

# The role of biomarkers in measurement of health status

Teresa Seeman, Ph.D

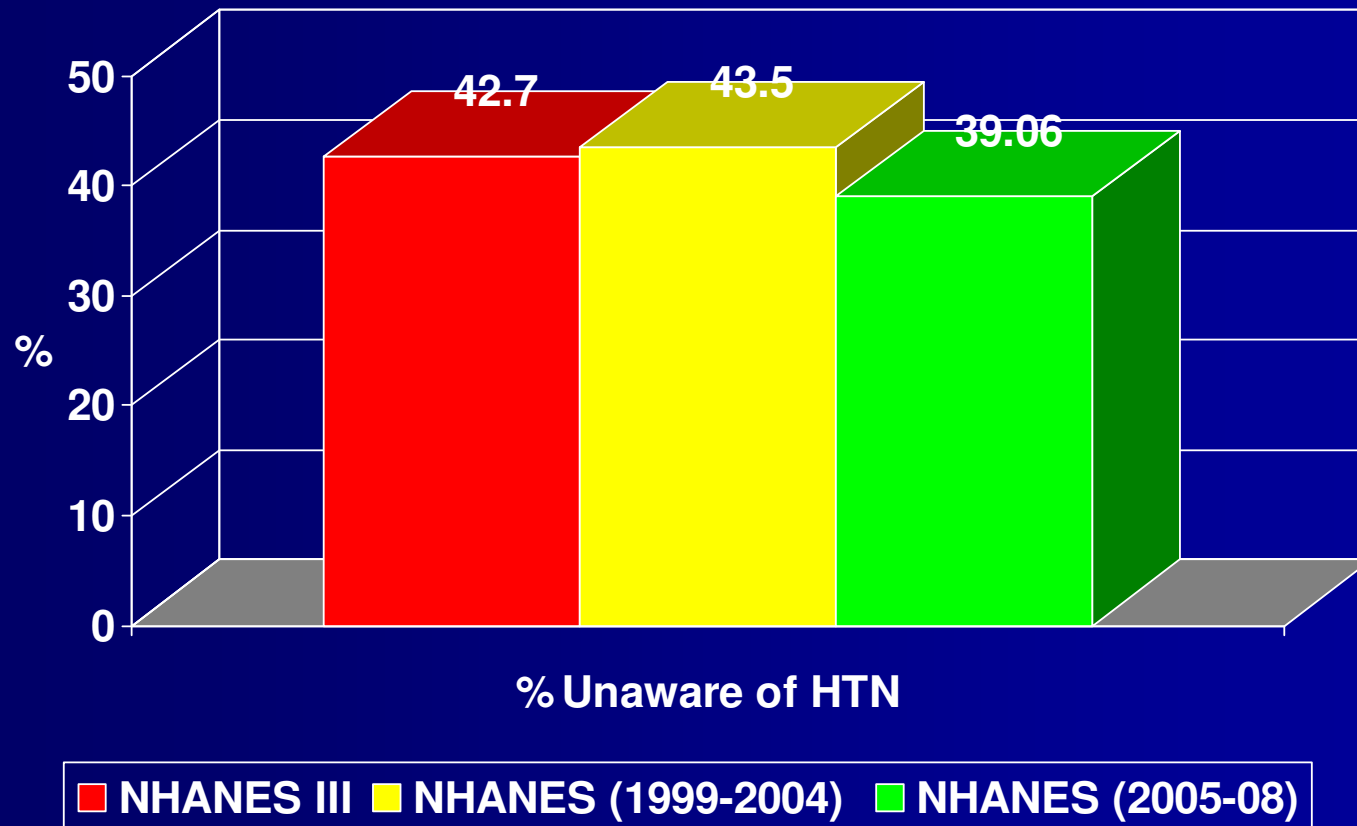
Professor of Medicine & Epidemiology

David Geffen School of Medicine at  
UCLA

# Biomarkers as Sources of Unique Information

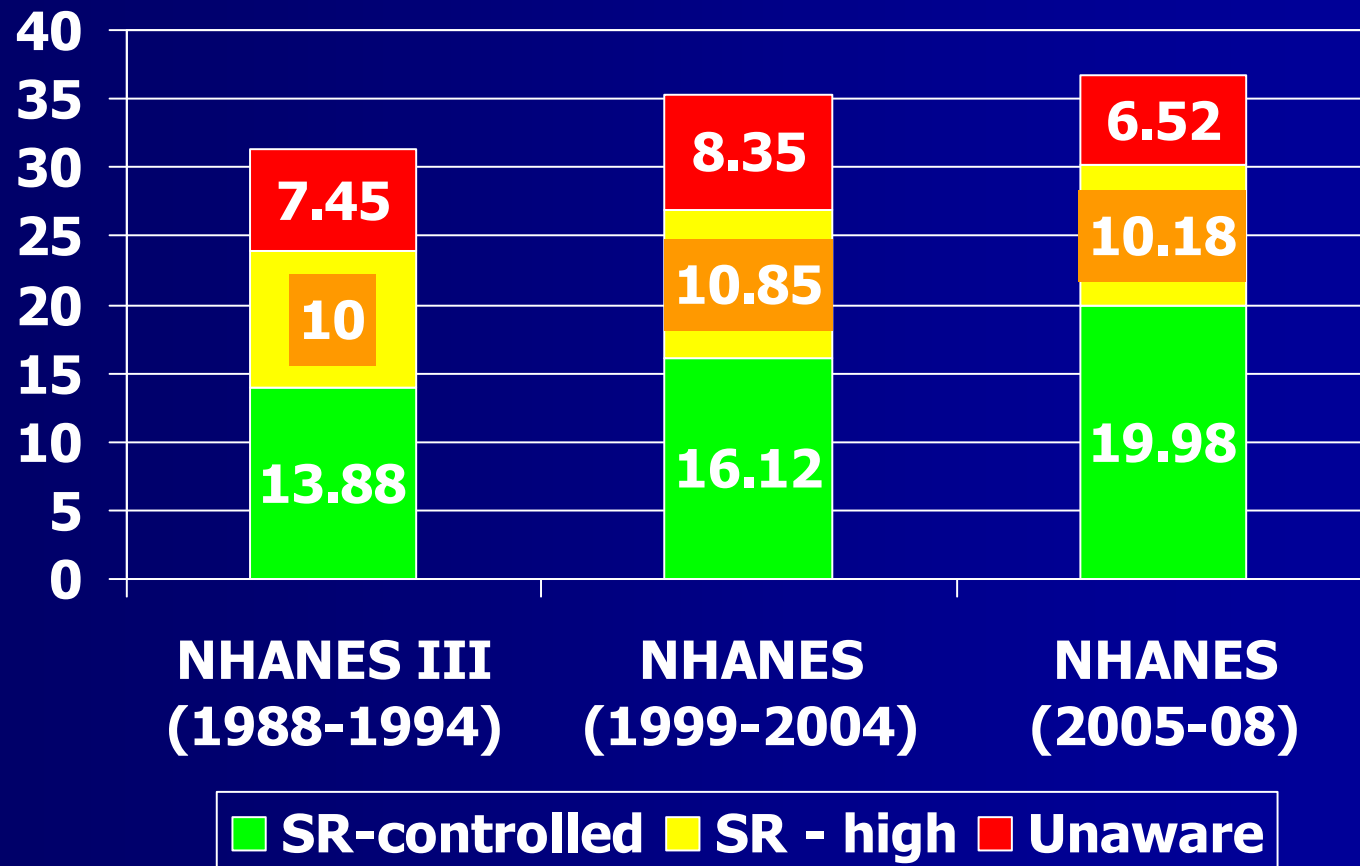
- Information not available from respondents self-reports
- Unique risk information – over & above “disease” conditions

# Hypertension: missed cases by "self-report"

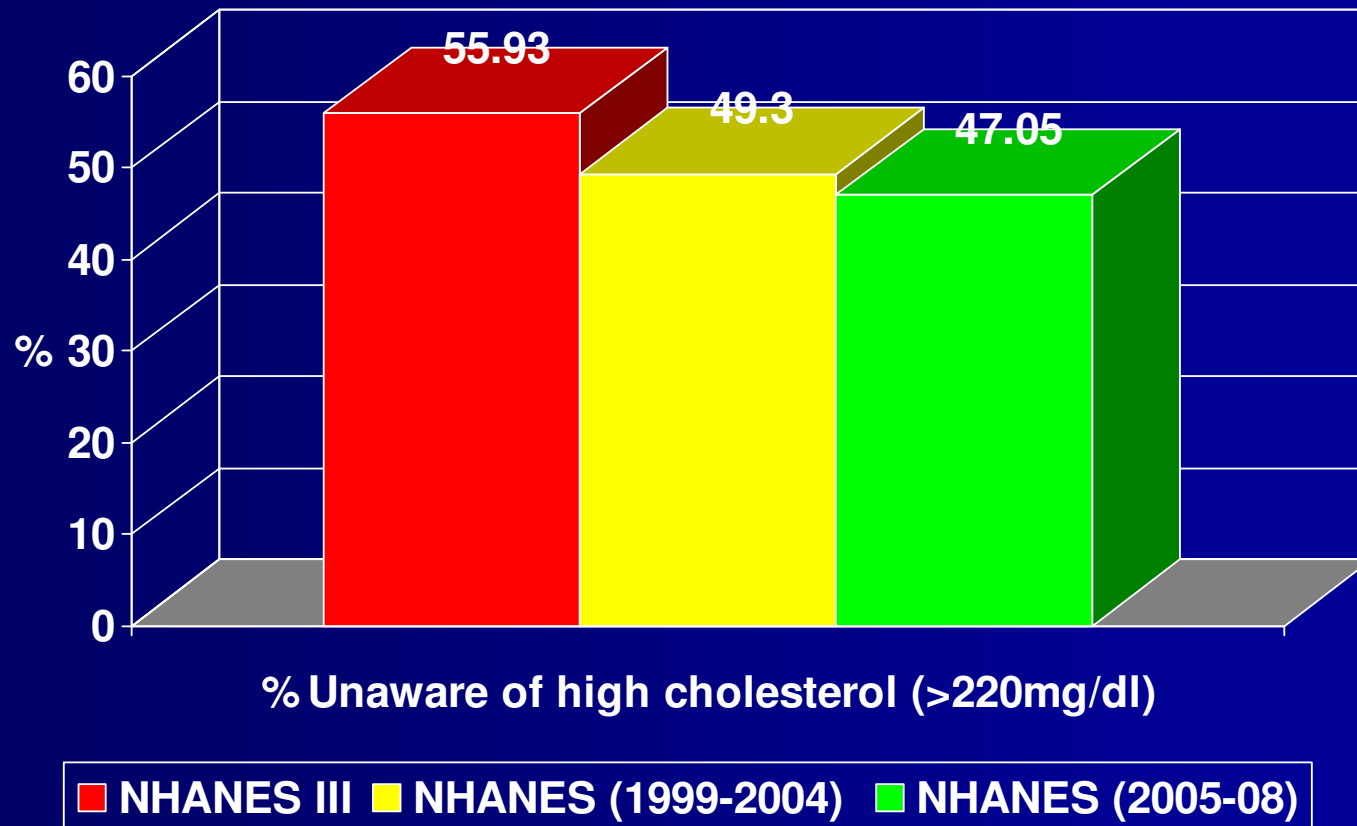


% unaware among those with measured Hypertension (>140/90mmHg)

# High Blood Pressure: self-reports vs. “undiagnosed”

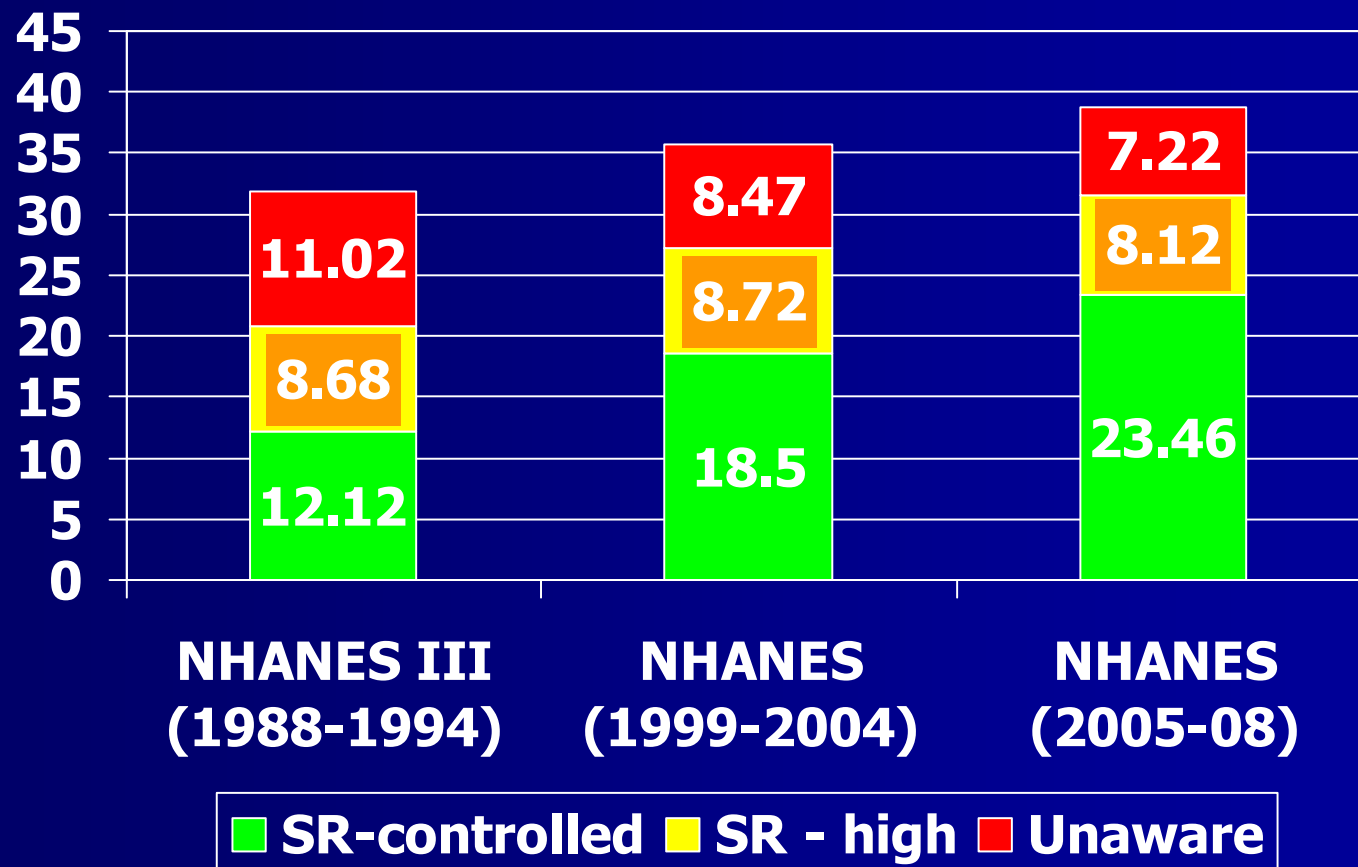


# High Cholesterol: missed cases by "self-report"

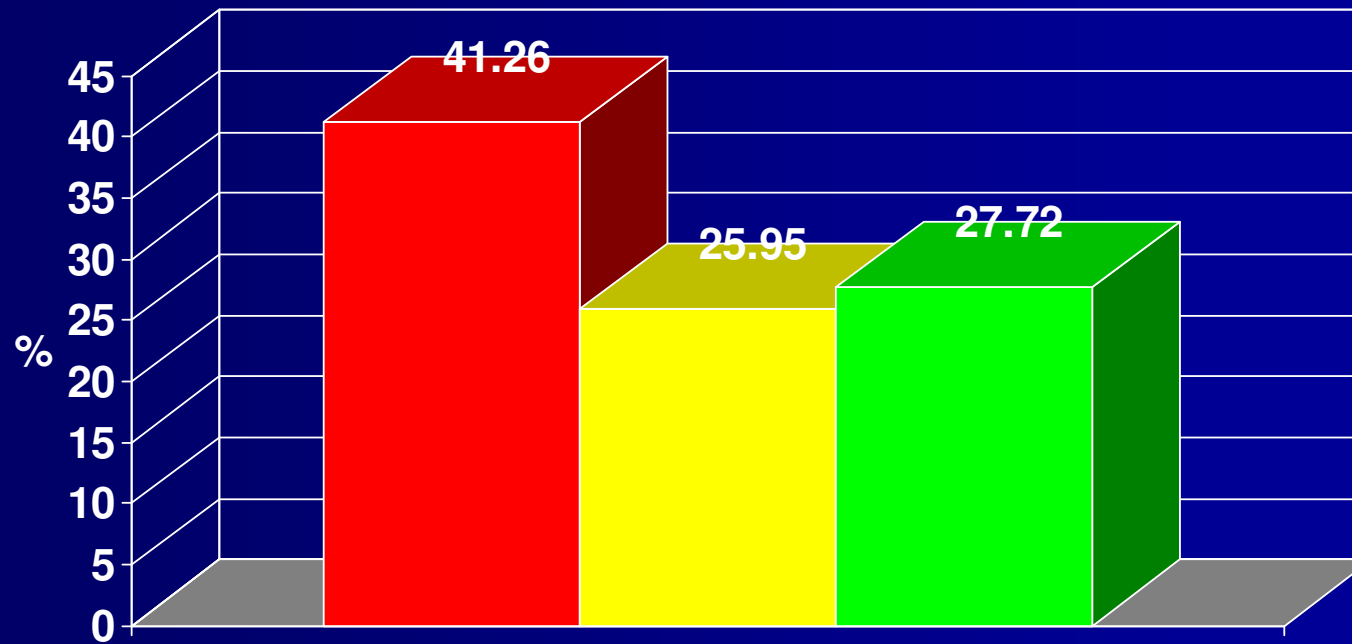


% unaware among those with measured Total Cholesterol > 220mg/dL

# High serum total cholesterol: self-reports vs. “undiagnosed”



# Diabetes: missed cases by "self-report"

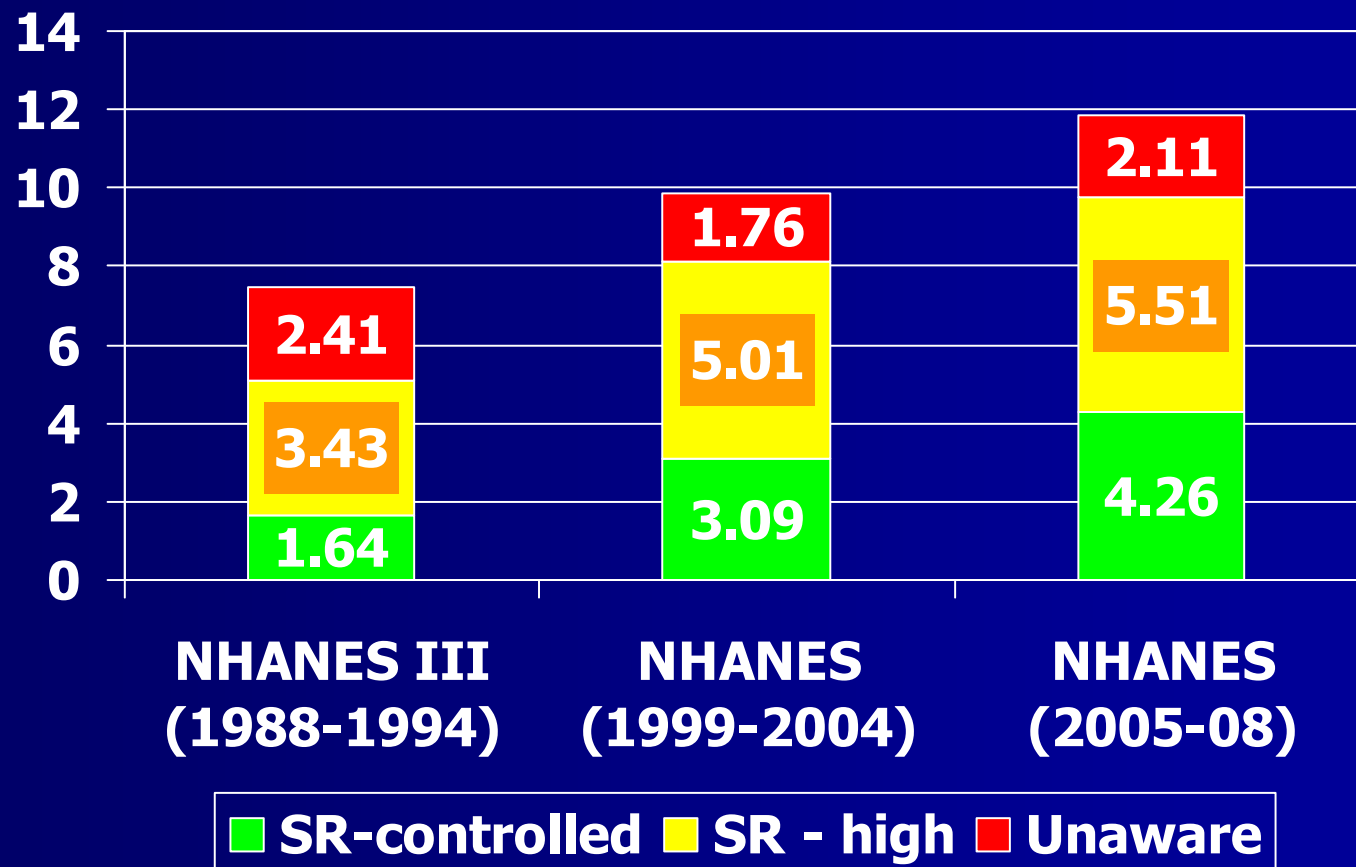


% Unaware of "diabetes" (HgA1c > 6.4%)

■ NHANES III ■ NHANES (1999-2004) ■ NHANES (2005-08)

% unaware among those with measured HgA1C > 6.4%

# Self-reports of diabetes vs. “undiagnosed” (i.e. HgA1c > 6.4%):



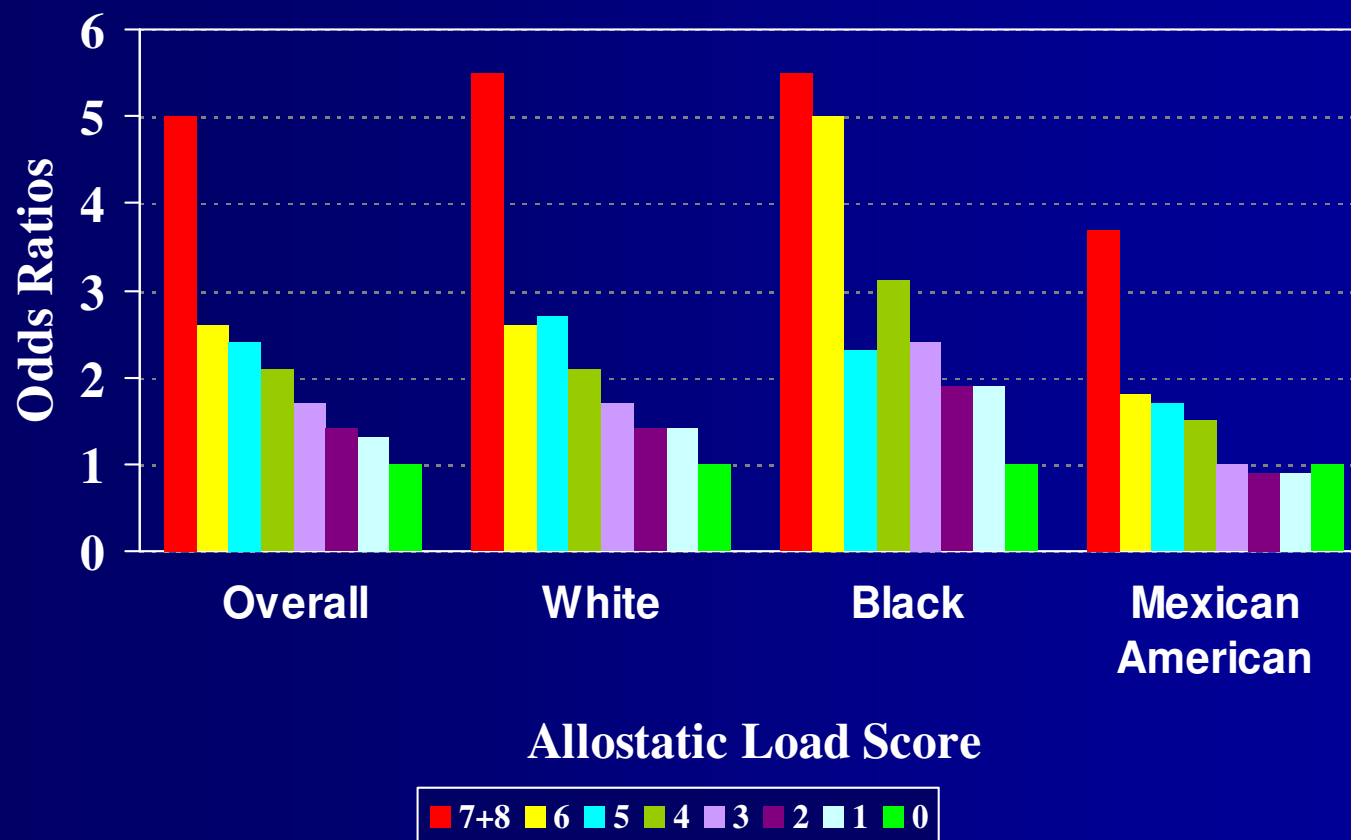
# Biomarkers as Risk Indices

Predicting subsequent health outcomes

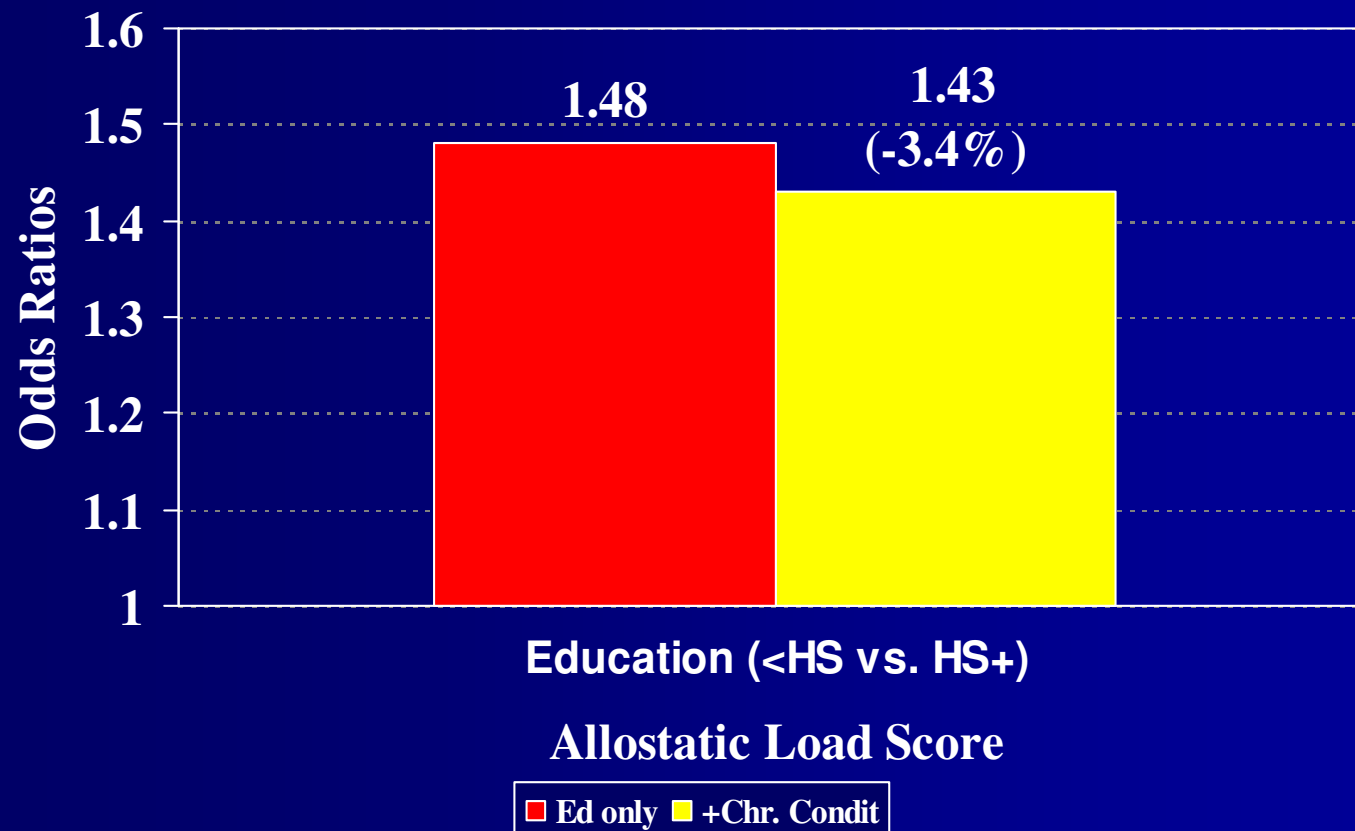
# US NHANES: Allostatic Load Component Criterion Cutpoints

Biomarker	Total N	High Risk	%	Cutpoint	Criterion
DBP (mmHg)	15,489	1,180	7.62	$\geq 90$	Clinical
SBP (mmHg)	15,491	3,461	22.34	$\geq 140$	Clinical
Pulse Rate	15,117	1,009	6.67	$\geq 90$	Clinical
HgA1c (%)	15,441	1,482	9.60	$\geq 6.4$	Clinical
WHR	14,824	6,778	45.72	$\geq 0.94$	Clinical
HDL Choles (mg/dL)	15,187	3,440	22.65	$< 40$	Clinical
Total Choles (mg/dL)	15,293	3,196	20.90	$\geq 240$	Clinical
CRP (mg/dL)	13,813	3,914	28.34	$> 0.3$	Clinical
Albumin (g/dL)	15,095	341	2.26	$< 3.4$	Clinical

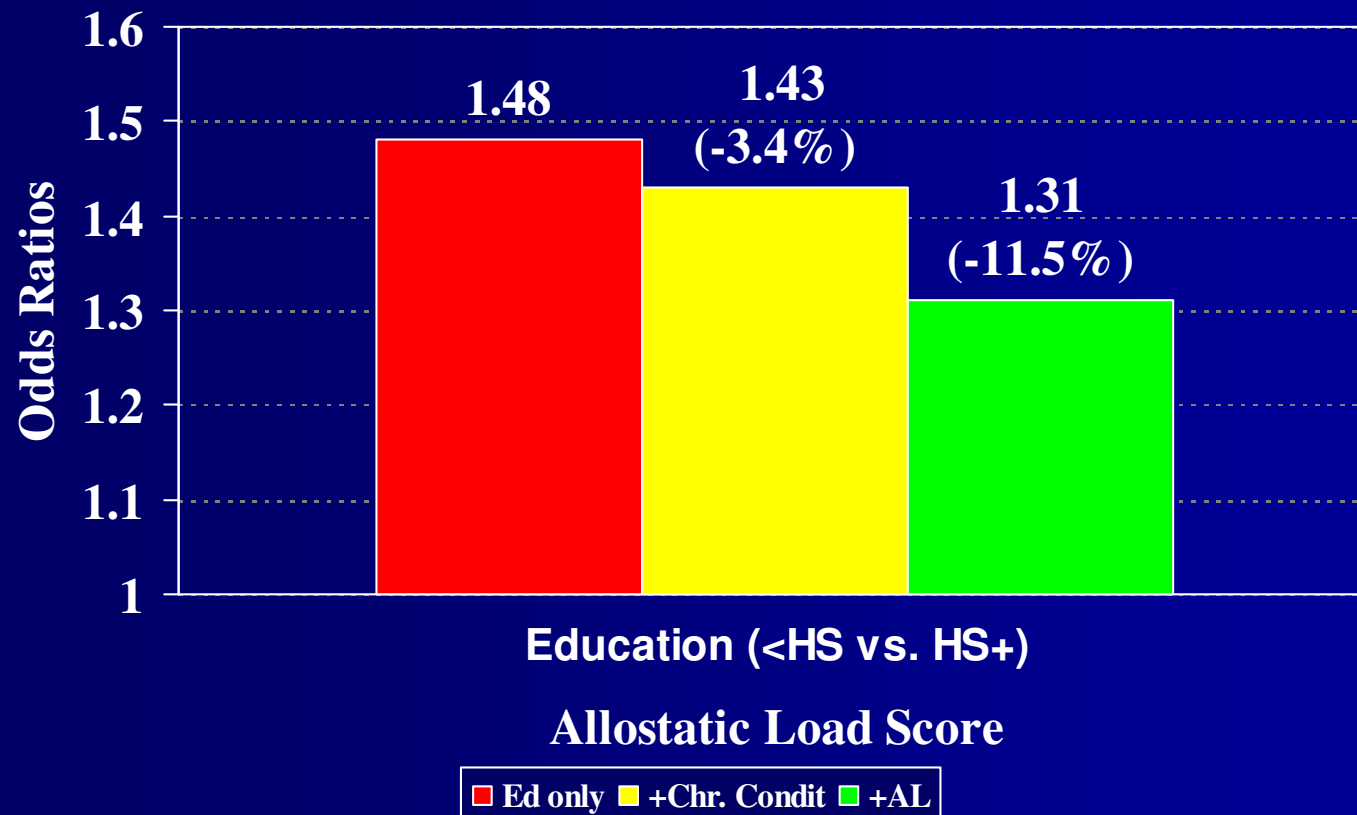
# Odds of Mortality by Allostatic Load Score (controlling for age, sex, education)



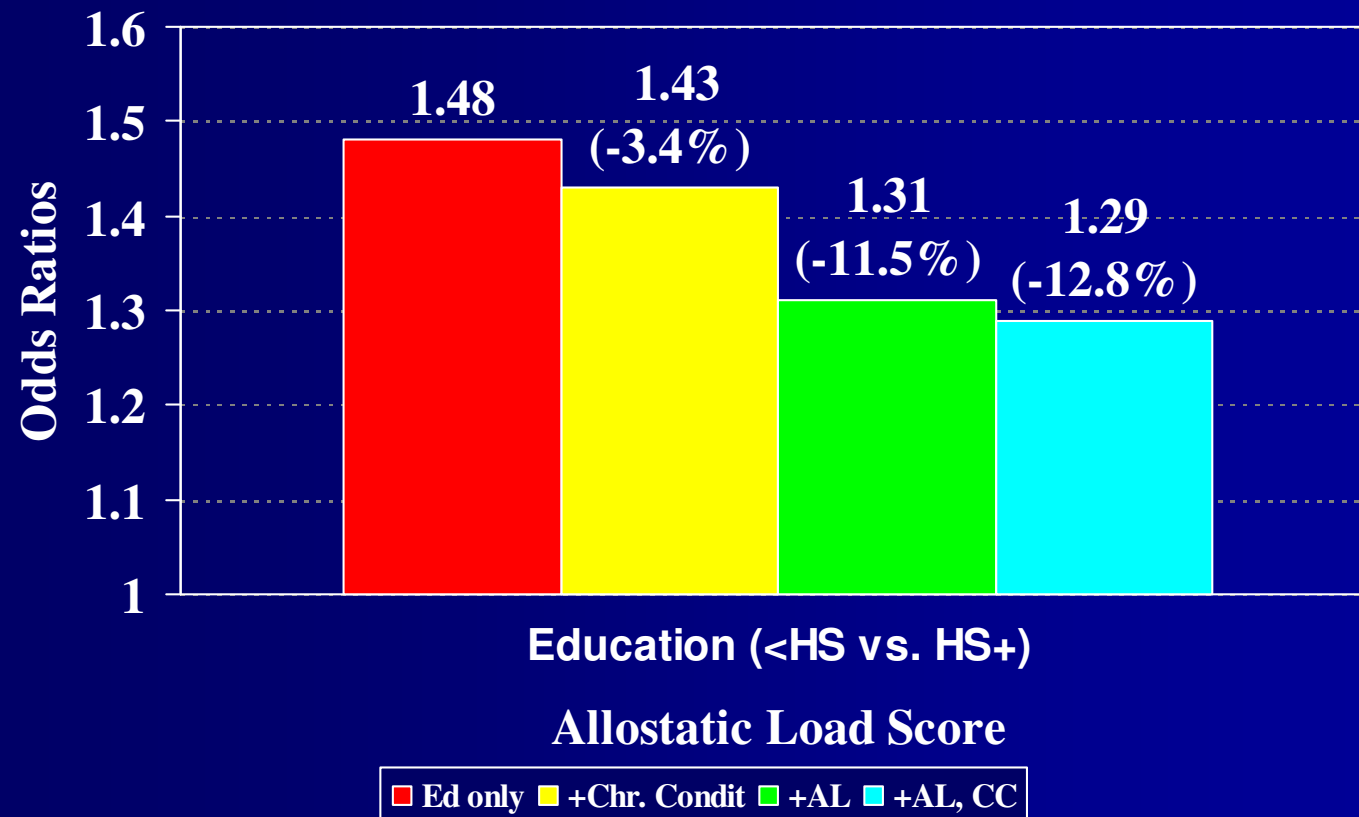
# Mediating Socio-Economic Differences in 7.5 year Mortality: Chronic conditions in MacArthur Studies of Successful Aging



# Allostatic Load vs. Chronic conditions & SES differentials in 7.5-yr Total Mortality: MacArthur



# Allostatic Load, Chronic conditions & 7.5-yr Total Mortality: MacArthur



# Summary: value of biomarkers

- Objective indices of health risks (does not require R to have “knowledge” of health condition)
- Provide unique risk information (independent of known disease status)
- Contribute to understanding of pathways linking SES and other factors to health disparities

# Adding Biomarkers to Surveys - Issues/Considerations

- **Collection of biomarker specimens**
  - Validation of protocols for “field implementation”
  - Standardized implementation & processing
- **Biomarker Assays**
  - Validation - against “gold-standard”
  - Quality control
    - Cross-laboratory validation/calibration
    - Cross-time stability/validity
- **Respondent Issues**
  - Reportable results?
  - Specimen storage (future use)