

Study Design

The Health and Retirement Study began collecting salivary DNA samples in 2006 and now has approximately 13,000 such samples stored in repository. An ARRA-supported “Grand Opportunity (RC2)” proposal (David Weir, PI) submitted in 2009 funds state-of-the-art genotyping of these samples. The genotyping is being performed using the Illumina HumanOmni1-Quad beadchip. The profile from this platform includes over one million single nucleotide polymorphisms (SNPs). Statistical imputation methods directed by co-investigator Sharon Kardia (Chair of Epidemiology, School of Public Health, University of Michigan) will double the number of available markers and will make possible comparisons across platforms that do not assay the same genome-wide SNP panel. The result will be a publicly-available resource of linkable genotype, phenotype, and environmental conditioning variables that can be used widely in the scientific community.

Linking rich genotyping with the deep phenotyping available in an ongoing multi-disciplinary longitudinal study creates uniquely valuable opportunities for research on the genetics of disease, cognitive and physical function, longevity, and social and economic behavior and decision-making. Longitudinal measurement permits multiple observations on stable traits, and the modeling of trajectories of change in age-related traits or age at onset in discrete disease states. The breadth of measurement will enable investigation of correlated genetic patterns in multiple domains, and sophisticated modeling of gene-environment interactions. A genotype database from a large nationally representative sample will be an important reference point on allele frequencies and ancestry admixtures in the US population. Finally, the results of genetic analysis can inform future waves of HRS to sharpen measurement of relevant traits.

Equally important, the HRS is built for comparability with other studies, creating potentials for replication and pooling that are crucial for future advance in genetic discovery. This resource creates new horizons for research in behavioral and health sciences.

Collecting Salivary DNA

Beginning in 2006 the study added direct measures of physical function, biomarkers of cardiovascular risk, expanded measurement of psychological traits (e.g., big 5 personality measures, affect, sense of control) and social networks. As part of the new measures added in 2006, the study also began asking respondents to donate DNA samples to be held in repository for future research. In 2006, samples were collected using a mouthwash method. In 2008, we switched to collection using Oragene DNA self-collection kits which provide samples with higher DNA concentration and yield. Based on prior rates of consent, the HRS expects an additional 3,000 Oragene samples to be added in 2010, including a substantial expansion of the minority sample.

Data Sharing Plan

The genotype data and a limited set of phenotype measures will be deposited in the NIH GWAS repository (dbGaP), which should provide a convenient method of distribution to researchers who meet NIH requirements for access. Researchers who wish to link to other HRS measures not in dbGaP will be able to apply for access from HRS.

Co-Investigator Team

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Selected Publications

The HRS bibliography of over one thousand publications is on-line at <http://hsonline.isr.umich.edu/papers/>. To search for a specific publication or topic in the bibliography click on the link for the Dynamic Bibliography or go to <http://hrsweb.isr.umich.edu/biblio/index.html>.

Availability

Data documentation will be made available to the public at <http://hrsonline.isr.umich.edu>

Terms

dbGaP is the **database of Genotypes and Phenotypes** which is a data bank developed by the National Institutes of Health to archive and distribute the results of studies that look at the interaction of genotype and phenotype.

Genotype is the inherited instructions an organism carries within its genetic code

Phenotype is any *observable characteristic* or trait of an organism: such as its size and shape, development, biochemical or physiological properties, or behavior. Phenotypes result from the expression of an organism's genes as well as the influence of environmental factors and possible interactions between the two.

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