Physical Activity, Fruit and Vegetable Intake, and Smoking in Working-Aged Adults
Opportunities for Prevention in Primary Care

BY CATHERINE A. MCCARTY, PH.D., M.P.H., R.D., ANDRINE LEMIEUX, PH.D., MICHAEL M. HITZ, JEANETTE A. PALCHER AND PATRICIA G. CONWAY, PH.D., M.S.W.

The purpose of this study was to document health behaviors (diet, physical activity, cigarette smoking) in working-aged adults with identified primary care providers. We surveyed 1,344 adults in Minnesota and North Dakota 25 to 64 years of age from Essentia Health primary care patient lists in May of 2012. A 21-page, self-administered questionnaire asking about their health habits was mailed to the sample three times during a three-month period. The response to the three mailings was 38.8%, with a final sample size of 522 completed surveys. Overall, 18.5% (95% CL=18.2, 18.8) of men and 22.3% (95% CL=22.0, 22.6) of women reported currently smoking. The BMI distribution (normal, overweight and obese) was 16.9%, 40.0% and 43.1%, respectively, for men and 32.8%, 31.7% and 35.5%, respectively, for women. Mean fruit and vegetable intake was significantly lower for men than women (mean=1.92 servings a day for men and 2.15 for women). Physical inactivity was reported by 6.2% (95% CL=6.0, 6.4) of the men and 7.2% (95% CL=7.0, 7.4) of the women. After adjusting for the other variables, people in the older age groups were less likely to smoke (OR=0.78, 95% CL=0.65, 0.93) than those in the younger age groups, people living in rural areas were more likely to be obese (OR=1.67, 95% CL=1.16, 2.39) than those living in urban areas, and women were more likely than men to be inactive or have low levels of physical activity (OR=1.47, 95% CL=1.02, 2.11). These data highlight a number of modifiable risk factors for chronic diseases that primary care providers could address in order to improve long-term health outcomes.

Eating healthfully, engaging in physical activity and not smoking have been promoted by the U.S. government and various health organizations as ways to reduce one’s risk for a number of adverse health outcomes. Current dietary recommendations include consumption of at least five servings of fruits and vegetables daily. However, many people, especially those living in rural areas, don’t eat enough of those foods. A recent review of 2009 Behavioral Risk Factor Surveillance data found that in 37 states adults living in rural areas did not consume the recommended number of servings. Other studies have shown that less social cohesion (involvement in social organizations or groups) is associated with lower fruit and vegetable consumption, as people tend to eat better when they’re around others. People in rural areas tend to be more isolated than those in urban settings. Living far from supermarkets also is associated with rural residents’ consuming fewer fruits and vegetables.

In addition, adults should engage in at least 150 minutes of moderately intense physical activity or 75 minutes of vigorous physical activity a week. Although inactivity is associated with obesity in both rural and urban residents, the prevalence of obesity has been shown to be higher in adults living in rural parts of the United
States than in those living in urban areas (39.4% versus 33.4%).

Tobacco use is the most preventable cause of morbidity and mortality in the United States; in 2010, 19.3% of U.S. adults smoked cigarettes. Data from the 2008 Behavioral Risk Factor Surveillance System (BRFSS) indicate higher cigarette smoking rates in rural areas (22.2%) than in suburban (17.3%) or urban areas (18.1%).

As health care organizations become responsible for the care of defined populations of patients, they will need to quantify the health needs of particular communities in order to better target primary prevention efforts such as getting people to quit smoking, manage their weight, eat more healthfully and exercise.

In this study, we wanted to document the extent to which working-aged adults with identified primary care providers from Essentia Health clinics in northern Minnesota and southeastern North Dakota smoked or engaged in other behaviors that can have a negative impact on health.

Methods
A random sample of 1,344 adults ages 25 to 64 years stratified by gender and urban/rural residence was selected from Essentia Health primary care lists in May of 2012. A 21-page, self-administered questionnaire was mailed to the sample three times over a three-month period in order to improve the response rate. The questionnaire asked about demographics, cigarette smoking, fruit and vegetable intake, physical activity and chronic disease risk factors. The final response rate was 38.8% (522 completed surveys); 116 respondents were males living in an urban setting, 115 were males residing in a rural setting, 138 were females living in an urban setting and 153 were females residing in a rural setting.

Most of the questions were selected from the PhenX Toolkit (www.phenx-toolkit.org), which provides standard measures related to complex diseases, phenotypic traits and environmental exposures. This allows for comparison across population-based studies.

We categorized a person’s cigarette use as never, past or current. Body mass index (BMI) was calculated from self-reported weight and height. Pearson correlation coefficients for estimated daily servings of fruits and vegetables were 0.61 for men and 0.74 for women. We used the Stanford Brief Activity Survey (SBAS), which is included in the toolkit and has been validated (test-retest reliability of 0.62) as a low-burden, self-report tool, to summarize frequency and intensity of physical activity at work and leisure. Scoring of the SBAS involves determining the intersection of the respondent’s on-the-job activity and leisure time activity and categorizing the participant as being inactive or engaging in activity that has light intensity, moderate intensity, hard intensity or very hard intensity.

IBM SPSS Version 21.0 was used for the analyses. T-tests were used to compare means, chi-squared tests were used to compare proportions, and 95% binomial confidence limits were calculated around estimates of proportions. Logistic regression was used to quantify the independent relationship of age, gender and location (urban/rural) with health behaviors. A P<0.05 was considered to be statistically significant.

This protocol was reviewed and approved by the Essentia Institute of Rural Health Institutional Review Board.

Results
The percentages of respondents who reported being current cigarette smok-
smoked for all age categories except the oldest (over 60).

BMI also varied by age and gender (Table 2). The distribution of BMI measures for the men who responded was 16.9% normal, 40.0% overweight and 43.1% obese; of the women who responded, 32.8% had a normal BMI, 31.7% were overweight and 35.5% were obese. The percentage of male respondents who were overweight/obese was significantly higher than the percentage of female respondents (83.1%, 95% CL=82.8, 83.4 for men and 67.2%, 95% CL=66.9, 67.5 for women).

Mean fruit and vegetable intake was significantly lower for men than for women (mean=1.92 servings per day for men and 2.15 for women, t=-2.506, P=0.014 for servings without fries).

Inactivity was reported by 6.2% (95% CL=6.0, 6.4) of men, with men ages 60 to 64 years of age being the least-active age group (11.4%). Among the women who responded, 7.2% reported being inactive (95% CL=7.0, 7.4). The percentage rose to 11.8% among those women in the 60 to 64 age category. The percentage of respondents engaged in intense and very intense activity decreased dramatically by age for both men and women (Figures 1a and 1b).

Logistic regression analyses were run to quantify the independent role of age, gender and location (urban/rural) in predicting current smoking, obesity and physical inactivity. Logistic regression models were not run to predict fruit and vegetable consumption because such a small percentage of respondents were consuming the recommended number of servings each day. After adjusting for other variables, our study found people in the older age categories were less likely than those in younger ones to be current smokers (OR=0.78, 95% CL=0.65, 0.93), rural residents were more likely than those living in urban areas to be obese (OR=1.67, 95% CL=1.16, 2.39), and women were more likely than men to be inactive or have low levels of physical activity (OR=1.47, 95% CL=1.02, 2.11).
Discussion
The findings from our study point to a number of areas where primary care physicians and other providers can have an impact on their patients’ health outcomes and, thus, the health of their communities. The U.S. Preventive Services Task Force has issued recommendations for screening for and managing obesity, behavioral counseling to promote healthful eating and physical activity, and counseling and interventions for quitting smoking. A systematic review of the literature revealed that counseling patients about changing their behaviors is effective in primary care settings.

Several of the behaviors we studied are related. For example, by increasing daily fruit and vegetable intake and physical activity, body mass index should decrease. In our study, the mean intake of fruits and vegetables was so low for everyone that it is not possible to examine whether higher levels of fruit and vegetable consumption would be associated with lower BMI.

The overall smoking rate of 18.5% among the men and 22.3% among the women in our study is lower for men and higher for women than the overall national rate of 19.3% in the 2010 National Health Interview Survey and slightly higher than that for all Minnesotans (13.0% to 15.9%), demonstrating higher smoking rates among rural residents.

Consumption of fruits and vegetables in our study (1.97 servings per day for men and 2.17 for women) was considerably lower than the recommended five servings per day. Fruit and vegetable intake has been shown to be lower in rural communities and associated with lower levels of intrapersonal, interpersonal and community support.

Physical activity can be classified as inactive, low, medium and high. People with medium or high levels of physical activity receive substantial overall health benefits. The majority of respondents in our study reported engaging in low-intensity activity.

Conclusion
Our findings highlight a number of modifiable risk factors that can affect the development of several chronic diseases, including heart disease, many cancers, osteoarthritis and stroke. Primary care providers can help patients by asking about certain behaviors and helping them make changes through counseling and other interventions in order to avoid poor health outcomes in the long run. Specifically, younger people should be asked about smoking, women should be encouraged to engage in more active physical activity, and men and women in rural areas should be encouraged to lose weight and eat more fruits and vegetables. The data from our study could also serve as a baseline to assess the effectiveness of interventions aimed at changing behaviors.

Catherine McCarty is a principal research scientist, Andrine Lemieux is an associate research scientist, Michael Hitz is a student intern, Jeanette Palcher is a programmer analyst, and Patricia Conway is senior research scientist with the Essentia Institute for Rural Health.

This research was supported by a grant from the Essentia Health Duluth Clinic Foundation.

REFERENCES