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Cohort Profile: the Health and Retirement Study (HRS)

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Abstract

The Health and Retirement Study (HRS) is a nationally representative longitudinal survey of more than 37 000 individuals over age 50 in 23 000 households in the USA. The survey, which has been fielded every 2 years since 1992, was established to provide a national resource for data on the changing health and economic circumstances associated with ageing at both individual and population levels. Its multidisciplinary approach is focused on four broad topics—income and wealth; health, cognition and use of healthcare services; work and retirement; and family connections. HRS data are also linked at the individual level to administrative records from Social Security and Medicare, Veteran's Administration, the National Death Index and employer-provided pension plan information. Since 2006, data collection has expanded to include biomarkers and genetics as well as much greater depth in psychology and social context. This blend of economic, health and psychosocial information provides unprecedented potential to study increasingly complex questions about ageing and retirement. The HRS has been a leading force for rapid release of data while simultaneously protecting the confidentiality of respondents. Three categories of data—public, sensitive and restricted—can be accessed through procedures described on the HRS website (hrsonline.isr.umich.edu).

Key Messages

- HRS findings overall paint a rich portrait of retirement as a process with multiple influences and outcomes; although the health and well-being of ageing Americans is good overall, findings point to vulnerable population subgroups.
- In addition to improving survey measurement in several areas—such as new techniques for assessing income and wealth—HRS has led the way in multi-modal data collection, especially in internet surveying.
- Because of its innovations in design and measurement, HRS has become the model for a network of studies around the world that share a common scientific and policy mission with a mutual desire to harmonize some of their main survey content.

Why was the cohort set up?

Scientists and policy makers have long anticipated the rapid ageing of the USA population as the large Baby Boom generation transitions from work to retirement. In the late 1980s, the National Institute on Aging (NIA) recognized the need for data resources to support necessary research and, under the leadership of Dr Richard Suzman, the basic framework of an investigator-initiated, multidisciplinary, longitudinal, public-use study was established. The USA Congress in 1990 directed the NIA to create a new study, the Health and Retirement Study (HRS). Begun in 1992, HRS was the first longitudinal study of older people to include detailed economic and health information in the same survey.[1] The goal was not only to build our understanding of ageing but also to provide scientific data for studying national-level social and policy changes that may affect individuals. Indeed, the data are often used to study the effects and implications of different public policies. The topics covered include resources for successful ageing (e.g. economic, public, familial, physical, psychological and cognitive); behaviours and choices (e.g. work, health behaviours, residence, transfers, use of programmes); and events and transitions (e.g. health shocks, retirement, widowhood, institutionalization). HRS has grown to represent all Americans over age 50 years. Expansion into biomarkers and genetics and new psychosocial content make it the most comprehensive population-representative study of ageing in the USA.

Yet population ageing is a global phenomenon. Many countries face the challenge of a rapidly growing older population and are now developing their own public data sources. As a metric of its success, HRS has spawned 30 other international surveys that share a common scientific and policy mission with a mutual desire to harmonize content. HRS supports the development of these surveys through technical assistance, interviewer training, and collaboration. These surveys not only provide data for individual countries but also offer the opportunity for cross-national comparisons. HRS sister surveys include MHAS in Mexico, ELSI in Brazil, ELSA in England,[2] TILDA in Ireland,[3] THISLS in Scotland, NICOLA in Northern Ireland, 18 countries in the SHARE network, IFLS in Indonesia, KLoSA in South Korea, CHARLS in China[4], LASI in India, HART in Thailand and JSTAR in Japan (Box 1).

HRS is conducted by the Institute for Social Research (ISR) at the University of Michigan. Two leadership transitions (F Thomas Juster to Robert Willis to David Weir) demonstrate the institutional commitment at ISR as well as the robust demand for the data the study produces. HRS works through a cooperative agreement with the NIA Division of Behavioral and Social Research (BSR), directed by Dr Richard Suzman. From the beginning, Suzman and BSR have seen HRS as the cornerstone of the scientific platform that studies the dynamics of population ageing.

Who is in the cohort?

Creating the sample

The HRS sample was built up over time. The initial HRS cohort, recruited in 1992, consisted of persons born 1931–41 (then aged 51–61) and their spouses of any age. A second study, Asset and Health Dynamics Among the Oldest Old (AHEAD), was fielded the next year to capture the cohort born 1890–1923 (then aged 70 and above). In 1998, the two studies merged and, in order to make the sample fully representative of the USA population over age 50, two new cohorts were enrolled: the Children of the Depression (CODA), born 1924–30, and the War Babies, born 1942–47. HRS now employs a steady-state design, replenishing the sample every 6 years with younger cohorts not previously represented. In 2004, Early Baby Boomers (EBB, born 1948–53) were added, and in 2010, Mid Baby Boomers (MBB, born 1954–59) were added.

The HRS sample is based on a multi-stage area probability design involving geographical stratification and clustering and oversampling of certain demographic groups.[5] To determine eligibility, a brief household

Box 1. HRS sister studies to date

ELSA	English Longitudinal Study of Ageing
SHARE	Survey of Health, Ageing and Retirement in Europe (Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Israel, Italy, The Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and Switzerland)
JSTAR	Japanese Study of Aging and Retirement
TILDA	The Irish Longitudinal Study of Ageing
MHAS	Mexican Health and Ageing Study
THISLS	The Scottish Longitudinal Study of Ageing
KloSA	Korean Longitudinal Study of Ageing
CHARLS	China Health, Aging, and Retirement Longitudinal Study
ELSI-BRASIL	Brazilian Longitudinal Study of Aging
LASI	Longitudinal Aging Study in India
IFLS	Indonesian Family Life Survey
HART	Study on Health, Aging, and Retirement in Thailand
NICOLA	Northern Ireland Cohort Study on Ageing

screening interview is conducted with each sampled housing unit. Adults (age 18+) of the household are listed with their age and coupleness status. A primary respondent is randomly selected from all age-eligible household members and, if the selected person is coupled, their spouse or partner is also included in the sample, regardless of age. To date, household screening efforts have been conducted in 1992, 2004 and 2010.

HRS has always oversampled African-American and Hispanic households at about twice the rate of Whites and has been successful at recruiting and retaining minority participants.[6] In 2010, the minority sample from the Baby Boom cohorts was further increased by a supplemental screening effort (NIA U01AG009740-20S3). Core interviews and mail surveys are conducted in English and Spanish.

Weighting

Sample weights are derived to account for differential probability of selection and differential non-response in each wave.[5] Correct use of weights is essential to population inference as the sample is not self-weighting by design. Because the HRS has a complex sample design, analysts should account for geographical stratification and clustering in the estimation of standard errors. Sampling weights are provided for the community-dwelling population, post-stratified to national totals (Current Population Survey through 2004; American Community Survey thereafter).

Interviewing

In single households, the age-eligible respondent answers all questions in the main interview about him/herself and the household, unless a proxy is needed. In coupled households, each member of the couple is designated as either a financial or a family respondent. Questions about housing, income and assets are asked of the financial respondent, and questions about family composition and transfers are asked of the family respondent. Both respondents receive all individual-level questions about him/herself.

A proxy respondent is sought for respondents who are unwilling or unable to do an interview themselves. Proxies are usually a spouse or other family member. About 9% of interviews are with a proxy respondent each wave—18% for those who are 80 and older. Proxy interviews are essential to maintaining coverage of the cognitively impaired.[7] Baseline interviews are conducted with community dwelling persons only. However, respondents who move to nursing homes after baseline are retained and interviewed. The HRS now fully represents the USA nursing home population. Community dwelling respondents interviewed by proxy are weighted together with all other respondents. Nursing home residents are weighted separately.

Mode of interview

Most baseline interviews are conducted face-to-face (FTF). Prior to 2004, the primary mode for follow-up interviews was telephone, except for respondents over the age of 80 who are offered face-to-face (FTF) follow-up interviews. Since 2006, HRS has utilized a mixed-mode design for follow-up in which half of the sample is assigned an FTF interview with physical and biological measures and a psychosocial questionnaire, the enhanced FTF (EFTF) interview. The other half completes only the core interview, usually by telephone. The half-samples alternate

waves so longitudinal information from the EFTF interview is available every 4 years at the individual level, and the expanded content is available every wave on a nationally representative half-sample. To expand data collection at lower cost and respondent burden, the study also incorporates internet surveys and self-administered mail surveys for supplemental studies conducted in off years.

How often have they been followed-up?

The main survey occurs every 2 years, making 2012 the 11th follow-up of the 1992 cohort (wave 10 for those entering in 1993, wave 8 for those entering in 1998, wave 5 for those entering in 2004 and wave 2 for those entering in 2010).

Mortality surveillance and exit interviews

HRS monitors vital status through its own efforts to locate respondents and through linkages to the National Death Index (NDI). Mortality coverage is essentially complete.[8] In the event of respondent death, HRS attempts an interview with a surviving spouse, child or other informant to obtain information about medical expenditures, family interactions, disposition of assets following death, and other circumstances during the final stages of life. These 'exit' interviews have been conducted for 93% of decedents identified as of the end of 2010.

Response rates

Table 1 reports response rates (and sample sizes) for each cohort for baseline and follow-up waves. Baseline (wave 1) response rates reflect the percentage of all individuals determined to be eligible for HRS who completed a baseline interview. These rates have declined over time, following the general national trend. Follow-up rates are based on the sample for which interviews were attempted and have remained high. At each follow-up, interviewers attempt to locate the entire sample that participated at baseline. If a respondent is not interviewed in one wave, he

Table 1. Interview response rates for each cohort at each wave

Cohort	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9	Wave 10
HRS										
Eligible	15 497	12 777	12 622	12 202	11 762	11 230	10 835	10 026	9587	8919
Interviewed	12 652	11 420	10 964	10 584	10 044	9724	9362	8879	8493	7904
Response rate (%)	81.6	89.4	86.9	86.7	85.4	86.6	86.4	88.6	88.6	88.6
Year	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010
AHEAD										
Eligible	10 229	7554	6512	5526	4559	3766	2979	2362	1708	
Interviewed	8222	7027	5951	5000	4107	3365	2700	2142	1526	
Response rate (%)	80.4	93.0	91.4	90.5	90.1	89.4	90.6	90.7	89.3	
Year	1993	1995	1998	2000	2002	2004	2006	2008	2010	
CODA										
Eligible	3200	2300	2140	1973	1770	1608	1410			
Interviewed	2320	2124	1951	1777	1618	1454	1255			
Response rate (%)	72.5	92.3	91.2	90.1	91.4	90.4	89.0			
Year	1998	2000	2002	2004	2006	2008	2010			
WB										
Eligible	3619	2652	2630	2612	2539	2488	2445			
Interviewed	2529	2410	2384	2295	2237	2165	2138			
Response rate (%)	69.9	90.9	90.6	87.9	88.1	87.0	87.4			
Year	1998	2000	2002	2004	2006	2008	2010			
EBB 2004										
Eligible	4420	3461	3433	3405						
Interviewed	3330	3035	2963	2926						
Response rate (%)	75.3	87.7	86.3	85.9						
Year	2004	2006	2008	2010						

The denominator used in calculating response rates for the first wave includes sample members who were identified as eligible in the household screener or sample frame. The denominator used in calculating the response rates for the second and later waves includes only those who were themselves respondents at wave 1, or whose spouse or partner was a respondent at wave 1: that is, households in which no sample member was interviewed at the baseline are dropped from the sample in subsequent waves. In addition, individuals who have died or who have requested to be permanently removed from the sample are excluded from the denominators for the follow-up waves.

or she is contacted again the next. Although interviewers are persistent in their attempts to obtain interviews, they will not sacrifice goodwill to do so. This makes respondents more likely to agree to be interviewed again in the future. A small proportion of sample members have been removed from the study at their request.

What has been measured?

Core content

The survey has grown and changed, but 2010 is generally representative of the core interview (Box 2).

Physical measures, biomarkers and genetics

In the EFTF interview, interviewers administer physical tests and obtain biological specimens.[9] Physical measures include grip strength, timed walk, lung function, balance, height and weight, waist circumference and blood pressure. Saliva is obtained for DNA extraction, and blood—in the form of dried blood spots—is used to measure selected blood-based biomarkers. Blood samples have been assayed for five biomarkers: total and high-density lipoprotein (HDL) cholesterol, glycosylated haemoglobin (HbA1c), C-reactive protein (CRP) and cystatin C, for which data from the 2006 and 2008 waves are currently available for analysis.

Under separate award mechanisms through the American Recovery and Reinvestment Act (ARRA) (RC2 AG036495; RC4 AG039029), the HRS saliva samples are being genotyped by the Centers for Inherited Disease Research (CIDR) and archived with the database of Genotypes and Phenotypes (dbGaP) at the National Institutes of Health (NIH). Over 2.5 million single nucleotide polymorphisms (SNPs) are being identified using the Illumina beadchip platform, with imputations to 21 million SNPs based on the 1000 genomes project. Currently 15 620 samples are available to qualified researchers via dbGaP, with another 3300 being added by the end of 2014. Data on approximately 18 000 samples from a first-generation exome array will be available in 2014. Expanding our genotype data to include more complete coverage of the exome is an efficient strategy to selectively measure variants in the coding regions of the human genome that are likely to have larger effect sizes. HRS also measured average telomere length using quantitative PCR (qPCR). The 2008 Telomere Data release includes samples from 5808 HRS respondents.

Psychosocial content

In 2004, HRS piloted a psychosocial questionnaire left behind at the end of the EFTF interview, for respondents to complete and return by mail. Since 2006, participants have reported on personal evaluations of their life circumstances, subjective well-being, lifestyle and stress (Table 2).

Modules

HRS includes experimental modules (3 min on specialized topics or greater depth on core content) as part of the main survey. Random subsamples of approximately 1500 respondents for each module are invited to answer a few more questions at the end of the interview. Modules are solicited through announcements on the HRS website from the research community prior to each wave.

Linkage to administrative data

HRS attempts to obtain permission from all HRS respondents to access and link survey data to their Social Security earnings and benefits records and, from eligible respondents, to their Medicare records. Linkage consent rates range from 78% to 84%. HRS also attempts to obtain—using the Employer Identification Number (EIN)—a wide range of pension plan information from respondents' current and past employers, without revealing the respondent's identity to the employer. Finally, healthcare utilization and other data from the Veterans Affairs (VA) healthcare system are currently being linked to HRS respondents who have self-reported prior military service and have received VA health care. We expect that approximately 2000 to 3000 HRS respondents will have linked VA data. All of these sources of linked data not only provide validation of self-reported information but also add information not collected from respondents in the survey. De-identified administrative data linked to HRS survey data are made available under restricted data use agreements to researchers.

Off-year and supplemental studies

In 1999, HRS fielded the first of its off-year and supplemental studies, which take place in between interview waves. These studies are fielded in subsamples as internet-based surveys, mailed paper and pencil questionnaires, or in-home assessments. Some of them took place only once; others are biennial studies of varying duration (Box 3).

What has been found?

HRS findings are widely published. As of January 2014, the HRS bibliography (hrsonline.isr.umich.edu/bibliography) included 1409 journal articles, 614 reports, 154 books or book chapters and 316 doctoral dissertations.

Box 2. Summary of HRS 2010 core interview content by section

Sections A and B: Demographics and Background
Household and child rosters, respondent education, race, marital status and history, number of children, military service, nativity and immigration, citizenship, state of birth and childhood residence, childhood health and financial situation, religious affiliation and attendance, English as main spoken language, length in current residence.

Section C: Health
Physical conditions and treatment (blood pressure, diabetes, disabilities, cancer, lung disease, heart disease, stroke, arthritis, emotional/psychiatric problems); health behaviours (smoking, alcohol use, sleep, exercise); preventive services (mammography, breast self-examination, prostate examination, cholesterol, Pap smear, flu immunization).

Section D: Cognition
Self-rated meta-memory; memory and mental processing (immediate and delayed recall; timed backwards counting; serial 7's subtraction; date/object/President/VP naming; vocabulary; numeracy; retrieval fluency; number series; verbal reasoning); depressive symptoms. Proxy rating of respondent's global memory (present and past) and respondent's change in memory.

Sections E and F: Family Structure and Transfers
Structure of extended family relationships, family proximity and moves, transfers to and from children of money, time, housing

Section G: Functional Limitations
Activities of daily living; instrumental activities of daily living (ADLs and IADLs); information on helpers.

Section H: Housing
Type of home; home value; housing costs; second home information.

Section I: Physical Measures
Blood pressure; breathing; grip strength; balance; timed walk; measured height and weight; waist circumference; saliva; blood spots.

Sections J–L: Employment and Pensions
Employment status and history; job search; job characteristics, earnings; retirement plans, pensions; annuities, Social Security; early retirement buyout.

Section M: Disability
Benefits (Social Security/SSDI/SSI, Veterans Administration, Workers Compensation, other programmes); impairment history; injuries at work.

Section N: Health Services and Insurance
Health providers (dentist, doctor); drugs; financial assistance; government health insurance; health insurance; hospitalization; in-home care/special facilities; long-term care insurance; Medicaid; Medicare; nursing home information; outpatient surgery; out-of-pocket medical spending.

Section P: Expectations
Subjective expectations of event probability (leave inheritance, work, life expectancy, medical expenses, Social Security benefits; value mutual fund, stock market; move to nursing home).

Section Q: Assets and Income
Assets (bonds, business or farm, CD, T-Bill, checking/savings/money market, IRA, other, pension, real estate, stocks, transportation, trusts); expenses (charity, medical, debts, food); federal tax return; income (employment, annuities, bonds, CD, T-Bill, checking/savings/money market, self-employment, food stamps, pension, profession/trade, rental, social security, stocks, supplemental security (SSI), tips, bonus, unemployment, veterans benefits, welfare, workers' compensation, other employment, other sources); lump sum payments.

Section R: Asset Change
Business purchased; business sold; household member addition assets/debts; own home; real estate purchased; real estate sold; residence bought or sold; major home improvement; stocks.

Section S: Widowhood and divorce
Change in benefits around widowhood and divorce; expenses.

Section T: Wills, insurance, and trusts: value; beneficiaries.

Table 2. Summary of 2010 HRS psychosocial content

Well-being	Lifestyle	Social relationships
Life satisfaction	Activities in life	Spouse/child/kin/friends
Domain satisfaction	Neighbourhood evaluation	Positive support
Depression	Religiosity	Negative support
Positive/negative affect	Discrimination	Closeness
Hedonic well-being	Lifetime traumas	Loneliness
Purpose in life	Early life experiences	Early parental relationships
Personal growth	Stressful life events	Friend contact
Financial strain	Ongoing stress	Child contact
Personality	**Work**	**Self-related beliefs**
Extraversion	Work stress	Personal mastery
Neuroticism	Work discrimination	Perceived constraints
Openness	Work satisfaction	Hopelessness
Agreeableness	Capacity to work	Subjective age
Conscientiousness	Effort-reward balance	Perceptions of ageing
Cynical hostility	Work support	Subjective social status
Anxiety	Work/family priorities	Optimism
Anger	Work/life balance	Pessimism

This section highlights findings across some of the themes of HRS; it is not intended to be exhaustive but rather illustrative.

A large number of HRS publications address the interplay of health, family connections, economic status and retirement. As a whole, the findings paint a rich portrait of retirement as a process with multiple influences and outcomes, often occurring in a series of steps over several years.[10,11] Researchers have used HRS data to examine the impact of health on retirement, revealing circumstances in which poor health can hasten departure from the labour force depending on economic resources,[12] and others in which it can delay retirement depending on illness severity.[13] With data linked to Social Security earnings and benefits records, researchers show that the majority of workers claim retirement benefits as soon as they qualify.[14] However, data on subjective expectations in the HRS show that current workers in the Baby Boom generation expect to work longer than earlier cohorts.[15] And although they report themselves to be in good health in general, their self-reported health is worse than earlier cohorts.[16] HRS is uniquely positioned to track these trends and to provide insight into the causes and consequences of retirement as the population ages.

Many HRS publications utilize the exceptionally high-quality data on income and wealth. HRS has pioneered new techniques for assessing income and wealth for respondents who were unable or unwilling to report precise amounts, resulting in substantially improved data quality.[17,18] Researchers have used these data to study, for example, income replacement in retirement,[19] the impact of macroeconomic events on retirement wealth,[20] retirement savings behaviour[21] and the dynamic relationship between health and wealth.[22–24] In 2001, HRS initiated the Consumption and Activities Mail Survey (CAMS), providing extensive information on consumption and time use that allows researchers to study, among other things, changes in spending patterns with age.[25]

Health and ageing research accounts for a significant portion of HRS published findings. Data in the HRS on limitations in activities of daily living have been widely used to document patterns and trends in health, disability and physical functioning in the USA.[26] Other studies capitalize on the HRS sister studies' harmonized data to examine cross-national differences in health, finding for example striking similarity in gender differences in the USA, England and 11 European countries, with women much more likely to have disabling conditions and functioning problems than men across all countries.[27] Another study found those aged 55–64 in the USA to be in poorer health compared with their English counterparts.[28] Many HRS health studies focus on topics that have the potential to inform medical practice. For example, incidence of severe sepsis was found to predict substantial new cognitive impairment and functional disability among survivors, suggesting the need for increased awareness of potential caregiving requirements.[29] Increasingly studies are also leveraging linkages to administrative health data to study the impact of regional variations in healthcare delivery on individuals. One study found that patients who lived in

Box 3. Off-year/supplemental studies

Consumption and Activities Mail Survey (CAMS) biennial from 2001–13+

CAMS is administered by mail to a random subsample of about 4000 HRS core respondents. The survey collects extensive information about individuals' time use and household patterns of spending.

Aging, Demographics and Memory Study (ADAMS) 2001, 2002, 2006, 2008

ADAMS is an in-home neuropsychological assessment designed to provide a diagnostic determination of dementia or cognitive impairment without dementia. The study aims to estimate the prevalence of dementia as well as risk factors and outcomes.

Prescription Drug Study (PDS) 2005, 2007, 2009

PDS (called Health and Well-Being Study in 2009) is designed to track changes in prescription drug use and coverage as Medicare Part D—the federal prescription drug benefit—was implemented. Administered by mail to 3500–5000 HRS respondents. The 2009 wave added new content on experienced well-being.

Internet Surveys 2003, 2006–07, 2009, 2011

Web-based surveys developed in conjunction with RAND Corporation. Cover topics including internet use/social media, health literacy, childhood health, cognition, well-being, residence history, income, assets, expectations, consumption, retirement preferences, prescription drug use, health behaviours, annuities and sibling transfers.

HRS Mail-out Survey 1999

First mail-out survey designed to evaluate the impact on response rate of questionnaire length and impact of participation in the mail survey on core response rates. Topics include health and healthcare use, psychosocial and attitudinal; housing and employment; spending preferences.

Human Capital Mail Survey (HUMS) 2001

HUMS surveyed a random subsample of about 4000 HRS 2000 core respondents by mail about parental economic investments in education, children's educational attainment and the costs associated with attending college.

Diabetes Study 2003

A study conducted by mail with a subsample of about 2000 HRS respondents who reported having diabetes in the 2000 or 2002 core interview. The focus was diabetes care, self-management, and healthcare utilization.

Disability Vignette Survey (DVS) 2007

The DVS interviewed about 4000 HRS respondents about their own health and disabilities, then vignettes that provided descriptions of people in different states of health, and asked respondents to rate the level of disability of the hypothetical person.

Health Care Mail Survey (HCMS) 2011

For the HCMS, questionnaires were mailed to a subsample of about 7000 HRS respondents on topics in health care, including access, utilization, policy and veteran's health services.

Health Care and Nutrition Study (HCNS) 2013

Questionnaires will be sent to 12 500 HRS respondents on topics in healthcare access and satisfaction (replicating content from HCMS 2011), food security, food expenditures and nutritional intake.

regions of the country with aggressive end-of-life practice styles were less likely to die in hospital and more likely to receive hospice care if they had prepared an advance directive (living will).[30]

Finally, a topic of growing interest is cognitive function, which HRS has measured since the first wave. The addition of the Aging Demographic, and Memory Study (ADAMS) beginning in 2001, provided the first national data on the prevalence of dementia and cognitive impairment.[31,32] Other studies report on factors that may influence cognitive change,[33,34] the consequences of cognitive decline[35] and the monetary costs to society.[36] A number of studies have investigated the impact of retirement on cognitive functioning. One study used HRS and the harmonized data from England and 11 European countries and found that countries with public pension systems that have earlier retirement ages have much lower cognitive scores than those with workers who stay in the labour force longer.[37]

What are the main strengths and weaknesses?

HRS has several key strengths.

(i) Sample size and composition. HRS is a representative sample of the USA population over age 50, allowing analysts to determine population estimates of various states and conditions; the large sample increases our confidence in those estimates. In addition, oversampling and targeted recruitment has yielded responses rates for minorities that are roughly equivalent to those of Whites.[6] The high overall panel response rate reduces attrition bias.

(ii) Biennial panel design. The advantages of a longitudinal design are manifold, and the HRS now has 11 waves of data and multiple birth cohorts. Researchers are beginning to report on longer-term studies of change as well as cohort trends.

(iii) Content. HRS encompasses a wide range of multidisciplinary content, and new data on biomarkers and psychosocial factors will significantly enhance potential modelling of causal pathways to health and well-being.

(iv) Methodological innovations. In addition to improving survey measurement in several areas, HRS has led the way in multi-modal data collection, especially internet surveying.

Several issues demand future attention. Although HRS has a large sample, cost considerations in recent years have forced reductions in the sample size of new cohorts. Moreover, sample retention is always a challenge but even more so with younger cohorts. In addition, other content areas should be addressed. Much more could be learned about the connections between social environment and physical health through better biomarkers such as epigenetic markers only available through whole blood. The use of actigraphy could improve measurement of physical activity and sleep. Neuroimaging for early stages of Alzheimer's disease in a large population-based study would shed light on its utility for general use.

How can I access the data?

HRS has always placed a premium on early and open access to data while implementing state-of-the-art data security to protect respondent confidentiality. Public, sensitive and restricted data can be accessed through the HRS website. Public data are available to all registered users. Sensitive and restricted data require submission of a separate data use agreement. Researchers at RAND Corporation have created a user-friendly version of much of the HRS public data. The RAND contribution is available through the HRS website and is a good starting place for new users. The Gateway to Global Aging Data (G2G) is another useful resource for researchers interested in cross-national data, also available through the HRS website.

To encourage widespread use of the data, HRS staff conduct data use workshops in various locations throughout the year. An exhibit booth is also available at professional conferences, with HRS staff available to help with questions. Various resources for getting started with the data are available on the website, and an online help desk is offered for all users: hrsquestions@umich.edu. User outreach efforts have been successful with 14 700 registered users worldwide. Visit the HRS website (hrsonline.isr.umich.edu), especially under the documentation link, for more information on all of the topics addressed in this paper.

Collaboration

The HRS study design and content are managed by more than 30 researchers and professionals at the University of Michigan and other leading institutions. Through the cooperative agreement mechanism, the NIA Division of Behavioral and Social Research provides critical scientific input, advice and priorities. The NIA Data Monitoring Committee (DMC) is an advisory group to NIA-BSR, comprising independent members of the academic research community as well as representatives of agencies interested in the study.

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References

1. Juster FT, Suzman R. An overview of the Health and Retirement Study. *J Hum Resources* 1995;**30:**S7–S56.
2. Steptoe A, Breeze E, Banks J, Nazroo J. Cohort profile: the English Longitudinal Study of Ageing. *Int J Epidemiol* 2013;**42**: 1640–48.

3. Kearney PM, Cronin H, O'Reagan C *et al*. Cohort profile: the Irish Longitudinal Study on Ageing. *Int J Epidemiol* 2011;**40:** 877–84.
4. Zhao Y, Hu Y, Smith JP, Strauss J, Yang G. Cohort profile: the China Health and Retirement Longitudinal Study (CHARLS) *Int J Epidemiol* 2012; 12 December: 1–8. PMID: 23243115.
5. Heeringa SG, Connor JH. Sample design and methods for the Health and Retirement Survey. Technical Report. Statistical Design Group, Survey Research Center, University of Michigan,1995.
6. Ofstedal MB, Weir DR. Recruitment and retention of minority participants in the health and retirement study. *Gerontologist* 2011;**51:**S8–S20.
7. Weir D, Faul JD, Langa K. Proxy interviews and bias in the distribution of cognitive abilities due to non-response in longitudinal studies: A comparison of HRS and ELSA. *Longitud Life Course Stud* 2011;**2:**170–84.
8. Weir D. Socio-economic status and mortality: Perceptions and outcomes. Paper presented at *Population Association of America*, *April 2010*. Dallas, TX, 2010.
9. Weir, D. Elastic Powers: The integration of biomarkers into the Health and Retirement Study. In: Weinstein M, Vaupel JW, Wachter K (eds). *Bio-Social Surveys: Current Insight and Future Promise*. Washington, DC: National Research Council, National Academies Press, 2008.
10. Maestas N. Back to work: Expectations and realizations of work after retirement. *J Hum Resources* 2010;**45:**718–48.
11. Cahill K, Giandrea M, Quinn J. Reentering the labor force after retirement. *Monthly Labor Rev* 2011;**134:**34–42.
12. Bound J, Stinebrickner T, Waidmann T. Health, economic resources and the work decisions of older men. *J Econometrics* 2010;**156:**106–29.
13. Miah MS, Wilcox-Gök V. Do the sick retire early? Chronic illness, asset accumulation and early retirement. *Applied Econ* 2007;**39:**1921–36.
14. Gustman AL, Steinmeier TL. The Social Security early entitlement age in a structural model of retirement and wealth. *J Public Econ* 2005;**89:**441–63.
15. Mermin GBT, Johnson RW, Murphy DP. Why do Boomers plan to work longer? *J Gerontol: Psychol Sci Soc Sci* 2007;**62:** S286–94.
16. Weir DR. Are Baby Boomers living well longer? In: Madrian B, Mitchell OS, Soldo B (eds). *Redefining Retirement: How Will Boomers Fare?* Oxford, UK: Oxford University Press, 2007.
17. Hurd MD, Juster FT, Smith JP. Enhancing the quality of data on income: Recent innovations from the HRS. *J Hum Res* 2003;**38:**758–72.
18. Juster FT, Cao H, Perry M, Couper M. The effect of unfolding brackets on the quality of wealth data in HRS. Ann Arbor, MI: University of Michigan, Michigan Retirement Research Center, 2006.
19. Purcell PJ. Income replacement ratios in the Health and Retirement Study. *Soc Secur Bull* 2012;**72:**37–58.
20. McFall BH. Crash and wait? The impact of the Great Recession on the retirement plans of older Americans. *Am Econ Rev* 2011;**101:**40–44.
21. De Nardi M, French E, Jones JB. Why do the elderly save? The role of medical expenses. *J Polit Econ* 2010;**118:**39–75.
22. Adams P, Hurd MD, McFadden D, Merrill A, Ribeiro T. Healthy, wealthy, and wise? Tests for direct casual paths between health and socioeconomic status. *J Econometrics* 2003; **112:**3–56.
23. Smith JP. Healthy bodies and thick wallets: The dual relation between health and economic status. *J Econ Perspect* 1999; **13:**145–66.
24. Zajacova A, Burgard SA. Healthier, wealthier, and wiser: A demonstration of compositional changes in aging cohorts due to selective mortality. *Popul Res Policy Rev* 2013;**32:**311–24.
25. Hurd M, Rohwedder S. Methodological innovations in collecting spending data: The HRS Consumption and Activities Mail Survey. *Fiscal Stud* 2009;**30:**435–59.
26. Freedman VA, Spillman BC, Andreski PM *et al*. Trends in late-life activity limitations in the United States: An update from five national surveys. *Demography* 2013;**50:**661–71.
27. Crimmins E, Kim JK, Sole-Auro A. Gender differences in health: results from SHARE, ELSA and HRS. *Eur J Public Health* 2010;**21:**81–91.
28. Banks J, Marmot M, Oldfield Z, Smith JP. Disease and disadvantage in the United States and in England. *JAMA* 2006; **295**:2037–45.
29. Iwashyna TJ, Ely EW, Smith DM, Langa KM. Long-term cognitive impairment and functional disability among survivors of severe sepsis. *JAMA* 2010; **304:**1787–94.
30. Nicholas LH, Langa, KM, Iwashyna, TJ, Weir, DR. Regional variation in the association between advance directives and end-of-life Medicare expenditures. *JAMA* 2011;**306**:1447–53.
31. Plassman BL, Langa KM, Fisher GG, *et al*. Prevalence of dementia in the United States: The Aging, Demographics, and Memory Study. *Neuroepidemiology* 2007;**29:**125-132.
32. Plassman BL, Langa KM, Fisher GG *et al*. Prevalence of cognitive impairment without dementia in the United States. *Ann Intern Med* 2008;**148:**427–34.
33. Llewellyn D, Lang I, Matthews F *et al*. Vascular health, diabetes, APOE and dementia: the Aging, Demographics, and Memory Study. *Alzheimer Res Ther* 2010;**2:**19–26.
34. Rogers MAM, Langa KM. Untreated poor vision: A contributing factor to late-life dementia. *Am J Epidemiol* 2010;**171:** 728–35.
35. Gure T, Kabeto M, Plassman B, Piette J, Langa K. Differences in functional impairment across subtypes of dementia. *J Gerontol A Biol Sci Med Sci* 2010;**65A:**434–41.
36. Hurd MD, Martorell P, Delavande A, Mullen KJ, Langa KM. Monetary costs of dementia in the United States. *N EngL J Med* 2013;**368:**1326–34.
37. Rohwedder S, Willis, R. Mental retirement *J Econ Perspect* 2010;**24:**119–38.