

## **PSID and Biomeasures Outline: Metabolic and Cardiovascular Measures**

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### **I.) Introduction**

Overview of metabolic measures of interest and their importance, brief history of use in other social surveys (MIDUS, LAFANS, MacArthur, HRS, ELSA, Taiwan, NSHAP, etc.)

- *Metabolic Measures:* anthropometric (height, weight, waist, hip, arm circumference, skinfold measurements), HbA1c, fasting glucose, total and HDL cholesterol, triglycerides, homocysteine, C-reactive Protein (other inflammatory markers?), metabonomics, kidney function
- *Cardiovascular Measures:* blood pressure, heart-rate variability, cardiac output, coronary calcification, endothelial function
- *Accuracy of Self-Reports:* current evidence on the accuracy of self-reports of these measures in the U.S. (obesity, hypertension, diabetes, high cholesterol), the extent of diagnoses or selection biases in self-reported measures, overall value added of "objective" measurements.

### **II.) Benefits of these markers for the generation of scientific knowledge:**

- *Causes and consequences of obesity epidemic:* given huge increases in obesity and diabetes, these markers would help track further developments in these trends as well as the economic, social and health consequences of long durations of obesity over the life course.
- *Causes and consequences of subclinical and clinical cardiovascular disease:* CVD is still the leading cause of death in the U.S. and the cause of substantial morbidity for the population at working ages. Current assumptions about reverse causality from health to income suggest that overt illness or disability limits one's ability to work. Given the long etiology of many of the metabolic and cardiovascular diseases, it is plausible that subclinical disease may effect individuals in subtle ways for years before disease is evident or diagnosed, which in turn could influence an individual's labor market, savings and expenditure decisions, etc.
- *Consequences of early life events:* a large literature discusses the idea of fetal programming and critical periods for development of metabolic and cardiovascular disease, though very little longitudinal data exist to shed light on these hypotheses. (Birthweight data in both the CDS and adult file)
- *Impact of subclinical metabolic and cardiovascular markers on children's educational performance and attainment.* Feedbacks from early life health to the

accumulation of human capital and achievement may be driven by more subtle differences in health at the subclinical level and thus underestimated when looking only at the effects of overt disease or low birthweight. For example, proper glucose levels are thought to be very important for memory and learning.

- *Impacts of "non-health" policy or other unexpected events:* these data would provide ongoing opportunities to attempt to estimate the impact of policy changes and other events on changes biological systems without waiting for information on acute health events or diagnosed disease (e.g., mortality or heart attacks). Examples: Tax changes (EITC), changes in school or education policy, unforeseen unemployment, housing boom and bust, disasters such as Katrina. Blood pressure, other cardiac measures are probably sensitive to shorter term changes in circumstances.

### **III.) Synergies with key features of the PSID**

- Longitudinal structure of data with high response rate, long employment, income, expenditure, housing history on most respondents (and their parents)
- Wide age range-- many biomarker studies (HRS, MIDUS, Mac Arthur) are restricted to middle and older ages. With the PSID, we could examine social and biological interactions that begin long before age 50.
- Developmental outcomes, cognitive tests, etc available from the CDS, also birthweight and gestation, food frequency and time use diaries, valuable for testing critical periods and metabolic/CVD programming hypotheses.
- Neighborhood and geographical influences on health (obesity, diabetes)
- Geneological design- ability to utilize sibling, cousin, fixed effects models to examine the impact of early life health or other shocks on later life biology, important to help reduce bias from unobserved family characteristics. Unique ability to look at persistence of economic status and health status across multiple generations.
- National sample-- many recent biomarker studies are based on a small number of communities (MIDUS, MacArthur, CHS). Some include only one sex (Normative Aging Study, WHAS). NHANES is based on a national sample and has a huge number of biomarkers, but is cross-sectional and doesn't have rich social information. In this sense the PSID would offer a broader population for analysis than all other studies in the US.

### **IV.) Ethical and Legal Concerns**

- Responsibilities to notify individuals of subclinical or clinical disease

- Depth of understanding of “informed consent”
- Additional considerations with children

#### **V.) Operational Aspects**

- Sample: full sample vs. subsample, age groups-include children?
- Frequency: every two years, or less frequent intervals
- Collection: home, clinic, mailed kits
- Easiest to collect: anthropometrics, blood pressure and heart rate (but desirability of multiple measurements over several days)
- Blood: dried blood spots (Hba1c, CRP, possibly cholesterol) versus venipuncture (more options for future assays as well). Issues of requiring overnight fast.
- Urine: microalbuminuria (kidney function)
- More expensive/technological tests (heart rate variability, doppler ultrasound)
- Potential effects on length of interview, response rates
- Interviewer training, transporting of any necessary equipment
- Requirements for collecting additional information on medication usage such as anti-hypertensives, statins, insulin

#### **III.) Conclusions:**

Summary, overall advice on value of adding metabolic and CVD markers versus adding nothing and also their relative value versus other markers that could potentially be included.