

# Maintaining and Promoting Cardiovascular Health Across the Lifespan

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Coronary Artery Risk in Young Adults (CARDIA) Study



**CARDIA**

Coronary Artery Risk Development in Young Adults

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# CARDIA

- Recruited Black and White men and women 18-30 years at baseline
- Followed for 30 years
- Detailed assessments on a wide-range of risk factors, lifestyle, environment, subclinical measures, physiological measures
- Aimed to study early predictors of development/severity/progression of subclinical CVD and incidence of early clinical CVD events in a biracial population

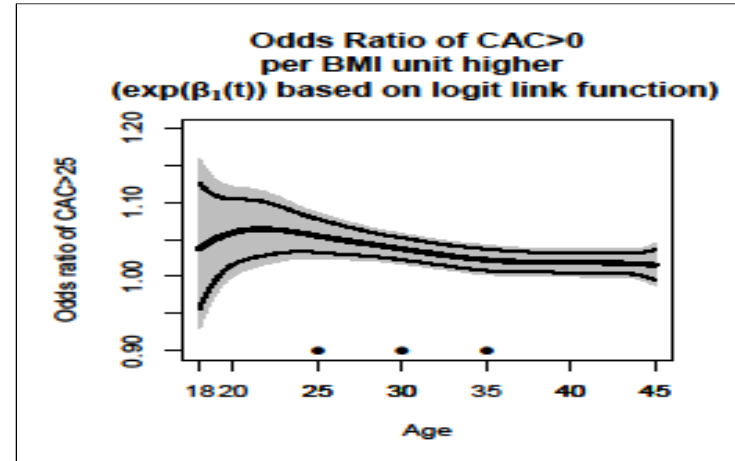
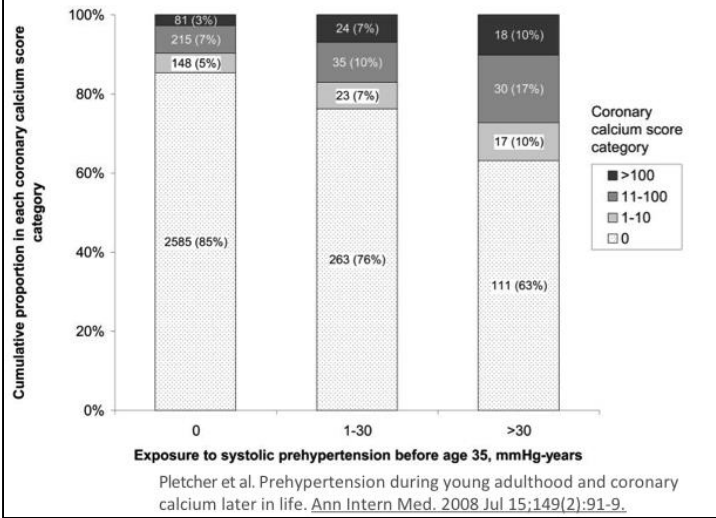
# Taking Advantage of 30 yrs of Data

- Utilizing longitudinally collected data for innovative research questions
- Develop novel statistical methodologies to understand the accumulation and patterns of cardiovascular risk and disease development
  - Time-varying coefficients
  - Thresholds/Point of No Return
  - Trajectories and Cumulative Exposure
  - Age vs Period Effects

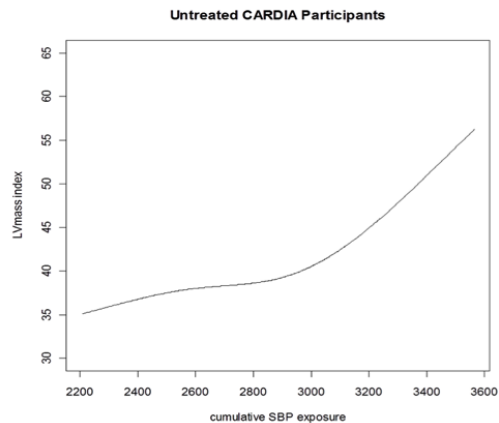


# Analyses of Long-Term CV Risk in CARDIA

**Coronary Calcium Score Distribution in Middle Age with Increasing Exposure to Systolic Prehypertension Before Age 35**



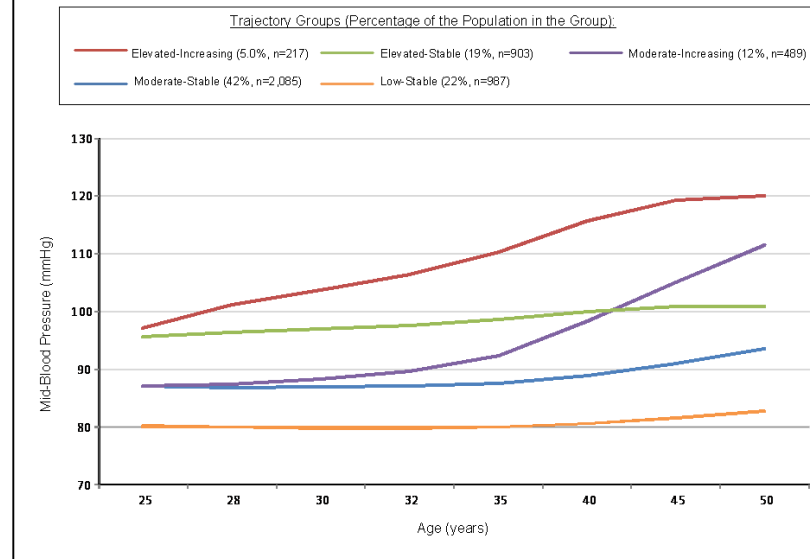
**Adjusted<sup>‡</sup> Relationship (Spline Regression) Between LV Mass Index and 25-Year Cumulative SBP**



<sup>‡</sup> adjusted for age, gender, race, BMI, smoking, diabetes, LDL-C, and cholesterol medication

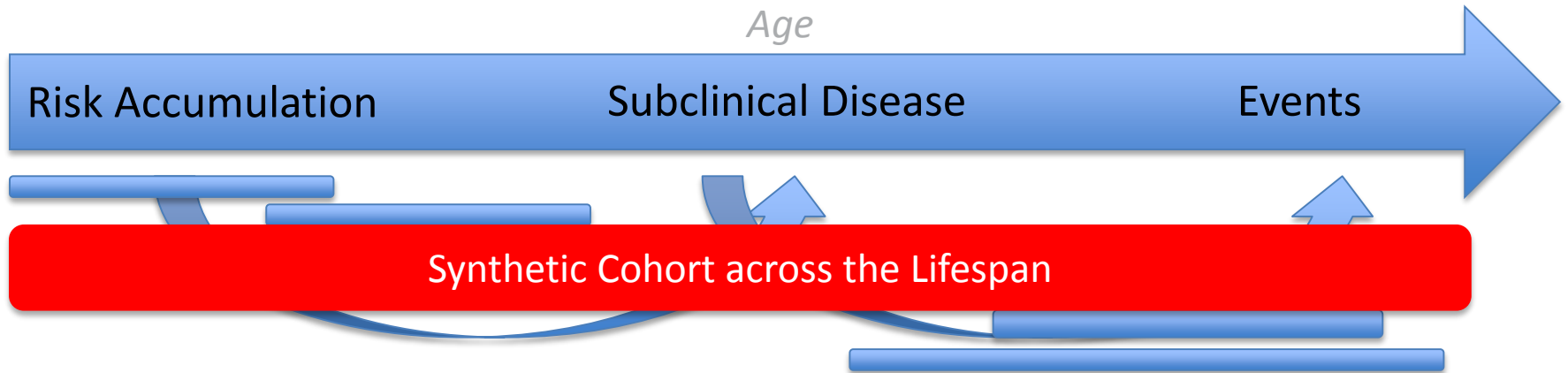
Unpublished data. Presented by K. Liu AHA 2014

**Trajectories in Mid-Blood Pressure in the Coronary Artery Risk Development in Young Adults (CARDIA) Study**





# CV Health and its Impact on Outcomes



Risk Factors in Childhood (and prenatal period) are associated with the development of subclinical disease in early Adulthood

Risk Factors and the development of subclinical disease are associated with the occurrence of events later in life

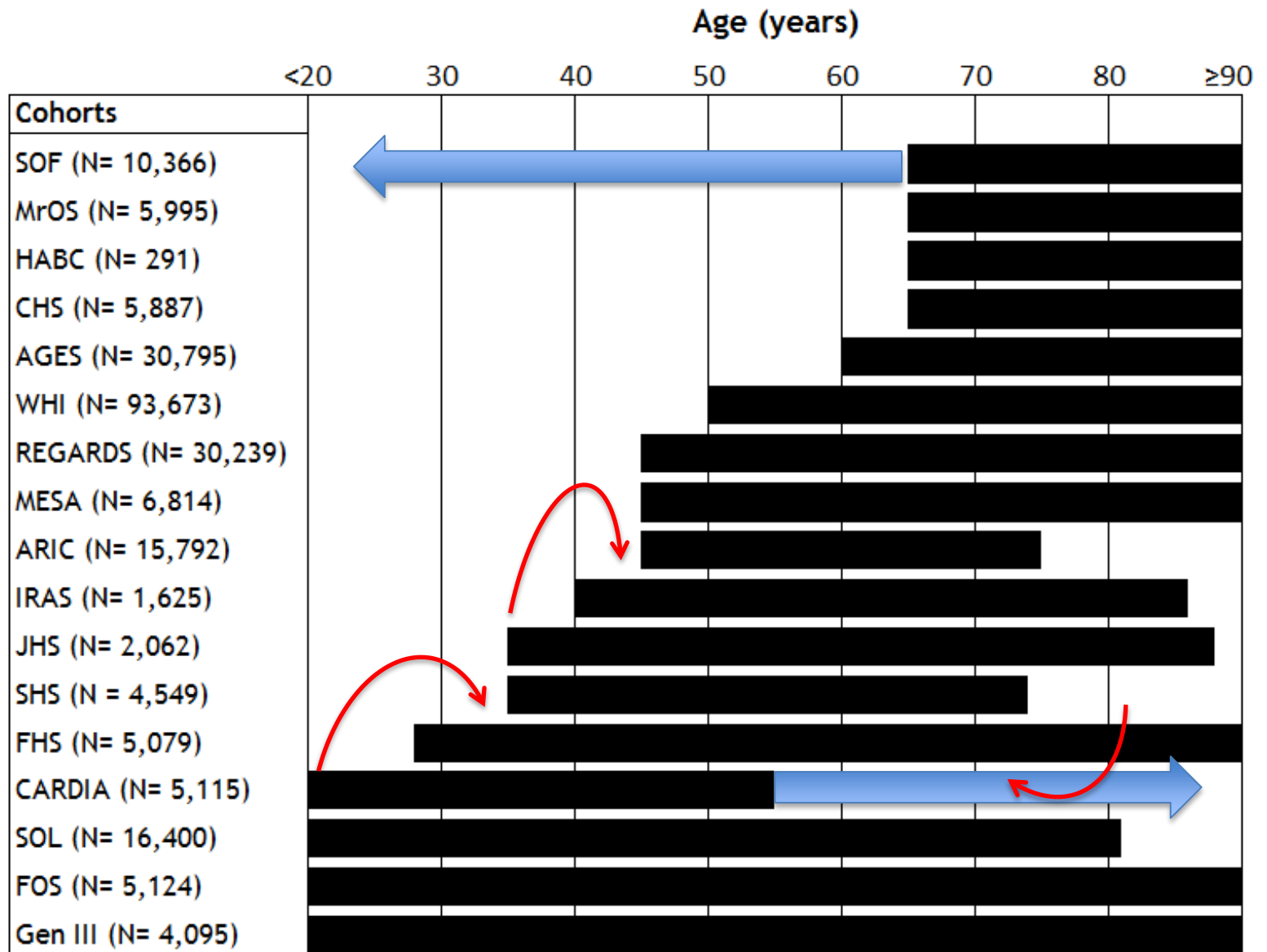


# Creation of a Synthetic Cohort

- Most often cohorts are simply pooled together with only minimal sensitivity analyses to account for inter-cohort differences
- We propose the creation of a synthetic cohort whereby the exposure information from younger cohorts could be linked to outcomes that have occurred among older cohort
- Sophisticated statistical techniques such as multilevel multiple imputation methods can be used and validated
  - Can take into account period and cohort effects, geographic differences, design and collection differences



# Age Range of Cohorts

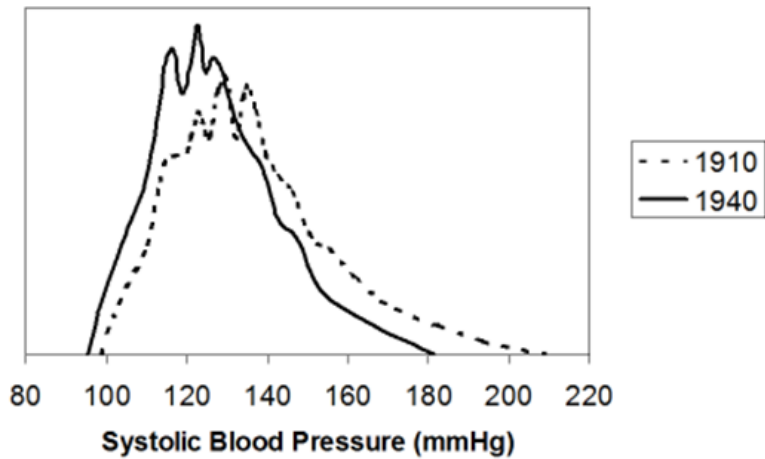




# Temporal Trends in CV Risk

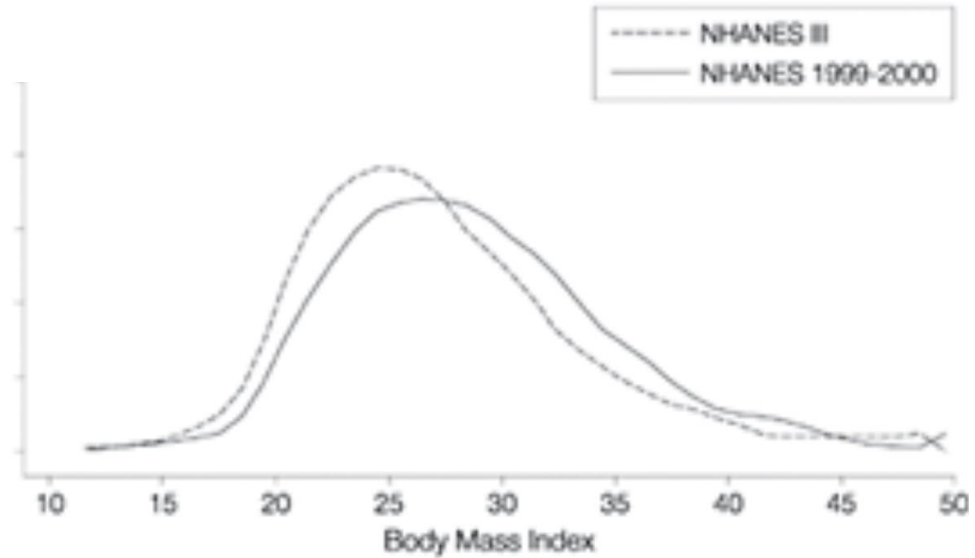
## SBP in 50 Year Olds in 1910 and 1940

Goff et al. *Ann Epidemiol* 2001;11:271-9.



## BMI in Women 60-79 Years Old

Flegal et al. *JAMA*. 2002;288(14):1723-1727



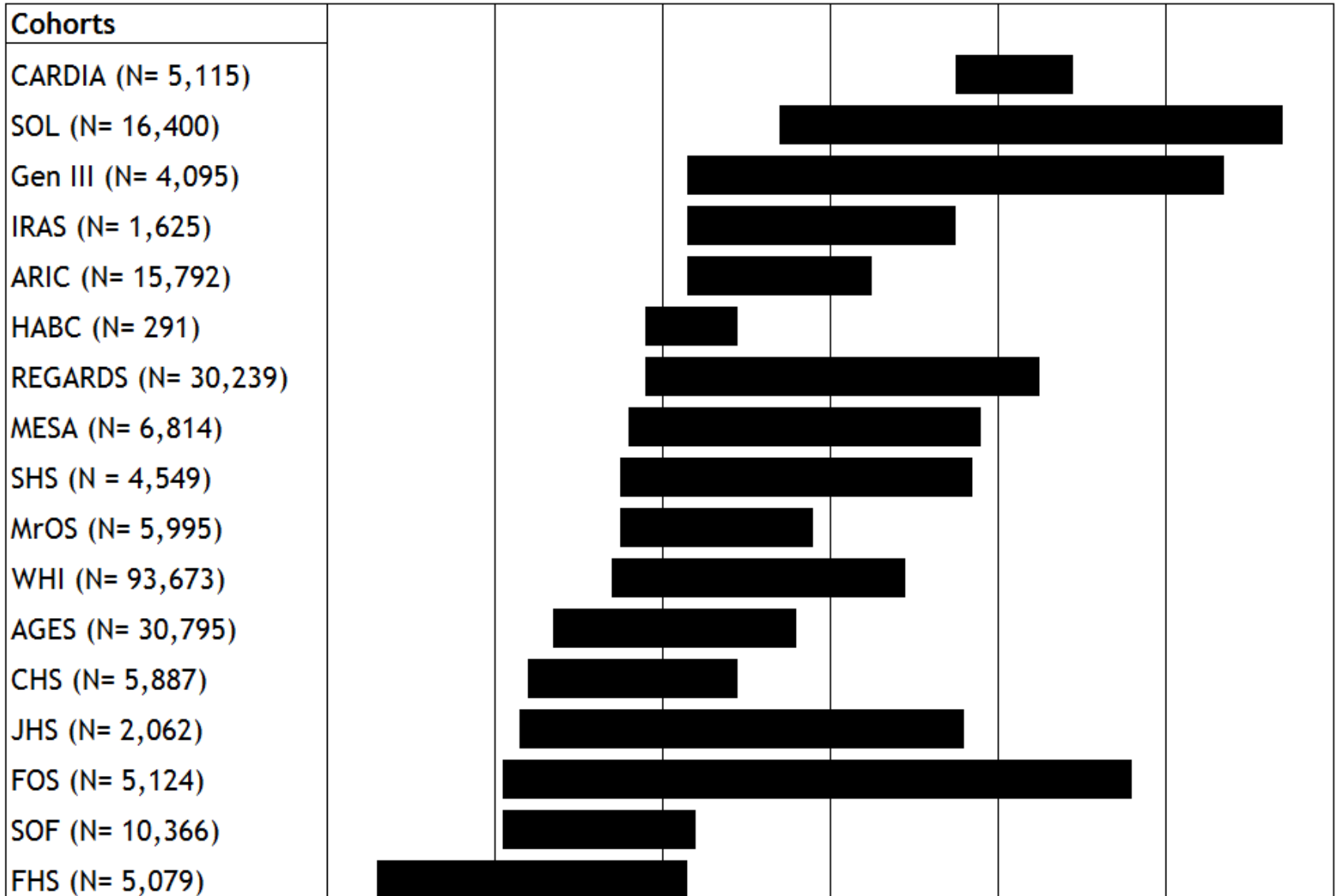




# Birth Year Range of Cohorts

Birth Year

1880      1900      1920      1940      1960      1980      2000





# Advantages of a Synthetic Cohort

- Efficient use of data
- Harnesses the power of large amounts of data
- Provides power to examine rare phenotypes
- Can examine how exposures vary in their impact on outcomes over the lifespan
- Can examine temporal changes (birth cohort effects) in risk and CVD
- With the addition of childhood cohorts, will provide a deeper understanding of the cumulative effects of exposure over the entire lifespan



# Novel Study Questions to be Addressed

- Lifetime Risk Factor Trajectories and their Association with Events
- Cumulative Exposure to CV Risk
- Time-varying impact of CV Risk Factors Throughout the Lifetime on CVD incidence
- Ordering and Timing in the Development of CV Risk Factors
- Critical Periods in the Development of CV Risk
- Predictors of Healthy/Successful Aging
- Temporal Trends in the Development of CVD risk
- *Just to name a few.....*

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