

Using Existing Databases to Answer Research Questions in Aging

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Overview

- Existing data sets in career building
- Finding the data you Need
- The Health ABC Study

Resources Can be Found at: www.Peppercenter.org

Just a few examples . . .

Tian Q, et al. Cardiorespiratory fitness and brain diffusion tensor imaging in adults over 80 years of age. *Brain Res.* 2014 Nov 7;1588:63-72.

Goldenstein L, et al. Serum bicarbonate concentrations and kidney disease progression in community-living elders: the Health, Aging, and Body Composition (Health ABC) Study. *Am J Kidney Dis.* 2014 Oct;64(4):542-9.

Yende S, et al. Epidemiology and long-term clinical and biologic risk factors for pneumonia in community-dwelling older Americans: analysis of three cohorts. *Chest.* 2013 Sep;144(3):1008-17.

Barbour KE, et al. Calcitropic hormones and the risk of hip and nonspine fractures in older adults: the Health ABC Study. *J Bone Miner Res.* 2012 May;27(5):1177-85.

Park SW, et al. Excessive loss of skeletal muscle mass in older adults with type 2 diabetes. *Diabetes Care.* 2009 Nov;32(11):1993-7.

Role of Existing Data in Career Development (I)

- Establishes your intellectual interests
 - What is your brand?
- Link specialty concerns to a broader range of health issues for older adults.
- Provides a way to be productive while waiting for other activities to mature

Role of Existing Data in Career Development (II)

- Provides an opportunity to expand your professional network to gerontology
- Play funding “small ball”
- Generate preliminary data for grants
- Many studies have archived samples that may provide the raw material for ancillary studies.

Finding Data

“You can’t always get what you want, but if you try sometimes well you might find you get what you need.”

Rolling Stones

How to Find Data

- NIA supported sites
- National Center for Health Statistics
- CMS
- Google
- National Archive of Computerized Data on Aging (www.ipr.umich.edu)
- Approaching Lead Investigators of Existing Studies (both epidemiological studies and trials)

www.nia.nih.gov/research/scientific-resources#Population

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Home

RESEARCH & FUNDING

Scientific Resources

Research & Funding

- Division of Extramural Activities
- Division of Aging Biology
- Division of Behavioral and Social Research
- Division of Geriatrics and Clinical Gerontology
- Division of Neuroscience
- FAQs
- Funding Opportunities

Biological Resources

- Rodent Resources
- Nonhuman Primates
- Comparative Biology of Aging Resource Sharing Network
- Interventions Testing Program (ITP)
- Human Biospecimen Collections
- Caenorhabditis elegans* Genetic Stock
- Cell Repository

Data/Informatics Resources

- Clinical Research Study Investigators Toolbox
- Detecting Cognitive Impairment Database
- NIH Toolbox
- Patient-Reported Outcomes Measurement Information System (PROMIS)
- NIA Population Studies Database
- Division of Behavioral and Social Research Databases and Links

NIA Population Studies Database

A searchable database for epidemiologic research on aging changes across the lifespan.

U.S. NATIONAL INSTITUTES OF HEALTH

National Institute on Aging



[Population
Studies
Database
Search
Results](#)



LEADING THE FEDERAL EFFORT ON AGING
RESEARCH

| Title | Data Available? | Biospecimens Collected? | Project Period |
|-----------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------|---------------------|
| Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) | Yes | Yes | 1999-2001 |
| Advanced Glycation End Products and Alzheimer's Disease | No | Yes | 2005-2010 |
| Age, Gene/Environment Susceptibility Study (AGES) | No | Yes | 2002-2006 |
| Age, Lead Exposure, Neurobehavioral Decline | Yes | Yes | 1993-2009 |
| Age-related Neurodegenerative Diseases in Micronesia | Yes | Yes | 1998-2010 |
| Aging, Status, and Sense of Control (ASOC) | Yes | No | 1995, 1998 and 2001 |
| Alameda County Study (HEALTH AND FUNCTION OVER THREE DECADES IN ALAMEDA COUNTY) | Yes | No | 1965-1994 |
| Alterations of Circadian Timing in Sleep and Aging (Project 1) | No | No | 1994-2009 |
| Alzheimer's Disease and Estrogen Replacement | No | No | 1998-2009 |
| Alzheimer's Disease Patient Registry (ADPR) | No | No | 1986-2009 |
| Alzheimer's Disease Patient Registry (Mayo Clinic Study of Aging) | Yes | Yes | 2004-2014 |
| Assessing Cognitive Function in the Bogalusa Heart Study Cohort | No | No | 2007-2009 |
| Australian Longitudinal Study on Ageing (ALSA) (COLLABORATIVE STUDY OF AGING IN THE US AND AUSTRALIA) | Yes | No | 1992-2004 |
| Baltimore Longitudinal Study on Aging (BLSA) | No | Yes | Ongoing since 1958 |

CDC: National Center for Health Statistics



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Surveys and Data Collection Systems

Some NCHS data systems and surveys are ongoing annual systems while others are conducted periodically. There are four major data collection programs at NCHS:



[\(/nchs/nsfg/nhanes.htm\)](http://nchs/nsfg/nhanes.htm) The ***National Health and Nutrition Examination Survey (NHANES)*** ([/nchs/nhanes.htm](http://nchs/nhanes.htm)) is NCHS' most in-depth and logistically complex survey, operating out of mobile examination centers that travel to randomly selected sites throughout the country to assess the health and nutritional status of Americans. This survey combines personal interviews with standardized physical examinations, diagnostic procedures, and laboratory tests to obtain information about diagnosed and undiagnosed conditions; growth and development, including overweight and obesity; diet and nutrition; risk factors; and environmental exposures.



[\(/nchs/dhcs.htm\)](http://nchs/dhcs.htm) The ***National Health Care Surveys*** ([/nchs/dhcs.htm](http://nchs/dhcs.htm)) provide information about the organizations and providers that supply health care, the services they render, and the patients they serve. Provider sites surveyed include physician offices, community health centers, ambulatory surgery centers, hospital outpatient and emergency departments, inpatient hospital units, residential care facilities, nursing homes, home health care agencies, and hospice organizations. The National Health Care Surveys are used to study resource use, including staffing; quality of care, including patient safety; clinical management of specific conditions; disparities in the use and quality of care; and diffusion of health care technologies, including drugs, surgical procedures, and information technologies.



[\(/nchs/nhis.htm\)](http://nchs/nhis.htm) The ***National Health Interview Survey (NHIS)*** ([/nchs/nhis.htm](http://nchs/nhis.htm)) provides information on the health status of the U.S. civilian noninstitutionalized population through confidential interviews conducted in households by Census Bureau interviewers. NHIS is the Nation's largest in-person household health survey, providing data on health status, access to and use of health services, health insurance coverage, immunizations, risk factors, and health-related behaviors.

www.cdc.gov/nchs/surveys.htm

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NATIONAL ARCHIVE OF COMPUTERIZED DATA ON AGING

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About NACDA

Welcome

The *National Archive of Computerized Data on Aging* (NACDA), located at [ICPSR](#), is funded by the [National Institute on Aging](#). NACDA's mission is to advance research on aging by helping researchers to profit from the exploited potential of a broad range of datasets. NACDA acquires and processes data relevant to gerontological research, processing as needed to provide for effective research use, disseminates them to researchers, and facilitates their use. By preserving and making available the largest library of electronic data on aging in the United States, NACDA offers opportunities for secondary analysis on major issues of scientific and policy relevance.

Some Notable Data Sets

| Name | Key Features |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Health ABC | 3,075 70-70 year old well-functioning men and women followed since 1997. Longitudinal data on function, body composition and physiology. Biologic samples are available. |
| Cardiovascular Health Study | 5,888 65+ followed since November 1992. CVD focused, but hospitalizations & deaths adjudicated. Biologic samples are available. |
| Baltimore Longitudinal Survey on Aging | Most extensive and comprehensive data relating to age-related physiologic changes. |
| National Health & Aging Trend Study | Has a Social Sciences Perspective. 8,000 Medicare beneficiaries followed annually. |
| Medicare Current Beneficiary Survey | Good for linking function & conditions to costs. Completely Interview Based. |
| NHANES | Has basic clinical chemistries, different exams may emphasize different / special measurements. |
| The LIFE Study | A RCT of Exercise to Prevent Mobility Disability in 1600 at risk sedentary older adults. Samples available. |

Gaining Access to Data



Main Approaches

- Data / Documentation is publically available.
- Data is available upon completion of a publications & data release process.
- Data is only available directly from a study investigator.

Tips

- What's the win-win: You receive data, and you provide productivity and credit.
- The investigators you approach have poured their hearts and souls into the study.
- The people you work with are your future colleagues.
- Studies are supposed to have a data sharing process. Find out how it works, and follow it.

More things to remember

- You may have to sign a data use agreement
- You may need IRB approval
- Ask for as much data as possible
- It's harder to get data from recently started studies
- Patience and persistence will pay-off

What to do when you get the data

- Read the key papers
- Read the documentation, carefully
- Get copies of the data collection forms and code books
- Understand the data structure
- Things you may need help with
 - Getting the data into an format that is easy to analyze
 - Deriving variables for analysis
 - Appropriate approaches for data that is a probability sample from a population.

The Health Aging and Body Composition Study

http://nihlibrary.ors.nih.gov/ia/ps/NIADB_Details.asp?width=74

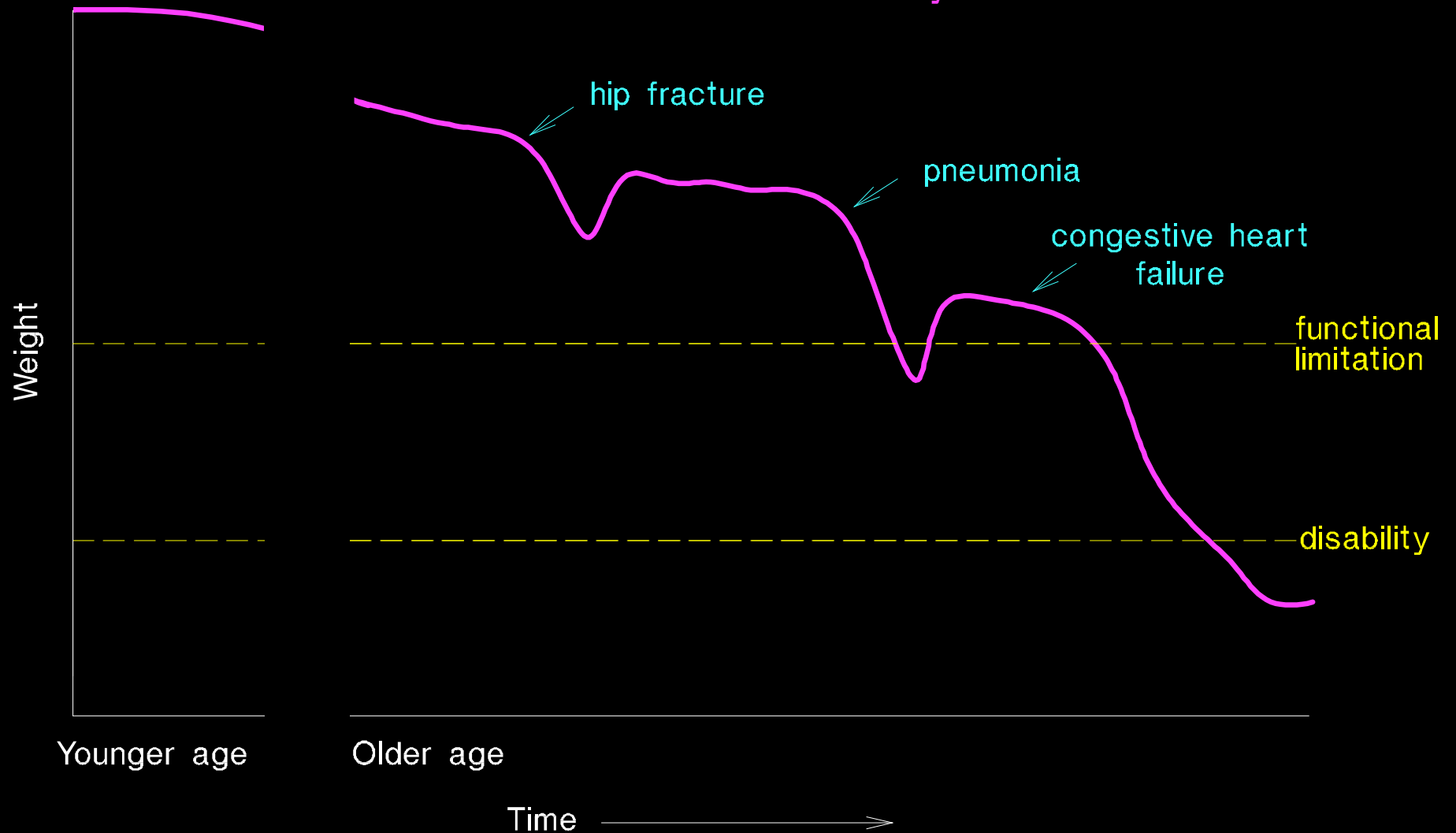
Health ABC Objectives

Primary: To examine whether change in body composition, particularly loss of muscle, represents a common pathway by which multiple conditions contribute to disability.

General: To understand early transitions in the disablement process to support intervention development to delay or prevent decline in physical function.

Health, Aging and Body Composition Study

Hypothetical Trajectory for Weight in Relation to Illness and Risk of Disability



Health ABC Design

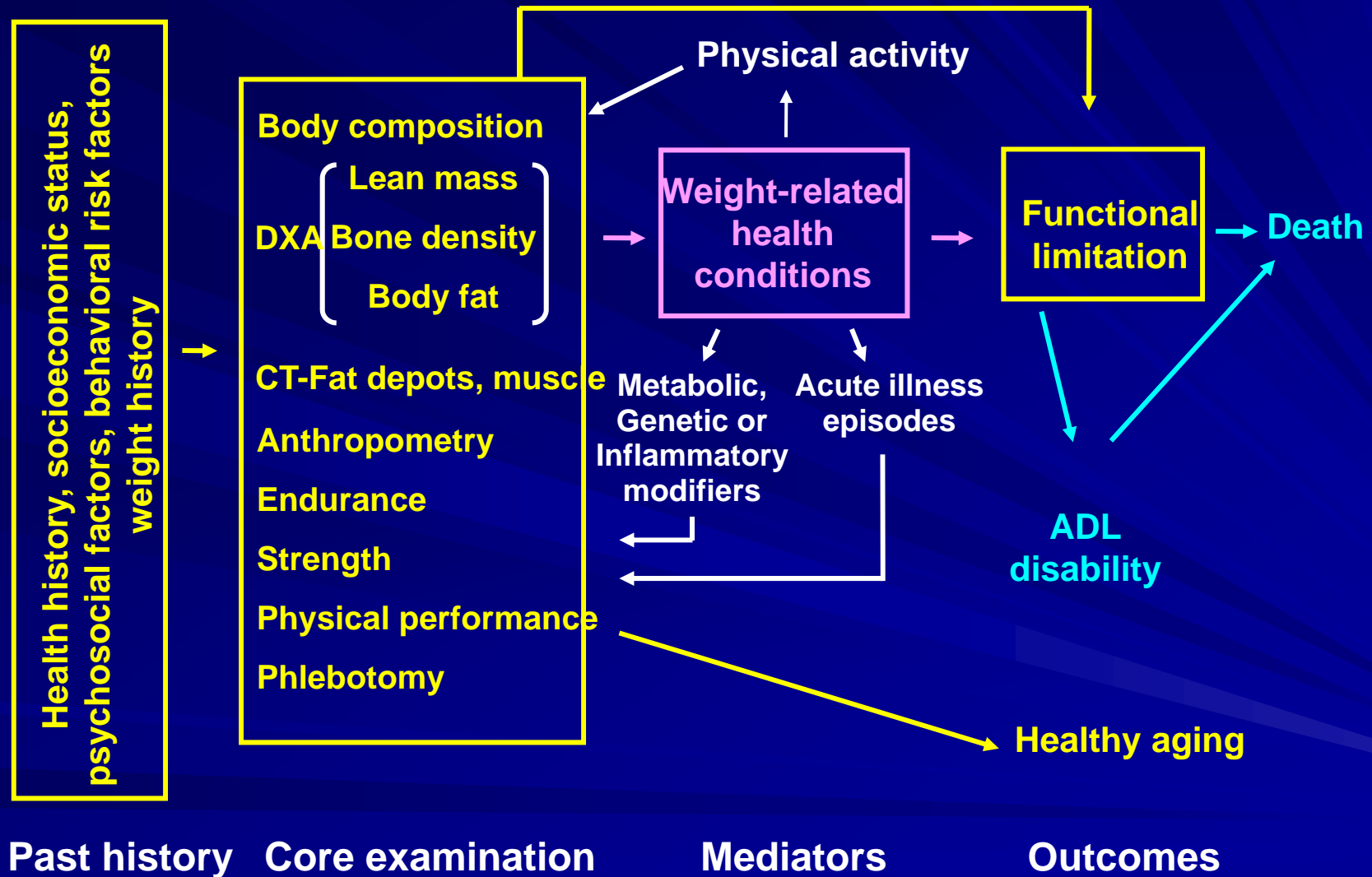
■ Longitudinal Cohort Study

- N=3,075
- 70-79 year olds
- Memphis, TN & Pittsburgh, PA
- No difficulty in walking $\frac{1}{4}$ mile or climbing 10 steps & ADLs
- 50% Women, 41% African-American
- In it's 9th year of follow-up

Participating Sites & Key People

- National Institute on Aging
 - Tamara Harris, MD, MS (harrist@gw.nia.nih.gov)
 - Eleanor Simonsick, PhD
- University of California, San Francisco
 - Michael Nevitt, PhD (mnevitt@psg.ucsf.edu)
 - Steve Cummings, MD
- University of Pittsburgh
 - Anne Newman, MD, MPH (newmana@edc.pitt.edu)
- University of Tennessee
 - Suzy Satterfield, MD (ssatterfield@uthsc.edu)
- Wake Forest University
 - Stephen B. Kritchevsky, PhD (skritche@wakehealth.edu)

Health, Aging and Body Composition Study



Novel Exam Components

Computed tomography (CT)

- CT - abdominal fat
- CT - thigh muscle
- CT - spine CT scout (T4 thru upper sacrum)
- CT - vertebral BMD

DXA

- DXA, hip
- DXA, whole body

Osteoarthritis assessment

- Knee MRI
- Knee x-ray

Performance measures

- 4-meter walk
- 20-meter walk
- Balance walks
 - Usual pace walk
 - 20 cm narrow walk
- Chair stands
- Finger tapping
- Grip strength
- Isokinetic ankle strength (Kin-Com)
- Isokinetic muscle fatigue (Kin-Com)
- Isokinetic quad strength (Kin-Com)
- Isometric strength (Litek chair)
- Long distance corridor walk (400-m)
- Standing balance
 - Semi-tandem stand
 - Tandem stand
 - One-leg stand

Dental/periodontal exam

Dietary assessment (food freq)

ECG, resting

Energy expenditure

Hearing - audiometric testing

Medication inventory

Olfaction

Peripheral neuropathy

- Monofilament
- Peroneal motor nerve conduction
- Vibration perception

Pulmonary function test

Vision

- Bailey-Lovie distance visual acuity
- Frisby stereo test
- Pelli-Robson contrast sensitivity

Novel Exam Components

Assays

- 2-hour glucose (after glucola)
- Albumin
- Alkaline phosphatase
- Blood count
- Cholesterol, total
 - Cholesterol, HDL
 - Cholesterol, LDL
- Creatinine
- Cytokine assays
 - CRP
 - IL-6
 - IL-6sr
 - IL-2sr
 - Leptin
 - PAI-1
 - TNFa
 - TNF-RI
 - TNF-RII

- Fasting glucose
- Fasting insulin
- Free T4 value
(sample assayed for when TSH value is an alert)
- Hemoglobin A1C
- o-LDL
- Thyroid stimulating hormone
- Triglycerides

Stored

- Buffy coat
- Citrate
- Cryopreserved buffy coat
- EDTA plasma
- PAXgene (for mRNA analysis)
- Platelets
- RBC
- SCAT-1
- Serum

Cognitive assessment

- CLOX 1
- Digit symbol substitution (DSST)
- Exit 15
- Rapid Estimate of Adult Literacy in Medicine (REALM)
- Teng Mini-Mental State (3MS)
- Cognitive vitality substudy
 - Buschke Selective Reminder Test (SRT)
 - Activity assessment
 - Social contact
 - Personality assessment
 - Cognitive vitality questionnaire
 - Boxes test
 - Digit copying test
 - Pattern comparison test
 - Letter comparison test
 - Simple reaction time test
 - Digit digit test
 - Digit symbol test

The Publications Process

- Writing Group Focused
- Proposal forwarded to the P&P committee through the Coordinating Center at UCSF
- Reviewed for scope and overlap
- Comments from the P&P
- Assignment of co-authors
- Data made available upon approval of the writing group proposal

Ancillary Studies

Fetuin-A and Incident Diabetes Mellitus in Older Persons

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for the Health ABC Study

TYPE 2 DIABETES MELLITUS HAS become a global epidemic and the increased prevalence of obesity¹ is a major contributing factor.²⁻⁴ However, diabetes does not develop in all obese individuals and there is a strong genetic contribution to risk.⁵ Despite significant recent advances,⁶ mechanisms responsible for individual differences in clinical phenotype remain largely unknown. Recent research has identified

Context Fetuin-A is a hepatic secretory protein that binds the insulin receptor and inhibits insulin action in vitro. In prior cross-sectional studies in humans, higher fetuin-A levels were associated with insulin resistance. However, the longitudinal association of fetuin-A with incident type 2 diabetes mellitus is unknown.

Objective To determine whether fetuin-A levels are associated with incident diabetes in older persons.

Design, Setting, and Participants Observational study among 3075 well-functioning persons aged 70 to 79 years. In this case-cohort study, we retrospectively measured fetuin-A levels in baseline serum among 406 randomly selected participants without prevalent diabetes, and all participants who developed incident diabetes mellitus during a 6-year follow-up (to August 31, 2005).

Main Outcome Measure Incident diabetes mellitus.

Results Incident diabetes developed in 135 participants (10.1 cases/1000 person-years). Participants with fetuin-A levels within the highest tertile (>0.97 g/L) had an increased risk of incident diabetes (13.3 cases/1000 person-years) compared with participants in the lowest tertile (≤ 0.76 g/L) (6.5 cases/1000 person-years) in models adjusted for age, sex, race, waist circumference, body weight, physical activity, blood pressure level, fasting glucose level, high-density lipoprotein cholesterol concentration, triglyceride concentration, and C-reactive protein level (adjusted hazard ratio, 2.41; 95% confidence interval, 1.28-4.53; $P = .007$). The association was not affected by adipocytokine levels but was moderately attenuated by adjustment for visceral adiposity (adjusted hazard ratio of highest vs lowest tertile 1.72; 95% confidence interval, 0.98-3.05; $P = .06$).

Conclusion Among well-functioning older persons, serum fetuin-A is associated with incident diabetes, independent of other markers of insulin resistance.

JAMA. 2008;300(2):182-188

www.jama.com

Ancillary Study Process

- An ancillary study adds new information to Health ABC
- The data becomes part of the Health ABC data base
- Ancillary Proposal process
 - File a proposal
 - Review
 - Materials made available upon approval

Go Forth and Quantify!