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# Cardiovascular Disease Risk Factors and Menopausal Status in Midlife Women from the Former Soviet Union

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# Cardiovascular Disease Risk Factors and Menopausal Status in Midlife Women from the Former Soviet Union

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**ABSTRACT.** The purpose of this cross-sectional analysis is to examine modifiable CVD risk factors in relation to menopausal status, age, and length of residence in the U.S. of midlife women from the former Soviet Union. The analysis includes baseline data for 193 women, aged 40-70, who lived in the U.S. fewer than 8 years and were enrolled in an ongoing four-year study of post-immigration health and behavior change. Data collection was conducted in women's homes or other community locations. The presence of seven health risk indicators (obesity, dyslipidemia, high blood pressure, diabetes mellitus, sedentary lifestyle, smoking, and excessive alcohol use) was assessed. In addition, Framingham 10 year risk scores for heart disease, and the presence of metabolic syndrome, were calculated using recent National Cholesterol Education Program (ATP-III) guidelines. Consistent with the age distribution, 60% of the

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women were postmenopausal. Four risk indicators (obesity, dyslipidemia, high blood pressure, and sedentary lifestyle) were identified as significant areas of concern. Although the Framingham risk scores did not seem excessively high, almost 25% of the women had metabolic syndrome. Older and postmenopausal women had significantly higher scores on all risk estimates. When age and menopausal status were held constant, menopausal status remained an independent contributor for the number of CVD risk indicators. Issues specific to this group of women because of their pre- and post-migration lifestyles are discussed in relation to their CVD risk status. 

**KEYWORDS.** Cardiovascular disease, menopause, immigrants, women's health



Cardiovascular disease (CVD) is the major cause of death for men and women in the United States, and the risk of developing CVD is close to three times as high for postmenopausal as for premenopausal women (Hoyert, Kochanek, & Murphy, 1999; Kannel & Wilson, 1995). Elevated low density lipoproteins (LDL) and total cholesterol as a result of lower estrogen levels after menopause are believed to contribute to the risk (Akahoshi et al., 1996). Nevertheless, recent evidence suggests that exogenous estrogen may not protect postmenopausal women from cardiovascular events (Mosca et al., 2001). The risk of death for women with coronary heart disease is about the same as for men who are 10 years younger, but mortality rates for women, particularly those who have hypertension, diabetes mellitus, and obesity, are higher than for men following a cardiovascular event (Mosca et al., 1997).

Modifiable CVD risk factors include high blood pressure, obesity, dyslipidemia, diabetes mellitus, sedentary physical activity patterns, cigarette smoking, and excess alcohol consumption (Mosca et al., 1997; National Cholesterol Education Program, 2001). Genetic, environmental, and other factors may also be amenable to lifestyle interventions that focus on diet, physical activity, stress management, and smoking and alcohol cessation. Each of these health risks is targeted in *Healthy People 2010* (U.S. Department of Health and Human Services, 2000), which has an explicit focus on reducing health disparities in our multicultural society. In spite of a growing body of behavioral research in Eu-

ropean-American, African-American, and Mexican-American women, characteristic patterns of health behavior and the presence of specific risk factors have not been examined for women from many other ethnic and cultural minority groups (Pasick, D'Onofrio, & Otero-Sabogal, 1996; Vega et al., 1987; Wilbur, Miller, & Chandler, 2001). Women from the former Soviet Union (FSU) may be at particularly high risk of developing CVD due to premigration as well as postmigration lifestyle factors. The purpose of this study is to describe the presence of modifiable CVD risk factors in relation to menopausal status, age, and length of residence in the U.S. in midlife women from the FSU.

Many CVD risk factors are interrelated. Moderate intensity exercise provides cardiovascular health benefits that affect obesity, dyslipidemia, and hypertension. Epidemiological evidence has demonstrated that losing weight can lower blood pressure as well as improve lipid levels in obese adults (U.S. Department of Health and Human Services, 2000). Moderate alcohol intake has been associated with improved lipid profiles for some individuals, but long-term excessive use of alcohol is associated with hypertension, increased LDL levels, and heart disease (Task Force, 1998). There is also evidence that there is an additive effect of risk factors. For example, smokers are three times as likely to have a myocardial infarction compared to nonsmokers, with older women and those who have additional risk factors at highest risk (Wenger, 1997). In fact, the recommended treatment for both elevated blood pressure and dyslipidemia varies depending on the presence and number of other risk factors (National Cholesterol Education Program, 2001).

Culturally-influenced health behaviors contribute to many modifiable CVD risk factors. Immigrants' food preferences, which may influence blood pressure, lipids, glucose level, and obesity, are often determined by food availability in one's native country and ethnic customs. Women frequently direct food choices and meal preparation, and they may try to please family members by serving familiar but unhealthy foods. Women may also have little free time to participate in leisure physical activities because of competing family responsibilities (Wilbur, Miller, Montgomery, & Chandler, 1998).

Life expectancy for both men and women decreased following the collapse of the Soviet government in 1991, and deaths due to CVD increased 50% in the Soviet Union from 1960-1989. Russian women aged 45-64 years old contributed the most to the rise in female mortality rate. A genetic explanation does not account for the swiftness of the change, nor does the quality of medical care in the FSU. The rise is believed to

have resulted primarily from an increase in chronic illnesses, particularly heart disease, that are related to unhealthy lifestyles, stress, smoking, and alcohol abuse (Cockerham, 1997). Nutritional surveys conducted in the FSU document that diets are high in fat and that there is a high prevalence of obesity in the adult population (Popkin, Baturin, Kohlmeier, & Zohoori, 1997).

In a study of immigrants from the FSU conducted in Israel, Cwikel, Abdelgani, Goldsmith, Quastel, and Yevelson (1997) found that obesity, hypertension, elevated blood cholesterol, and low levels of physical activity are prevalent in the Ukraine and Belarus (two former Soviet Republics from which many U.S. immigrants originate). Even with wider food availability in the U.S., anecdotal reports suggest that immigrants from the FSU tend to have diets high in fat, cholesterol, and carbohydrates, and tend not to participate in aerobic activities (Cutler, 1990; Smith, 1996). In a recent study of former Soviet immigrants in Denver, Mehler et al. (2001) identified a higher prevalence of hyperlipidemia and hypertension among those immigrants aged 55-64 than among their U.S. counterparts; almost half of the participants had two or more cardiac risk factors.

Immigration from the FSU increased tremendously in the U.S. during the 1990s. Although it has tapered off in the past few years, annual immigration from the FSU increased from 1,408 in 1989 to an unprecedented 62,800 in 1996 (U.S. Department of Commerce, 1997). In 1997, an estimated 734,000 immigrants from the FSU resided in the U.S. (Schmidley & Alvarado, 1998). More than 25% of immigrants from the FSU are women over 50 years old. The majority of former Soviet immigrants settled in California and New York; Washington DC, Pennsylvania, Massachusetts, and Illinois have the next highest numbers of immigrants from Russia and the Ukraine (U.S. Immigration and Naturalization Service, 2000).

Multifocal biobehavioral interventions for CVD have been identified as high priorities for health promotion in the U.S. Women from the FSU are part of a growing segment of the population of immigrants with a particularly high risk of postmenopausal cardiovascular morbidity. An examination of specific risk factors is an important preliminary step for designing targeted, culturally relevant intervention strategies to change behavior and improve cardiovascular health. Identifying risk factors that vary by menopausal status, age, and length of residence across cultural groups is an important step for developing interventions tailored to the needs of midlife and older women.

## METHOD

### Design

This cross-sectional analysis of CVD risk in relation to menopausal status, age and length of residence in the U.S. includes baseline data from an ongoing four-year study of post-immigration health and behavior change in midlife women from the FSU. The purpose of the longitudinal study is to examine the influence of acculturation, family adaptation, and modifiable health behaviors on health status and psychological well-being.

### Participants

Data are reported for 193 women enrolled in the parent study for whom all baseline measures were complete. Women were eligible for the study if they were 40-70 years old, immigrated to the U.S. from the FSU during the previous eight years, were married, and had at least one child living in the U.S. The latter two criteria are included because the parent study examines family adaptation variables that are not included in the present analysis. Recruitment strategies included flyers and posters in businesses and health clinics, Russian language radio and newspaper advertisements, and network sampling. The women resided in urban and suburban neighborhoods of a large metropolitan area in the Midwest.

Demographic characteristics, including age, length of residence, Republic from which the women emigrated, and education, were obtained from self-report information. The mean age of the women in this sample was 57.26 (SD = 7.96). The mean number of years in the U.S. was 3.36 (SD = 2.18), with a range of 0.09-7.99 years. Consistent with the distribution of immigrants from the FSU, the majority listed their primary nationality/religion as Jewish (121; 62.7%). Similarly, although women emigrated from 10 different former Soviet Republics, the majority came from the three Republics with the largest numbers of emigrants to the U.S.: Ukraine (77; 39.9%), Russia (62; 32.1%), and Belarus (27; 14.0%). The women were well-educated in their former country; 141 (73.1%) had completed a degree at a university or institute, and 49 (24.9%) had completed general, specialized, or technical secondary school.

### *Procedures*

Data collection took place individually at participants' homes or in a group of 5-12 women at a convenient community meeting place such as a room in the public library. Informed consent forms were signed in the presence of the bilingual research staff. A light breakfast was served after blood samples were obtained. Questionnaires were self-administered under the supervision of the research staff, and data for the other physical measures were collected. Completion of the questionnaires and physical measures took approximately 3 hours. Women received written documentation of their physical measures immediately following their assessment. Women with borderline or abnormal findings were informed and referred to their health care providers or other health care facilities.

### *Measures*

*Menopausal status*. Menopausal status was assessed using self-report questions from the Massachusetts Women's Health Study (McKinlay, Brambilla, & Posner, 1992). Women were classified as premenopausal if they reported regular menses during the past 3 months with no change in menstrual regularity; perimenopausal if they reported menses in the last 3-11 months with menstrual irregularity or periods of amenorrhea; and postmenopausal if they reported no menses in the last 12 months. Women who reported having had a hysterectomy, with or without oophorectomy, comprised a surgical menopause group. Women who had experienced natural menopause were categorized into early (1-5 years), middle (5-10 years), and late (more than 10 years after the last menstrual period) postmenopausal phases.

*CVD risk factors*. Values for the 13 measures used to determine CVD risk status are summarized in Table 1. Body mass index (BMI) was calculated from height and weight measurements using Quetelet's Index ([weight in kilograms]/[height in meters$^2$]). Waist circumference was measured at the narrowest part of the trunk, below the rib cage and above the umbilicus, to provide an assessment of body fat distribution (Lee & Nieman, 1996). Measurements were recorded to the nearest 0.1 centimeter. Lipids were assessed by fasting blood samples obtained by fingerstick and analyzed for total cholesterol, HDL, LDL, and triglycerides using the Cholestech LDX® analyzer. Recommendations from the National Cholesterol Education Adult Treatment Panel-III (ATP-III)

TABLE 1. Values for Determining Risk Factors, and Number and Percent of Women with Risk Factors That Comprise the CVD Indicators, Framingham 10-Year CHD Risk Estimate, and Metabolic Syndrome

| Risk factor | Risk value | n | % | CVD indicator | Framingham | Metabolic syndrome |
|---|---|---|---|---|---|---|
| Body mass index (n = 193) | > 25[3] | 173 | 89.6 | x | | |
| Waist circumference (n = 193) | > 35 inches[3] | 104 | 53.9 | x | | x |
| Systolic blood pressure (n = 193) | > 130 mm/Hg[1] | 48 | 24.9 | x | x | x |
| Diastolic blood pressure (n = 193) | > 85 mm/Hg[1] | 12 | 6.2 | x | | x |
| Hypertension-diagnosis (n = 193) | Self-report | 83 | 43.0 | x | x | |
| Total cholesterol (n = 191) | 200+ mg/dL[1] | 126 | 65.3 | x | x | |
| Elevated LDL (n = 185) | > 130 mg/dL[1] | 108 | 56.0 | x | | |
| Low HDL (n = 190) | < 40 mg/dL | 24 | 12.4 | x | x | x |
| Metabolic syndrome | < 50 mg/dL[1] | 68 | 35.8 | x | x | x |
| Triglycerides (n = 189) | 200+ mg/dL[1] | 47 | 24.9 | x | | x |
| Metabolic syndrome | > 150 mg/dL[1] | 47 | 24.9 | x | | x |
| Fasting blood glucose (n = 190) | > 110 mg/dL[1] | 47 | 23.9 | | | x |
| Diabetes Mellitus-diagnosis (n = 193) | Self-report | 15 | 7.8 | x | | |
| Sedentary lifestyle (n = 193) | < 1.5 hrs/ week[2] | 135 | 69.9 | x | | |
| Smoking (n = 193) | Smoking/past mo[1] | 12 | 6.2 | x | x | |
| Excessive alcohol use (n = 193) | > 10 drinks/wk[2] | 4 | 2.1 | x | | |

[1]National Cholesterol Education Program, 2001; [2]Task force, 1998; [3]NHLBI, 1998

(National Cholesterol Education Program, 2001) were used to determine risk status. Blood pressure was measured by sphygmomanometer with appropriate cuff size, using guidelines recommended by the National Heart, Lung, and Blood Institute (NHLBI) National High Blood Pressure Education Program (NHLBI, 1997). Two readings separated by at least two minutes were averaged. If the first two readings differed by more than 5 mm Hg, an additional reading at the conclusion of that session was obtained and the two closest measures were averaged. Diabetes mellitus was considered to be a CVD risk indicator if women reported that they had been diagnosed and/or treated for the disease by a health care professional. Fasting blood glucose was assessed by Cholestech LDX® analyzer in the same manner as lipids. Sedentary physical activity level was assessed by the Paffenbarger Physical Activity Questionnaire (Paffenbarger, Blair, Lee, & Hyde, 1992). Smoking was assessed by self-report of any smoking during the past month. Alcohol use was also assessed by self-report questions regarding the number and frequency of alcoholic drinks (one glass of wine, one can/bottle of beer, or one ounce of liquor) consumed during the past month.

*CVD risk indicators*. Table 1 summarizes the criteria described below. Seven CVD risk indicators were derived from the measures described above. The risk indicators are obesity, dyslipidemia, high blood pressure, diabetes mellitus, sedentary lifestyle, smoking, and excessive alcohol use. Women were considered to have the CVD risk indicator of obesity if either of the two measures of body composition (i.e., waist circumference or BMI) were high. Women had the risk indicator of dyslipidemia if any one of the four blood lipid measures was out of the normal range. The risk indicator of elevated blood pressure was identified as either elevated blood pressure on examination, or previous diagnosis and treatment of hypertension by a health care provider, because women taking antihypertensive medication could have normal blood pressure readings. Smoking one or more cigarettes in the past month defined that indicator. Women were considered to have a CVD risk indicator of excessive alcohol use if they reported drinking an average of 10 or more drinks per week. This definition approximates the Task Force on Behavioral Research in Cardiovascular, Lung, and Blood Health and Disease definition of alcohol intake of greater than 1-2 drinks daily (Task Force, 1998). The sum of the CVD indicators with values outside the recommended range was obtained for each woman.

*Framingham CHD risk scores*. Framingham CHD risk scores were calculated for each woman. Based on the findings of the Framingham Heart Study, points are designated for the presence of the following factors: age over 55 years, elevated total cholesterol, low HDL, elevated systolic blood pressure, treatment for hypertension, and current cigarette smoking. Additional points are given for the presence of elevated total cholesterol, low HDL, and smoking for women in certain age groups. The Framingham scoring is intended to identify people for whom the likelihood of developing CHD in the next 10 years is $< 1\%$ to $> 30\%$ (National Cholesterol Education Program, 2001).

*Metabolic syndrome*. Metabolic syndrome is a constellation of risk factors believed to increase the risk of heart disease, and is closely linked to insulin resistance. The syndrome includes excess abdominal fat (measured by waist circumference), low HDL, elevated blood pressure, high triglycerides, and high blood glucose. The syndrome is defined as the presence of three of these five factors (National Cholesterol Education Program, 2001).

## RESULTS

### Menopausal Status

Consistent with the age distribution of this sample, most of the women were postmenopausal. Thirty-five women (18.1%) were premenopausal, 15 (7.8%) were perimenopausal, 116 (60.1%) were naturally postmenopausal, and 29 (15.0%) had surgical menopause. Only 15 (7.8%) of the women were currently taking female hormones; these were fairly evenly distributed among the perimenopausal, natural menopausal, and surgical menopausal groups. Because it is impossible to determine true menopausal status for those in the surgical group, that group was not included in the analyses that examined menopausal status. The reported age at menopause ranged from 40-57 years (50.7 ± 3.9). Of the 116 women who had experienced natural menopause, 25 (21.5%) were considered to be in the early (1-5 years), 30 (25.9%) were considered to be in the middle (5-10 years), and 61 (52.6%) were in the late (more than 10 years) postmenopausal phases.

The number and percent of women who had each of the risk factors that comprised the seven CVD risk indicators, Framingham CHD Risk Scores, and metabolic syndrome are presented in Table 1. Descriptive statistics for the physical measures are presented in Table 2. Mean values for the sample are greater than recommended for BMI, waist circumference, and total and LDL cholesterol.

### CVD Risk Indicators

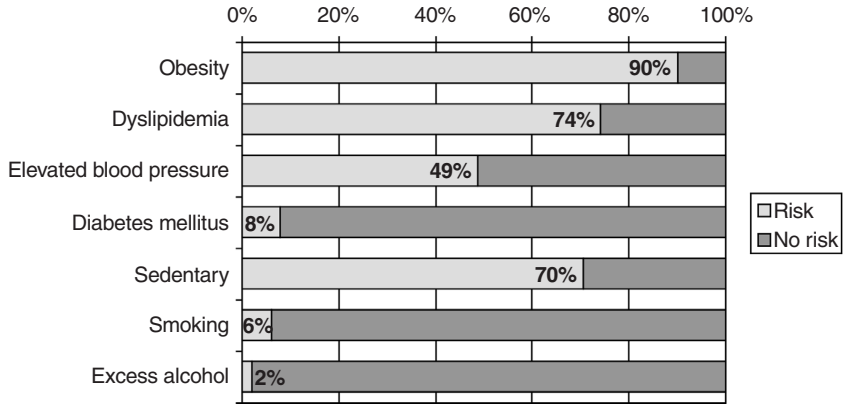
Over 90% (174) of the women met criteria for the CVD risk indicator of obesity, close to three-quarters (143; 74.1%) had the CVD risk indicator of dyslipidemia, approximately 70% (135) of the women were judged to be at risk for CVD due to sedentary lifestyles, and close to half of the women (94; 48.7%) had the CVD risk indicator of high blood pressure. Fewer than 10% of the sample had risk indicators related to diabetes mellitus, smoking, or excessive alcohol use. The percentage of women in the sample who had each of these CVD risk indicators is illustrated in Figure 1.

The mean number of CVD risk indicators per woman for the sample was 3.0 (SD = 1.1). Only four (2.1%) women had no risk indicators, 73 (37.3%) of the women had three, and 10 (5.2%) had five indicators, which was the highest number identified for any of the women. The

TABLE 2. Means, Standard Devations, and Ranges of Physical Measurements for This Sample

| Measurement | M | SD | Range |
|---|---|---|---|
| Weight (n = 193) | 167.76 lbs. | 31.41 | 100.20-301.50 |
| Height (n = 193) | 62.11 inches | 2.25 | 56.50-67.25 |
| Body mass index (n = 193) | 30.59 | 5.52 | 17.89-53.83 |
| Waist circumference (n = 193) | 35.59 inches | 4.90 | 25.20-52.36 |
| Systolic blood pressure (n = 193) | 120.64 mm/Hg | 19.75 | 86-197 |
| Diastolic blood pressure (n = 193) | 74.14 mm/Hg | 10.13 | 51-104 |
| Total cholesterol (n = 191) | 221.26 mg/dl | 43.22 | 123-406 |
| LDL (n = 185) | 140.45 mg/dl | 38.78 | 60-312 |
| HDL (n = 190) | 56.59 mg/dl | 14.88 | 24-100 |
| Triglycerides (n = 189) | 123.24 mg/dl | 58.84 | 45-463 |
| Fasting blood glucose (n = 190) | 105.91 mg/dl | 24.46 | 76-264 |

FIGURE 1. Percent of women with CVD risk indicators.




number of risk indicators differed significantly by menopausal status ($p < .001$). Tukey's HSD test indicated that all three menopausal status groups differed significantly from each other. When divided into the three postmenopausal phases based on years since menopause, however, women in the three postmenopausal phases did not differ significantly from each other.

The number of CVD risk indicators had a low but significant correlation to age ($p < .001$), and was not related to length of residence in the U.S. In spite of the expected close association between age and meno-

pausal status, when the number of CVD risk indicators was regressed on these two variables, menopausal status remained a significant independent contributor to the number of CVD risk indicators when age was held constant (coefficient = .436, t = 2.445, $p = .016$). The model accounted for 10% of the variance in number of CVD risk indicators. When length of residence was added to the regression, it did not make a significant contribution, and the model explained less of the variance.

### *Framingham CHD Risk Scores*

CHD Risk Scores were derived using the Framingham scoring method. The Framingham risk scores for this sample ranged from 0-22, and indicated that 25% of the women had a 3-5% risk, 9% had a 6-8% risk, and 4% had a greater than 10% risk of developing CHD within 10 years. The Framingham risk scores differed significantly by menopausal status ($p < .001$). Pre- and perimenopausal women differed significantly from each of the three postmenopausal phases according to Tukey's HSD test, but women in the three postmenopausal phases did not differ significantly from each other. As expected, because of the emphasis on age in the measure, the Framingham scores and age were highly correlated ($r = .74$, $p < .001$). Scores were weakly but significantly correlated with length of time in the U.S. ($r = .16$, $p = .02$). The Framingham risk scores were significantly correlated with the sum of the seven risk indicators for each women, ($r = .60$, $p < .001$).

### *Metabolic Syndrome*

Slightly more than one-quarter (53; 27.5%) of the women had metabolic syndrome. Women who had metabolic syndrome were significantly older (mean age = 60.08, SD = 5.95) than those who did not (mean age = 56.19, SD = 8.37, $F$ (1, 191) = 9.56, $p < .01$). The proportion of women who had metabolic syndrome varied significantly by pre-, peri-, and postmenopausal status ($p = .027$). Thirteen percent of the women with metabolic syndrome were premenopausal, 11% were perimenopausal, and 68% were postmenopausal. However, metabolic syndrome did not vary significantly by menopausal status when postmenopause was divided into early, middle, and late phases. Length of time in the U.S. did not vary by presence or absence of metabolic syndrome.

## *DISCUSSION*

The results indicate a high CVD risk status in this sample of community-dwelling, midlife, immigrant women from the FSU. The majority considered their primary nationality in the FSU to be Jewish, and the women are well educated. This profile is reflective of the actual composition of women in the wave of immigration from the FSU that occurred between 1991 and 2000. The women in this cohort experienced the rapid disintegration of the Soviet Communist system, as well as ethnic or religious discrimination in their jobs and social lives. They came to this country as refugees or as family-sponsored immigrants (U.S. Immigration and Naturalization Service, 2000).

The sample is somewhat skewed toward older women who have been in the country more than 3 years. Although many of the older women waited to migrate until they retired from professional or technical jobs in the FSU, the younger women are highly motivated to pursue jobs and careers. This might account for the larger proportion of older women who are available to participate in research activities, in comparison to younger women who are working, attending English and technical retraining classes, and may have families with adolescent or younger children. The number of immigrants from the FSU began to decrease around the middle of the 1990s, which probably accounts for the weak but significant relationships between age and years in the U.S.

The mean age of menopause in this sample, 50.7 years, is about the same as the expected age of 51.5 years in North American and Northern European women (McKinlay, Brambilla, & Posner, 1992). However, the proportion of women from the FSU who are using hormone replacement therapy is much smaller than their U.S. counterparts. This is probably in part culturally-based. Anecdotal reports as well as survey data suggest that menopause was considered a natural event in the FSU, and HRT was not readily available or a popular remedy for menopausal symptoms (Miller &Wilbur, 1997).

Of the seven potentially modifiable CVD risk indicators assessed, obesity, dyslipidemia, high blood pressure, and sedentary lifestyle were identified as significant areas of concern. The Framingham method of assessing 10-year risk of developing CHD indicated that 25% of the women had a 3-5% risk and 4% had a greater than 10% risk of developing CHD within 10 years. Because so few of the women smoke or drink excessively, Framingham risk assessments did not exceed 17% for any one woman. In addition, slightly more than one-quarter (53; 27.5%) of the women had metabolic syndrome. Their relatively high measure-

ments on the body composition risk factors, however, contributed to the high risk evidenced by the metabolic syndrome estimates. The three risk assessment methods produced different risk profiles for this sample because each of the methods emphasizes somewhat different risk factors.

CVD risk indicators, Framingham 10 year CHD risk scores, and presence of metabolic syndrome were considered in relation to menopausal status, age, and length of residence in the U.S. Postmenopausal and older women demonstrated significantly higher scores on all three of these risk estimates in this sample. Length of residence was not a significant contributor to risk status in terms of the measures used. The parent study, in which these variables will be studied longitudinally, may enable us to determine whether differences by age and length of residence in the U.S. within this sample are confounded by cohort differences.

The findings in this baseline analysis of physical and behavioral risk factors suggest that, as a group, midlife women from the FSU are at very high risk for CVD, particularly with regard to four interrelated areas: obesity, dyslipidemia, high blood pressure, and sedentary lifestyles. With the exception of African-Americans and Hispanic-Americans, few cross-cultural data are available for health risk indicators in this country. Close to 50% of European-American women in the U.S. and close to 70% of both African-American and Mexican-American women aged 20-70 have a BMI over 25 and are considered overweight or obese, according to the Behavioral Risk Factor Surveillance Survey (BRFSS) (Centers for Disease Control and Prevention, 2001). In comparison, almost 90% percent of women in the present study had a BMI that was greater than 25. Further, just over half of the women in this sample had a waist circumference measurement over 35 inches. This measure of body composition is believed to be a strong determinant of CVD risk in individuals with increased BMI, as well as in persons who are not overweight (NHLBI, 1998).

The findings regarding total and LDL cholesterol in this sample also merit serious consideration. The mean level for U.S. women in 1988-1994 was 206 mg/dL, and there is a trend toward lower levels in this country. In comparison, more than 65% of the women in this sample had total cholesterol levels over 200 mg/dL, and the mean in this group was 221.26. This mean level of total cholesterol is in the 50-75th percentile for women over age 40 in the U.S. (Centers for Disease Control and Prevention, 2001). In addition, the mean LDL level for this sample

was 10 points higher than the recommended level of 130 for those who have two or more risk factors.

Conversely, the mean HDL level in this sample was 56.59, 16 points higher than the recommended target of > 40, and close to the level of 60 mg/dL that is considered protective against CVD. Also, the mean triglyceride level is considerably below the cut-off value of 200 mg/dL. The reason for the discrepancy between elevated total and LDL cholesterol values, and normal HDL and triglyceride levels is not clear, particularly as two of the factors that contribute to low HDL levels in women (i.e., HRT and moderate to high physical activity levels) were not demonstrated to a great extent in this group.

Close to 70% of the women had a sedentary lifestyle, which was defined as participating in fewer than 1.5 hours of moderate or vigorous activity per week. This is close to the even higher proportion of women in the U.S. (85%) who do not report regular physical activity. Additional instrument development is needed to modify U.S.-based physical activity questionnaires for use in immigrant populations. For example, in this study, women expressed concern over questions that evaluated aerobic activity in terms of the amount of time spent in exercise that caused them to perspire. Some believed that exercising at this level would be bad for the heart. Another area of misunderstanding was the level of exercise needed to be considered vigorous. Many women participated in daily stretching and movement known as Russian morning exercises (*utrennyaya zaryadka*, literally, morning recharging). These exercises are not aerobic, but were described as vigorous by the women, especially those who were older. This is an example of the need to ensure that questionnaires are culturally sensitive and elicit accurate information; this is necessary even for instruments that seem fairly straightforward, such as assessment of physical activity.

Contrary to the expectations related to smoking and alcohol use in Europe, and to the findings regarding obesity, dyslipidemia, high blood pressure, and sedentary lifestyle, very few women had risk factors related to smoking (6.2%) and alcohol use (2.1%). In the U.S., smoking is reported by approximately 22% of women, and about 6% are classified as "heavier" drinkers, i.e., more than 7 drinks per week for women (Powell-Griner, 2000; Schoenborn & Adams, 2001). Excessive alcohol use is a known health problem in Russia and the Baltic States, where per capita consumption of hard liquor is the highest in the world. Excessive alcohol use is normative, especially by men, who experience social pressure to drink (Bobak, Pikhart, Hertzman, Rose, & Marmot, 1998; Bratus, 1997). Alcohol use among Jews and Baptists, however, is consid-

ered to be relatively low compared to the general population (Cockerham, 1997). Because immigrants to the U.S. are primarily those who experienced religious or ethnic discrimination in the FSU, Jewish women constitute a majority in our sample. Although this cohort includes women who drink wine and other alcoholic beverages socially, they tend not to meet the criteria for alcohol abuse. A similar cohort effect appears to be present with regard to smoking.

The large number of women in this sample who were postmenopausal provided the opportunity to examine the postmenopausal group by time since last menstrual period. Chi-square analyses of metabolic syndrome and sedentary lifestyle were significant for menopausal status, but not significant when postmenopause was divided into early, middle, and late postmenopausal phases. Physiological measures of hormonal status were not included in this study, however. For the risk factors of blood pressure, lipids, and body composition, the division of the postmenopausal group into three did not enhance the results. This suggests that the physiological changes that occur at menopause are more important than age in relation to the metabolic syndrome and the risk factors examined.

The findings of this cross-sectional data analysis corroborate those of Matthews, Kuller, Sutton-Tyrrell, and Chang (2001), who found substantial changes in lipids that were larger between the premenopausal and first postmenopausal years than between the first and fifth postmenopausal years, despite inclusion in their study of women whether or not they were taking HRT. Do et al. (2000) also found that HDL cholesterol was not correlated with age; in fact they found that HDL was the only lipid measure in their study that changed in relation to onset of menopause. The weak but statistically significant correlations of some of the risk factors with age suggests that although the problem may be more likely to occur with age, it is not true for all women. Other factors, such as genetics and behavior, have an impact. Therefore, relationships such as this serve to highlight areas where interventions may improve health.

Length of residence was not related to any of the risk indicators. Length of residence is considered by many researchers to approximate the construct of acculturation and is often used as a proxy measure for that variable. Anecdotal information from the women in this sample suggests that many, particularly the older women, are not aware of the components of a healthy diet, and had only recently begun to be concerned about their cholesterol levels. There was little emphasis in the FSU on health promotion and prevention of disease, though treatment

for illness was readily accessible and available. Even well-educated people were not well-versed in the type of foods that are low in fats or high in vitamins. In the present health-conscious environment in the U.S., it is possible that immigrant women will increase their knowledge regarding the value of low fat diets for CVD prevention. Longer follow-up may be needed to detect change within people over time; however, length of residence may not be a good estimate of acculturation in this population. Changes in dietary intake may be detected in future longitudinal analyses.

In conclusion, biobehavioral risk factors for CVD are particularly relevant for midlife women from the FSU due to their age, menopausal status, and cultural background. The high presence of risk factors suggests that programs targeted toward improvements in diet and exercise are very important for this population. The longitudinal study will facilitate examination of behavior change over time in relation to cardiovascular risk in women from the former Soviet Union. Although a relatively comprehensive literature is developing regarding Hispanic and Asian immigrants, additional studies are needed to improve researchers' and practitioners' cultural competence regarding immigrants from these and other parts of the world. Increasing numbers of immigrants and refugees are expected to arrive in the U.S. from countries in Eastern Europe. Better understanding of the process of adaptation and factors relating to health for their unique historical and cultural backgrounds is vital for the design of timely and culturally sensitive health interventions.

## REFERENCES

Akahoshi, M., Soda, M., Nakashima, E., Shimaoka, K., Seto, S., & Yano, K. (1996). Effects of menopause on trends of serum cholesterol, blood pressure and body mass index. *Circulation*, *94*, 61-66.

Bobak, M., Pikhart, H., Hertzman, C., Rose, R., & Marmot, M. (1998). Socioeconomic factors, perceived control, and self-reported health in Russia: A cross-sectional survey. *Social Science & Medicine*, *47*, 269-279.

Bratus, B. S. (1997). Alcoholism in Russia: The enemy within. In D. F. Halpern & A. E. Voiskounsky (Eds.), *States of mind: American and post-Soviet perspectives on contemporary issues in psychology* (pp. 198-212). New York: Oxford University Press.

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. (2001). *Behavioral Risk Factor Surveillance System* [*http://www.cdc.gov/nccdphp/brfss/*].

Cockerham,W. C. (1997). The social determinants of the decline of life expectancy in Russia and Eastern Europe: A lifestyle explanation. *Journal of Health and Social Behavior*, *38*, 117-130.

Cutler, B. (1990). In one Russian day. *American Demographics*, *12*(9), 9.

Cwikel, J., Abdelgani, A., Goldsmith, J. R., Quastel, M., & Yevelson, I. I. (1997). Two-year follow-up study of stress-related disorders among immigrants to Israel from the Chernobyl area. *Environmental Health Perspectives*, *105*(Supp. 6), 1545-1550.

Do, K.-A., Green, A., Guthrie, J., Dudley, E., Burger, H., & Dennerstein, L. (2000). Longitudinal study of risk factors for coronary heart disease across the menopausal transition. *American Journal of Epidemiology*, *151*, 584-593.

Hoyert, D. L., Kochanek, K. D., & Murphy, S. L. (1999). *Deaths: Final data for 1997–National vital statistics reports*. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics.

Kannel, W. B., & Wilson, P. W. (1995). Risk factors that attenuate the female coronary disease advantage. *Archives of Internal Medicine*, *155*, 57-61.

Lee, R. D., & Nieman, D. C. (1996). *Nutritional assessment*. St. Louis: Mosby.

Matthews, K., Kuller, L., Sutton-Tyrrell, K., & Chang, Y. (2001). Changes in cardiovascular risk factors during the perimenopause and postmenopause and carotid artery atherosclerosis in healthy women. *Stroke*, *32*, 1104-1111.

McKinlay, S. M., Brambilla, D. J., & Posner, J. G. (1992). The normal menopause transition. *Maturitas*, *14*, 103-115.

Mehler, P. S., Scott, J. Y., Pines, I., Gifford, N., Biggerstaff, S., & Hiatt, W. R. (2001). Russian immigrant cardiovascular risk assessment. *Journal of Health Care for the Poor & Underserved*, *12*, 224-235.

Miller, A., & Wilbur, J. (1997). Midlife attitudes and menopausal symptoms in women from the former Soviet Union. Paper presented at the meeting of the Society for Menstrual Cycle Research, Montreal, Canada.

Mosca, L., Collins, P., Herrington, D. M., Mendelsohn, M., Pasternak, R. C., Robertson, R., Schenck-Gustafsson, K., Smith, S., Taubert, K., & Wenger, N. (2001). Hormone replacement therapy and cardiovascular disease: A statement for healthcare professionals from the American Heart Association [AHA Scientific Statement]. *Circulation*, *104*, 499-503.

Mosca, L., Manson, J. E., Sutherland, S. E., Langer, R. D., Manolio, T., & Barrett-Connor, E. (1997). Cardiovascular disease in women: A statement for healthcare professionals from the American Heart Association. *Circulation*, *96*, 2468-2482.

National Cholesterol Education Program. (2001). *Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Full Report*. Bethesda, MD: U.S. Dept. of Health and Human Services.

National Heart, Lung, and Blood Institute (NHLBI), National High Blood Pressure Education Program. (1997). *Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*. Washington, DC: National Institutes of Health.

National Heart, Lung, and Blood Institute (NHLBI), Obesity Education Initiative Expert Panel on the Identification,Evaluation,and Treatment of Overweight and Obesity in Adults. (1998). *Clinical guidelines on the identification, evaluation, and*

*treatment of overweight and obesity in adults: The evidence report* (Preprint) [*http://www.nhlbi.nih.gov/nhlbi/cardio/obes/prof/guidelns/obgdlns.htm*].

Paffenbarger, R. S., Blair, S. N., Lee, I., & Hyde, R. T. (1992). Measurement of physical activity to assess health effects in free-living populations. *Medicine and Science in Sports and Exercise*, *25*(1), 60-70.

Pasick, R., D'Onofrio, C., & Otero-Sabogal, R. (1996). Similarities and differences across cultures: Questions to inform a third generation for health promotion research. *Health Education Quarterly*, *23*, S142-S161.

Popkin, B. M., Baturin, A., Kohlmeier, L., & Zohoori, N. (1997). Russia: Monitoring nutritional change during the reform period. In V. Wheelock (Ed.), *Implementing dietary guidelines for healthy eating* (pp. 23-46). New York: Blackie.

Powell-Griner, E. (2000). *2000 BRFSS Summary Prevalence Report*. Behavioral Surveillance Branch, Centers for Disease Control and Prevention [*http://www.cdc.gov/nccdphp/brfss/pdf/2000prvrpt.pdf*].

Schmidley, D., & Alvarado, H. A. (1998). *The foreign-born population in the United States: March*, *1997 (Update)*. (Report No. P20-507). U.S. Census Bureau [*www.census.gov/population/www/socdemo/foreign.html*].

Schoenborn, C., & Adams, P. (2001). *Alcohol use among adults: United States, 1997-98–Advance data from vital and health statistics*. Hyattsville, MD: National Center for Health Statistics. (Report No. 324).

Smith, L. S. (1996). New Russian immigrants: Health problems, practices, and values. *Journal of Cultural Diversity*, *3*(3), 68-73.

Task Force on Behavioral Research in Cardiovascular, Lung and Blood Health and Disease. (1998). *Report of the Task Force on Behavioral Research in Cardiovascular, Lung and Blood Health and Disease* [*http://www.nhlbi.nih.gov/nhlbi/sciinf/taskforc.htm*].

U.S. Department of Health and Human Services. (2000). *Healthy people 2010: Understanding and improving health (2nd ed.)*. Washington, DC: U.S. Government Printing Office.

U.S. Immigration and Naturalization Service. (2000). *Statistical yearbook of the immigration and naturalization service*, *1999*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Commerce. (1997). *Statistical abstract of the United States 1997* (117th Edition). Hyattsville, MD: Bernan Press.

Vega, W. A., Sallis, J. F., Patterson, T. P., Rupp, J., Atkins, C., & Nader, P. R. (1987). Assessing knowledge of cardiovascular health-related diet and exercise behaviors in Anglo- and Mexican-Americans. *Preventive Medicine*, *16*, 696-709.

Wenger, N. (1997). Coronary heart disease: An older woman's major health risk. *British Medical Journal*, *315*, 1085-1090.

Wilbur, J., Miller, A., & Chandler, P. (2001). Recruitment and cardiovascular risk characteristics of African American and Caucasian midlife women. *Journal of Cardiovascular Nursing*, *15*(3), 88-104.

Wilbur, J., Miller, A. M., Montgomery, A., & Chandler, P. J. (1998). Women's physical activity patterns: Nursing implications. *Journal of Obstetrical, Gynecological, and Neonatal Nursing*, *27*, 383-392.