

# **The Triglyceride / HDL-C Ratio**

**Thomas Dayspring, MD, FACP, FNLA, NCMP**

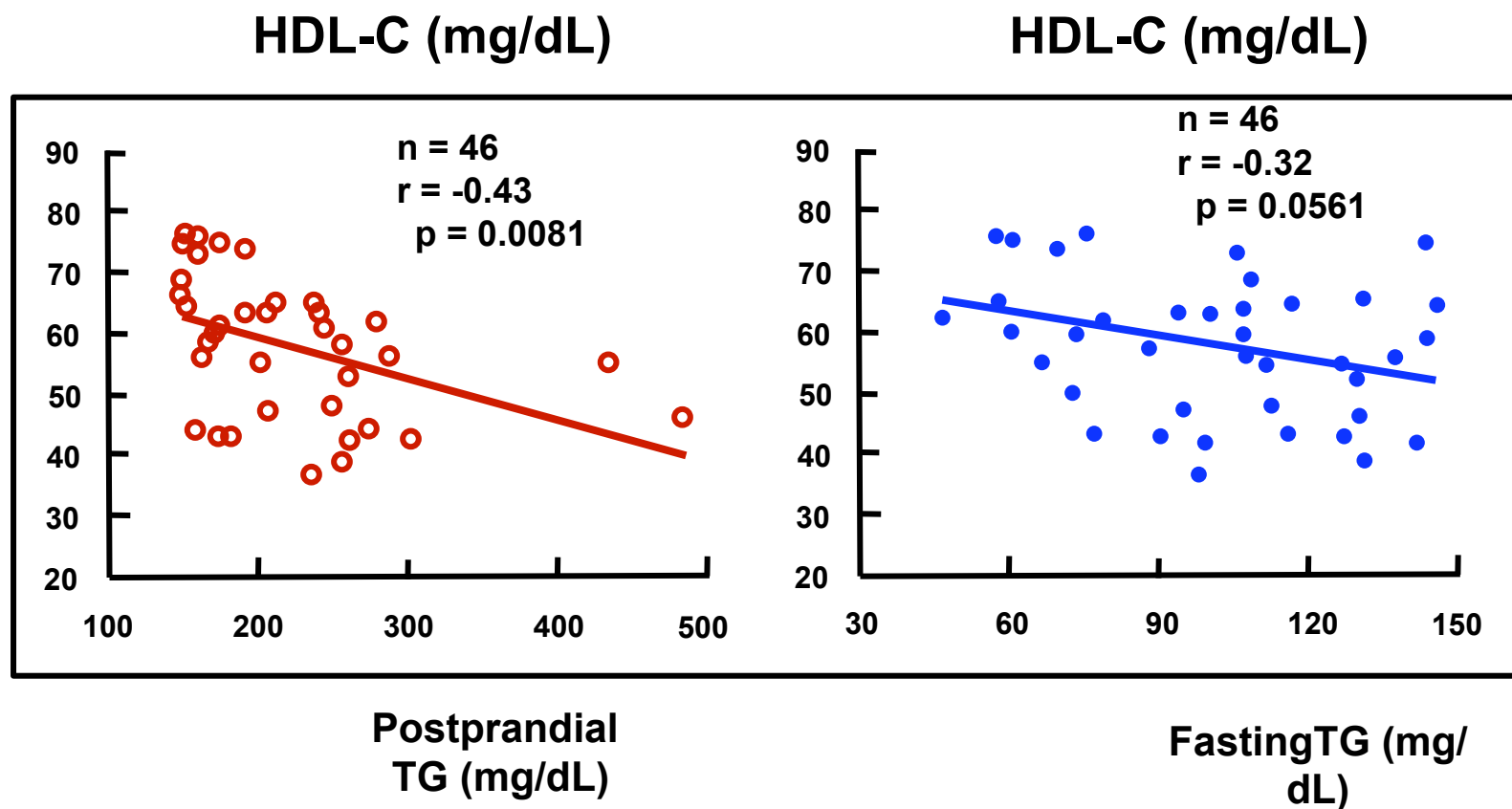
**Director: North Jersey Institute of Menopausal Lipidology**

**Diplomate American Board of Clinical Lipidology**

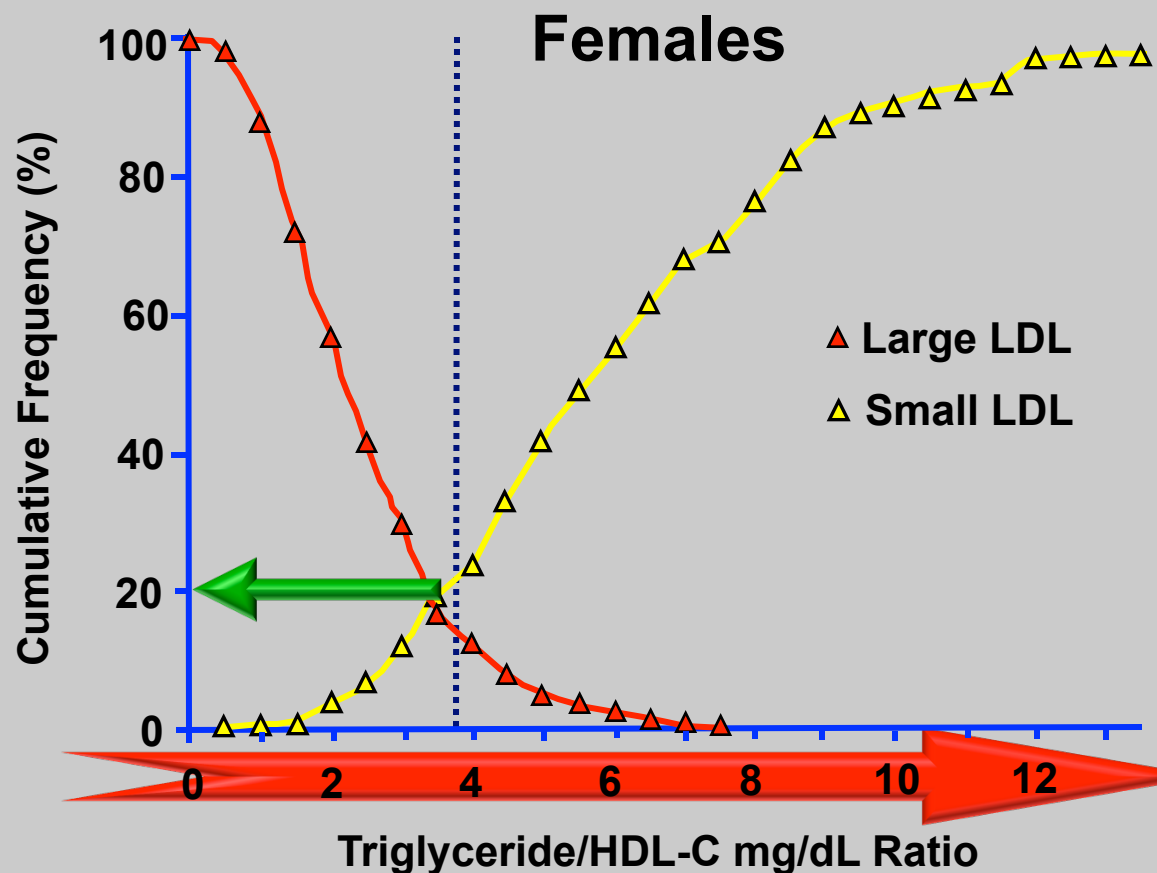
**Fellow of the National Lipid Association**

**Certified Menopause Clinician: North American Menopause Society**

# Fasting and Postprandial Triglycerides and HDL-C in Japanese Women



# Relationship of Small LDL to Triglyceride/HDL-C Ratio

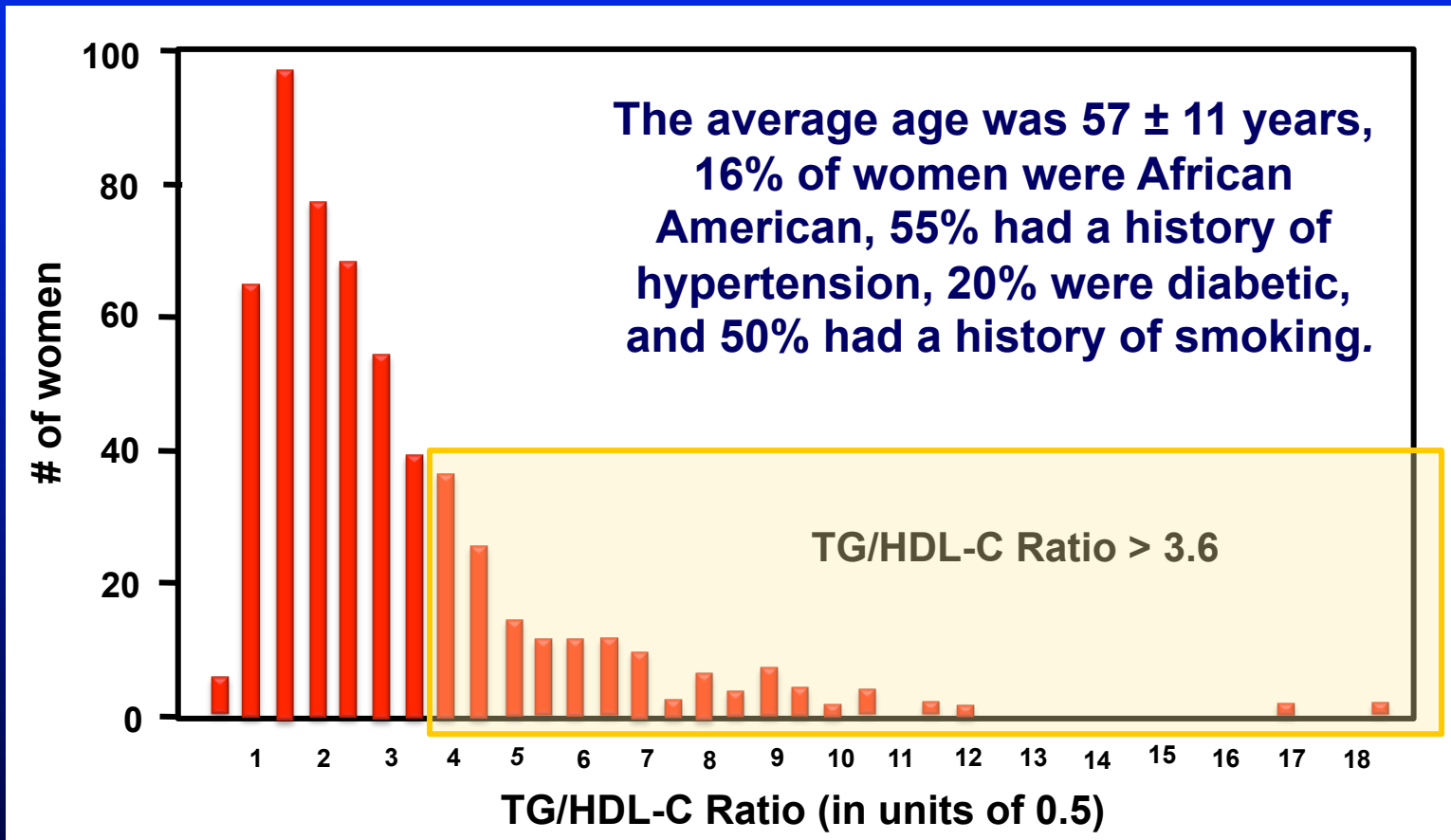


**At a ratio  $\geq 3.8$ , 80% of patients will have small LDL phenotype**

# Women's Ischemia Syndrome Evaluation (WISE): The TG/HDL-C Ratio

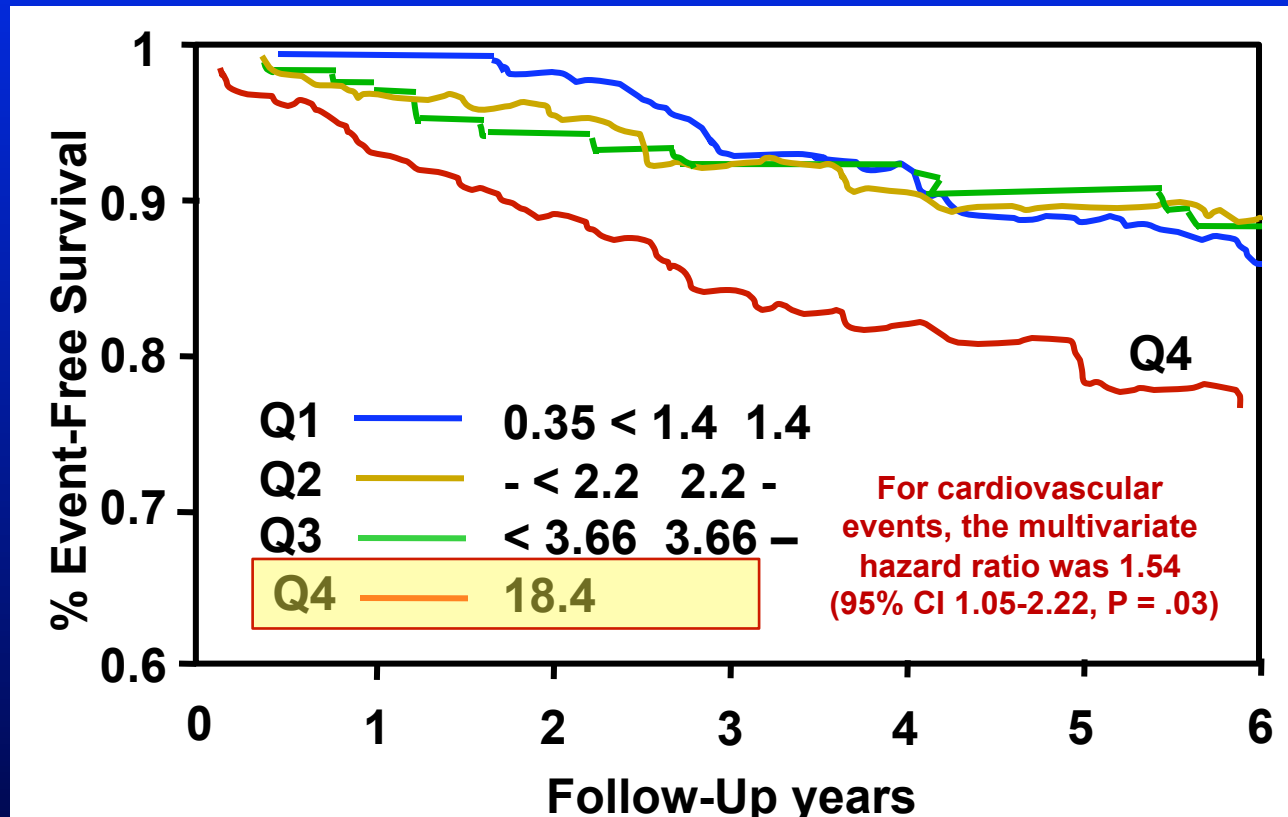
- ▶ We studied 544 women without prior myocardial infarction or coronary revascularization, referred for clinically indicated coronary angiography. Fasting lipid profiles and detailed demographic and clinical data were obtained at baseline .
- ▶ Multivariate Cox-proportional hazards models for all-cause mortality and cardiovascular events (death, myocardial infarction, heart failure, stroke) over a median follow-up of 6 years were constructed using log TG/HDL-C ratio as a predictor variable and accounting for traditional cardiovascular risk factors.
- ▶ Mean age was  $57 \pm 11$  years; 84% were white, 55% hypertensive, 20% diabetic, 50% current or prior smokers. Triglyceride/HDL-C ranged from 0.3 to 18.4 (median 2.2, first quartile 0.35 to <1.4, fourth quartile 3.66-18.4). Deaths (n = 33) and cardiovascular events (n = 83) increased across TG/HDL-C quartiles (both  $P < .05$  for trend).

# Women's Ischemia Syndrome Evaluation (WISE): The TG/HDL-C Ratio



Women with higher TG/HDL-C ratios were more likely to have other components of the metabolic syndrome, fulfill criteria for the metabolic syndrome,<sup>24</sup> and have diabetes and were more likely to have obstructive angiographic coronary artery disease and to have more severe coronary artery disease.

# Women's Ischemia Syndrome Evaluation (WISE): The TG/HDL-C Ratio



Kaplan-Meier curves for freedom from cardiovascular events by TG/ HDL-C quartile. Quartile 1 (Q1) through Q4 correspond to the quartiles of TG/HDL-C

**Excess risk of cardiovascular events is limited to individuals in Q4 of the TG/HDL-C distribution.**

Mean follow-up time for surviving women was 5.3 ±2.5 years (median 6.0 years, interquartile range 3.7-7.0 years).

Among women with suspected ischemia, the TG/HDL-C ratio is a powerful independent predictor of all cause mortality and cardiovascular events.

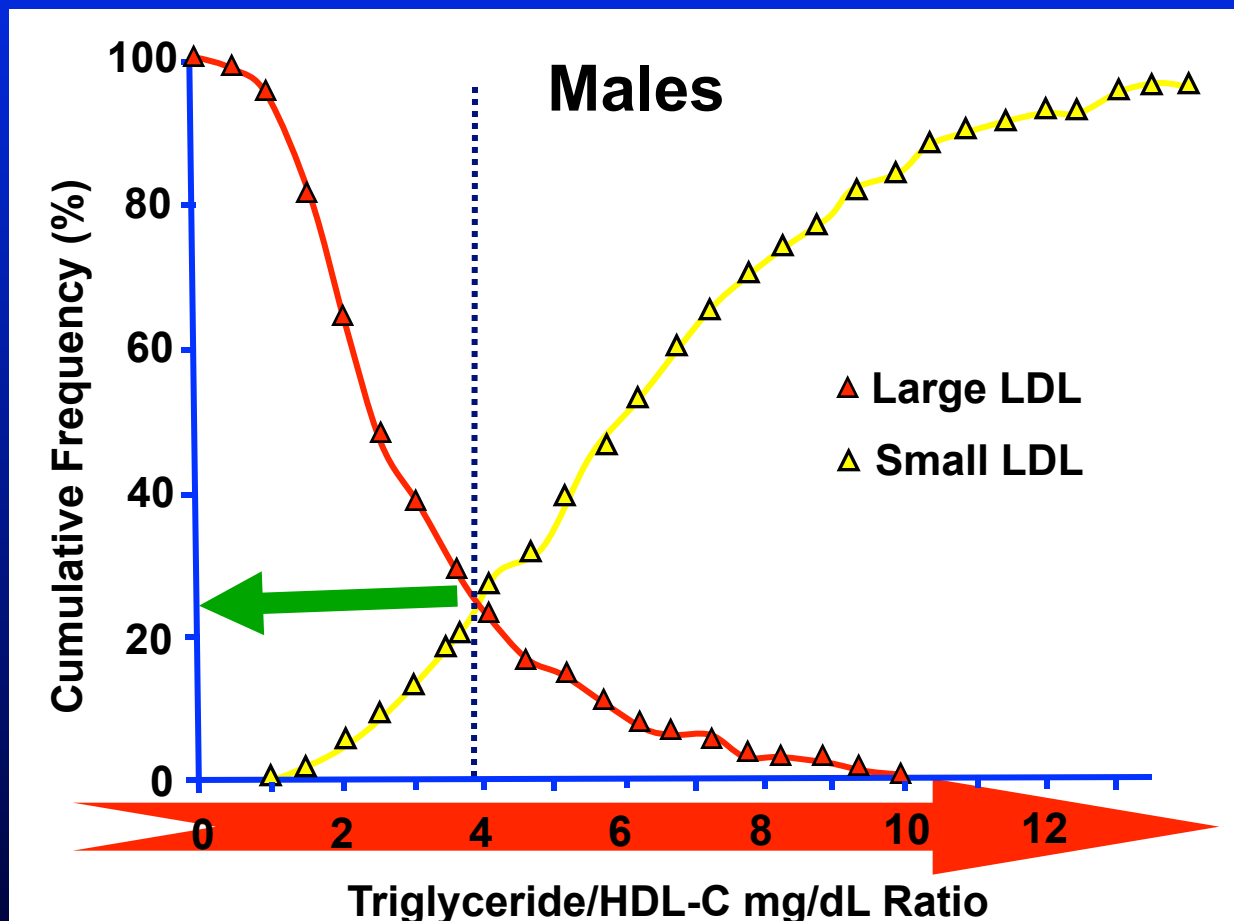
# Women's Ischemia Syndrome Evaluation (WISE): The TG/HDL-C Ratio

## Conclusion

This is the first study among high-risk women to show that the TG/HDL-C ratio is a powerful predictor of total mortality independent of important prognostic variables including age, race, smoking, hypertension, diabetes, and severity of coronary artery disease.

We also found a strong relationship between the TG/HDL-C ratio and severity of coronary artery disease as well as subsequent cardiovascular events among these women with suspected myocardial ischemia.

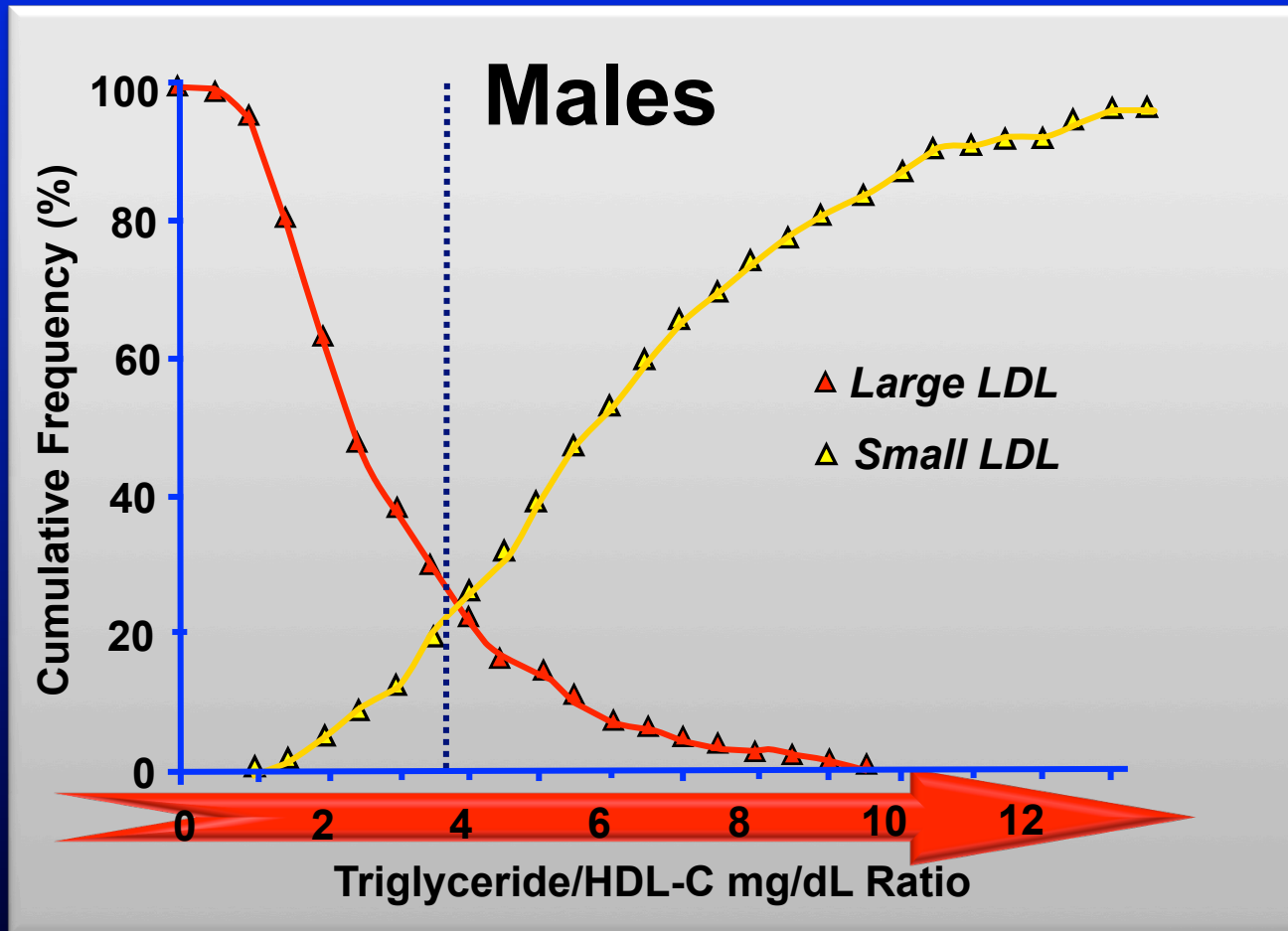
# Relationship of Small LDL to Triglyceride/HDL-C Ratio



**At a ratio  $\geq 3.8$ , 77% of patients will have small LDL phenotype**



# Relationship of Small LDL to Triglyceride/HDL-C Ratio



In men, 76% of the LDL phenotype A was less than and 77% of phenotype B was greater than the cutoff of 3.8.

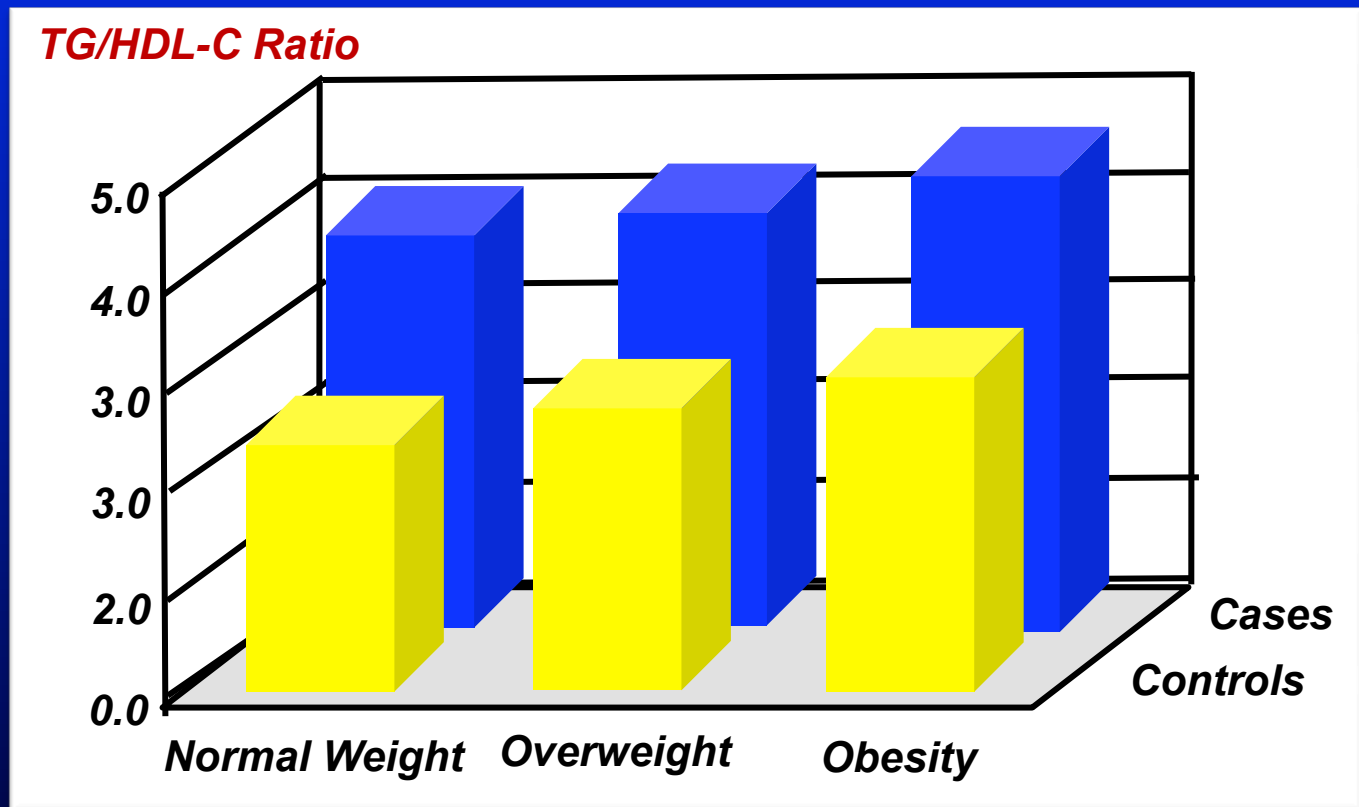
# Multi-Ethnic Study of Atherosclerosis (MESA)

## TG/HDL-C Ratio for Predicting the First Coronary Event in Men

- ▶ We evaluated the predictive value of a surrogate marker of insulin resistance, the ratio of triglyceride (TG) to high-density lipoprotein (HDL), for the incidence of a first coronary event in men workers according to body mass index (BMI).
- ▶ Case subjects included those with myocardial infarction, unstable angina pectoris, or subclinical myocardial ischemia detected through electrocardiographic abnormalities. The sample was constituted by 208 case and 2,080 control subjects (mean age 49.9 years, 49.6 to 50.2). General characteristics of case and control subjects were well matched.
- ▶ Multivariable analysis, adjusted by smoking, demonstrated that TG/HDL -C increased 50% the risk of a first coronary event (odds ratio [OR] 1.47, 95 % confidence interval [CI] 1.26 to 1.71), whereas low-density lipoprotein cholesterol values indicated a more moderate increased risk (OR 1.01, 95% CI 1.005 to 1.012); metabolic syndrome (OR 1.76, 95% CI 0.94 to 3.30) and hypertension (OR 1.50, 95% CI 0.81 to 2.79) did not reach statistical significance.

# Multi-Ethnic Study of Atherosclerosis (MESA)

## TG/HDL-C Ratio for Predicting the First Coronary Event in Men



*Mean values of the TG/HDL-C ratio in case and control subjects according to BMI categories ( $p < 0.01$  for comparison between each category of BMI and between case and control subjects).*

*This study demonstrates the value of the TG/HDL-C ratio in primary prevention of cardiovascular events and allowed identification of this ratio as 1 of the main predictors of a first coronary event.*

**Cordero A et al. Am J Cardiol 2009;104:1393–1397**

# Multi-Ethnic Study of Atherosclerosis (MESA)

## TG/HDL-C Ratio for Predicting the First Coronary Event in Men

The present study demonstrated the value of the TG/HDL-C ratio in primary prevention of cardiovascular events and allowed identification of this ratio as 1 of the main predictors of a first coronary event.

In conclusion, the TG/HDL-C ratio has a high predictive value of a first coronary event regardless of BMI.