



WHO Study on Global Ageing and Adult Health

2005 SAGE Pilot Study in Ghana, India and Tanzania

WHO's Study on Global Ageing and Adult Health (SAGE) is a longitudinal follow-up of a cohort of ageing and older adults. SAGE has been built on the experience of the World Health Surveys (WHS) carried out by the World Health Organization in 2000 and 2003. These surveys focused on health and health related outcomes and their determinants and impacts in nationally representative samples to fill gaps in other multi-country survey programmes. One of the major concerns of the WHS has been the lack of comparability in international health surveys with regard to self-reported health status due to systematic biases in reporting. This is despite using similar instruments and attempts at making questions conceptually equivalent in translation. SAGE builds on these strategies and will be implemented in a selection of countries where the WHS has been implemented and attempt to follow up at these sites a sub-sample of older adult respondents interviewed in the WHS.

Two important aspects will be incorporated into SAGE design, change in individual health status over time and the web of relationships of a variety of domains to health status. Change of time can be assessed by adding a longitudinal follow-up with addition to the sample at each subsequent survey round to compensate for attrition, coupled with a comparison cohort of younger adults. Following several cohorts can allow observation of the effects of age transitions and cohort differences. SAGE will also be closely linked to other ageing studies such as the Health and Retirement Study (HRS) in the US, the Study on Health and Retirement in Europe (SHARE) and other similar studies. Methods developed by the WHS and SAGE have already been implemented in these studies to assess and correct for systematic biases in self-report. In addition, close linkages with the International Network of field sites with continuous Demographic Evaluation of Populations and Their Health (INDEPTH) in developing countries will ensure that detailed methodological exercises can be undertaken to validate self-reported morbidity and survey mortality data. INDEPTH offers a unique opportunity to inform developments in SAGE.

The scope of the SAGE has been expanded considerably following two technical consultations with experts in October 2003 and August 2004. As originally proposed, SAGE was a methodological study designed to address problems of comparability of self-reports with regard to health and health related outcomes. The original conceptualization of SAGE had envisaged the development of a questionnaire that would capture these outcomes and their determinants through face-to-face interviews with 2000 respondents aged 50 years and older (including a comparison sample of 100 respondents aged 18-49 years) at each of eight performance sites with a follow up after one year. In addition, the study was to have collected data on performance tests and vignettes in a subset of 500 respondents at each site in order to triangulate data from these two separate sources to adjust for biases in self-report. With current funding levels, SAGE is being planned as a study that will generate cohorts in six countries (China, Ghana, India, Mexico, the Russian Federation and South Africa) of about 5000 respondents aged 50+ years and 1000 respondents aged 18-49 years at each site that are nationally representative (except China and India) and can then be followed up every 2 years over a 5-10 year period.

The content of SAGE was also expanded to include issues of well-being, collect data on biomarkers in order to improve the precision of self-reported morbidity, identify risks to health and monitor interventions, collect data on health examinations and performance tests such as anthropometry, grip strength, blood pressure and tests of cognition, vision and mobility, in order to allow adjusting for biases in self-reported health domains and activities of daily living and instrumental activities of daily living. In addition, separate validation exercises will have to be carried out that will provide data on characteristics of self reported morbidity questions.

The specific aims of SAGE as currently formulated are:

- To obtain reliable, valid and comparable data on levels of health on a range of key domains for older adult populations;
- To examine patterns and dynamics of age-related changes in health using longitudinal follow-up of survey respondents as they age, and to investigate socio-economic consequences of these health changes;
- To supplement and cross-validate self-reported measures of health and the anchoring vignette approach to improving comparability of self-reported measures, through measured performance tests for selected health domains.
- To collect data on health examinations and biomarkers to improve reliability of data on morbidity, risk factors and monitor effect of interventions.

Additional objectives include:

- Generation of large enough cohorts of older adult populations and comparison cohorts of younger populations for follow-up of intermediate outcomes, monitoring trends, examine transitions and life events, and address relationships between determinants and health and health-related outcomes;
- To develop a mechanism to link survey data to data from demographic surveillance sites;
- To build linkages with other national and cross-national ageing studies; and,
- To provide a public-access information base to engage all stakeholders, including national policy makers and health systems planners, in planning and decision-making processes about the health and well-being of older adults.

Background and Significance.

As global populations age, there is an increasing need for valid and comparable data on the health of older adults. In particular, questions about changing health over the life course and compression of morbidity demand a richer empirical basis for analysis, particularly in developing countries. A key methodological challenge for the collection of high quality health data from older adults is the problem of comparability in self-reported survey responses on health and health related outcomes. This proposed study seeks to address empirical gaps through extension of ongoing data collection efforts led by the World Health Organization, including novel instruments and analytical methods for improving comparability of survey results.

SAGE has a great potential to develop into a truly international study of global ageing and adult health using state-of-the-art methods. This would mean generating large enough cohorts that can be followed up in order to monitor transitions in health over time and examine relationships between health and economic activity and well-being. It would offer an opportunity to address major methodological problems that currently exist with biases in self-reported health and the problems of lack of comparability of morbidity data. In addition, by incorporating health examinations and biomarkers it would considerably increase the value of the data collected by allowing the documentation of risks to current and future health as well as allow the monitoring the effects of interventions.

The SAGE data collection platform can be used for developing a longitudinal panel survey and for experimental and validation work. The longitudinal survey design will enable investigation of evidence on the compression of morbidity in aging populations, provide new information on adult mortality in areas with limited or non-existent vital registration systems, and allow detailed analysis of changes in health as populations age.

Research Design and Methods

The first phase of the SAGE study design employed probability sampling techniques in order to generate a nationally representative sample of at least 2000 respondents 50 years or older in eight countries as part of the WHS. Of these, in China the survey was to build on the national household health survey and hence the sample frame was used but field work was restricted to only 10 provinces with the intention that in the next phase we would create a nationally representative sample. In India, the study was carried out in six states that were geographically spread out over the country and were representative of the other states in the country even though the sample was not drawn from a national frame.

As a longitudinal study, SAGE will need to create large enough cohorts to account for attrition and loss to follow up and to provide enough power to measure associations. We will follow-up as many of the baseline respondents as possible in this round of data collection, and will need to add new respondents. In order to increase efficiencies of data collection and reduce costs, we propose that in the next phase of data collection we limit the number of clusters to be selected. Within each cluster we will approach every household where there is at least one member who is 50 years or older and seek to recruit them for the study. Since in most of our sites at least 40% of all households meet this requirement and on an average cluster sizes are of about 200 households, accounting for refusals and other non-response, we propose selecting about 100 clusters in a probabilistic manner from the original WHS sampling frames. This would then allow us to generate cohorts of at least 5000 respondents at each performance sites and would create considerable efficiencies for the additional components of the study related to health examinations, measured performance tests and biomarkers.

There is a growing recognition about the feasibility and utility of collecting biomarker data in household surveys. A core set of biomarkers that could explain a large amount of current and future risks to health as well as detect disorders that may not be reported accurately through self-reported morbidity questions, include:

- 1) hemoglobin;
- 2) lipid profiles (apolipoprotein ratios or HDL/LDL);

- 3) glycosylated hemoglobin;
- 4) C-reactive protein; and,
- 5) HIV (via anonymous unlinked samples).

We will continue to explore the possibilities of doing more extensive biomarker data collection such as buccal washes for isolating DNA or extensive health examination and biomarker data collection such as tests for hearing, aerobic capacity, whole blood collection through a venipuncture for measuring immune status, exposure to infections and/or detailed lipid profiles in selected subsamples.

A key component of SAGE is the exploration of the relationship between health and well-being in so far as measures of well-being and quality of life are predictive of health seeking behaviour, future health outcomes (including morbidity), stress and social capital. The means to measure well-being and subjective quality of life, as it contributes to overall health status, has recently been developed by Dr Daniel Kahneman and colleagues in the United States. This objective measure can be used meaningfully to complement our efforts, using the health state description and vignette methodologies, to describe overall health especially with the increasing heterogeneity in health seen at older ages. We have worked with Dr Kahneman to develop a brief version of this module and have tested the brief day reconstruction method in a number of countries. Further revisions and testing has been accomplished in Ghana and China during the pretest phase.

In order to address the complexities that surround the measurement of well-being and quality of life, we propose that we develop a more extensive module of about 20 minutes, as discussed with Dr Kahneman's colleagues, to be included as a nested add-on in a sub-set of respondents in a number of countries. We will demonstrate the stability and sensitivity to change of this instrument at the population level.

Another key area of concern in SAGE, specifically in Sub-Saharan African sites and some Asian sites, is the impact of HIV/AIDS on the ageing population. The two main areas of concern here are, first, the caregiver burden that the epidemic has placed on this population and which therefore has impacts on economic activity as well as general well-being and, second, the HIV/AIDS affected population that is transitioning into the older adult age groups. A related issue is the impact that the epidemic is having on individuals due to other household members having HIV/AIDS and the threats this may pose to economic security and health status, particularly the health risk attributable to caregiving. Prevalence figures are almost non-existent for this population, so the blood samples will be used to improve our understanding of the rates in this group. A module has been developed and is being further revised following the pretesting.

Preliminary results.

Pretest data have been sent to Advisory Group members and analyses at WHO are continuing at this time. Final results will be made available to countries at a meeting with countries and INDEPTH fieldsites in the final quarter of 2005. Data from the SAGE baseline will be put in the public domain along with the WHS data in early 2006. Preliminary analyses of the psychometric properties indicate good reliability and internal consistency with acceptable levels

of missing data. Results are preliminary at this stage - with more substantive analyses and ongoing discussion of results through the last quarter of 2005.

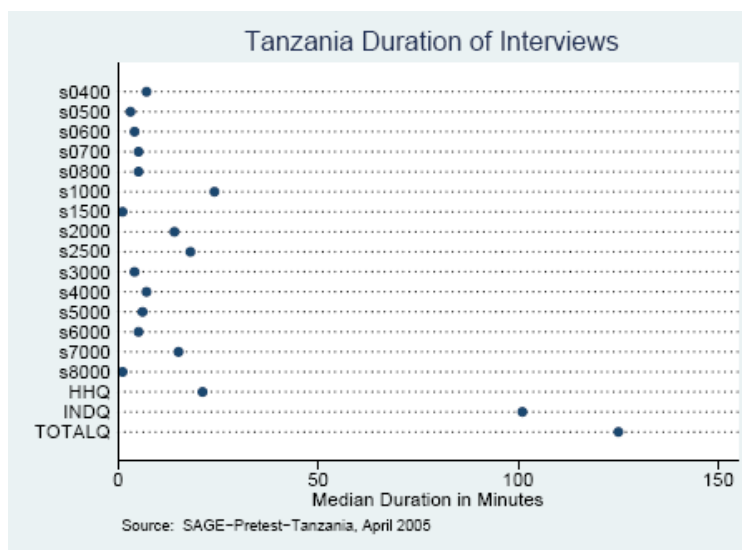
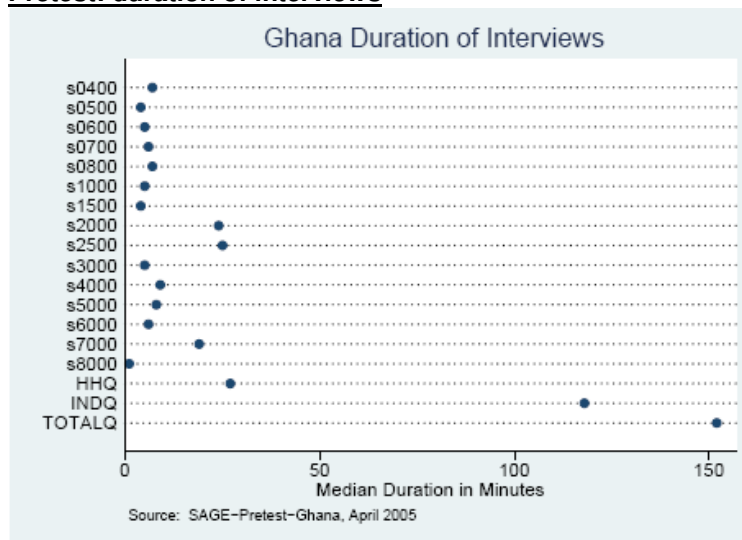
Pretest: sampling and sample size

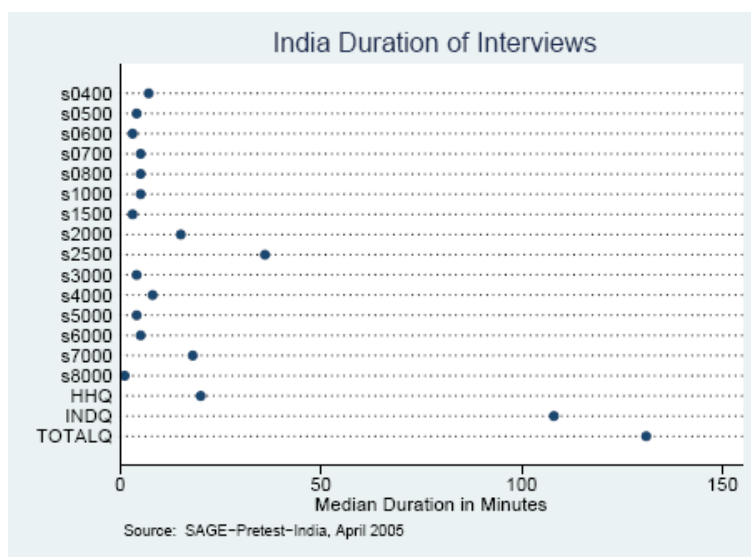
The SAGE pretest was conducted in three countries, Ghana, India and Tanzania, with a target sample size of N=500. All countries used a convenience sample and retest.

- Ghana included a number of follow-up respondents from the WHS.
- India included a small sample of respondents younger than 50 as a comparator group.
- Tanzania respondents were pulled from a random sample from an INDEPTH fieldsite.

	Test	Retest
Ghana	477	30
India	469	23
Tanzania	500	25

Pretest: duration of interviews





Pilot: household information

Table 2. Household population: percent distribution of age, residence and marital status by sex

	Ghana			India			Tanzania		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age									
0-4	7.7	3.9	5.6	9.2	10.4	9.8	10.3	12.2	11.3
5-11	18.5	18.6	18.5	21.3	22	21.6	30.4	25.9	28.1
15-29	33.6	32.6	33.1	31.5	27.5	29.5	31.5	23.3	27.3
30-44	8.6	9.6	9.2	15.6	11.8	13.7	6.4	9.1	7.8
45-59	15.4	20.9	18.4	10.8	15.1	12.9	8.1	14.3	11.3
60-69	9.1	8.2	8.6	7.5	7.1	7.3	6.8	8.4	7.6
70-79	5.4	3.9	4.6	3.7	4.1	3.9	4.7	3.7	4.2
80+	1.7	2.2	2	0.4	1.9	1.2	1.8	3.1	2.5
Residence									
Urban	91.3	90.3	90.8	45.2	45.1	45.1	1.1	1.1	1.1
Rural	8.7	9.7	9.2	54.8	54.9	54.9	98.9	98.9	98.9
Marital Status									
Never	63.1	53.8	58	49.9	39.9	45.1	69.6	54.8	62.1
Currently	31.3	29.1	30.1	48.5	51.4	49.9	25.8	27.6	26.7
Separated/Divorced	1.1	2.5	1.9	0.1	0.1	0.1	2.1	5.6	3.9
Widowed	1.6	5.3	3.7	0	0.1	0	0.3	1.5	0.9
CoHabiting	2.2	8.6	5.8	1.4	8.5	4.8	2	10.2	6.2
Missing	0.6	0.6	0.6	0.1	0	0.1	0.1	0.2	0.2
Total	100	100	100	100	100	100	100	100	100
Number	981	1226	2207	1392	1302	2694	1584	1660	3244
Number of Households			472			375			498

Pilot: Individual respondent characteristics

Table 3. Background characteristics of respondents: percent distribution of age, residence, marital status and education by sex

	Ghana			India			Tanzania		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age									
50-59	50	43.3	46.3	32.2	37.3	34.8	40.9	37.5	39
60-69	24.3	29.7	27.3	34.7	30.5	32.6	28.8	35.1	32.4
70-79	15.9	17.1	16.6	16.1	20.6	18.3	20	15.4	17.4
80+	6.1	6.5	6.3	2.1	5.2	3.6	10.2	11.9	11.2
Missing	3.7	3.4	3.6	14.8	6.4	10.7	0	0	0
Residence									
Urban	90.7	89.4	89.9	53.8	54.9	54.4	1.4	0.7	1
Rural	9.3	10.6	10.1	46.2	45.1	45.6	98.6	99.3	99
Marital Status									
Never	2.3	0.4	1.3	5.5	0.4	3	0.5	0	0.2
Currently Separated/Divorced	79	36.5	55.6	87.7	58.8	73.3	80.5	28.8	51
Widowed	7.9	25.1	17.4	0	1.3	0.6	8.8	22.5	16.6
Co-habiting	10.3	37.6	25.4	6.8	39.1	22.8	10.2	47	31.2
Missing	0	0.4	0.2	0	0	0	0	1.8	1
	0.5	0	0.2	0	0.4	0.2	0	0	0
Education									
No formal education	17.3	49.4	35	31.8	71.2	51.4	33.5	80.7	60.4
Less than Primary	9.3	12.5	11.1	14.4	4.7	9.6	37.2	14.4	24.2
Primary	32.2	24.3	27.9	19.1	11.6	15.4	23.3	4.6	12.6
Secondary	20.6	8	13.6	11.9	4.3	8.1	4.7	0	2
High School	12.1	4.6	8	8.1	2.1	5.1	0	0.4	0.2
College	6.1	1.1	3.4	8.9	4.7	6.8	1.4	0	0.6
Post Graduate	1.9	0	0.8	5.9	0.9	3.4	0	0	0
Missing	0.5	0	0.2	0	0.4	0.2	0	0	0
Total	100	100	100	100	100	100	100	100	100
Number	214	263	477	236	233	469	215	285	500

Next steps

The SAGE Pilot results were used to revise the survey instruments and finalize the implementation protocols. SAGE Wave 1 was conducted in all six countries between 2007 and 2010. SAGE Wave 2 is planned for late 2011. SAGE Wave 3 is planned for late 2013. Data sets will be put into the public domain as soon as possible after data collection and cleaning is completed - through WHO, NACDA and other portals.