



# China Health and Retirement Longitudinal Study (CHARLS)



National Institute  
on Aging



北京大学  
PEKING UNIVERSITY



National Natural Science  
Foundation of China

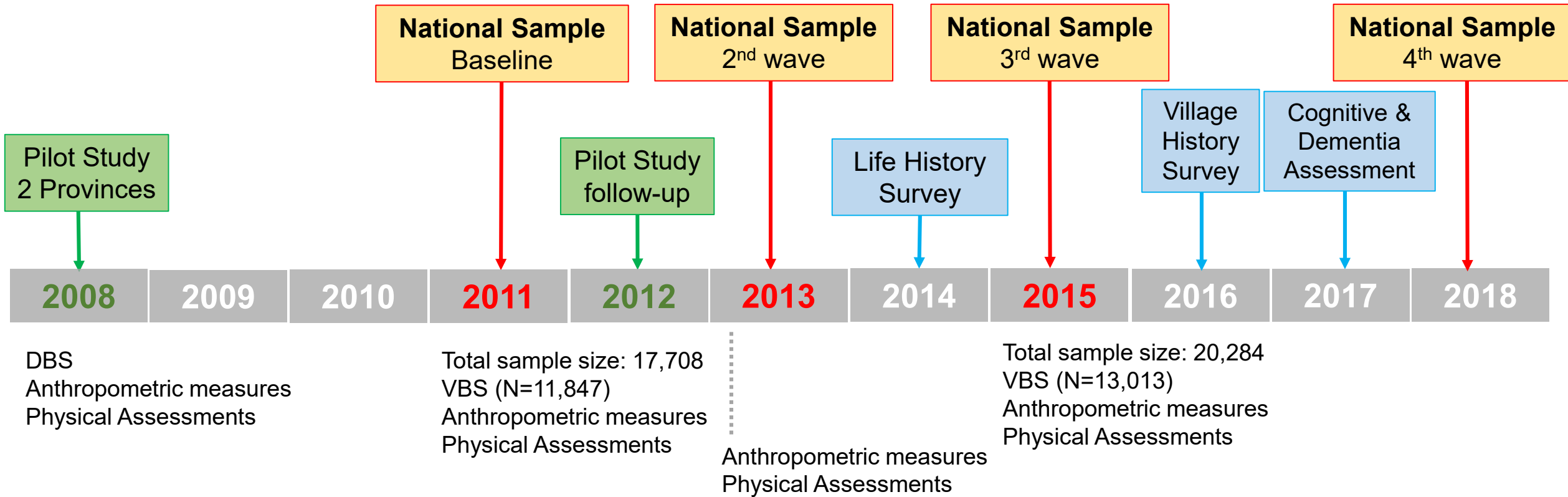


THE WORLD BANK

# Study Name: China Health and Retirement Longitudinal Study (CHARLS)

- **PI:** Yaohui Zhao, John Strauss
- **Biological data personnel:** Perry Hu, Eileen Crimmins, John Strauss, Qinqin Meng, Yuan Zhang
- **General design:** Longitudinal cohort study
- **Demographics:** national sample: 45+ in 2011, refresh sample
- **Survey domains:** HH interview, community survey, policy survey (county level), physical assessment, venous blood collection, exit interview, verbal autopsy

# Brief History



# Existing biomarkers

- **Blood based biomarkers from venous blood sample (2011 and 2015)**
  - hsCRP, HbA1c, total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, glucose, blood urea nitrogen, creatinine, uric acid, cystatin C.
  - CBC
- **Non-blood based biomarkers (2011, 2013, and 2015)**
  - Anthropometric measurements: height, weight, waist circumference, knee height, and arm length
  - Blood pressure, pulse rate, lung peak flow, grip strength, timed sit-to-stand, timed walk, and balance measures

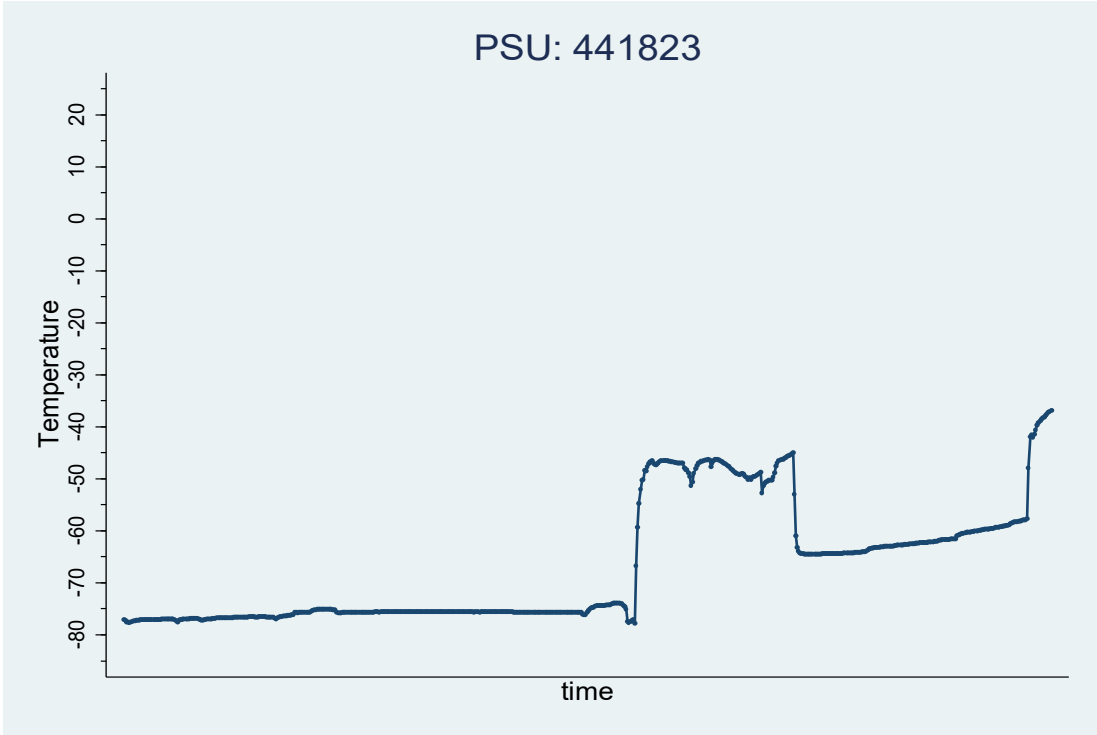
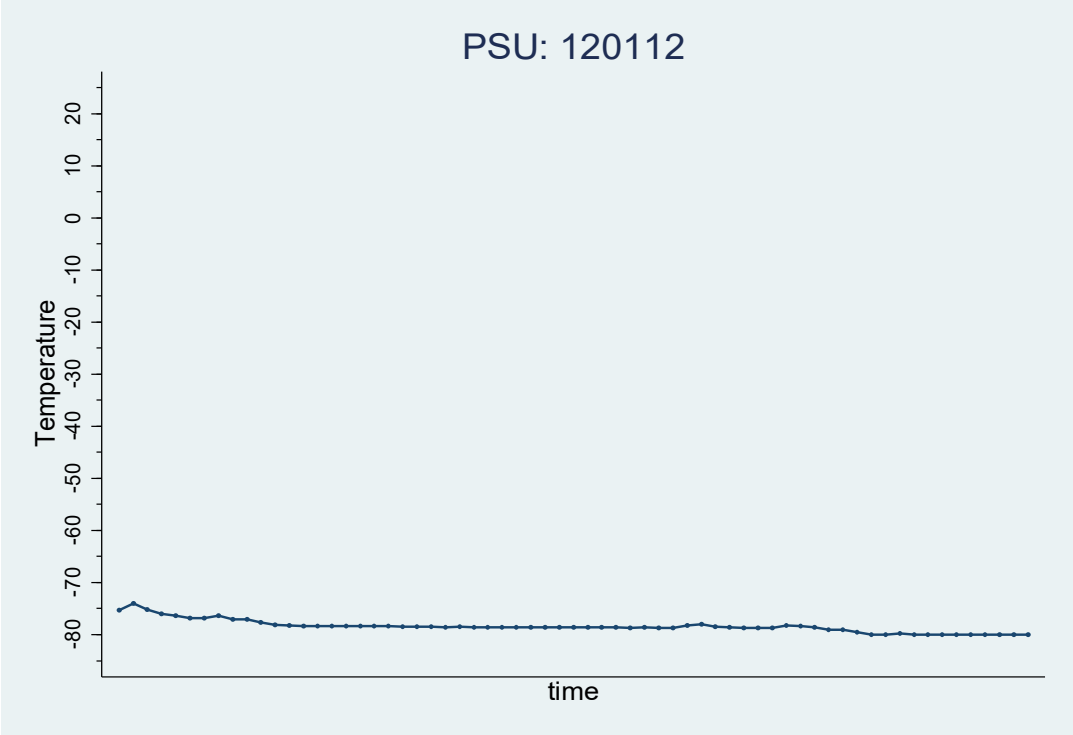
# Specimen Collection Procedures for 2015

- Nurses or phlebotomists collected venous blood at centralized locations (94%, remaining 6% in homes).
- Overnight fasting requested (85% did), but we took blood even if they had not fasted.
- 3 tubes of venous blood collected
  - 2 mL tube for CBC test - transported to the laboratories under ambient temperature. The median time from blood collection to CBC assay was 107 minutes.
  - 6 mL tube of whole blood for kept under 4°C until centrifuged at local hospitals or health centers - median time from collection to centrifugation was 78 minutes. Plasma was stored in two 1 mL cryovials and the buffy coat in a separate cryovial. These cryovials were immediately stored frozen at -20°C until they were picked up by a cold chain company.
  - 2 mL tube was collected for the HbA1c assay. This 2 mL tube of whole blood was stored under 4°C until the tubes were picked by the cold chain company.

# Specimen Collection Procedures for 2015

- Plasma, buffy coat, and whole blood for HbA1c were collected by the cold chain company within a median of 5 days and more than 2/3 of the specimens were in a week or less. These specimens were shipped with dry ice. The median shipping duration from various counties to Beijing University was 48.6 hours.
- Shipped with temperature monitors

# Illustrative temperature patterns during specimen shipment, CHARLS wave 3:



- Only two shipments had recorded temperature above 0°C for 3 hours and 33 hours respectively

# Issues from last round

- Overall great experience working with a commercial clinical laboratory, but staff at commercial laboratories may not have as much experience working with frozen specimens. So, real-time monitoring and supervision of the laboratory is very important.
- Change in laboratories across waves and changes in assay platform in the same laboratory may affect comparability of assay results over time.
  - Clinical laboratories typically do not focus on longitudinal analysis
  - Need to prepare for cross-calibration across study waves



# Proposed Biomarkers from stored samples

- None

# Future Plan – 2021 wave

- **Blood based biomarkers from venous blood sample** - to be determined
  - hsCRP, HbA1c, total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, glucose, blood urea nitrogen, creatinine, uric acid, cystatin C.
  - CBC
- **Non-blood based biomarkers**
  - Anthropometric measurements: height, weight, waist circumference, right lower leg length, and arm length
  - Blood pressure, pulse rate, lung peak flow, grip strength, timed sit-to-stand, timed walk, and balance measures

# Mortality Follow-up

- All respondents are sought for interview every wave
- Exit interview
  - **Dates of death**
  - Health before death
  - Health care utilization before death
- Cause of death – verbal autopsy interview
  - 2012 WHO verbal autopsy instrument
  - Written narrative text: reports from survivors