

Cardiovascular Disease in its Social Setting – The Evans County Study

Victor Schoenbach, Judith Winkler, Gerardo Heiss

Cardiovascular Epidemiology Seminar Series

March 21, 2017

Sources and Attributions

<http://www.epi.umn.edu/cvdepi/study-synopsis/evans-county-cardiovascular-and-cerebrovascular-study/>



Early CVD Epidemiology: Cohort Studies (1946-1960)

<http://www.epi.umn.edu/cvdepi/essay/table-of-cohort-studies-table-of-preventive-trials/>

Common name of study	Lead Investigator	Dates
Coronary Heart Disease in Young Adults	White, P.D.	1946-1976
Minnesota Business & Professional Men	Keys, A.	1947-1983
Framingham Heart Study	Dawber, T.R.	1948-
Johns Hopkins Precursors Study	Thomas, C. B.	1948-
Los Angeles Civil Servants Study	Chapman, J.	1949-
London Transport and Postal Workers	Morris, J.	1949- 1952
California Longshoremen Study	Paffenbarger, R.	1951- 1973
British Doctors Study	Doll, R. and A.B. Hill	1951- 2001
Cooperative Lipoprotein Study	Cooperative Lipoprotein Study	1952-
Albany Civil Servants Study	Doyle, J.	1953-
Dupont Company Study	Pell, S. and D'Alonzo C.A	1956-
Seven Countries Study	Keys, A.	1957-
Chicago Western Electric Study	Paul, O.	1957-
U.S. Railway Study	Taylor, H.L.	1957-
Chicago Peoples Gas Company Study	Stamler, J.	1958-
Tecumseh Community Health Study	Epstein, F.	1959- 1973
Charleston Heart Study	Boyle, E.	1960-
Western Collaborative Group Study	Rosenman, R.H.	1960-
Evans County Heart Study	Hames, C.	1960- 1995

Early CVD Epidemiology: Cohort Studies (1946-1960)

<http://www.epi.umn.edu/cvdepi/essay/table-of-cohort-studies-table-of-preventive-trials/>

Common name of study	Lead Investigator	Dates
Coronary Heart Disease in Young Adults	White, P.D.	1946-1976
Minnesota Business & Professional Men	Keys, A.	1947-1983
Framingham Heart Study	Dawber, T.R.	1948-
Johns Hopkins Precursors Study	Thomas, C. B.	1948-
Los Angeles Civil Servants Study	Chapman, J.	1949-
London Transport and Postal Workers	Morris, J.	1949- 1952
California Longshoremen Study	Paffenbarger, R.	1951- 1973
British Doctors Study	Doll, R. and A.B. Hill	1951- 2001
Cooperative Lipoprotein Study	Cooperative Lipoprotein Study	1952-
Albany Civil Servants Study	Doyle, J.	1953-
Dupont Company Study	Pell, S. and D'Alonzo C.A	1956-
Seven Countries Study	Keys, A.	1957-
Chicago Western Electric Study	Paul, O.	1957-
U.S. Railway Study	Taylor, H.L.	1957-
Chicago Peoples Gas Company Study	Stamler, J.	1958-
Tecumseh Community Health Study	Epstein, F.	1959- 1973
Charleston Heart Study	Boyle, E.	1960-
Western Collaborative Group Study	Rosenman, R.H.	1960-
Evans County Heart Study	Hames, C.	1960- 1995

An Unusual Question at a Time of the Search for CHD Risk Factors

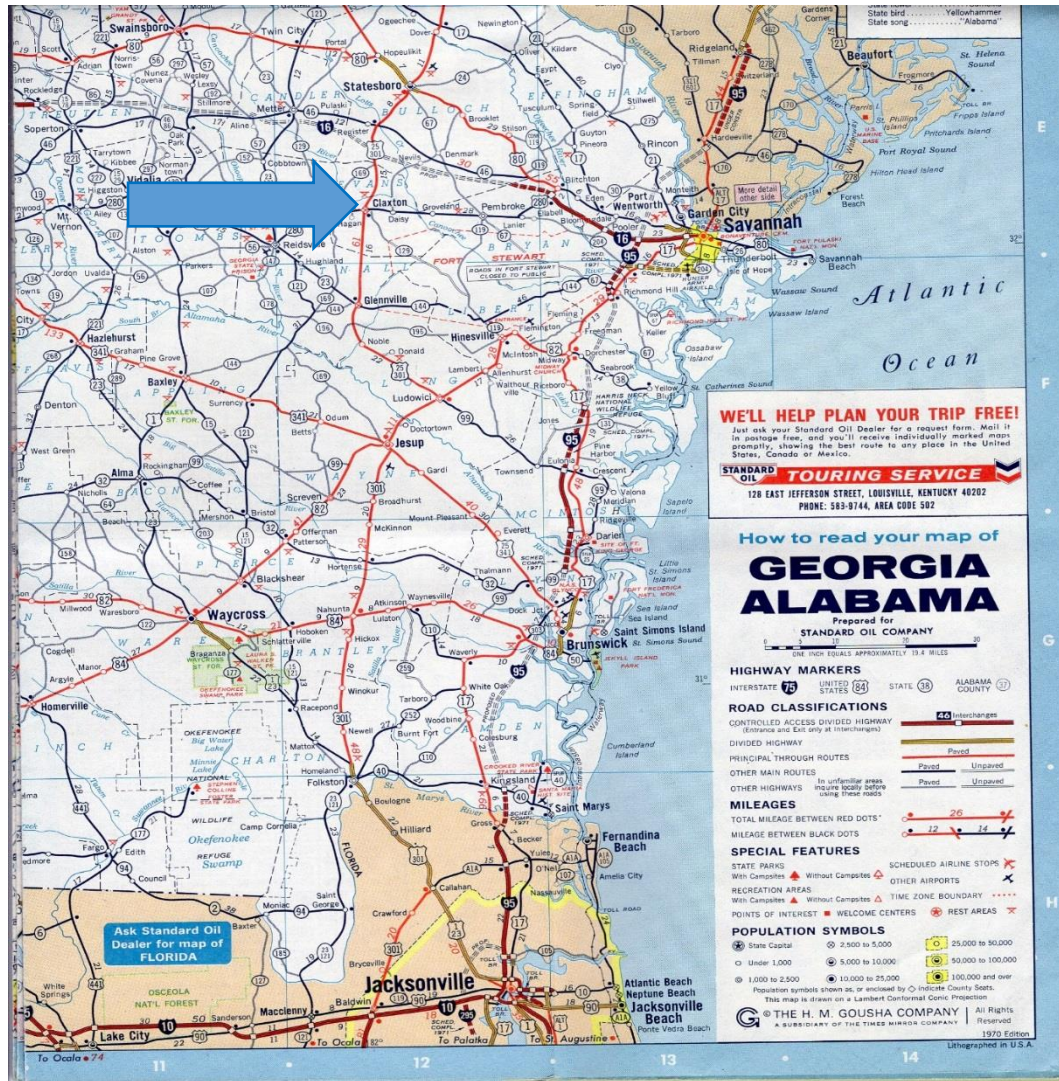
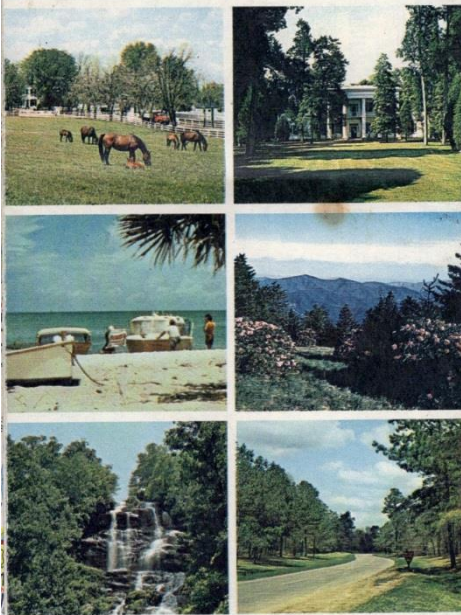
- Is the clinical observation valid that coronary heart disease occurs more commonly among whites than blacks in Evans County?
- If so, what is the reason for the difference?
- What further data should be gathered to enable study of other cardiovascular diseases and conditions among the population?

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1915405/pdf/pubhealthreporig00084-0045.pdf>

GEORGIA ALABAMA

STANDARD OIL

ROAD MAP



Evans County, GA

“Evans County ... is located on the coastal plain about 60 miles inland from the port city of Savannah, Ga. The county is 19 miles in greatest diameter. Much of the county is covered by pine forests, which are harvested for pulpwood, turpentine, and lumber. About half of the population live on farms; the other half live in a few small villages including the town of Claxton (population 2,000). About 40 percent of the population are Negro.” p1051

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1915405/pdf/pubhealthreporig00084-0045.pdf>

An Unusual Partnership

- The initiative and impetus originated with a primary care physician, Dr. Curtis Hames
 - CHD mortality quite high in the region, but coronary heart disease observed to be infrequent among black patients despite elevated blood pressure
- Conduct a study to assess whether these impressions are valid; if so, do they apply to the residents of the county ?
- Start-up challenges
 - Initial research proposal to USPHS; team building; seed funding, community outreach and population survey
- Population based study in partnership with an academic institution, funded by USPHS

Main Cast - UNC



Dean Bernard Greenberg

John C. Cassel, Chair



Main Cast - UNC



Alfred (Al) Tyroler

Berton H. Kaplan



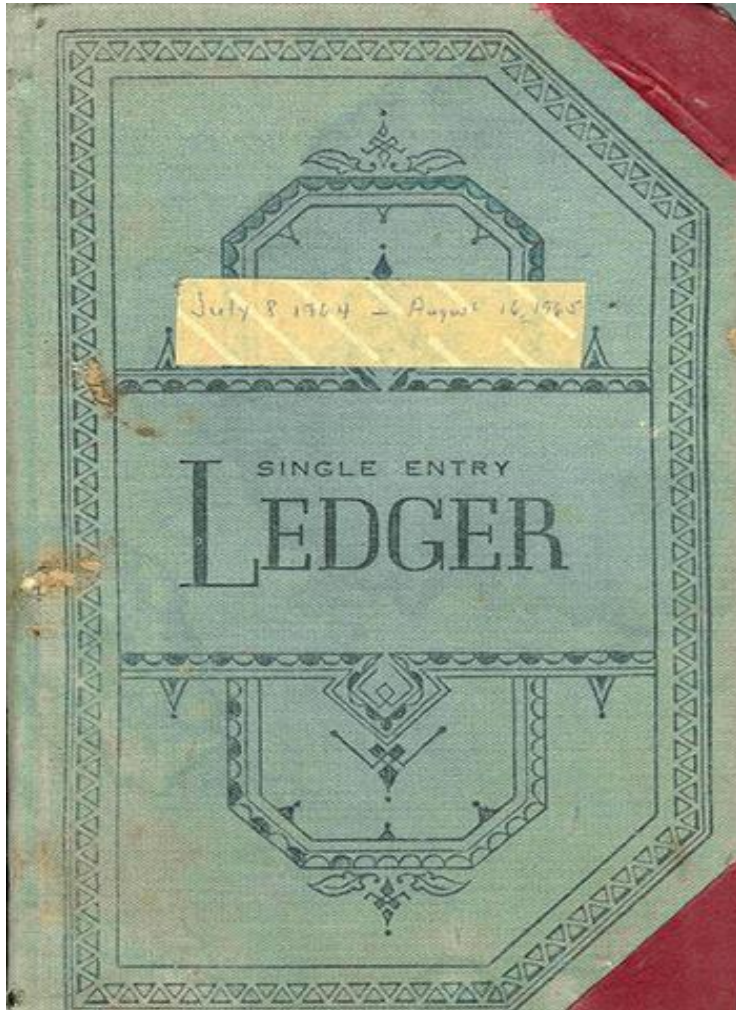
Other Members of the Cast

- U.S. Public Health Service
- James Watt, Jeremiah Stamler, Glen Garrison
- John McDonough, Stephen J. Zyzanski
- C. David Jenkins, Joan Cornoni
- Departments of Neurology at Duke and Emory
- Residents of Evans and Bulloch counties
- Staff at Evans County and at UNC

An Unusual Partnership

- The initiative and impetus originated with a primary care physician, Dr. Curtis Hames
 - CHD mortality quite high in the region, but coronary heart disease observed to be infrequent among black patients despite elevated blood pressure
- Conduct a study to assess whether these impressions are valid; if so, do they apply to the residents of the county ?
- Start-up challenges
 - Initial research proposal to USPHS; team building; seed funding, community outreach and population survey
- Population based study in partnership with an academic institution, funded by USPHS

Population Census



Household enumeration
of Evans and Bulloch
counties.

Random subsamples

Verified against U.S.
Census

Cross-sectional Survey

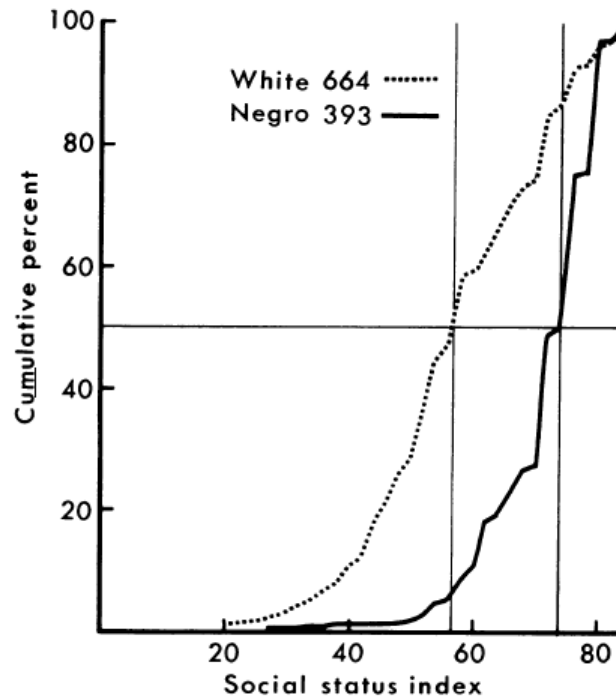
- Cross-sectional exam (1960-1962)
 - Included health behavior, socio-economic and medical history questions, anthropometry, serum cholesterol and blood pressure, i.a.
- Achieved a 92% response rate for a total study population of 3,102 residents.

Cross-sectional Study Results

- Overall, All manifestations of CHD occurred more frequently in men than women, and in white men compared to black men
 - Among white men, the age-adjusted prevalence of CHD was 99 per 1,000 in the upper half of the social class score* and 44 per 1,000 in the lower half
 - The prevalence of CHD manifestations was comparable in black men and low social class white men
 - These differences persisted at all levels of CHD risk factors risk
 - Differences by occupation suggested a further risk factor: CHD rates were comparable in black and white men when both were sharecroppers
- * * Occupation, education, source of income

McGuire-White index of social status Evans Co. residents

Figure 2. Social status classification of white and Negro males aged 40-74 years

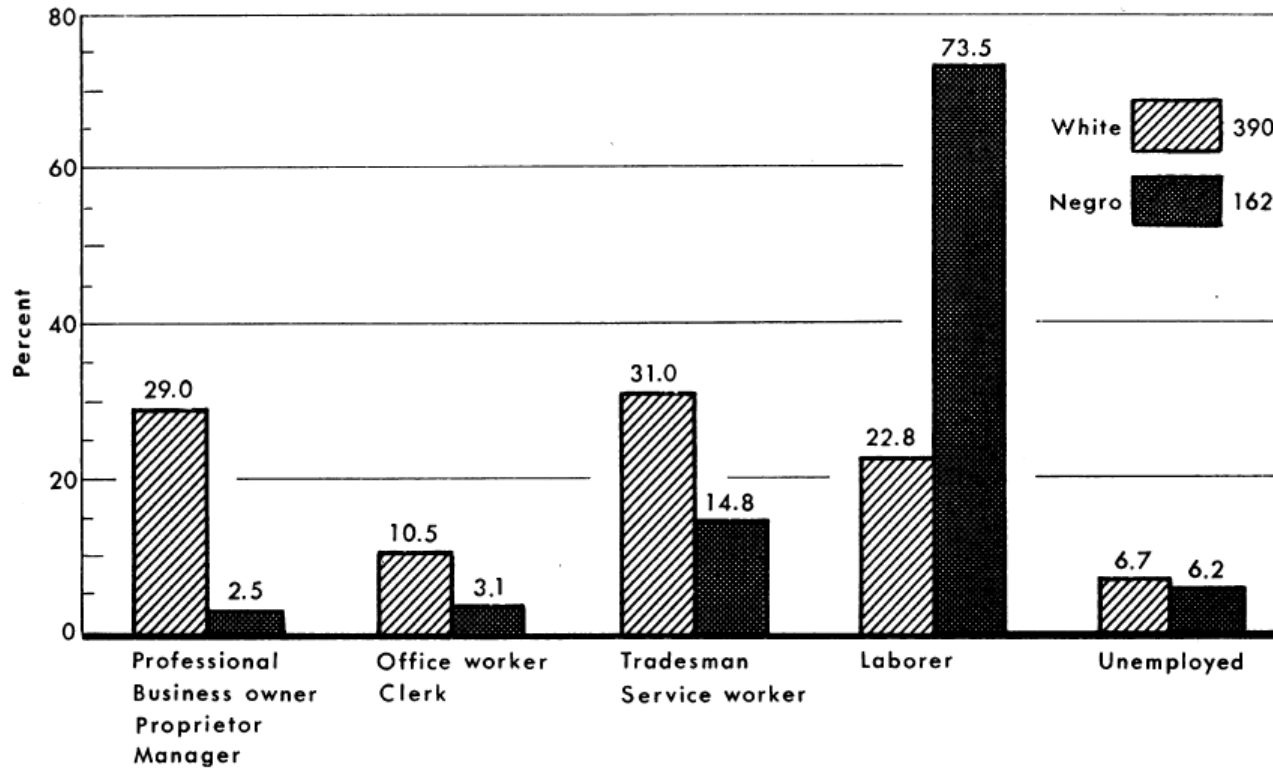


1055

(low scores are better)

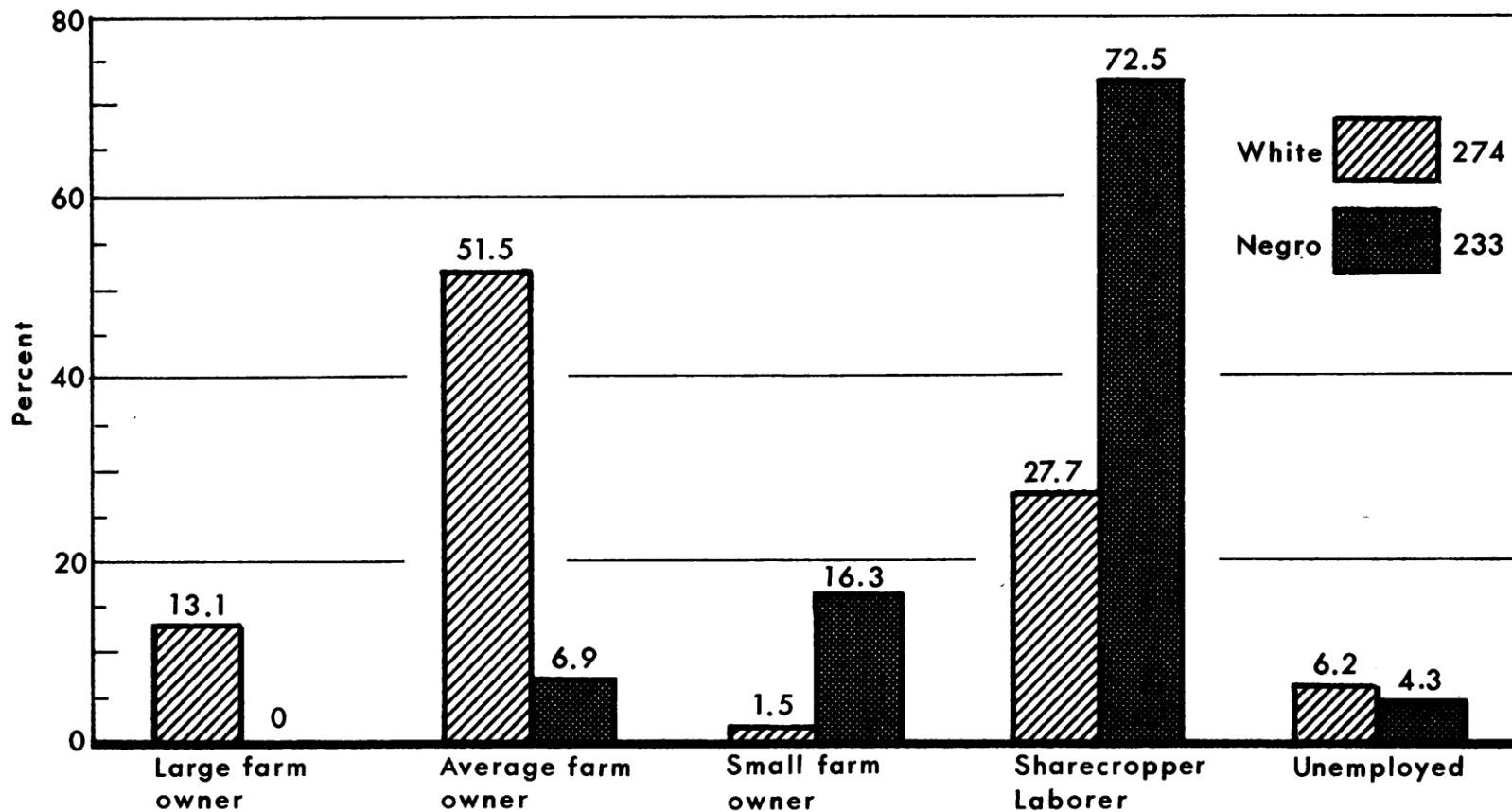
Non-farm Employment - Evans County

Figure 3. Nonfarm employment of white and Negro males aged 40-74 years



Farm Employment - Evans County

Figure 4. Farm employment of white and Negro males aged 40-74 years



Cross-sectional Study Results

- All manifestations of CHD occurred more frequently in men than women, and in white men compared to black men
 - Among white men, the age-adjusted prevalence of CHD was 99 per 1,000 in the upper half of the social class score* and 44 per 1,000 in the lower half
 - Prevalence of CHD manifestations were comparable in black men and low social class white men
 - These differences persisted at all levels of CHD risk factors
 - Differences by occupation suggested a further risk factor: CHD rates were comparable in black and white men when both were sharecroppers
- * Occupation, education, source of income

Evans Co. Study Cohort Study

- Questions leading to study prospective cohort study:
Differential mortality? Reverse causation?
- Thus, follow up and re-examine all those examined in 1960-1962 and found to be free of CHD

Evans Co. Study Cohort Study

- Cohort members were re-contacted or traced through relatives & contacts
- Health events were ascertained, and documentation assembled for central review and classification
- Decedents were identified and autopsy reports collected
- The health status of those not re-examined was ascertained
- Stroke investigation introduced and treated as competing risk
- Misclassification (over-diagnosis in whites / under-diagnosis in blacks) estimated & introduced into the analyses

Evans Co. Study Cohort Study

- Cohort re-examination (1967-1969) included interviews & tests comparable to those at baseline, conducted by two standardized MD examiners
- Factors assessed included socio-economic indicators, blood pressure, serum cholesterol level, cigarette smoking, body weight, hematocrit, 12-lead ECG and diet
- The overall rate of follow-up was 98.8% and 90.9% of the cohort was re-examined. Health events were ascertained for 7.9% by phone interview of the study participant or a family member

Evans Co. Study - Main Results

Distinctive features:

- Prospective cohort composed of the entire population of the county >40 years of age, and half the population aged between 15 and 39 years
- Only epidemiologic study at the time to study incidence of CHD in blacks and whites, and one of only two epidemiologic studies to examine the entire population of a community
- Examined the roles of social, behavioral, economic and biologic factors – and their temporal change in cardiovascular health and disease

Evans Co. Study - Main Results

Novel findings of the study:

- Factors associated with increased risk of CHD did so equally for blacks and whites, whether the risk factors were considered singly or in combination.
- Risk factors acted comparably across race & social status differences
- Changes in occupation, behaviors & risk factors were seen after 7 years of follow-up
- CHD incidence remained markedly higher for white Evans County residents

Evans Co. Study - Main Results

Novel findings of the study:

- Factors associated with increased risk of CHD did so equally for blacks and whites, whether the risk factors were considered singly or in combination.
- Risk factors acted comparably across race & social status differences
- Changes in occupation, behaviors & risk factors were seen after 7 years of follow-up
- CHD incidence remained markedly higher for white Evans County residents
- The only social grouping of white residents that had equally low incidence of CHD was white sharecroppers
- This was attributed to higher rates of physical activity among blacks, and sharecroppers, when compared to whites of higher socioeconomic status.

Five Decades after Evans County

Observations:

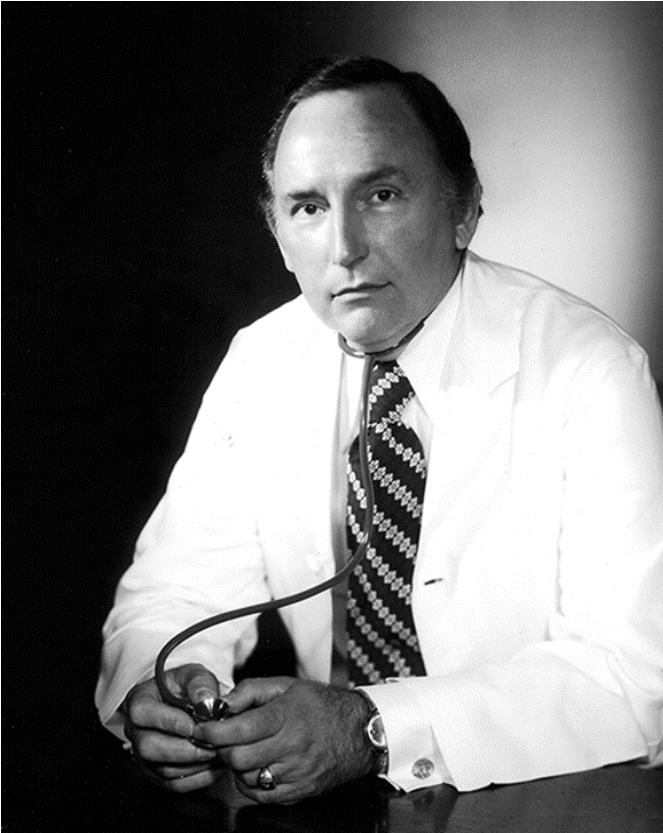
- “Race” is still used to group people, and as a proxy to study health and disease
- Considerable disadvantage in the burden of CHD and stroke exist by race, cultural and economic stratification
 - In contrast to Evans County, GA in the 1960’s, African American men and women experienced excess mortality and morbidity from cardiovascular & cerebrovascular diseases in the US
- Risk factors for CHD, stroke and its sequelae are now well understood and account for ~75% of variation in CHD and stroke in populations
 - Biologic traits were given primacy over social and behavioral characteristics in the search for CVD risk factors and their control

Five Decades after Evans County

Observations:

- Insights based on decades of research on the origins and distribution of CVD were channeled primarily into individualized, 'clinical' settings
- Public health still slow to address the social origins of poor health at its sources
- A wealth of information from observational research is waiting to be put to the test of population-based interventions to improve the health of society

Curtis G. Hames



Recipient of the 1984 John D. and Catherine T MacArthur Foundation Award for commitment to the health of his patients, insightful clinical observations, questions, and resourcefulness that initiated and sustained the Evans County Heart Study.

Applied the fellowship resources to advance research in family medicine and primary care.

Resources

Heart Attack Prevention: A History of Cardiovascular Disease Epidemiology (<http://www.epi.umn.edu/cvdepi/>)

Community Health: A Model for the World
https://apps.nlm.nih.gov/againsttheodds/exhibit/community_health/model_world.cfm

Archives of Internal Medicine, December 1,
1971;128(6)

<http://jamanetwork.com.libproxy.lib.unc.edu/journals/jamainternalmedicine/issue/128/6>