

The Strong Heart Study: Interviews and Procedures by Examination						
	Cohort Study (n=4549)			Family Study (n=3665)		
PROCEDURES	Phase 1	Phase 2	Phase 3 (including a family pilot study)	Phase 4	Phase 5	Phase 6
	1988-91	1991-96	1996-2000	2000-05	2005-10	2014-2018
INFORMED CONSENT	CVD & risk factors					CVD & risk factors + lung, liver, inflammatory diseases &cancer
	x	x	x	x	x	x
MORBIDITY AND MORTALITY SURVEILLANCE (medical chart review, CVD and mortality, ongoing continuously)	x	x	x	x	x	x
INTERVIEWS						
Demographic	x	x	x	x	x	x
Socioeconomic Status	x	x	x	x	x	
Health Behavior	x	x	x	x	x	
Family History of Diseases	x					
Reproductive History (Women only)	x	x	x	x	x	
Respiratory Symptoms		x	x			
Sleep Habit			x			
Medication Survey	x	x	x	x	x	
Medical/Health History	x	x	x	x	x	x
CHD Events/Procedures	x	x	x	x	x	
TIA/Stroke	x	x	x	x	x	
Denture and Eating Problems		x				
Access to Medical Care	x		x			
Diabetes Ascertainment						x

Dietary Intake						
24-Hour Recall	x (20% pts)	x	x			
Food Frequency				x	x	
Artificial Sweeteners					x	
Soft Drink					x	
Physical Activity Questionnaire	x	Brief follow-up questions	Brief follow-up questions			
Physical Activity - Pedometer				x	x	
Psychosocial Questionnaire						
Quality of Life						
SF-36		x	x			
SF-12				x	x	
Weight Satisfaction				x	x	
Stress evaluation	x	Perceived Stress		Perceived Stress	Perceived Stress	
Gambling Questionnaire			x			
Risk Factor Knowledge		x	x			
Culture Factor	x	x		x		
Depression (CESD)		x		x	x	
Multidimensional Health Locus of Control (MHLC, measures of health related beliefs)				x		
Social Support		x (ISEL)		x	x	
Anger Expression Scale (Spielberger)		x		x		
Cook-Medley Hostility Scale		x		x		
PTSD/Anxiety/Fatalism					x	
ANTHROPOMETRY						
HEIGHT						
Standing Height	x	x	x	x	x	
GIRTHS						
Hip	x	x	x	x	x	
Waist	x	x	x	x	x	
WEIGHT	x	x	x	x	x	
BLOOD PRESSURE						

SITTING	X	X	X	X	X	
ANKLE	X	X	X	X	X	
PHYSICAL EXAMINATION						
Neck	X	X		X		
Cardio/pulmonary	X	X	X	X	X	
Extremities	X	X	X	X	X	
Diabetic Foot Screen		X	X			
ELECTROCARDIOGRAMS						
12 LEAD	X	X	X	X	X	
Bioelectrical Impedance	X	X	X	X	X	
ECHOCARDIOGRAPHY		X		X	X	
ULTRASONOGRAPHY						
CAROTID ARTERIES			X	X	X	
POPLITEAL ARTERY					X	
Applanation Tonometry			X	X		
Gallbladder Sonogram		X				
PULMONARY FUNCTION						
FEV ₁		X				
FVC		X				
Skin Test for TB		X				
Asthma Substudy			X			
Medical Data Review - CVD and Mortality	X	X	X	X	X	
VENIPUNCTURE						
CHEMISTRIES						

Glucose	X	X	X	X	X	
Creatinine	X	X	X	X	X	
Insulin	X	X	X	X	X	
Total Protein			X	X	X	
Albumin			X	X	X	
Uric Acid			X	X	X	
Urea Nitrogen			X	X	X	
Calcium			X	X	X	
Phosphorous			X	X	X	
Magnesium			X	X	X	
Sodium			X	X	X	
Potassium			X	X	X	
Glucose Tolerance	X	X	X			
HEMATOLOGY (Complete Blood Count etc.)			X	X	X	
Hematocrit			X	X	X	
Hemoglobin			X	X	X	
White Blood Cell Count			X	X	X	
Platelet Count			X	X	X	
Neutrophil Count			X	X	X	
Neutrophil Bands			X	X	X	
Lymphocytes			X	X	X	
Monocytes			X	X	X	
Eosinophils			X	X	X	
Basophiles			X	X	X	
Glycated Hemoglobin A1C	X	X	x (only G0 > 110)	x (only G0 > 110)	x (only G0 > 110)	
HEMOSTASIS						
Fibrinogen	X	X	X	X		
LIPIDS						
Apo AI	X			X		
Apo B	X			X		
ApoE	X			X		
Total Cholesterol	X	X	X	X	X	
Total Triglyceride	X	X	X	X	X	
HDL Cholesterol	X	X	X	X	X	

LDL Cholesterol	x	x	x	x	x	
LDL Size		x				
VTRIG	x	x				
VCHOL	x	x				
Lipoprotein (a)		x		x		
High-sensitivity CRP		x		x	x	
PAI-1		x		x		
Free fatty acid (FFA)				x		
Interleukin 6 (IL6)				x		
Urine collection						
Urinary albumin	x	x	x	x	x	
Urinary creatinine	x	x	x	x	x	
ANCILLARY STUDIES						
Note: Many ancillary studies are case-control study conducted at various time and do not have full data for whole cohort.						
Urinary Metal Study (arsenic species, total As, Cd, Mo, Pb, Sb, Se, U, W, Zn)	x	only ~300	only ~500	x (non-diabetes)		
Metabochip			only ~200	x (non-diabetes)		
Metabolomic Profiles (have not been generated yet)						
Androgen-Estrogen Balance Study (case-control study, measured on a subset of participants)						
Estrone		x	x			
Total Estradiol		x	x			
Free estradiol		x	x			
Bioavailable estradiol index		x	x			
Total testosterone		x	x			
Free testosterone		x	x			
Bioavailable testosterone index		x	x			
Sex hormone-binding globulin		x	x			

Dehydroepiandrosterone sulfate		x	x			
Androstenedione		x	x			
Leptin and Obesity (Case-control)						
Leptin						
Infectious Burden on CVD (case-control)						
CMV IgG						
Hepatitis A IgG						
Herpes simplex type 1 IgG						
Herpes simplex type 2 IgG						
C. pneumonia IgG, IgA						
H. pylori IgG						
Homocystine and CVD (case-control)						
Homocystine						
Brain Natriuretic Peptide (BNP) and Congestive Heart Failure						
BNP (Dakotas only)		x				
Mannose Binding Lectin and CVD (case-control)						
MBL						
Polymorphisms of inflammatory markers						
ppar_g						
Resistin						
HSD11B1						
pparg2						
IL6						
Haptoglobin and CVD (case-control)						
Haptoglobin						
Adiponectin and CVD (case-control)						
Adiponectin						
Resistin and CVD (case-control)						

Resistin genotype						
plasma resistin						
Free Iron and CVD (case-control)						
Free iron						
Vcam, IL6 and CVD (case-control)						
Vcam						
IL6						
TSH and CVD (case-control)						
TSH						
Sleep Heart Health Study (~200 each site)		x				
PSG Data						
Vision Keepers (OK only)		x				
Visual acuity						
Retinopathy						
Cataract						
Glaucoma						
Strong Heart Stroke Study (SHSS)			2010-2013: N=1033 Surviving participants from SHS Phase 1	2017-2019: N=? Surviving participants from S1/SHSS1		
Cranial 1.5T sagittal/axial T1,T2 MRI: vascular brain injury (number/size/type/location of infarct & hemorrhage; white matter hyperintensity volume; graded white matter hyperintensities)			x	x		
Cranial 1.5T sagittal/axial T1,T2 MRI: structural loss / atrophy (graded ventricle enlargement, graded sulcal widening, hippocampal volume, brain volume, intracranial volume)			x	x		
Neuropsychological / Cognitive tests						
Executive function (3MSE)			x	x		
Processing speed (WAIS-IV Coding)			x	x		

Verbal phonemic fluency (COWA FAS)			X	X		
Verbal learning and memory (CVLT-II)			X	X		
(NACC) UDS: MOCA, Craft Story, Benson Complex				X		
Figure, Number Span, Category Fluency, Trail Making, MINT, Verbal Fluency						
Functional tests						
Fine motor: finger tap			X	X		
Grip strength			X	X		
SPPB: chair stand, timed stand/balance, timed walk			X	X		
Quality of Life (SF-36)			X	X		
Depression (CESD)			X	X		
Trauma (PCL-C)			X	X		
Family medical history			X	X		
Personal medical history			X	X		
Health attitudes, beliefs, daily activity, daily pain			X	X		
Alzheimer's Disease Knowledge Scale				X		
Electrocardiogram (ECG)			X			
Lipids: LDL, HDL, Tg			X	X		
Glucose: FPG, HbA1c			X	X		
Inflammation: CRP			X	X		
Renal: serum & urine Cr, serum Cys-C, urine albumin			X	X		
Anthropometric: BP, Waist, Hip, Height, Weight			X	X		