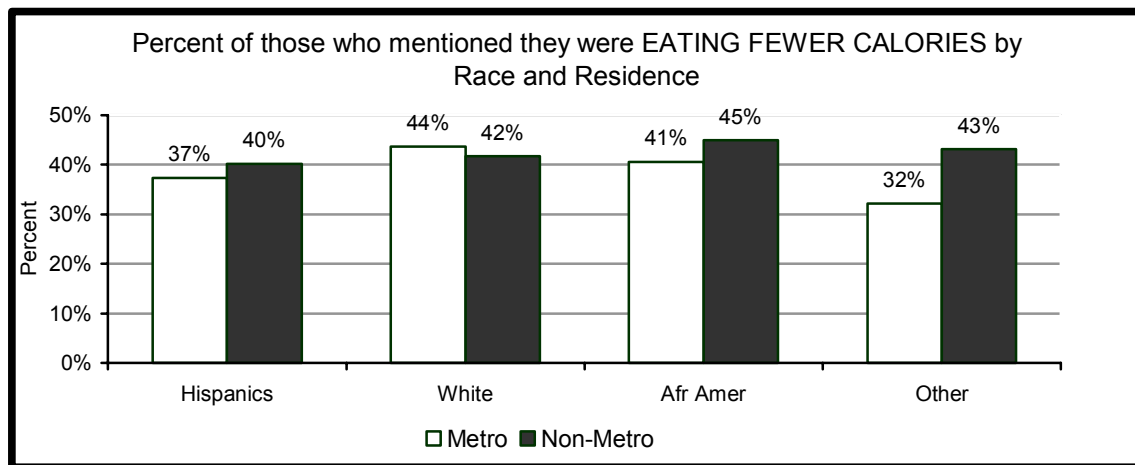
Roughly 35% of all adult whites were overweight, while 18% were obese (overweight 35.2%, or 50.4 million persons; obese 18.5%, or 26.5 million persons; Table 5A). Similar percentages of metropolitan and non-metropolitan adult whites were overweight. Non-metropolitan white adults were more likely to be obese (17.7% metropolitan, 21.4% non-metro; Table 5A) and slightly more likely to be severely obese (5.3% metropolitan, 6.4% non-metro; Table 5A). As a group, non-metropolitan whites were less likely than any other non-metropolitan racial/ethnic group to be overweight or obese.

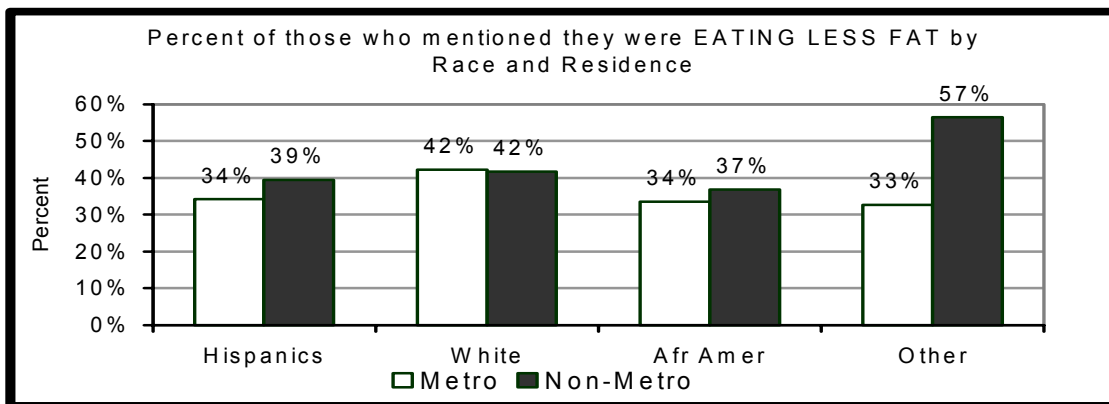
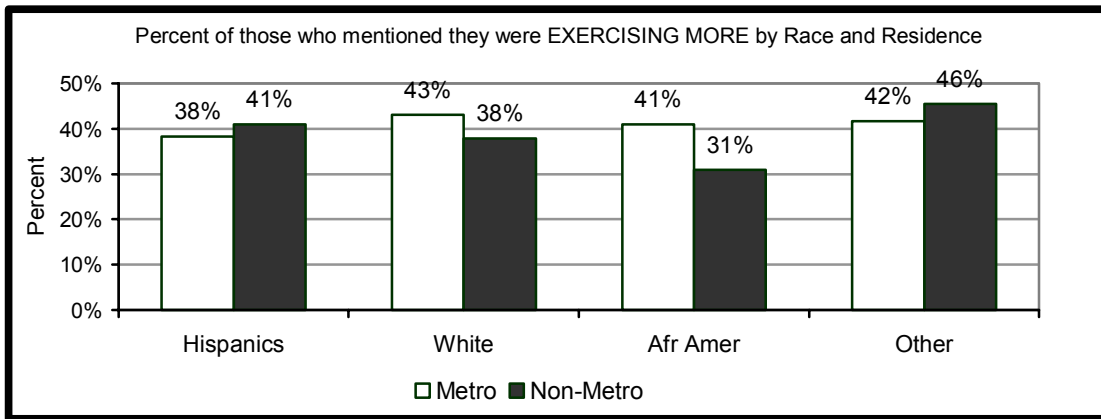
Weight Control Behaviors



Most Americans reported doing something about their weight in 1998. What was being done is illustrated in the chart above. A small percentage of persons were trying to gain weight (3.7% in metro areas, 3.8% non-metro; Table 5B). Just over one in every five persons reported consciously trying to keep their weight the same (23.2% metropolitan, 21.3% non-metro; Table 5B). About one in every three persons was trying to lose weight (32% metropolitan, 29% non-metro; Table 5B). Finally, about 40% of persons were not doing anything at all about their weight (41.1% metropolitan, 45.9% non-metro; Table 5B). Although rates of overweight and obesity were higher among non-metro residents, they were less likely to report trying to lose weight and more likely to report doing nothing at all regarding weight.

Three possible weight control methods were explored by the 1998 National Health Interview Survey: eating fewer calories, exercising more, and eating less fat. Findings for each of these areas are graphically illustrated below.





Weight Control Behaviors Among African Americans

Although overweight and obesity were slightly more common among non-metro residents, a larger percentage of metropolitan African American adults reported trying to lose weight (metropolitan 32.3%, non-metro 28.3%; Table 5B). Conversely, non-metro African Americans were more likely to report that they were doing nothing with regard to their weight than were metropolitan African American adults (non-metro 42.7%, metropolitan 38.8%; Table 5B). Rural African Americans were also more likely to report trying to gain weight (non-metro 10%, metropolitan 5.7%; Table 4B), although they were not a great deal more likely to be underweight as measured by BMI (non-metro 2%, metropolitan 1.2%; Table 5A).

Of those adult African Americans who reported trying to control their weight,² 41.1%, or 4.7 million persons, reported eating fewer calories. Self-reported calorie restriction was more common among rural African American adults (non-metro 44.9%, metropolitan 40.5%; Table 5C). A similar percentage of adult African Americans reported eating less fat (33.9%, or 3.9

² Includes all persons except those explicitly doing nothing; i.e., those who are trying to lose weight, stay about the same, refused to answer the question, or did not know.

million persons). As with “eating less” in general, a larger percentage of non-metro African American adults reported eating less fat (non-metro 36.9%, metropolitan 33.5%; Table 5D).

Over one-third of all African American adults who reported doing something about their weight, also reported they were exercising more (39.6%, or 4.6 million persons). Exercise for weight reduction was reported more often by metropolitan African Americans (metropolitan 40.9%, non-metro 30.9%; Table 5E).

Weight Control Behaviors Among Hispanics

One-third of all Hispanic adults reported that they were trying to lose weight (30%, or 5.8 million persons). At the same time a much larger percentage are not trying to do anything about their weight (48.3%, or 9.4 million persons). A larger percentage of metropolitan than non-metro Hispanic adults were trying to lose weight (metropolitan 30.4%, non-metro 26.7%; Table 5B), paralleling the slightly higher prevalence of overweight and obesity in metropolitan Hispanics. Strikingly, half of all non-metropolitan Hispanic adults were not trying to do anything about their weight (non-metro 50.6%, metropolitan 48%; Table 5B).

Of those adult Hispanics who said they were trying control their weight, just over a third (37.6%, or 3.5 million persons) responded that they were eating fewer calories. Calorie restriction was more common among non-metropolitan Hispanic adults (non-metro 40.2%, metropolitan 37.3%; Table 5C). A similar percentage of Hispanic adults mentioned they were eating less fat (34.8%, or 3.2 million persons). Again, this was more common among the non-metropolitan adult Hispanic population (non-metro 39.4%, metropolitan 34.3%; Table 5D).

Just one-third of all Hispanic adults mentioned they were exercising more (38.5%, or 3.6 million persons). Rates of reported increased exercise were similar among non-metropolitan and metropolitan Hispanic adults (non-metro 40.9%, metropolitan 38.2%; Table 5E).

Weight Control Behaviors Among Persons of the “Other” Race

Similar proportions of metro and non-metro adults of the “other” race reported trying to lose weight (metropolitan 24.2%, non-metro 23%; Table 5B). The proportion of persons explicitly not trying to control their weight was higher among rural residents (non-metro 50.9%, metropolitan 45.2%; Table 5B). Both of these findings are troubling in light of the fact that rates of overweight or obesity were discovered to be higher in non-metropolitan populations (51.7%) than in urban populations (34.8%).

Among adults of the “other” race who reported doing something about their weight, over one-third mentioned they were eating fewer calories (33.5%, or 1.1 million persons). Self-reported calorie restriction was more common among rural than urban populations (non-metro 43.1%, metropolitan 32.1%; Table 5C). In addition, a larger percentage of non-metropolitan adults of the “other” race mentioned they were eating less fat than urban residents (non-metro 56.5%, metropolitan 32.6%; Table 5D).

Similar to African American and Hispanic adults, four of every ten “other” race adults who were trying to lose weight or stay about the same mentioned they were exercising more (42.1%, or 1.4 million persons). A larger proportion of non-metropolitan adults were trying to exercise more versus metropolitan adults (non-metro 45.5%, metropolitan 41.6%; Table 5E).

Weight Control Behaviors Among Whites

Whites were more likely to report that they are trying to lose weight (31.8% or 46.1 million persons) than any other racial / ethnic group. A larger percentage of metropolitan adult whites were trying to lose weight compared to non-metro adult whites (metropolitan 32.7%, non-metro 29.3%; Table 5B). Conversely, a larger percentage of non-metropolitan adult whites are not trying to do anything about their weight (non-metro 45.8%, metropolitan 40.2%; Table 5B).

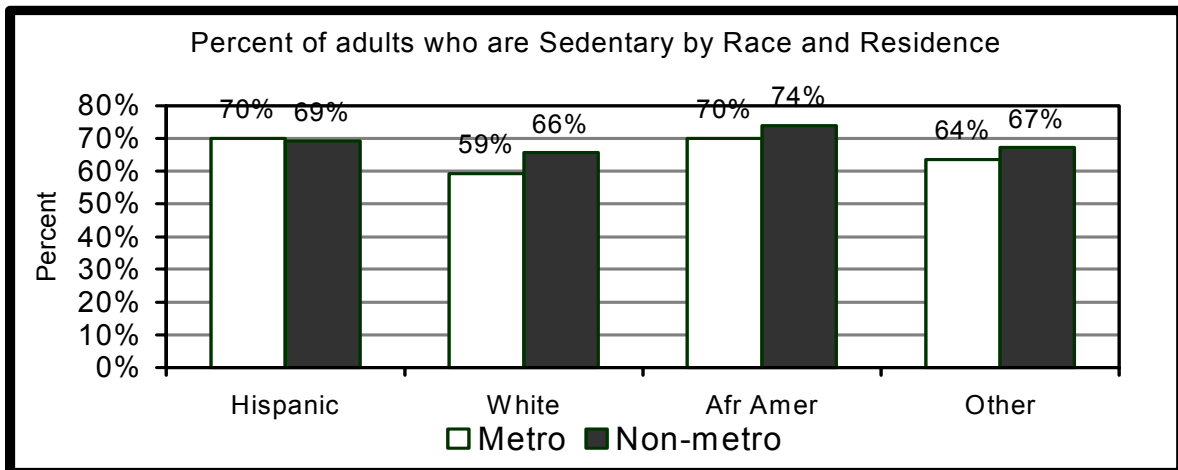
Of those adult whites that said they were trying to lose weight or stay about the same, 43.3%, or 34.7 million persons, mentioned eating fewer calories. Eating less was more common among metropolitan adult whites (metropolitan 43.7%, non-metro 41.7%; Table 5C). A similar percentage of adult whites mentioned they were eating less fat (42.1%, or 33.7 million persons). The proportion of persons restricting fats was similar among rural and urban residents (non-metro 41.7%, metropolitan 42.2%; Table 5D).

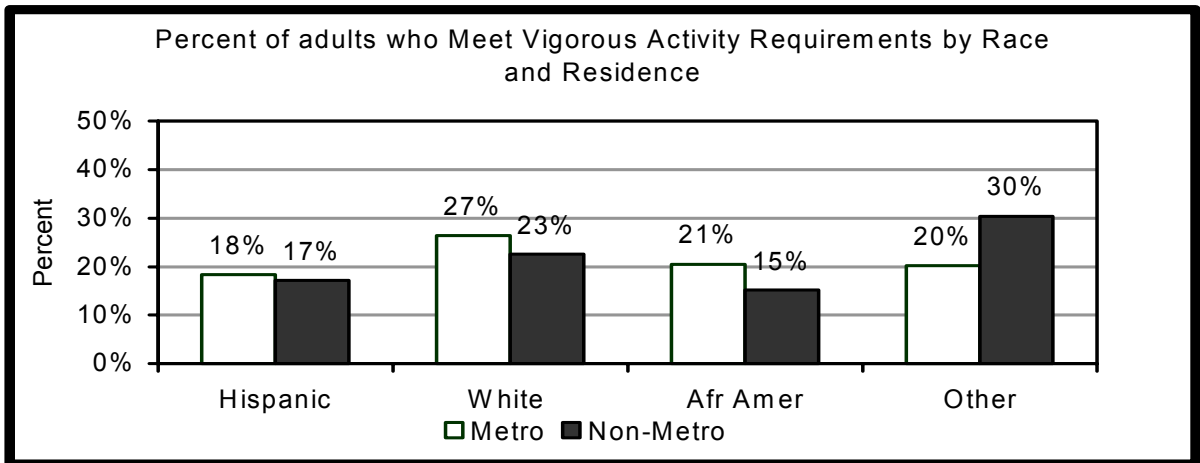
Paralleling other groups, four out of every ten adult whites who said they were trying to lose weight or stay about the same mentioned exercising more (41.9%, or 33.5 million persons). Reported increased exercise was more common among metropolitan adults (metropolitan 43.1%, non-metro 37.8%; Table 5E). Since rural whites, like African Americans and persons of the “other” race, were more likely to be overweight or obese than their urban peers, similar or lower rates of weight control activity among non-metro residents are disturbing.

Chapter Five

EXERCISE

Across all race / ethnicity groups, non-metro residents were less likely to meet recommendations for regular, vigorous physical activity than were urban residents. With the exception of Hispanics, non-metro residents were also more likely to be sedentary. Within non-metro residents, minorities were more likely to be sedentary than were whites and, with the exception of adults of the “other” race, less likely to meet vigorous activity requirements. Research is needed to determine whether racial disparities stem from lack of access to appropriate facilities and resources, lack of education or activity training, or differing cultural preferences.





Healthy People 2010 expanded the Healthy People 2000 physical activity objectives. A broader and more holistic approach was recommended for improving physical fitness among Americans. A large body of evidence supports regular physical activity as a tool for reducing the morbidity and mortality related to chronic diseases. Regular physical activity can reduce the likelihood of premature death due to cardiovascular disease (CVD), and reduce or delay CVD related diseases, like chronic hypertension (*“Physical Activity and Health,”* 1996; Haennel et al, 2002; Papademtriou et al, 1999; Lesniak et al, 2001).

There are disparities in leisure time physical activity across racial/ethnic populations as well as populations residing in different geographical locations (Parks et al, 2003; Wilcox et al, 2000). The Surgeon General’s report also highlighted lower levels of physical activity among women, minorities, older adults and the less affluent (*“Physical Activity & Health,”* 1996). Recent statistics show that as age increases, physical inactivity increases (*“Nutrition & Physical Activity,”* 2001). In addition, the prevalence of physical inactivity varies across states, from 41.3% in Kentucky to 16.1% in Utah (*“Nutrition & Physical Activity,”* 2001).

The nature and prevalence of physical activity is estimated by many different methods and sources, which can be confusing. Different measures provide varying estimates of the prevalence of physical activity (Sarkin et al, 2000). According to the Behavioral Risk Factor Surveillance Survey (BRFSS) for 1998 and 2000, 72.3% and 73% respectively, of all adult Americans exercised in the past month (*“Prevalence Data,”* 2002). The Report on Physical Activity and Health by the Surgeon General, however, estimated that over 60% of adult Americans do *not* engage in recommended daily amounts of physical activity, while approximately 25% of all adults are not active at all (*“Physical Activity & Health,”* 1996).

This chapter uses two measures, focusing on whether different population groups meet the recommended amount of exercise/ physical activity as outlined by the Centers for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM). First, we used the NHIS definition, which categorizes person based on their reported physical activity (kcal/kg/day). *Sedentary persons*, those highlighted in the graph on page 20, are those who do not engage in regular physical activity, participate in an exercise program, or meet the minimal physical activity recommendations from the U.S. Surgeon General’s report (Balady et al, 2000;

“Physical Activity and Health,” 1996). Sedentary persons represent the “bad” end of the exercise spectrum.

Vigorous Physical Activity is defined as activities of >6 METS, (METS is a measure of exercise intensity). Vigorous exercise may alternatively be defined as exercise intense enough to represent a substantial cardiorespiratory challenge (*Balady et al, 2000*). This report identified *persons not meeting vigorous physical activity recommendations* based on information supplied by respondents concerning their frequency of physical activities, the number of minutes spent doing the activity, and the change in the respondent’s heart rate or breathing as a result of the activity (*“NHIS Survey Description,” 2000*). It is worth noting that an individual can be physically active and still not meet recommended frequencies and intensities of physical activity as outlined by the CDC and ACSM (*Balady et al, 2000; “Physical Activity and Health,” 1996*). “Meeting vigorous physical activity standards” is the “good” end of the exercise spectrum.

Physical Activity Levels Among African Americans

Over two-thirds of adult African Americans are sedentary (70.5%, or 14.7 million persons). A sedentary lifestyle is more common among non-metropolitan adult African Americans (non-metro 73.9%; metropolitan 70%; Table 6A).

More than three-quarters of adult African Americans do not meet the recommended requirements for regular vigorous physical activity (80.2%, or 16.8 million persons). A larger percentage of non-metropolitan adult African Americans do not meet recommendations for regular vigorous physical activity (non-metro 84.9%; metropolitan 79.5%; Table 6B).

Physical Activity Level Among Hispanics

A sedentary lifestyle is, for the most part, just as common among Hispanics as among African Americans (69.9%, 13.5 million persons). Metropolitan adult Hispanics were more likely to be sedentary than non-metropolitan residents (metropolitan 70%; non-metro 69.1%; Table 6A).

More adult Hispanics fail to meet the recommended levels of regular vigorous physical activity than all other racial/ethnic groups (81.8%, or 15.8 million persons). Failure to meet requirements was slightly more common among non-metropolitan Hispanics (non-metro 82.9%; metropolitan 81.7; Table 6B).

Physical Activity Level Among Persons of the “Other” Race

Nearly two-thirds of all adult “others” reported a sedentary lifestyle (64%, or 4.5 million persons). A greater percentage of non-metropolitan adult “others” were sedentary (non-metro 67.1%; metropolitan 63.5%; Table 6A).

Three out of every four adults of the “other” race do not meet the recommended requirements for regular vigorous physical activity (78.5%, or 5.8 million persons). Metropolitan adults of the “other” race were more likely than non-metropolitan residents to fail to meet recommendations for regular vigorous physical activity (metropolitan 79.8%, non-metro 69.6%; Table 6B).

Physical Activity Level Among Whites

More than 60% of all adult whites reported a sedentary physical activity lifestyle (60.8%, or 86.9 million persons). A larger percentage of non-metropolitan adult whites were sedentary (non-metro 65.6%, metropolitan 59.2%; Table 6A).

Whites were more likely than other race/ethnicity groups to report some vigorous physical activity. Nonetheless, 74% of adult whites do not meet recommendations (74.5%, or 106.2 million persons). Non-metropolitan white adults were more likely to fail to meet recommendations for regular vigorous physical activity than their urban peers (non-metro 77.4%; metropolitan 73.5%; Table 6B).

Chapter Six

Conclusions and Recommendations

Self Reported Disease Prevalence

Rural residents of all racial / ethnicity groups were more likely to report having been told they have hypertension than were metropolitan residents. The highest rates of reported hypertension were found among rural African Americans, one third of who reported high blood pressure. The pattern of diabetes prevalence was more complex. Among African Americans, diabetes was more likely to be reported by metropolitan residents. Among all other ethnic groups, diabetes was more common in rural areas. Across non-metro residents, persons of the “other” race reported the highest prevalence of diabetes. The majority of persons of the “other” race in non-metro areas are Native American.

Both hypertension and diabetes are closely related to body composition, with persons who carry excess weight being more vulnerable. Non-metro adults in general, and minority adults in particular, were more likely to be overweight or obese than were urban populations. Two thirds of non-metro African Americans were overweight or obese, and African Americans were more likely than others to be severely obese. Non-metro Hispanics were the only racial/ethnic group with a higher prevalence of these problems in urban areas.

Hypertension and diabetes can only be diagnosed, and thus a patient informed, after clinical testing (blood pressure or glucose screening). Thus, self-reported prevalence is generally lower than actual prevalence. In addition, an earlier South Carolina Rural Health Research Center study found that rural African Americans with diagnosed diabetes were significantly more likely to exhibit inadequate control of their disease (*Mainous, et al, 2002*).

Cholesterol screening can also be used as an educational tool to reinforce the link between lipid levels and health habits (*Sparling et al, 1999*). As a measure of the degree to which non-metro residents obtain needed clinical preventive services, we examined self-reported receipt of cholesterol screening. Across all racial groups, a larger percentage of non-metro than urban persons have never had their blood cholesterol levels checked. Lack of cholesterol screening was highest among the non-metro Hispanic population. More than half (51%) of adult, non-metro Hispanics have *never* had their cholesterol checked. Among non-metro African Americans and persons of the “other” race, 44% had never had a cholesterol check.

Rural Healthy People 2010 recommends establishing diabetes education, prevention, and detection programs that possess the infrastructure to attain long-term improvement (*Gamm et al, 2003*). Using existing health care and public health infrastructure, allied health professionals are recommended to develop approaches based upon routine patient care. Rural Healthy People 2010 also recommends targeting modifiable risk factors for heart disease and stroke. In particular, high blood pressure and high cholesterol should be targeted in at risk rural populations as early as age 20, using primary, secondary, and tertiary prevention strategies (*Gamm et al, 2003*). Models of practice targeting diabetes include:

- The Diabetes Collaborative Program located in Wellsboro, Pennsylvania. The program targets the problem of diabetes and access to primary care, specifically addressing HP 2010 objectives 1-9. Additional information can be obtained from: <http://www.laurelhs.org>
- The Delta Community Partners in Care Program located in Clarksdale, Mississippi. The program targets diabetes and hypertension, specifically addressing HP 2010 objectives 5 and 12. Additional information can be obtained from: Lela Keys (662)-624-3484 or lbkeys2@bellsouth.net
- The Holy Cross Hospital Diabetes Self-Management Program located in Taos, New Mexico. The program targets diabetes, specifically addressing HP 2010 objective 5. Additional information can be obtained from: <http://www.taoshospital.org>
- The White River Rural Health Center, Inc. Diabetes Collaborative Program located in Augusta, Arkansas. The program targets diabetes and access to primary care, specifically addressing HP 2010 objective 5 and 12. Additional information can be obtained from: Brenda Kennedy (870)-347-2534 or bkennedyrn@yahoo.com

Models of practice targeting hypertension and cholesterol include:

- The Western Maine Center for Heart Health Program located in Farmington, Maine. The program targets heart disease and stroke, specifically addressing HP 2010 objectives 12-1, 12-11, and 12-15. Additional information can be obtained from: <http://www.franklinscorekeeper.org>
- The Well Valdosta-Lowndes County Program located in Valdosta, Georgia. The program targets chronic disease including heart disease, specifically addressing HP 2010 objective 12. Additional information can be obtained from: <http://www.lcpfh.org>
- The Healthy Hearts Program located in Ellaville, Georgia. The program targets heart disease and stroke, specifically addressing HP 2010 objective 12-8. Additional information can be obtained from: Mary Anne Shepherd (229)-937-5321.
- The Oregon County Heart Health Coalition Program located in Alton, Missouri. The program targets heart disease and stroke, specifically addressing HP 2010 objectives 12-1 and 12-11. Additional information can be obtained from: <http://www.dhss.state.mo.us>

Reported Weight and Weight Control Activities

Non-metro adults in general, and minority adults in particular, were more likely to be overweight or obese than were urban populations. Two thirds of non-metro African Americans were overweight or obese, and African Americans were more likely than others to be severely obese. Non-metro Hispanics were the only racial/ethnic group with a higher prevalence of these problems in urban areas. It should be noted that these conclusions are drawn from self-reported weight and height. Research has shown that individuals consistently under-report their own

weight, making the estimates of the prevalence of obesity and overweight presented here relatively conservative. True rates are likely to be higher than those reported.

While overweight and obesity were more common in non-metro areas for most ethnic groups, weight control activities were less common. Across all race / ethnicity groups, non-metro residents were less likely to meet recommendations for regular, vigorous physical activity than were urban residents. Fewer than one in six non-metro African American (15%) or Hispanic (17%) adults meet the vigorous activity recommendations of the CDC and ACSM. Three quarters of non-metro African American adults (74%), and seven of every ten Hispanic adults (69%), are sedentary. Within non-metro residents, minorities were more likely to be sedentary than were whites and, with the exception of adults of the “other” race, less likely to meet vigorous activity requirements.

Rural Healthy People 2010 recommends reinforcing the Surgeon General’s Call to Action, whereupon progress in reducing the prevalence of obesity and persons who are overweight by introducing interventions at multiple levels of society (*Gamm et al, 2003*). Interventionists are encouraged to remember the basic goals of reducing fat and caloric intake and increase physical exercise. Rural Healthy People 2010 offer two models of practice, where rural communities have been innovative in their efforts to attain these goals:

- The Physical Dimensions/Focus Program located in Wichita, Kansas. The program targets lack of physical education in the Kansas schools, specifically addressing HP 2010 objective 19. Additional information can be obtained from: Bobbie Harris (316)-978-5957.
- The Daya Tibi “House of Good Living” / Fort Peck Community College Wellness Center Program located in Poplar, Montana. The program targets Nutrition and Diet, specifically addressing HP 2010 objective 19. Additional information can be obtained from: Jeanette Charbonneau (406)-768-5630.

Rural Barriers to Effective Interventions

Obesity, hypertension and diabetes together form a triad of conditions having common roots in poor diet and exercise practices. Eradicating these problems among non-metro minority populations requires policies that identify and intervene with persons experiencing these conditions, while on the other hand supporting educational activities at all levels from kindergarten through senior centers to promote healthier behavior and prevent the development of disease. The need for a multi-faceted intervention approach has long been recognized. The principal challenge to policy is ensuring that actions taken or recommendations offered address the needs of *rural* minority populations.

Rural settings and circumstances are often not considered. For example, the Centers for Disease Control and Prevention, through its Community Preventive Services Task Force, has recommended as series of interventions to promote physical activity:³

³ Guidelines for nutrition interventions have not yet been developed.

- Community – wide educational programs
- “Point of use” prompts suggesting that persons use stairs rather than elevators
- School-based physical education
- Social support (walking groups and programs, for example)
- Enhanced accessibility of exercise venues (sidewalks, walking trails)
- Individualized health behavior change programs

All of these interventions should be promoted, where feasible, among rural minority communities. Most of these interventions, however, appear best suited to urban settings. Rural areas have fewer multi-story buildings, for example, rendering the stair use prompt less relevant. Similarly, safe exercise locations such as sidewalks or walking trails are generally not present along rural roads. A study of walking trails in rural Missouri found that more than two in every five respondents (43%) had to travel 15 miles or more to reach a trail (*Brownson, et al, 2000*). Rural clinicians may not structure time during patient visits for individualized counseling.

In 2001, CDC funded grants for “nutrition and physical activity to prevent chronic disease” in 12 states (California, Colorado, Connecticut, Florida, Massachusetts, Michigan, Montana, North Carolina, Pennsylvania, Rhode Island, Texas, and Washington). One of these states, Colorado, has the lowest rate of obesity in the nation. Of the 21 states with the highest rates of obesity, only four (Michigan, North Carolina, Pennsylvania and Texas) received funding. Since the process of obtaining funding is initiated by the states, remaining states with high rates of obesity may have elected not to give priority to this particular program. However, it is also possible that states may lack the expertise to assess and document obesity and physical inactivity problems and develop grant applications. Similar problems may affect faith-based and community organizations: those with the highest ability to compete for funding and those with the highest need may not be the same.

Policy Recommendations

Screening, detection and intervention are needed among rural minority populations currently experiencing high rates of obesity, hypertension and diabetes, but not engaged in physical activity or weight loss programs. Coordinated educational and clinical approaches are needed to promote health-enhancing behaviors. All of these activities fall into the framework of community and clinic based preventive and intervention activities, activities that are currently being conducted but may lack an appropriate focus. Specific recommendations include the following:

- The Secretary of the Department of Health and Human Services should direct the Community Preventive Services Task Force of the Centers for Disease Control and Prevention to explicitly assess the effectiveness of interventions directed at physical activity and nutrition among rural and minority populations. A rural sub-committee should be added to the Task Force for this purpose.
- The Secretary of Department of Health and Human Services should direct the Centers for Disease Control and Prevention to include rural, minority populations

among priority groups targeted for prevention and intervention grants pertaining to nutrition and physical activity.

- The Secretary, DHHS, should encourage to all non-metro federal Community Health Centers (CHCs) to design and evaluate clinical and community based interventions to promote screening and detection of hypertension, diabetes and hyperlipidemia. The Bureau of Primary Care, Health Resources and Services Administration, should include quality of planned outreach and screening activities when assessing applications for new and expanded CHCs. While research developing new models is needed, practitioners can work at developing screening activities that reflect the best current knowledge.

Recommendations for Further Research

To inform future policy, additional information is needed about prevention, screening and intervention programs in rural areas. Research recommendations include the following:

- Targeted research is needed to define and demonstrate effective interventions for weight loss and physical activity promotion in non-metro and minority communities. Most previous research into the effectiveness of such preventive programs has been conducted place in urban settings.
- Additional research is needed to identify community screening and education programs for hypertension and hyperlipidemia that are effective in reaching rural, minority populations. A range of screening models is needed to address diverse rural settings and to provide guidance to practitioners working with low-income, rural populations.
- Research is needed into the availability of physical education for grades K-12 in rural areas. Cutbacks in “optional” programming in financially stressed rural school districts may impair the access rural children have to age-appropriate physical activity promotion. Relatedly, small rural schools may not be able to offer a full range of team and life-style sports training. Identifying areas at highest risk for failing to provide appropriate physical education in schools is the first step in defining appropriate interventions.
- Research has shown that rural primary care practitioners are less likely to include clinical preventive services in a routine office visit than are urban physicians (e.g., Probst, Moore, et al 2002). Additional research is needed to identify office and clinic practices, such as use of nurses and other professionals that enhance the ability of rural physicians to provide these services.

APPENDIX A

METHOD AND DETAILED TABLES

Data Source

Data from this report come from 1998 National Health Interview Survey (NHIS). The 1998 NHIS is a multipurpose health survey conducted by the National Center for Health Statistics (NCHS), and the Centers of Disease Control and Prevention (CDC). The NHIS is the principal source of information on the health of the civilian, non-institutionalized, household population of the United States (*"NHIS Survey Description," 2000*). The survey has been conducted since 1957 on a continual basis and at the end of every year results are released for public and professional alike to examine and analyze.

The survey is actually made up of a series of smaller surveys. When an interviewer enters a household they administer questionnaires based on the makeup of the household. Questions are designed to retrieve essential information related to a household's, person's and child's demographics (i.e., age, sex, ethnicity), health status (i.e., health problems), behavioral patterns (i.e., exercise, smoking), health services (i.e., insurance coverage) and other.

The NHIS sample is weighted to provide representative national estimates. The NHIS is made up of distinct core questionnaires. These questionnaires are designed to answer basic health status, health services, and behavioral issues. Every so often the NHIS adds Topical Modules, which allow for a more in-depth examination of certain populations (i.e., pregnant adults, and children). The 1998 NHIS included an Adult Prevention Module, a Child Prevention Module and a Pregnancy and Smoking section for those who were eligible. This addition of more in-depth questionnaires helped to answer important questions related to the behaviors of Adults as they related to health.

The interviewed sample for the 1998 NHIS consisted of 38,209 households, which yielded 98,785 persons in 38,773 families (*"NHIS Survey Description," 2000*). For the purposes of this report South Carolina Rural Health Research Center (SCRHRC) staff concentrated on the sample adults. According to the NHIS documentation, the total number of adults sampled reached 32,440 persons 18 years of age and older. The response rate for the Sample Adult component of the survey was 83.8% (*"NHIS Survey Description," 2000*).

However, the overall response rate for the Adult Sample Component was calculated to be (Overall Family Response Rate)(Sample Adult Response Rate) $(88.2\%)(83.8\%) = 73.9\%$ (*"NHIS Survey Description," 2000*). The response rate is a fairly good indication that the majority of those sampled did in fact complete their responses. This good response rate also ensures that an excellent representation of the American public can be obtained, which will permit the generalization of responses to the populous.

For this specific report, data from the Sample Adult Core survey and the Adult Prevention Core Module describing behavioral and diagnostic risk factor data related to Hypertension, Diabetes, blood cholesterol screening, body weight, weight loss activities, and

exercise were pulled and analyzed. All percentages shown in the tables that follow are appropriately weighted to provide accurate national estimates. When an estimate is not reliable, either because the number of unweighted observations is below 30 or because the relative standard error is greater than 30%, the value is italicized.

In order to identify any significant trends in different ethnic groups, data were stratified by race (Hispanic, African American, white, and other), as well as by urban and rural status. When interpreting results one should take into account the diversity of the “other” race geographically. More than half of rural adult “other are American Indian, while less than 10% of urban residents fall into this category (non-metropolitan = 56.8%; metropolitan = 8.5%; see chart, below). The majority of urban adult others are of Asian decent, with nearly 4 out of every 10 being Asian Pacific Islanders (metropolitan A/PI = 38.5%). It should also be noted that the number of interviews completed for non-metro adults of “other” race is small (144 total observations); estimates for this population are frequently unreliable.

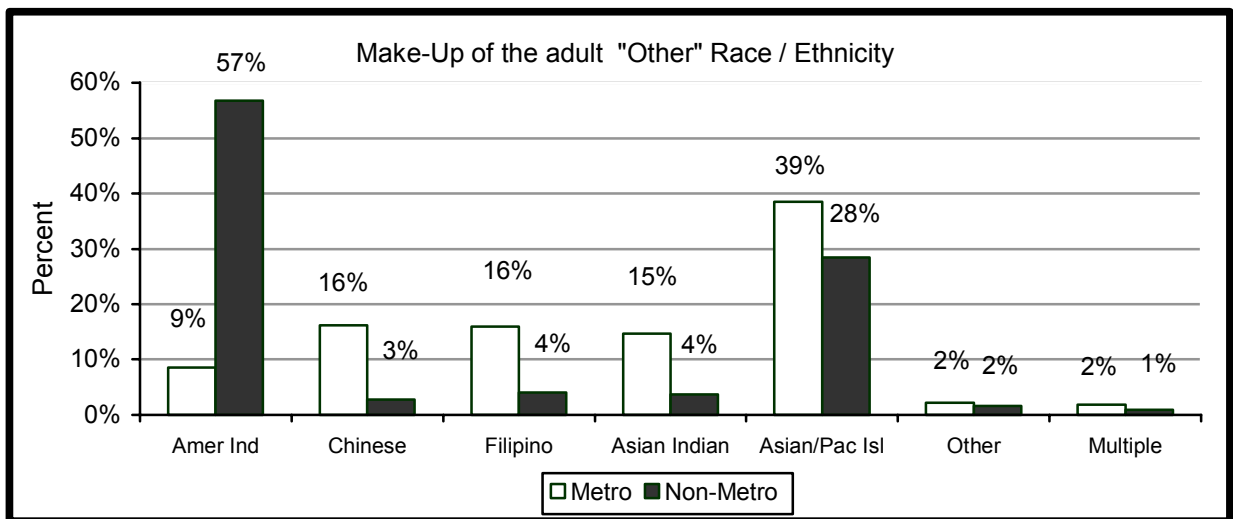


TABLE 1A: Prevalence of self-reported Hypertension by residence and race. Response to the question “Have you ever been told you have hypertension by a doctor or other health professional?”

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|----------------------------------|-------------|------------|-------------|------------------|-----------|
| Ever told you have hypertension? | Total | Hispanic | White | African American | Other |
| Total US | | | | | |
| Un-weighted observations | 32,364 | 5,177 | 21,782 | 4,332 | 1,073 |
| Weighted national estimate | 196,965,402 | 19,944,132 | 147,411,355 | 22,012,525 | 7,597,390 |
| Yes | 22.7 | 16.0 | 23.0 | 29.4 | 16.8 |
| **Told Twice | 19.0 | 12.7 | 19.3 | 24.8 | 14.3 |
| No | 77.3 | 84.0 | 77.0 | 70.6 | 83.3 |
| Metropolitan | | | | | |
| Un-weighted observations | 25,899 | 4,620 | 16,611 | 3,739 | 929 |
| Weighted national estimate | 154,901,331 | 17,968,315 | 111,529,647 | 18,796,679 | 6,606,690 |
| Yes | 22.1 | 15.9 | 22.3 | 28.7 | 15.8 |
| **Told Twice | 18.4 | 12.6 | 18.7 | 24.0 | 13.2 |
| No | 77.9 | 84.1 | 77.7 | 71.3 | 84.2 |
| Non-metro | | | | | |
| Un-weighted observations | 6,465 | 557 | 5,171 | 593 | 144 |
| Weighted national estimate | 42,064,071 | 1,975,817 | 35,881,708 | 3,215,846 | 990,700 |
| Yes | 25.2 | 16.2 | 25.0 | 33.5 | 23.3 |
| **Told Twice | 21.6 | 13.7 | 21.3 | 29.7 | 21.7 |
| No | 74.8 | 83.8 | 75.0 | 66.5 | 76.7 |

*Note: Variable HYPEV (Sample Adult Conditions); Weight = wfa_sa

*Original Sample size n=32,440, weighted=197,303,607. Less than 0.5% of total response were missing and were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

**Told Twice was figured using variable HYPDIFV (Sample Adult Conditions); Weight = wfa_sa
A subset to those answering “yes” to HYPEV; ((% of HYPEV) * (% of HYPDIFV) = Told Twice)

TABLE 1B: Prevalence of self-reported Hypertension based on being told on 2+ visits, by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|-------------------------------------------------------|------------|-----------|--------------|------------------|-----------|
| Ever told you have hypertension on 2 + visits? | Total | Hispanic | <i>White</i> | African American | Other |
| Un-weighted observations | 7,984 | 904 | 5,439 | 1,454 | 187 |
| National estimates | 44,719,197 | 3,180,523 | 33,801,831 | 6,464,523 | 1,272,320 |
| Yes | 83.8 | 79.6 | 84.0 | 84.5 | 85.4 |
| No | 16.2 | 20.4 | 16.0 | 15.5 | 14.6 |
| Metropolitan | | | | | |
| Un-weighted observations | 6,209 | 799 | 4,019 | 1,238 | 153 |
| National estimates | 34,145,741 | 2,861,316 | 24,853,641 | 5,389,286 | 1,041,498 |
| Yes | 83.3 | 79.0 | 83.7 | 83.7 | 83.7 |
| No | 16.7 | 21.0 | 16.3 | 16.3 | 16.3 |
| Non-metro | | | | | |
| Un-weighted observations | 1,775 | 105 | 1,420 | 216 | 34 |
| National estimates | 10,573,456 | 319,207 | 8,948,190 | 1,075,237 | 230,822 |
| Yes | 85.6 | 84.5 | 85.0 | 88.6 | 93.2 |
| No | 14.4 | 15.5 | 15.0 | 11.4 | 6.8 |

*Note: Variable HYPDIFV (Sample Adult Conditions); Weight = wfa_sa

A subset to those answering "yes" to HYPEV

*Original Sample size n=8,001, weighted=44,793,532. Less than 0.5% of total responses were missing and were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 2A: Description of the “Other” race

| Race/Ethnicity | Metro Weighted | Non-Metro Weighted | Metro Un-weighted | Non-Metro Un-weighted | Metro wtd % | Non-Metro wtd % |
|----------------------------|-----------------------|---------------------------|--------------------------|------------------------------|--------------------|------------------------|
| Indian (American) “other” | 561,661 | 562,126 | 95 | 80 | 8.5 | 56.8 |
| Chinese “other” | 1,074,366 | 27,903 | 153 | 7 | 16.2 | 2.8 |
| Filipino “other” | 1,051,406 | 39,467 | 144 | 7 | 15.9 | 4.0 |
| Asian Indian “other” | 970,788 | 36,613 | 120 | 4 | 14.7 | 3.7 |
| Asian/Pacific Isl. “other” | 2,548,240 | 281,592 | 361 | 40 | 38.5 | 28.4 |
| Other Race “other” | 146,144 | 16,164 | 23 | 2 | 2.2 | 1.6 |
| Multiple Race “other” | 123,408 | 8,467 | 15 | 1 | 1.8 | 0.9 |
| Refused to Answer “other” | 94,661 | 13,279 | 16 | 2 | 1.4 | 1.3 |
| Not Ascertained “other” | 0 | 0 | 0 | 0 | 0 | 0 |
| Don’t Know “other” | 52,888 | 5,089 | 5 | 1 | 0.8 | 0.5 |

*Note: Total figures are representative of those interviewed for the Sample Adult and Sample Adult Prevention Module Questionnaires solely.

TABLE 3A: Prevalence of self reported diabetes by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|------------------------------------------|-------------|------------|-------------|------------------|-----------|
| Ever told by a doctor you have Diabetes? | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 32,387 | 5,179 | 21,802 | 4,333 | 1,073 |
| National estimates | 197,065,435 | 19,965,644 | 147,489,578 | 22,014,016 | 7,596,197 |
| Yes | 5.3 | 6.2 | 4.8 | 7.6 | 5.0 |
| No | 93.8 | 93.1 | 94.3 | 91.3 | 93.8 |
| Borderline | 0.9 | 0.7 | 0.9 | 1.1 | 1.2 |
| Metropolitan | | | | | |
| Un-weighted observations | 25,914 | 4,622 | 16,623 | 3,740 | 929 |
| National estimates | 154,969,224 | 17,988,294 | 111,577,263 | 18,798,170 | 6,605,497 |
| Yes | 5.2 | 6.2 | 4.7 | 7.7 | 4.6 |
| No | 94.0 | 93.0 | 94.6 | 91.2 | 94.8 |
| Borderline | 0.8 | 0.8 | 0.7 | 1.1 | 0.6 |
| Non-metro | | | | | |
| Un-weighted observations | 6,473 | 557 | 5,179 | 593 | 144 |
| National estimates | 42,096,211 | 1,977,350 | 35,912,315 | 3,215,846 | 990,700 |
| Yes | 5.5 | 6.4 | 5.3 | 6.7 | 7.4 |
| No | 93.0 | 93.2 | 93.2 | 92.4 | 87.0 |
| Borderline | 1.5 | 0.5 | 1.5 | 0.9 | 5.6 |

*Note: Variable DIBEV (Sample Adult Conditions); Weight = wtfa_sa

*Original Sample size n=32,440, weighted=197,303,607. Less than 0.5% of total response were missing and were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 4A: Prevalence of self reported cholesterol screening by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|-----------------------------------|-------------|------------|-------------|------------------|-----------|
| Last time Cholesterol was checked | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 30,084 | 4,809 | 20,389 | 3,910 | 976 |
| Weighted estimate | 183,908,120 | 18,566,482 | 138,383,361 | 20,054,829 | 6,903,448 |
| Never | 28.4 | 43.9 | 25.3 | 33.1 | 36.0 |
| Within last 2 years | 57.0 | 45.2 | 58.7 | 57.6 | 52.4 |
| 2-5 years ago | 9.6 | 7.5 | 10.3 | 6.6 | 9.3 |
| 5 + years | 5.0 | 3.4 | 5.7 | 2.7 | 2.3 |
| Metropolitan | | | | | |
| Un-weighted observations | 24,054 | 4,289 | 15,552 | 3,375 | 838 |
| Weighted estimate | 144,550,133 | 16,775,758 | 104,715,224 | 17,116,947 | 5,942,204 |
| Never | 27.4 | 43.2 | 23.8 | 31.3 | 34.7 |
| Within last 2 years | 58.1 | 45.9 | 60.1 | 59.3 | 54.0 |
| 2-5 years ago | 9.7 | 7.5 | 10.6 | 6.8 | 9.0 |
| 5 + years | 4.8 | 3.4 | 5.5 | 2.6 | 2.3 |
| Non-metro | | | | | |
| Un-weighted observations | 6,030 | 520 | 4,837 | 535 | 138 |
| Weighted estimate | 39,357,987 | 1,790,724 | 33,668,137 | 2,937,882 | 961,244 |
| Never | 32.2 | 50.6 | 29.9 | 43.9 | 43.9 |
| Within last 2 years | 52.8 | 38.9 | 54.3 | 48.2 | 42.5 |
| 2-5 years ago | 9.1 | 7.8 | 9.5 | 5.3 | 11.7 |
| 5 + years | 5.9 | 2.7 | 6.3 | 2.6 | 1.9 |

*Note: Variable CHLCHK (Sample Adult Prevention Module); Weight = wtfa_ap

*Original Sample size n=32,440, weighted=197,303,607. Approximately ~6.8% of total responses were missing and were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 5A: Prevalence of differing BMI categories by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|--------------------------------|--------------|-----------------|--------------|-----------------------------|--------------|
| BMI Body Mass Index | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 31,353 | 4,971 | 21,155 | 4,184 | 1,043 |
| Weighted estimate | 191,180,124 | 19,176,632 | 143,295,509 | 21,286,866 | 7,421,117 |
| Underweight | 2.2 | 1.6 | 2.3 | 1.3 | 6.0 |
| Normal | 42.5 | 36.9 | 44.0 | 32.6 | 56.9 |
| Overweight | 35.1 | 36.6 | 35.2 | 36.9 | 25.8 |
| Obesity I | 13.7 | 16.6 | 13.0 | 18.4 | 6.4 |
| Obesity II | 4.2 | 5.0 | 3.7 | 7.0 | 2.5 |
| Obesity III | 2.3 | 3.3 | 1.8 | 3.8 | 2.4 |
| Metropolitan | | | | | |
| Un-weighted observations | 25,061 | 4,444 | 16,108 | 3,609 | 900 |
| Weighted estimate | 150,191,235 | 17,322,603 | 108,277,888 | 18,151,860 | 6,438,884 |
| Underweight | 2.3 | 1.5 | 2.3 | 1.2 | 6.3 |
| Normal | 43.0 | 36.7 | 44.7 | 33.1 | 58.9 |
| Overweight | 35.2 | 36.6 | 35.3 | 36.5 | 25.7 |
| Obesity I | 13.3 | 16.8 | 12.4 | 18.6 | 5.1 |
| Obesity II | 4.0 | 5.0 | 3.5 | 6.9 | 1.8 |
| Obesity III | 2.2 | 3.3 | 1.8 | 3.7 | 2.2 |
| Non-metro | | | | | |
| Un-weighted observations | 6,292 | 527 | 5,047 | 575 | 143 |
| Weighted estimate | 40,988,889 | 1,854,029 | 35,017,621 | 3,135,006 | 982,233 |
| Underweight | 2.1 | 2.4 | 2.0 | 2.0 | 4.5 |
| Normal | 40.7 | 38.1 | 41.7 | 29.4 | 43.8 |
| Overweight | 35.1 | 36.3 | 34.9 | 39.2 | 26.0 |
| Obesity I | 15.1 | 14.6 | 15.0 | 17.0 | 14.7 |
| Obesity II | 4.8 | 5.3 | 4.4 | 7.7 | 7.3 |
| Obesity III | 2.3 | 3.4 | 2.0 | 4.7 | 3.7 |

*Note: Original Variable BMI classified as:

Underweight 0.00 < BMI < 18.5
 Normal 18.5 ≤ BMI < 25.0
 Overweight 25.0 ≤ BMI < 30.0
 Obesity I 30.0 ≤ BMI < 35.0
 Obesity II 35.0 ≤ BMI < 40.0
 Obesity III BMI ≥ 40.0
 Unknown/Missing BMI = 99.5

(Sample Adult Questionnaire); Weight = wfa_ap

*Original Sample size n=32,440, weighted=197,303,607. Approximately ~3.1% of total responses were missing and were excluded from analysis. *Italicized percentages indicate that sample size numbers are below 30.

TABLE 5B: Prevalence of weight control behaviors by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|--------------------------------------------------|--------------|-----------------|--------------|-------------------------|--------------|
| Are you doing anything about your weight? | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 31,751 | 5,062 | 21,461 | 4,187 | 1,041 |
| Weighted estimate | 193,492,308 | 19,493,375 | 145,267,738 | 21,338,284 | 7,392,911 |
| Lose Weight | 31.3 | 30.0 | 31.8 | 31.7 | 24.0 |
| Gain Weight | 3.7 | 3.5 | 3.2 | 6.3 | 6.4 |
| Stay the Same | 22.8 | 18.2 | 23.4 | 22.6 | 23.6 |
| Not trying anything | 42.2 | 48.3 | 41.6 | 39.4 | 46.0 |
| Metropolitan | | | | | |
| Un-weighted observations | 25,352 | 4,512 | 16,339 | 3,604 | 897 |
| Weighted estimate | 151,921,040 | 17,608,141 | 109,722,595 | 18,188,093 | 6,402,211 |
| Lose Weight | 32.0 | 30.4 | 32.7 | 32.3 | 24.2 |
| Gain Weight | 3.7 | 3.6 | 3.2 | 5.7 | 6.7 |
| Stay the Same | 23.2 | 18.0 | 23.9 | 23.2 | 23.9 |
| Not trying anything | 41.1 | 48.0 | 40.2 | 38.8 | 45.2 |
| Non-metro | | | | | |
| Un-weighted observations | 6,399 | 550 | 5,122 | 583 | 144 |
| Weighted estimate | 41,571,268 | 1,885,234 | 35,545,143 | 3,150,191 | 990,700 |
| Lose Weight | 29.0 | 26.7 | 29.3 | 28.3 | 23.0 |
| Gain Weight | 3.8 | 3.1 | 3.2 | 10.0 | 4.6 |
| Stay the Same | 21.3 | 19.6 | 21.7 | 19.0 | 21.5 |
| Not trying anything | 45.9 | 50.6 | 45.8 | 42.7 | 50.9 |

*Note: Variable LWGT (Sample Adult Prevention Module); Weight = wtfa_ap

*Original Sample size n=32,440, weighted=197,303,607. Less than 2% of total responses were missing and were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30

TABLE 5C: Prevalence of weight control behaviors by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|--------------------------------|-------------|-----------|------------|------------------|-----------|
| Are you eating fewer calories? | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 16,962 | 2,428 | 11,779 | 2,248 | 507 |
| Weighted estimate | 104,745,202 | 9,424,313 | 80,146,004 | 11,648,314 | 3,526,571 |
| Mentioned | 42.2 | 37.6 | 43.3 | 41.1 | 33.5 |
| Not Mentioned | 57.8 | 62.4 | 56.7 | 58.9 | 66.5 |
| Metropolitan | | | | | |
| Un-weighted observations | 13,794 | 2,183 | 9,191 | 1,977 | 443 |
| Weighted estimate | 83,804,843 | 8,551,460 | 62,011,409 | 10,155,557 | 3,086,417 |
| Mentioned | 42.3 | 37.3 | 43.7 | 40.5 | 32.1 |
| Not Mentioned | 57.7 | 62.7 | 56.3 | 59.5 | 67.9 |
| Non-metro | | | | | |
| Un-weighted observations | 3,168 | 245 | 2,588 | 271 | 64 |
| Weighted estimate | 20,940,359 | 872,853 | 18,134,595 | 1,492,757 | 440,154 |
| Mentioned | 41.9 | 40.2 | 41.7 | 44.9 | 43.1 |
| Not Mentioned | 58.1 | 59.8 | 58.3 | 55.1 | 56.9 |

*Note: Variable CWGTCAL. A subset to those trying to lose weight, stay about the same, or missing on Variable LWGT.

(Sample Adult Prevention Module); Weight = wtfa_ap

*Original Sample size n=17,639, weighted=108,498,692. Less than 3.5% were missing among those who responded that they were doing something about their weight. As a result the missing were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 5D: Prevalence of weight control behaviors by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|---------------------------------|-------------|-----------|--------------|------------------|-----------|
| Are you eating less fat? | Total | Hispanic | <i>White</i> | African American | Other |
| Un-weighted observations | 16,962 | 2,428 | 11,779 | 2,248 | 507 |
| Weighted estimate | 104,745,202 | 9,424,313 | 80,146,004 | 11,648,314 | 3,526,571 |
| Mentioned | 40.3 | 34.8 | 42.1 | 33.9 | 35.6 |
| Not Mentioned | 59.7 | 65.2 | 57.9 | 66.1 | 64.4 |
| Metropolitan | | | | | |
| Un-weighted observations | 13,794 | 2,183 | 9,191 | 1,977 | 443 |
| Weighted estimate | 83,804,843 | 8,551,460 | 62,011,409 | 10,155,557 | 3,086,417 |
| Mentioned | 40.0 | 34.3 | 42.2 | 33.5 | 32.6 |
| Not Mentioned | 60.0 | 65.7 | 57.8 | 66.5 | 67.4 |
| Non-metro | | | | | |
| Un-weighted observations | 3,168 | 245 | 2,588 | 271 | 64 |
| Weighted estimate | 20,940,359 | 872,853 | 18,134,595 | 1,492,757 | 440,154 |
| Mentioned | 41.6 | 39.4 | 41.7 | 36.9 | 56.5 |
| Not Mentioned | 58.4 | 60.6 | 58.3 | 63.1 | 43.5 |

*Note: Variable CWGTFAT. A subset to those trying to lose weight, stay about the same, or missing on Variable LWGT.

(Sample Adult Prevention Module); Weight = wtfa_ap

*Original Sample size n=17,639, weighted=108,498,692. Less than 3.5% were missing among those who responded that they were doing something about their weight. As a result the missing were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 5E: Prevalence of weight control behaviors by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|---------------------------------|--------------|-----------------|--------------|-------------------------|--------------|
| Are you exercising more? | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 16,962 | 2,428 | 11,779 | 2,248 | 507 |
| National estimates | 104,745,202 | 9,424,313 | 80,146,004 | 11,648,314 | 3,526,571 |
| Mentioned | 41.3 | 38.5 | 41.9 | 39.6 | 42.1 |
| Not Mentioned | 58.7 | 61.5 | 58.1 | 60.4 | 57.9 |
| Metropolitan | | | | | |
| Un-weighted observations | 13,794 | 2,183 | 9,191 | 1,977 | 443 |
| National estimates | 83,804,843 | 8,551,460 | 62,011,409 | 10,155,557 | 3,086,417 |
| Mentioned | 42.2 | 38.2 | 43.1 | 40.9 | 41.6 |
| Not Mentioned | 57.8 | 61.8 | 56.9 | 59.1 | 58.4 |
| Non-metro | | | | | |
| Un-weighted observations | 3,168 | 245 | 2,588 | 271 | 64 |
| National estimates | 20,940,359 | 872,853 | 18,134,595 | 1,492,757 | 440,154 |
| Mentioned | 37.6 | 40.9 | 37.8 | 30.9 | 45.5 |
| Not Mentioned | 62.4 | 59.1 | 62.2 | 69.1 | 54.5 |

*Note: Variable CWGTEXE. A subset of those trying to lose weight, stay about the same, or missing on Variable LWGT.

(Sample Adult Prevention Module); Weight = wtfa_ap

*Original Sample size n=17,639, weighted=108,498,692. Less than 3.5% were missing among those who responded that they were doing something about their weight. As a result the missing were excluded from analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 6A: Prevalence of physical activity by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|----------------------------------|-------------|------------|-------------|------------------|-----------|
| Physical Activity Level | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 31,226 | 5,014 | 21,103 | 4,099 | 1,010 |
| National estimates | 190,338,862 | 19,328,812 | 142,937,025 | 20,926,881 | 7,146,144 |
| Sedentary (0.0-1.4 kcal/kg/day) | 62.9 | 69.9 | 60.8 | 70.5 | 64.0 |
| Moderately (1.5-2.9 kcal/kg/day) | 15.0 | 12.1 | 16.0 | 10.8 | 15.5 |
| Very (3.0+ kcal/kg/day) | 22.1 | 18.0 | 23.2 | 18.7 | 20.5 |
| Metropolitan | | | | | |
| Un-weighted observations | 24,943 | 4,472 | 16,071 | 3,529 | 871 |
| National estimates | 149,448,256 | 17,455,268 | 107,984,100 | 17,827,629 | 6,181,259 |
| Sedentary (0.0-1.4 kcal/kg/day) | 61.9 | 70.0 | 59.2 | 70.0 | 63.5 |
| Moderately (1.5-2.9 kcal/kg/day) | 15.3 | 12.0 | 16.5 | 10.8 | 16.0 |
| Very (3.0+ kcal/kg/day) | 22.8 | 18.0 | 24.3 | 19.2 | 20.5 |
| Non-metro | | | | | |
| Un-weighted observations | 6,283 | 542 | 5,032 | 570 | 139 |
| National estimates | 40,890,606 | 1,873,544 | 34,952,925 | 3,099,252 | 964,885 |
| Sedentary (0.0-1.4 kcal/kg/day) | 66.4 | 69.1 | 65.6 | 73.9 | 67.1 |
| Moderately (1.5-2.9 kcal/kg/day) | 14.0 | 12.7 | 14.4 | 10.4 | 12.9 |
| Very (3.0+ kcal/kg/day) | 19.6 | 18.2 | 20.0 | 15.7 | 20.0 |

*Note: Variable PA_LEVEL (Sample Adult Prevention Module); Weight = wfa_ap.

*Variable PA_LEVEL is a recoded variable: sources include: HPSTAT; HPACT; HPLST (preliminary); KCAL. The recodes are based on summary measures developed for the 1985 National Health Interview Survey of Health Promotion and Disease Prevention (NHIS-HPDP) and used again in 1990. PA_LEVEL, based on KCAL, indicates sedentary, moderately active, and very active classifications. These recodes are based on information supplied by respondents regarding the frequency of these activities, the number of minutes spent doing the activity, and the change in the respondent's heart rate or breathing as a result of the activity. The algorithm draws on published work by Stephens and Craig (1989) based on the 1981 Canada Fitness Survey; detailed specifications for these recodes are available from DHIS upon request.

*Original Sample size n=32,440, weighted=197,303,607. Less than 4% were missing and were excluded from the analysis.

*Italicized percentages indicate that sample size numbers are below 30.

TABLE 6B: Prevalence of meeting physical activity recommendations by residence and race

| | TOTAL | TOTAL | TOTAL | TOTAL | TOTAL |
|--------------------------------|--------------|-----------------|--------------|-------------------------|--------------|
| Vigorous Activity Level | Total | Hispanic | White | African American | Other |
| Un-weighted observations | 31,155 | 5,004 | 21,004 | 4,107 | 1,040 |
| National estimates | 190,346,551 | 19,366,380 | 142,600,803 | 20,989,847 | 7,389,521 |
| Does not meet Recommendations | 76.0 | 81.8 | 74.5 | 80.2 | 78.5 |
| Meets Recommendations | 24.0 | 18.2 | 25.5 | 19.8 | 21.5 |
| Metropolitan | | | | | |
| Un-weighted observations | 24,972 | 4,461 | 16,065 | 3,547 | 899 |
| National estimates | 149,991,441 | 17,434,639 | 108,208,348 | 17,935,007 | 6,413,447 |
| Does not meet Recommendations | 75.5 | 81.7 | 73.5 | 79.5 | 79.8 |
| Meets Recommendations | 24.5 | 18.3 | 26.5 | 20.5 | 20.2 |
| Non-metro | | | | | |
| Un-weighted observations | 6,183 | 543 | 4,939 | 560 | 141 |
| National estimates | 40,355,110 | 1,931,741 | 34,392,455 | 3,054,840 | 976,074 |
| Does not meet Recommendations | 78.0 | 82.9 | 77.4 | 84.9 | 69.6 |
| Meets Recommendations | 22.0 | 17.1 | 22.6 | 15.1 | 30.4 |

*Note: Original Variables VIGMIN, VIGLONGD, VIGFREQW.

Meets requirements is ≥ 20 minutes per day, 3 days a week. The CDC and ACSM recommend that persons should accumulate 30 minutes or more of moderate (55-69% of Max Heart Rate) physical activity on most, preferably all, days of the week.⁴

(Sample Adult Questionnaire); Weight = wtfa_sa

*Original Sample size n=32,440, weighted=197,303,607. Less than 4% were missing and were excluded from the analysis.

*Italicized percentages indicate that sample size numbers are below 30.

⁴ Balady, G J, Berra, K A, Golding, L A, et al; ACSM's Guidelines for Exercise Testing and Prescription, sixth edition. Baltimore, MD: Lippincott Williams & Wilkins, (2000).

APPENDIX B

REFERENCES

- Bako, G, Dewar, R, Hanson, J, Hill, G. (1984). Population density as an indicator of urban-rural differences in cancer incidence, Alberta, Canada, 1969-73. *Canadian Journal of Public Health*, 75 (2):152-6.
- Balady BJ, Berra KA, Golding LA, Gordon NF, Mahler DA, Jonathan NM. (2000). *ACSM's Guidelines For Exercise Testing and Prescription, Sixth Edition*. Baltimore, Maryland, Philadelphia, Pennsylvania: Lippincott Williams & Wilkins.
- Bassett Jr, DR, Fitzhugh EC, Crespo CJ, King GA, McLaughlin JE. (2002). Physical activity and ethnic differences in hypertension prevalence in the united states. *Preventive Medicine*, 34(2):179-86.
- Baxter J, Hamman RF, Lopez TK, Marshall JA, Hoag S, Swenson CJ. (1993). Excess incidence of known non-insulin-dependent diabetes mellitus (niddm) in Hispanics compared with non-Hispanic whites in the San Luis valley, Colorado. *Ethnicity and Disease*, 3(1):11-21.
- Bolen, J. C., Powell-Griner, R. L., Bland, S. D., & Holtzman, D. (2000). MMWR Surveillance Summary 2000, State specific prevalence of selected health behaviors, by race and ethnicity. Behavioral Risk Factor Surveillance System 1997. *MMWR*, 49 (2):1-60.
- Brownson RC, Housemann RA, Brown DR, Jackson-Thompson J, King AC, Malone BR, et al. (2000). Promoting physical activity in rural communities. Walking trail access, use and effects. *American Journal of Preventive Medicine*, 18(3):235-241.
- Burton BT, Foster WR, Hirsch J, Vanltallie TB. (1985). Health implications of obesity: NIH consensus development conference. *International Journal of Obesity Related Metabolic Disorders*, 9:155-169.
- No Authors Listed. (1985). Closing the gap: the problem of diabetes mellitus in the United States. Carter Center of Emory University. *Diabetes Care*, 8(4):391-406.
- Denke MA, Sempos CT, Grundy SM. (1993). Excess body weight. An underrecognized contributor to high blood cholesterol levels in white American men. *Archives of Internal Medicine*, 153(9):1040-3.
- Dressler WW, Bindon JR, Neggers YH. (1998). Culture, socioeconomic status, and coronary heart disease risk factors in an African American community. *Journal of Behavioral Medicine*, 21(6):527-544.
- The American Diabetes Association Home Page. (No Updated Date). Facts and Figures & Groups affected by Diabetes. The American Diabetes Association, ADA. Retrieved April 20, 2002, from <http://www.diabetes.org>.
- Finkelstein EA, Fiebelkorn IC, Wang G. (2003). National medical spending attributable to overweight and obesity: how much, and who's paying? *Health Affairs*, 22(3):219-226.
- Gamm L, Hutchison L, Dabney B, Dorsey A, eds. (2003). Rural Healthy People 2010: A Comparison Document to Healthy People 2010, Volume I. College Station, Texas: The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center.
- Green LW, Kreuter MW. (1999). Health promotion planning: An educational and ecological approach (3rd ed.). Mountain View, CA: Mayfield.
- Haennel RG, Lemire F. (2002). Physical activity to prevent cardiovascular disease. How much is enough? *Canadian Family Physician*, 48:65-71.

- Hajjar I, Kotchen T. (2003). Regional variations of blood pressure in the United States are associated with regional variations in dietary intakes: the NHANES-III data. *Journal of Nutrition*, 133(1):211-4.
- Hill JO, Melanson EL. (1999). Overview of the determinants of overweight and obesity: Current evidence and research issues. *Medical Science Sports Exercise*, 31(11 suppl):S15-21.
- Hogan P, Dall T, Nikolov P. (2003). Economic costs of diabetes in the U.S. in 2002. *Diabetes Care*, 26(3):917-32.
- Jensen GL, Friedmann JM. (2002). Obesity is associated with functional decline in community-dwelling rural older persons. *Journal of the American Geriatric Society*, 50(5):918-923.
- Kuller L, Anderson H, Peterson D, Cassel J, Spiers P, Curry H, et al. (1970). Nationwide cerebrovascular disease mortality study. *Stroke*, 1:88-99.
- Lackland DT, Moore M. (1997). Hypertension-related mortality and morbidity in the southeast. *Southern Medical Journal*, 90(2):191-198.
- Lesniak KT, Dubbert PM. (2001). Exercise and hypertension. *Current Opinion in Cardiology*, 16(6):356-9.
- Lewis RJ, Cash TF, Jacobi L, Bubb-Lewis C. (1997). Prejudice towards fat people: the development and validation of the anti-fat attitudes test. *Obesity Research*, 5(4):297-307.
- Levin S, Mayer-Davis EJ, Ainsworth BE, Addy CL, Wheeler FC. (2001). Racial/Ethnic health disparities in South Carolina and the role of rural locality and educational attainment. *Southern Medical Journal*, 94(7):711-718.
- Liff JM, Chow W, Greenberg RS. (1991). Rural-urban differences in stage at diagnosis. *Cancer*, 67(5):1454-1459.
- Mainous AG, King DE, Garr DR, Perason WE. (October, 2002). *Diabetes and Cardiovascular Disease in Rural African Americans*, Report submitted to the Office of Rural Health Policy, HRSA.
- Millen BE, Silliman RA, Cantey-Kiser J, Copenhafer DL, Ewart CV, Ritchie CS, et al. (2001). Nutritional risk in an urban homebound older population. The nutrition and healthy aging project. *Journal of Nutritional Health and Aging*, 5(4):269-277.
- National Heart, Lung, and Blood Institute. (2002). Morbidity and Mortality: Chartbook On Cardiovascular, Lung, and Blood Diseases, 2002. Bethesda, Maryland: National Institutes of Health, Public Health Service, National Heart, Lung, and Blood Institute. Retrieved June 30, 2002, from http://www.nhlbi.nih.gov/resources/docs/02_chtbk.pdf.
- Muller MJ, Mast M, Asbeck I, Langnase K, Grund A. (2001). Prevention of obesity—is it possible? *Obesity Review*, 2(1):15-28.
- Must A, Spadano J, Coakley EH, Field AE, Colditz G, Dietz WH. (1999). The disease burden associated with overweight and obesity. *Journal of the American Medical Association*, 282(16):1523-1529.
- National Heart, Lung, and Blood Institute. (2001). National Cholesterol Education Program, 3rd Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). NIH Publication No. 01-3290.
- National Center for Chronic Disease Prevention and Health Promotion. (Last Revised December 11, 2001). (source: BRFSS 2000). Nutrition and Physical Activity Statistics. Percent of U.S. Adults that are Physically Inactive by State and Age Group. Retrieved May 15, 2002, from <http://apps.nccd.cdc.gov/dnpa/stats.htm>.

- Obisesan TO, Vargas CM, Gillium RF. (2000). Geographic variation in stroke in the United States. Region, urbanization, and hypertension in the third national health and nutrition examination survey. *Stroke*, 31(1):19-25.
- The 1998 National Health Interview Survey Public Use Data Release. (2000). NHIS Survey Description. The Centers for Disease Control and Prevention (CDC). 23 Jan. 2002, from http://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/1998/srvydesc.pdf
- Papademetriou V, Kokkinos PF. (1999). Exercise training and blood pressure control in patients with hypertension. *Journal of Clinical Hypertension*, 19(3):507-516.
- Parks SE, Housemann RA, Brownson RC. (2003). Differential correlates of physical activity in urban and rural adults of various socioeconomic backgrounds in the United States. *Journal of Epidemiological Community Health*, 57(1):29-35.
- Department of Health and Human Services. (1996). Physical activity and health: a report of the surgeon general. Atlanta: U.S. Department of Health and Human Services, Centers of Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance Survey. (Last revised August 7, 2002). Prevalence Data 1998, 2000. Retrieved August 7, 2002, from <http://www.cdc.gov/brfss/index.htm>.
- The Healthy People 2000 web site. (1999). Progress Review, Diabetes and Other Chronic Disabling Conditions. Department of Health and Human Services, DHHS. Retrieved May 28, 2002, from <http://odphp.osophs.dhhs.gov/pubs/hp2000/>.
- Probst JC, Moore CG, Baxley EG and Lammie JL. (2002). Rural – Urban Differences in Visits to Primary Care Physicians. *Family Medicine*, 34(8):609-615.
- Sarkin JA, Nichols JF, Sallis JF, Calfas KJ. (2000). Self-report measures and scoring protocols affect prevalence estimates of meeting physical activity guidelines. *Medicine and Science in Sports and Exercise*, 32(1):149-56.
- Sempos CT, Cleamon JI, Carroll MD, Johnson CL, Bachorik PS, Gordon DJ, et al. (1993). Prevalence of high blood cholesterol among U.S. adults: An update based on guidelines from the second report of the National Cholesterol Education Program Adult Treatment Panel. *Journal of the American Medical Association*, 269(23):3009-3014.
- Sparling PB, Snow TK, Beavers BD. (1999). Serum cholesterol levels in college students: opportunities for education and intervention. *Journal of American College Health* 48(3):123-7.
- The National Heart, Lung and Blood Institute. (1997). The Sixth Report on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. NIH Publication # 98-4080. Retrieved May 20, 2002, from <http://www.nhlbi.nih.gov/guidelines/hypertension/jnc6.pdf>.
- No Authors Listed. (1998). Trends in Ischemic Heart Disease Death Rates for African Americans and Whites – United States, 1981-1995. *Morbidity and Mortality Weekly Review*, 47(44):945-949.
- Wilcox S, Castro C, King AC, Housemann R, Brownson RC. (2000). Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse women in the United States. *Journal of Epidemiological Community Health*, 54(9):667-672.
- Williams JP, Saunders JT, Hunt DE, Schorling JB. (1997). Prevalence of coronary heart disease risk factors among rural African Americans: a community-based study. *Southern Medical Journal*, 90(9):814-820.