Trends in the Health of the Older Population: Disability versus Biomarkers of Health Risks

Health among the older population as measured by most dimensions has improved over the last two decades. Mortality has continued to decline while disability and functioning loss are less common now than in the past. However, the prevalence of most diseases has increased in the older population as people survive longer with disease and the reduction in incidence does not counter the effect of increased survival. On the other hand, having a disease appears to be less disabling in the past.

There are many ways to measure the health of the older population. Many studies examining time trends in the health of older adults have focused on trends in the presence of ADL or IADL disability, or the presence or absence of chronic diseases, conditions, and impairments. The consensus appears to be that with the exception of increasing disease prevalence, the health of older adults improved during the late 1980s and the 1990s. However, all of these indicators can be affected by circumstances other than the intrinsic health of the population. For instance, the built environment, the availability of assistive devices, and medical technology can affect trends in disability, functioning, and disease prevalence.

The intent of this paper is to examine changes over time in indicators of biological risk factors that are indicative of inherent health status and not affected by the environment and medical technology. Change over time in these indicators of risk will be examined relative to states of disability and disease.

Data and Methods

Two waves of the National Health and Nutrition Survey (NHANES), Waves III (1988) and IV (1999), are used to examine change in biological risk profiles of a

nationally representative sample. These indicators include such cardiovascular markers as systolic and diastolic blood pressure, and resting pulse. Metabolic measures include total cholesterol, HDL and LDL cholesterol, triglycerides, glycosylated hemoglobin, and BMI. Indicators of inflammation, such as serum albumin, c-reactive protein, and plasma fibrinogen are also included. Finally we consider measures of vitamin/antioxidant presence, including serum folate, and Vitamin B12.

The NHANES III data were collected in 1988 to 1994, centering on January 1, 1992; NHANES IV data were collected in 1999 and 2000, centering on January 1, 2000. This means that change is over approximately 8-year on average. Waves III and IV of NHANES contain a large sample of both African Americans and Hispanics. This makes it possible to examine trends for race and ethnic groups. All statistics are weighted to reflect the non-institutionalized population of older adults aged 70 and older.

Measures.

For each of the indicators of biological risk, "at-risk" is defined as the top quartile of the study sample. For a few examples, respondents with systolic blood pressure over 153.3 would be at-risk; total cholesterol greater than 246 mg/dL would be at-risk. Homocysteine levels greater than 12.9 µMol/mL would be at-risk, as would those with a resting pulse of greater than 80 beats per minute.

Statistical Analysis.

To begin our analysis, we run t-tests on mean values for all biological markers between the early and late 1990s to examine changes over time. Table 1 presents a sampling of results from this analysis.

Table 1. Sample Results – Percent Change In Mean Value Between Early And Late 1990s

	No change	% Improvement	% Deterioration
Cardiovascular		Diastolic BP 2.4%	
		Resting Pulse 4.9%	Systolic BP 2.2%
Metabolic	Triglycerides	HDL Chol. 2.5%	
		LDL Chol. 7.6%	
Inflammatory	C-reactive Protein		Plasma Fibrinogen 19.1%
Other		Vitamin B12 10.6%	

Further, logistic regression is used to examine the roles that age, gender, race and time have on the probability of being in the at-risk group. In addition, interactions are examined between selected variables and time—ageXtime, genderXtime, and raceXtime. Adjusted R-squares and the Hosmer-Lemeshow goodness of fit test are included to evaluate model fit.

Results

In general, we find significant changes in biomedical markers in the early and late 1990s. Triglycerides and c-reactive protein were the only biomedical markers to show no change in the mean level over time. We find improvement in the measures of diastolic blood pressure, resting pulse, HDL and LDL cholesterol, homocysteine, albumin, serum folate, and Vitamin B12. Measures that indicate deterioration over time include systolic blood pressure, plasma fibrinogen, and glycoselated hemoglobin.

Regression analysis reveals that the change in nearly all of the markers of biological risk are affected by sociodemographic factors, including age, gender, race, ethnicity, and education.