Chinese Longitudinal Healthy Longevity Survey and Research (CLHLS)

With U.S. NIA/NIH grants (10/1998-8/2004, P01 AG 08761, PI: Zeng Yi & P01 Director: James W. Vaupel; 9/2004-8/2009, R01 AG023627-01, PI: Zeng Yi) and Chinese grants support, CLHLS gathered extensive questionnaire data through interviewing 8,959, 1,161, 16,057 and 14,923 elderly in 1998, 2000, 2002 and 2005, respectively. Totalling in the four waves, 10,879, 13,985, 16,505, and 9,731 face-to-face interviews were conducted with centenarians, nonagenarians, octogenarians, and elders aged 65-79, respectively. At each wave, the longitudinal survivors were re-interviewed, and the deceased interviewees were replaced by additional participants. Data on mortality and health status before dying for the 12,136 elders aged 65-112 who died between the waves were collected in interviews with a close family member of the deceased. This largest study focusing on oldest-old with comparative younger group was conducted in randomly selected half of the counties/cities of 22 provinces, constituting about 85% of the total population of China. We also interviewed (with following-up) 4,478 elderly interviewees’ children aged 35-65.

Registered CLHLS Data sets users (not including Professors’ students and RAs) so far:
◆ 53 registered users from 34 Universities or research institutions in China;
◆ 42 registered users from 31 Universities or research institutions in the U.S.;
◆ 10 registered users from 9 Universities or research institutions in other countries;
◆ 13 registered users and 298 persons (address information unavailable) downloaded codebook from NIA Aging database at University of Michigan;

Publications, int. conference papers, and thesis using CLHLS data sets (incomplete):
◆ 17 Papers written in English published in the U.S. or European peer-reviewed journals;
◆ 4 chapters in a book published by Springer in 2005 in U.S. and Europe;
◆ 68 Papers written in English and presented in International conferences;
◆ 3 books published in China (two of them written in both English and Chinese);
◆ 81 Paper written and published in peer-reviewed Chinese journals;
◆ 2 Ph.D dissertations written in English and passed defense in the U.S. universities;
◆ 3 Ph.D dissertations written in Chinese and passed defense at Peking University;
◆ 11 M.A. thesis written in Chinese and passed defense at Peking University

Selected striking findings abstracted from published peer-reviewed articles
◆ The association of childhood socioeconomic conditions with healthy longevity at the oldest-old ages. Based on CLHLS data, logistic regression analyses show that receiving adequate medical service during sickness in childhood significantly reduces the risk of being ADL impaired, cognitively impaired, and self-reporting poor health by 18 to 33% at the oldest-old ages, adjusted for various confounders. Analysis on the cohort data from CLHLS and the censuses indicates that, as compared to no schooling, having at least one-year schooling, which was an indicator of childhood socioeconomic conditions in old China, dramatically increases the probability of survival and healthy survival from ages 84-89 to 92-97, and 100-105. It is clear that policies promoting childhood health care and education can have large and long-lasting benefits up to the oldest-old ages.

◆ Oldest-old Chinese women are seriously disadvantaged not only in socioeconomics but also in health status measured by activities of daily living, physical performance,
cognitive function, and self-reported health, as compared with their male counterparts; these gender differences are more marked with advancing age.

- **The unique CLHLS data on ADL before dying led to methodological innovation** - we found that conventional multi-state life table approach without ADL data before dying caused biases in estimating the active and disabled life expectancies. This bias is due to the unreasonable assumption of no changes in ADL status from age x to death if a person dies in the age interval (x, x+n); the biases are mostly sizable and statistically significant. We extended the multi-state life table method and applied it to the CLHLS data to improve the ADL-status-based estimates of active and disabled life expectancies.

- **Association of late childbearing and healthy longevity at oldest-old ages.** The Cox hazards model and logistic regression analysis based on CLHLS longitudinal data set demonstrate that late childbearing after age 35 or 40 is significantly associated with survival and healthy survival in the two-year follow-up period among oldest-old Chinese women and men, adjusted for a variety of confounding factors. The analysis has shown that late childbearing is positively associated with long-term survival and healthy survival from ages 80-85 to 90-95, and 100-105. The associations exist among oldest-old women and men, but the effects are substantially stronger in women than in men.

- **Optimism is one of the secrets of longevity.** Our CLHLS data show that percents of being active in daily living, having good capacity of physical performance, and normal cognitive function drop dramatically from age 80-84 to 100-105. The percent reporting good satisfaction in current life, however, remains almost constant from age 80-84 to 90-94 and declines slightly afterwards. This may suggest that being more positive in one’s outlook on life is one of the secrets of longevity.

- **Extent of disability & suffering before dying at oldest-old ages.** Based on information of 35 variables measuring extent of disability & suffering before dying collected in CLHLS, we found that male oldest-old had a substantially higher chance of experiencing a non-suffering death than did their female counterparts. The age differences in life table proportions of disability & suffering before dying are not substantial. We also found that ADL status reported in the survey is a powerful predictor of the extent of subsequent disability & suffering before dying among the oldest-old.

- **Association of religious participation with health and survival at oldest-old ages.** We found that religious participants were physically and mentally healthier than non-participants, adjusting for demographic, social connection/support and health practice factors. The Cox hazards model analysis revealed that the overall risk of dying was 25% lower for religious participants than for non-participants. The reduced risk was lessened (13-18%) and still remained statistically significant after adjusting for demographic factors, social connection/support, and health practice. The association between religious participation and health/survival was much stronger for women than for men.

- **Influenced thinking and policy.** The Chinese Vice Prime Minister Hui Liangyu wrote a note and recommended the other related high-rank officers to read the policy research briefing written by Zeng Yi and Prof. Hu based on findings from the CLHLS study. The General Office of Whole China Commission on Aging Work (consisting of ministers from 20 ministries) issued a special official paper [2003 No. 48] on intervention programs for the oldest-old, as suggested by Zeng Yi. About 60 Chinese and international medias such as Xinhua News Press, Voice of America, BBC, and Washington Post, as well as Science magazine reported the progress and findings of CLHLS project.
**Questionnaire Topics:**
The questionnaire data collected include family structure, living arrangements and proximity to children, activities of daily living (ADL), the capacity of physical performance, self-rated health, self-evaluation on life satisfaction, cognitive function, chronic disease, care needs and costs, social activities, diet, smoking and drinking, psychological characteristics, economic resources, caregivers and family support etc. Relevant demographic, socio-economic, and environmental data on the sampled counties and cities were also collected.

Information about the health status obtained from the oldest-old who were interviewed in the previous wave but died before the current survey was collected by interviewing a close family member. Information before dying consists of cause of death, chronic diseases, ADL before dying, how many times of hospitalization or being bedridden from the last interview to death, whether bedridden before death, length of disability and suffering before death, etc.

**Future Plans:** Conduct in-depth data analysis and make the data available to national and international research community. We also will continue the longitudinal survey and research including new follow-up wave in 2008.

**Data Availability:** The 1998 baseline, 2000, and 2002 follow-up healthy longevity survey data sets are being distributed internationally by the Peking University Center for Healthy Aging and Family Studies (http://www.pku.edu.cn/academic/ageing/) and the program at Duke University (http://www.pubpol.duke.edu/centers/ppa/). The 2005 wave data will be available in late Oct. or Nov. 2006.

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**Bibliography:** An incomplete list of published or conference articles, and graduate students’ theses, using The Chinese Longitudinal Healthy Longevity Survey (CLHLS) data, can be found at the Website of CHAFS of Peking University:  
http://www.pku.edu.cn/academic/ageing/ and the program project at Duke University  
http://www.pubpol.duke.edu/centers/ppa/.