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Statistical Fact Sheet — Risk Factors
2008 Update

Metabolic Syndrome — Statistics

The Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP III, NHLBI) defines the metabolic syndrome as having three or more of the following abnormalities: Waist circumference greater than 102 cm (40 inches) in men and 88 cm (35 inches) in women.

- — Triglyceride level of 150 mg/dL or higher.
- — High-density lipoprotein (HDL) cholesterol level less than 40 mg/dL in men and 50 mg/dL in women.
- — Blood pressure of 130/85 mm Hg or higher or drug treatment for hypertension.
- — Fasting plasma glucose level of 100 mg/dL or higher.

- An estimated 47 million U.S. residents have the metabolic syndrome. *(Ford, ES, et al. Prevalence of the metabolic syndrome among US adults: findings from the Third National Health and Examination Survey. JAMA 2002;287:356–9)*

- The age-adjusted prevalence of the metabolic syndrome for adults is 23.7 percent.
  - — The prevalence ranges from 6.7 percent among people ages 20–29 to 43.5 percent for ages 60–69 and 42.0 percent for those age 70 and older.
  - — The age-adjusted prevalence is similar for men (24.0 percent) and women (23.4 percent).
  - — Mexican Americans have the highest age-adjusted prevalence of the metabolic syndrome (31.9 percent). The lowest prevalence is among whites (23.8 percent), African Americans (21.6 percent) and people reporting an “other” race or ethnicity (20.3 percent).
  - — Among African Americans, women had about a 57 percent higher prevalence than men. Among Mexican Americans, women had a 26 percent higher prevalence than men did.

(Ford ES, et al. Prevalence of the metabolic syndrome among US adults: findings from the Third National Health and Examination Survey. JAMA 2002;287:356–9)

Prevalence of Metabolic Syndrome Among Children/Adolescents

- An estimated one in 10 12–19-year-old adolescents in the United States, has the metabolic syndrome, or 9.2 percent overall (9.5 percent for males; 8.9 percent for females). *(Pediatric definition based closely on ATP III)*
  - — Among overweight or obese adolescents, one in three has MetS. Two thirds of all adolescents have at least one metabolic abnormality.

Risk

- In the ARIC/NHLBI study of 12,089 black and white middle-aged individuals, ATP3 MetS was present in approximately 23 percent of individuals without diabetes or prevalent CVD at baseline. Over an average 11 years of follow-up, 879 incident CHD and 216 ischemic stroke events occurred. Men and women with the MetS were approximately 1.5 and 2 times more likely to develop CHD. Among the components of MetS, elevated blood cholesterol and low levels of HDL cholesterol exhibited the strongest associations with CHD. Similar

associations were found between the MetS and incident ischemic stroke. (*McNeill AM, et al. The metabolic syndrome and 11-year risk of incident cardiovascular disease in the Atherosclerosis Risk in Communities study. Diabetes Care 2005;28:385-90*)

- In the FHS, 3,323 middle-aged adults were followed for eight years for the development of new CVD, CHD and type 2 diabetes. In persons without CVD or diabetes at baseline, the prevalence of ATP3 MetS was 26.8 percent in men and 16.6 percent in women. Among men with a mean age of 50 years at baseline, MetS prevalence was 21.4 percent and at the end of follow-up it was 38.8 percent (or 33.9 percent after direct adjustment to the baseline age), demonstrating an adjusted increase of 56 percent over the baseline rate. For women with a mean age of 51 years at baseline, the prevalence was 12.5 percent, and eight years later, it was 30.6 percent (age-adjusted, 23.6 percent), representing an increase in prevalence of 47 percent. In men, the MetS age-adjusted relative risk (RR) and 95 percent CI were: RR=2.88; 95 percent CI, 1.99–4.16 for CVD, RR=2.54; 95 percent CI, 1.62–3.98 for CHD, and RR= 6.92; 95 percent CI, 4.47–10.81 for diabetes. Event rates and RRs were lower in women for CVD (RR=2.25; 95 percent CI, 1.31–3.88) and CHD (RR=1.54; 95 percent CI, 0.68–3.53), but they were similar for diabetes (RR=6.90; 95 percent CI, 4.34–10.94). Population-attributable risk estimates associated with MetS for CVD, CHD and diabetes were 34 percent, 29 percent and 62 percent in men and 16 percent, 8 percent and 47 percent in women. There was a strong positive association between the number of MetS traits and risk of subsequent CHD, CVD and diabetes. The data show that MetS is a far stronger risk factor for diabetes than for CVD. *(Wilson PW, et al. Metabolic syndrome as a precursor of cardiovascular disease and type 2 diabetes. Circulation 2005;112:3066-72)*

- Despite increased risk associated with MetS, data from the ARIC study showed that, by comparison of receiver operating characteristic curves, a diagnosis of MetS did not materially improve CHD risk prediction beyond the level achieved by the Framingham Risk Score (FRS). (*McNeill AM, et al. The metabolic syndrome and 11-year risk of incident cardiovascular disease in the Atherosclerosis Risk in Communities study. Diabetes Care 2005;28:385-90*)

- Population-based data from the United Kingdom compared ATP3 MetS with the Framingham Risk Score (FRS) as predictors of CHD, stroke and type 2 diabetes in men ages 40–59 with no history of CHD, stroke or diabetes, followed over 20 years. Men with MetS at baseline (26 percent) showed significantly higher relative risk (RR) than men without MetS of developing CHD (RR=1.64; 95 percent CI, 1.41–1.90), stroke (RR=1.61; 95 percent CI, 1.26–2.06), and diabetes (RR, 3.57; 95 percent CI, 2.83–4.50). The probability of developing CVD or diabetes over 20 years increased from 11.9 percent in those with no MetS traits to 31.2 percent in those with three traits to 40.8 percent in those with four or five traits. The FRS was a better predictor of CHD and stroke than MetS but was less predictive of diabetes. Areas under the receiver-operating characteristic curves for FHS vs. the number of metabolic traits were 0.68 vs. 0.59 for CHD, 0.60 vs. 0.70 for diabetes, and 0.66 vs. 0.55 for stroke (P<.001 for all). Thus, while the presence of MetS was a significant predictor of CVD and diabetes, it was a stronger predictor of diabetes than of CHD, and the FRS was superior to MetS for prediction of CVD. Data from the San Antonio Heart Study also demonstrate that dedicated risk engines perform better than MetS for prediction of diabetes or CVD. Whether the simple clinical “pattern recognition” afforded by a diagnosis of MetS will lead to better clinical or population health outcomes remains to be determined. (*Wannamethee SG, et al. Metabolic syndrome vs. Framingham risk score for prediction of coronary heart disease, stroke, and type 2 diabetes mellitus. Arch Intern Med 2005;165:2644-50; Stern MP, et al. Does the metabolic syndrome improve identification of individuals at risk of type 2 diabetes and/or cardiovascular disease? Diabetes Care 2004;27:2676-81*)

Abbreviations Used:
ARIC – Atherosclerotic Risk in Communities
FHS – Framingham Heart Study
MetS – Metabolic Syndrome
NHANES – National Health and Nutrition Examination Survey, NCHS

NHLBI – National Heart, Lung, and Blood Institute

For additional information see the Heart Disease and Stroke Statistics – 2008 Update, published in *Circulation*, available on our Web site.