

Aging in the U. S.: The Health and Retirement Study

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1. Introduction

The Health and Retirement Study is a large scale longitudinal data system built around a core longitudinal survey of more than 20,000 Americans that represents the U.S. population aged 51 and older. The core survey maintains representation of this population over time using a steady state design which adds a new six-year cohort of persons entering their 50's every six years. The core survey is augmented by a set of substudies which utilize the HRS as a sampling frame and by linkages to a variety of administrative records that add information about lifetime earnings, pensions, medical expenditures and death records.

The HRS is supported by the National Institute on Aging—one of the institutes of the U.S. National Institutes of Health—under a cooperative agreement with the University of Michigan with additional funding from the Social Security Administration. The goal of the HRS is to produce public use data in order to allow the full power and creativity of America's scientific community to help researchers address the scientific and policy challenges posed by an aging population.¹ It is designed by an interdisciplinary group of investigators from economics, demography, medicine, psychology, sociology, and survey methods from the University of Michigan and from other universities and research institutions around the country. The HRS research team and the NIA receive scientific advice from a Data Monitoring Committee and from participants in a variety of working groups, workshops and conferences. However, final decisions

¹ The HRS is a public use data set that can be downloaded from the internet after a simple registration process. The HRS data and documentation together with more detail concerning the background, design, and methodology of the HRS, a bibliography of papers using the data and other information may be found on the internet at <http://hrsonline.isr.umich.edu/index.html>.

about the content, design and execution of the HRS rest with the Principal Investigator and co-Investigators. The scientific productivity of the HRS is high and growing. Since it began in 1992, the HRS has generated about 1000 pieces of research including 500 papers in peer reviewed journals. Today, on average, one new paper using HRS data appears in a refereed journal every five days.

A final aspect of the HRS data system, which is not formally part of the HRS project, is the emergence of a set of longitudinal studies of aging in other countries which have been consciously designed to produce data as comparable as possible to that collected by the HRS. These studies include ELSA (English Longitudinal Study of Ageing), SHARE (Survey of Health, Ageing and Retirement in Europe) in eleven countries in Europe, and MHAS (Mexican Health and Aging Study), all of which have collected at least one round of data and all of which are committed to make their data available to the international research community in essentially the same way that HRS does. This international data system is growing. Israel, Ireland, the Czech Republic and Poland are planning to enter SHARE with baseline surveys in 2006. The first Asian study modeled on the HRS is the Korean Longitudinal Study of Aging (KLoSA). It will field its baseline survey in 2006. Japan has begun a pilot study with goal of replicating the HRS. Australia, New Zealand and Thailand have expressed interest in doing new surveys of aging, but their plans are still quite preliminary.

In this paper, I attempt to describe from both historical and analytical standpoints how and why the HRS began and how and why it has evolved into an interdisciplinary and international scientific project of major significance both for basic science and for public policy. The spread of the HRS model internationally has not been the result of top-down agreements among governments. Rather, in analogy with open source software such as Linux, the HRS design and content provides researchers with a platform that can be used as a template to develop surveys in their own countries to address scientific and policy questions of both local and general significance. Each of the international studies has found it in its self-interest to be as comparable as possible to the HRS and to one another because, by being comparable, each country can use data from other countries as natural experiments to explore the implications of alternative policies. American researchers, for example, are interested in the implications of alternative forms of financing and delivering health care that have been developed in England and continental Europe. Were data available, American health insurance researchers would be especially interested in Canada.

Although comparability is important, the open source approach allows researchers from each study to innovate, both to deal with issues of particular interest to researchers and policymakers within their country or region and to

pursue new scientific issues of broader interest that may be emulated in other studies. For example, ELSA has pioneered the addition of biomarkers to their survey and, following their lead, HRS is adding biomarkers in its 2006 wave. The spirit of innovation contributes to the willingness of talented researchers to help in the hard work of survey design, evaluation of data quality and creation of user-friendly documentation and dissemination of data.

2. Origins, Rationale, Design and Core Content

The origins of the HRS date back to the mid-1980's when the NIA and its advisors from demography, economics and sociology recognized that the Baby Boom and the subsequent fertility decline coupled with growing life expectancy would confront America with population aging. Population aging, in turn, would create major challenges for public sector Social Security retirement and disability and Medicare programs and for private sector employer pensions and health insurance when the Boomers began to retire around 2010. NIA also recognized that no existing data system was adequate to provide scientific and policy researchers with the information they would need to study the issues that pre-Boomers and Boomers alike would face as they grew old in an aging society. The NIA exhibited unusual foresight in the early 1990s by making a large investment to initiate the HRS longitudinal study which has since evolved into an extraordinarily rich and innovative data system that is now available to researchers and policy makers as they grapple with the literally trillion dollar issues involved in reforms of the Social Security and Medicare programs.

The intellectual and political history of the HRS leading up to its first wave in 1992 is described by Juster and Suzman (1995).² The Retirement History Survey, a longitudinal survey designed by the Social Security Administration and collected by the Census, was an important predecessor to the HRS. The RHS, which began in 1969 with a cohort of 58-63 year old men and unmarried women, provided data for the development of a growing body of retirement research. (See Hurd, 1990, for a survey.) However, because the cohort had completed its transition to retirement, it was discontinued after 1979. By the mid-1980s it was clear that data from the RHS would be inadequate to address the policy issues associated with population aging that would become most critical with the retirement of the Baby Boom generations in the first decade of the 21st century. For example, the design decision to exclude married women from the RHS, presumably on the grounds that their welfare in retirement depended almost exclusively on their husband's savings and pension, was clearly inappropriate for current and future cohorts. More generally, as I discuss later in this paper, an

² Their paper appears in a special issue of the *Journal of Human Resources* which also includes a collection of "early results" papers designed to stimulate interest in this new survey.

important rationale for the HRS steady state design is the fact that changes over time in technology, society, the economy and policy will inevitably render studies of a single cohort obsolete.

Initially, the HRS was designed as a longitudinal study of a single cohort of persons born between 1931 and 1941 who were 51-51 years of age in 1992. Like the RHS, this design emphasized the importance of studying the determinants of retirement, but attempted to improve on the RHS in a number of ways. The sample included age-eligible persons of both sexes and also sought interviews with the spouses of married respondents whatever the age of the spouse. The age range at baseline was chosen as a compromise between a desire, on the one hand, to be able to study retirement transitions as soon as possible and, on the other hand, the value of beginning with younger respondents in order to reduce initial conditions problems that may hamper causal inferences about the determinants of savings and retirement behavior by lengthening the period of longitudinal observation prior to retirement transitions. The core longitudinal survey took place with a two year periodicity in even numbered years. Baseline line interviews were conducted in person with longitudinal follow-up interviews conducted by telephone. This mixed mode approach was chosen to allow a larger sample size than would have been possible with the more costly option of personal interviews in the longitudinal phase. The survey methodology literature suggested that most of the information sought by the HRS could be obtained equally well in person or over the phone, but that an initial face-to-face interview would create a better bond with respondents and thus increase long run response rates.

The HRS introduced innovative methods to measure key economic concepts, most notably with the use of unfolding brackets to reduce measurement error on wealth (Juster and Smith, 1997; Hurd, 1999), improvement in measures of income from assets (Hurd, Juster and Smith, 2003) and the introduction of subjective probabilities to capture beliefs about factors such as mortality risk, work expectations, and bequests that enter into forward-looking models of life cycle behavior under uncertainty (Hurd and McGarry, 1995). The HRS also provided for the first time detailed measures of health, health service utilization, family structure and intergenerational transfers along with detailed economic measures to permit comprehensive models of the causes and consequences of retirement behavior. Finally, the HRS was also linked to administrative data on employer pensions and Social Security earnings and benefit data.³ These data provided

³ While core survey data from the HRS can be downloaded from the HRS website with simple user registration form, linked data and detailed geocodes are distributed to users under restricted data agreements to protect confidentiality. See the HRS website for details.

detailed information on pension characteristics and lifetime earnings that are difficult or impossible to obtain accurately in survey interviews.

Shortly after the HRS was launched, several of the HRS co-investigators proposed a companion study, the Asset and Health Dynamics of the Oldest Old (AHEAD), which represented cohorts born in 1923 or earlier who were age 70 or older in 1993. This study, also funded by NIA, shared much of its design and content with the HRS including a protocol in which spouses of married respondents are interviewed and a two year periodicity, with interviews taking place in odd numbered years. The AHEAD study also sought permission from respondents for linkage to their Medicare records in addition to linkages to Social Security records similar to that obtained from HRS respondents. Like the HRS, early results from the AHEAD were presented in a special issue of a journal—in this case the *Journal of Gerontology*—together with an article describing the overall goals and study design (Soldo, et. al. 1997).

With the introduction of the AHEAD, the combined HRS/AHEAD study encompassed a much broader range of topics than the original HRS study corresponding to the broader age range of its respondents. From the perspective of informing policy decisions about Social Security and Medicare, the combined studies enabled researchers research questions related to both pre- and post-retirement and to study both the determinants of the behavior and welfare of individual households and the aggregate effects of this behavior on the fiscal balance of these public programs.

However, the HRS/AHEAD study had two key weaknesses, one practical and the other conceptual. The practical difficulty stemmed from the problems of coordinating the HRS which was fielded in even numbered years and the AHEAD which was fielded in odd numbered years. This created a severe tension between the value of maintaining both longitudinal and cross-study comparability of measures, on the one hand, and introducing innovative measures, on the other hand. Each year a new survey wave needed to be designed for one study or the other with design decisions impacting future waves of both surveys. The conceptual weakness of the HRS/AHEAD model was the same threat of obsolescence that ultimately limited the utility of the RHS. That is, despite their wide age range, HRS and AHEAD were effectively studies of a fixed set of cohorts. In addition, from an analytical point of view, the AHEAD cohorts suffered from potentially serious initial conditions problems because the late age at which they entered the study precluded prospective observation of important precursors to their current status.

The HRS addressed these two weaknesses by shifting to a steady state design in 1998.⁴ The third wave of AHEAD was pushed back from 1997 to 1998, enabling it to be pooled with the fourth wave of HRS. Both cohorts were given the same longitudinal questionnaire. In addition, two new six-year cohorts entered the study and were given the same baseline questionnaire. One, called the Children of the Depression or CODA cohort, consisted of people born in 1924-30 who were in their early 70's and the other, called the War Baby or WB cohort, represents people born in 1942-47, who were age 51-56.⁵ The entire sample, which was named the Health and Retirement Study or HRS, represented the U.S. population over the age of 50 in 1998. In order to maintain representation, a commitment was made to add a new six-year cohort of individuals entering their 50's into the HRS every six years. Following this design, the Early Baby Boom cohort, born in 1948-53 entered the HRS in 2004 when they were 51-56 years of age and, with renewed funding from NIA, we plan to add the mid-Boomer cohort born in 1954-59 when they reach 51-56 years of age in 2010.

3. The Analytic Power of the Steady State Design

The steady state design of the HRS creates great analytic strength. It provides a research data base that can simultaneously support continuous cross-sectional descriptions of the U.S. population over the age of fifty-five, longitudinal studies of a given cohort over a substantial period of time (up to 18 years by 2010 for the original HRS cohort, following them from age 51-61 to age 69-79) and research on cross-cohort trends. By 2010 the HRS will be able to support cross-cohort comparisons of trajectories of health, labor supply, or wealth accumulation for persons who entered their 50's in 1992, 1998 and 2004. All these types of studies can be conducted utilizing variables of importance to the disciplines of economics, health, demography, sociology and psychology.

The steady state design of the HRS also provides researchers with the capacity to study the effects of expected and unexpected changes in policy, the economy or the society in a timely way, taking advantage of the many "natural experiments"

⁴ See Willis (1999) for further discussion of the rationale for this design change.

⁵ As with the original HRS and AHEAD cohorts, the spouses of individuals in the WB and CODA cohorts were also interviewed. Since all spouses of persons in the original HRS cohort of 1931-41 and in the original AHEAD cohort born before 1924 were interviewed regardless of age, individuals who were age-eligible for the WB or CODA cohort but whose spouse were in the HRS or AHEAD age range were not selected because such persons were already represented in the survey. Currently, HRS has obtained consents from 84.8 percent of the original HRS cohort for linkage of their data and 60-67 percent rates of consent from other entry cohorts. The difference in consent rates is, in part, due to a special effort funded by SSA in 2004 and focused on the original HRS cohort to convert respondents who had previously refused to consent.

that occur over time. For example, the HRS allowed researchers to study the effects of the run up of the stock market during the 1990s on retirement behavior (Coronado and Perozek, 2003; Engen, et. al., 2004; Gustman and Steinmeier, 2002; Sevak, 2003). In some cases, however, the impact of an event cannot be studied because of limited sample size. For example, in principle the HRS could be used to study the impact of Hurricane Katrina on the wealth, income, health and migration of its older victims but, in practice there are too few cases in HRS for serious analysis.

In addition, the steady state design provides a sampling frame which has the potential to be used to obtain supplementary data relevant to a given policy change. In conjunction with regularly collected HRS data, the supplementary data would enable researchers to carry out “before and after” analysis of the impact of the policy on a probability sample of older Americans. This potential is currently being exploited to examine the new Part D Medicare Prescription Drug Plan that went into effect on January 1, 2006. In the Fall of 2005, the HRS conducted a supplementary mail survey of a subsample of respondents to assess their prescription drug use and together with a number of questions about their knowledge of the new Medicare Part D. program, and their attitudes and plans about enrolment. The HRS will be asking additional questions about Part D in the 2006 survey wave and has plans to repeat the drug inventory in 2007. The resulting body of data from HRS which is relevant to an evaluation of Plan D is far richer and more representative than could ever have been assembled from an ad hoc evaluation project and it is being done at very low marginal cost. Moreover, because they are part of a public use data set, the value of the additional data on prescription drugs will no doubt support research on a variety of topics such as the effects of prescription drug costs on health or consumer decision making in complex situations that go beyond a narrow focus on a particular policy.

4. The Rest of the HRS Data System: Substudies and Linkages

It is important to recognize that the HRS project creates a *data system* that extends beyond the core survey waves. Data from each component of the system can be linked with data from other components, thus creating synergistic returns to scale, as discussed above in the context of the Prescription Drug Mail Survey.

4.1. Mail Surveys

One component of the data system is the use of the HRS survey as a sampling frame to support targeted substudies. This aspect of the HRS began modestly with an experimental “off year mail survey” in 1999 which was designed to see whether the content of the HRS could be expanded beyond the limits of a lengthy core survey at low cost without alienating respondents and lowering response rates to the core survey. This experiment was quite successful. It

obtained a response rate of about 80 percent from a randomly chosen set of HRS respondents from 1998; there were no significant mode effects for questions from the core survey that were repeated on the mail survey and there was no effect on response rates to the 2000 wave of HRS core survey. This experience led the HRS researchers to seek support from NIA to conduct two mail surveys in 2001, each directed to a random half of HRS respondents. One obtained information on the human capital investment by respondents in their children's education (HUMS) and the other collected data on consumption and time use (CAMS-Consumption and Activities Mail Survey). With support from NIA and SSA, the CAMS survey has subsequently been developed into permanent longitudinal survey which is collected in odd numbered years from about half of HRS households (Hurd and Rohwedder, 2005). This is the first longitudinal data on consumption and time use in the U.S., two variables which play key roles in life cycle economic models and as determinants of economic welfare. Other mail survey topics include a 2003 survey to diabetics focusing on self-management issues which also requested a blood spot from respondents in order to measure hemoglobin A1c, an indicator of persistent blood sugar level. As described earlier, a prescription drug survey was administered in 2005 to the portion of the HRS that did not receive the CAMS and will be repeated in 2007. Topics for one-shot mail surveys in 2009 and 2011 will be chosen later.

4.2. ADAMS

The most ambitious HRS substudy is the The Aging, Demographics, and Memory Study (ADAMS). ADAMS began in late 2001 as an NIA-funded supplement to the HRS to conduct in-home clinical dementia assessments in a stratified random subsample of 856 HRS respondents aged 70 years. Using measures of cognitive impairment from the core survey, three strata were formed containing persons who were probably impaired, probably not impaired and a middle group whose status was ambiguous. The ADAMS in-person evaluation is a 3-4 hour structured assessment conducted in the subject's residence by a nurse and psychometrician. The data from this assessment form the basis for a consensus diagnosis made by an expert panel of physicians and psychologists who classify subjects into three categories: not demented; cognitively impaired, not demented (CIND), and demented. Data collection was concluded March, 2005 with data released to researchers in September 2005 (Langa, et. al., 2005). HRS plans to study longitudinal transitions of non-demented ADAMS subjects into CIND and dementia.

ADAMS is the first nationally representative study of dementia in the United States and, hence, the first capable of producing a national estimate of dementia prevalence. However, the aims of ADAMS go well beyond this descriptive purpose. First, the ADAMS data themselves provide a array of clinical, psychometric and biological measures that will be of considerable interest to

dementia researchers. Second, the fact that ADAMS is embedded in the HRS study means that it can be used to study the costs of dementia to individuals who suffer cognitive impairment, to their families and to society. These costs are projected to grow at a rapid rate because, as other causes of death decline, a higher proportion of people will end their lives suffering from dementia. Finally, to the extent that survey measures of dementia are shown to be reasonably accurate relative to “gold standard” clinical measures, the full body of HRS data can be used to study dementia related questions. Preliminary analysis in progress suggests that this is the case. Since the survey measures are quite cheap to obtain, these results suggest that it may be possible to study social and economic aspects of dementia in broad social surveys at much lower cost than is possible when clinical assessment is required.

4.3. Linkages

Another key component of the HRS data system consists of linkages of administrative data to the HRS survey data. These linkages include Social Security earnings and benefit records, Medicare utilization and diagnostic records, employer pension records, and National Death Index information. The HRS is planning to expand these linkages to include nursing home information from the Minimum Data Set and linkages to Medicaid Records. In this paper, I will describe the Social Security and Pension linkages in a little more detail.

4.4. Social Security Data Links

An invaluable resource developed alongside the HRS respondent and spouse surveys has been the linkage of administrative Social Security earnings histories and retirement payments.⁶ This has provided invaluable information on the nonlinear incentives in pension and Social Security programs which are essential for understanding patterns of withdrawal from the labor force. In addition, Social Security accounts for some 40% of expected retirement assets (Mitchell and Moore, 1998; Moore and Mitchell, 2000). In addition, earnings records provide measures of lifetime earnings that are important inputs into many economic models and simply could not be obtained with any accuracy with retrospective recall questions on the core survey. Thus, the Social Security linkage helps remedy a serious “left censoring” problem that would otherwise afflict the HRS in which respondents do not enter the survey until they are in their fifties.

⁶ This linkage is based on a signed informed consent by respondents to allow SSA to provide their earnings and benefit data to the HRS. Because of their sensitivity and to protect confidentiality, these are treated as restricted data which are made available to researchers using procedures described on the HRS webpage.

4.5. Employer Pension Plans

The long term shift of American pension plans from traditional defined benefit to defined contribution or 401(k) plans has accelerated in recent years to the point that the demise of traditional plans in troubled companies like United Airlines and even healthy companies such as IBM regularly make headlines. These changes have resulted in significant changes in the way that people need to think about preparing for retirement and in deciding about retirement itself. Traditional defined benefit plans offer a secure stream of retirement benefits (setting aside plan risk due to the possibility of default). In addition, defined benefit pensions often create sharp incentives for retirement at particular age implied by the formula that relates pension benefits to the worker's age, job tenure, earnings and retirement age. Defined contribution plans are relatively neutral in their incentive effects for retirement age, but have other important implications. These plans shift the risk to workers and, in many cases, allow them to make decisions about their contribution rate and how they wish to balance risk and return through their investment choices. Firms may also create saving incentives by offering to match worker contributions and may impose constraints on portfolio choice. For example, employer contributions may come in the form of shares of company stock.

A central goal of the HRS is to collect sufficient information about employer pensions to permit researchers to study the determinants of retirement and the implications of pensions for pre-retirement saving and post-retirement economic well-being. This is one of the most complex goals of the HRS both because the relevant data are themselves complicated and because people's knowledge and understanding of the pensions is quite limited and possibly inaccurate. This is also a case where both perceptions and reality are important for researchers to understand because both are involved in decision making in retirement and savings (including decisions not to make decisions) and in the consequences of decisions for post-retirement resources.

The HRS asks detailed information about pensions directly from respondents in the core survey. In addition, the HRS asks respondents for the name and address of their current employer and past employers who provided pensions. The HRS then attempts to obtain the survey plan descriptions (SPDs) for employer provided pension plans by various means including seeking the SPD directly from the employer, from holdings of the U.S. Department of Labor,⁷ and, most recently, providing incentives to respondents to write a letter to their employers

⁷ Mandatory filing of SPDs with the Labor Department was discontinued in the mid-1990s. However, SPDs are sometimes provided as attachments to mandatory Form 5500 filings.

requesting their SPD which the respondent then sends to HRS.⁸ In addition, the SPDs for government employees are typically available on the web. Using all these methods, HRS obtained matches for about 79 percent of respondents covered by pensions in 2005.

Once HRS obtains the SPD, it is coded to obtain the plan parameters which determine the mathematical formula that relates pension benefits to the worker's age, job tenure, earnings and retirement age for defined benefit programs and parameters such as employer match rates for defined contribution plans. The HRS has developed a pension plan calculator with which researchers can input these pension parameters, data for an individual and assumptions about future earnings, retirement age, rate of interest in order to calculate the value of pension wealth and the future flow of pension income.

5. New Directions: Biomarkers, Physical Performance, Cognition and Psychosocial Measures

From the outset, the HRS has been characterized by a high level of innovation, most of which has been stimulated by the immersion of the HRS investigators, data users and advisors in cutting-edge research on aging. Because the HRS combines data from domains—economic, health, psychological, family—that are traditionally studied in separate disciplines, it has created new cross-disciplinary research programs that combine both theoretical and conceptual approaches and data in new ways. Two broad areas of cross-disciplinary research are especially promising—the relationship between health and economic status and the interplay between psychology and economics.⁹ In response to growing research interest in these areas the HRS plans to add new biomarker, physical performance, cognition and psychosocial measures, beginning in 2006. In order to add these measures, the HRS will conduct face-to-face interviews with one half of the sample every two years so that each respondent will provide these measures every four years.

5.1. Biomarkers

The collection of biomarkers and assessment of physical performance is an increasingly common feature of population-based studies of aging and health for at least four reasons: (1) the biological pathways to poor health have been

⁸ To protect respondent confidentiality, the HRS never asks a firm for the SPD that covers a named respondent nor does it inform the firm that any of its workers are HRS respondents. Because of this restriction, the match between a respondent and a given SPD may erroneous. This error is reduced when respondents request their own SPD.

⁹ See Smith (2003) for a discussion of the health-wealth relation; Willis, McArdle and Fisher, (2005) for a summary of HRS cognition measures; and Ryff (2002).for an assessment of HRS psychosocial measures.

increasingly clarified; (2) biomarkers are useful for adjusting observed differences by gender, SES, and other traits for unobserved frailty in a population; (3) biomarkers also provide insight into prior exposures to infection and earlier life circumstances; and, (4), the collection of biomarkers from a community population has become easier and less expensive. The biomarkers of primary interest to the HRS are those that have the potential to anchor studies of chronic disease, morbidity, disability, and, ultimately, mortality in a heterogeneous population. The additional content to be gathered during in-person interviews consists of: physical performance measures (grip strength, lung capacity, timed walk), blood pressure, anthropometric measures, dried blood spots for biomarker testing, buccal samples of DNA, a roster of prescription drugs (from a mail survey, described above), and a leave-behind questionnaire of psychosocial measures.

5.2. Cognition

The measurement of cognition was included early on in the HRS study because it was widely agreed that the potential “mismatch between cognitive capacity and cognitive demands” was an important requirement for understanding retirement and health decisions. The inclusion of cognitive measures is rare in survey research and, as a result, the HRS measures are now thought to be among the most innovative measures in the HRS (e.g., Juster & Suzman, 1995, p.S29). In addition, including cognition as part of HRS provides an opportunity to evaluate data quality on the basis of cognitive functioning (Herzog & Rodgers, 1999).

A major goal of the cognitive measures was to permit researchers to identify persons who suffer cognitive impairment and study the impact of impairment on their families. For example, Langa, et. al. (2001) use these measures to show that cognitive impairment has a dramatic effect on the amount of care received by a person from other family members. The ADAMS dementia substudy, described above, provides an important new source of data for this purpose. However, the growing complexity of decision making associated with financial planning and health care choices associated with the growth of defined contribution pensions, the new Medicare prescription drug program and many other changes suggests that it would be extremely useful to have better measures of higher order cognitive functioning.

To this end, the HRS has begun a major effort to strengthen its cognitive measures. Because established cognitive measures are time-consuming to obtain, one important focus of our work is to seek improved efficiency in measurement. In the 2004 core survey, HRS co-investigators, Jack McArdle and Willard Rodgers, developed an experimental module to administer a number series test which is one component of the Woodcock-Johnson measures of “fluid

intelligence” or reasoning ability¹⁰ In standard administration, this test is administered in person and asks 47 questions. Using adaptive testing in which item difficulty depends both on prior knowledge of respondent’s ability and is updated based on performance within the test, the McArdle-Rodgers module was able to obtain a test score covering the full range of the W-J test within three minutes with no more than six questions, using a protocol that could be administered either in a personal or telephone interview (McArdle, Fisher and Rodgers, 2005). Two additional cognitive modules are planned for HRS-2006, one repeating the number series and another obtaining a measure of verbal fluency.

A separate NIA project directed by McArdle and Rodgers, “Assessing and Improving Cognitive Measurements in the HRS,” will conduct intensive longitudinal cognitive testing of persons in a national random sample of about 1000 individuals age 57 and over that was generated as byproduct of screening for the new cohort of 51-56 year olds who entered the HRS in 2004. Research findings from this project and from related experimental modules in HRS will be used to help “re-engineer” the HRS cognitive measures so as to measure those components of intelligence that are most importantly related to decision making about health, savings and retirement in ways that are efficient, accurate and have known psychometric relationships to established cognitive factors.

In another activity related to cognition, I am leading a NIA supported Program Project titled “Behavior on Surveys and in the Economy using the HRS.” This program project is designed to combine several heretofore disciplinarily separate, but rapidly advancing theoretical and empirical lines of research in economics, econometrics, cognitive psychology, social psychology and survey methodology to study connections between people’s behavior on surveys and their economic behavior in the real world and the consequences of this behavior for subjective measures of well-being and objective measures of economic welfare. In addition to research projects using HRS on substantive topics involving analysis of subjective probability beliefs, well-being in economics and psychology and behavioral aspects of portfolio choice, the project supports a Data Innovation Core that will facilitate development of new cognitive or social psychological measures that are related to economic and health behaviors. This core will also support the assembly of “paradata” from the HRS—i.e, measures of the conduct of the survey such as call records, timing measures, receipt of

¹⁰ The HRS has included a set a dozen or so experimental modules in every wave except 1998. These modules, which are administered at the end of the survey to random subsamples, contain about three minutes of survey content on ad hoc topics of methodological or substantive interest. Module questionnaires and data files are available on the HRS web page.

incentives or patterns of missing data—in order to improve our understanding of the connection between the theoretical variables we seek to measure and the information we collect on surveys. We expect the research from this program to feed back into improvements in the HRS itself.

5.3. Psychosocial Measures

The HRS has tended to emphasize the collection of objective, albeit usually self-reported, measures of economic, health and family status and behavior. With the growth of interest by psychologists in the HRS, the growth of interest by behavioral economists in psychology and the interest of sociologists and health researchers in affective aspects of family life and health, the HRS has moved to add a significant number of psychosocial measures as part of the enhanced content associated with its longitudinal face-to-face interviews.¹¹ In 2004, the HRS followed a protocol used by ELSA to administer the psychosocial component of the surveys using a “leave behind” self-administered questionnaire that could either be completed during the interviewer visit while a spouse was being interviewed or, more commonly, to complete it afterward and return it to HRS by mail. Given the sensitivity of many items, the use of a self-administered questionnaire is preferred to interviewer administration. The 2004 questionnaire also drew much of its content from the ELSA questionnaire, thus creating the possibility of comparative analysis of these items. The HRS is currently in the final stages of designing a new psychosocial instrument that will be given to the half sample of people receiving personal interviews in 2006, with the other half receiving the psychosocial instrument in 2008.

6. Summary and Conclusion

The HRS provides public use data designed to allow the full power and creativity of America’s scientific community to address the challenges of an aging population. The HRS is making a significant impact on research on aging through investigator-initiated research which uses the HRS as an input without charge to researchers or granting agencies. Likewise, ELSA, SHARE and MHAS are public use data sets. This makes it possible for researchers from any these countries to conduct cross-national analyses. To date, the HRS has generated about 1000 pieces of research including about 500 papers in peer reviewed journals. Articles using the HRS have been published in top journals in a growing range of disciplines including demography (*Demography*), economics (*American Economic Review*), epidemiology (*American Journal of Epidemiology*), gerontology (*Journals of Gerontology*), health and medicine (*New England Journal of Medicine*; *JAMA*), health services (*Journal of Health Economics*; *Health Affairs*),

¹¹ A set of papers reviewing the content of the HRS in various topic areas were commissioned by the Data Monitoring Committee of the HRS in 2001. Three of the papers—Bumpass (2001), Kahneman and Laibson (2001) and Ryff (2001)—argued in favor of increasing psychosocial content in the HRS.

psychology, sociology (*American Sociological Review*), statistics and survey methodology. HRS data have also been widely used by government agencies and advisory groups including, for example, SSA, the Congressional Budget Office, the Council of Economic Advisors, Department of Treasury, the Federal Reserve Board and the President's Commission on Social Security Reform. As has been the case throughout its history, research using the HRS will feed back into innovations in content and design of the HRS itself. Fulfilling the plans that began at NIA in the 1980s, the HRS is now a crucial piece of the nation's scientific infrastructure. It will help shape the policies in both public and private sectors that will be needed to address the issues faced by individuals and households in the coming decades who are growing old in an aging society.

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