



Every year, more than 795,000 people in the United States have a stroke. Stroke kills almost 130,000 Americans each year and is a leading cause of serious long-term disability. On average, one American dies from stroke every 4 minutes.²

High blood pressure, high cholesterol, and smoking are major risk factors for stroke. About half of Americans (49 percent) have at least one of these three risk factors. Overweight and obesity affects 66 percent of Americans. Those affected have a higher incidence of the risk factors of stroke, and are thus more susceptible to death or disability due to stroke.

Fact 1 Obesity/ Overweight are primary risk factors for stroke for men and women of all races.

- Obesity can increase the risk of stroke due to inflammation caused by excess fatty tissue . This can lead to difficulty in blood flow and an increased risk of blockage, both of which can cause strokes.^{17, 18, 19, 20}
- Excess fatty tissue has been shown to have a significant association with risk of stroke/transient ischemic attack (AKA “mini-stroke”), independent of other vascular risk factors. Waist circumference and related ratios can better predict stroke than BMI.²²
- Degree of obesity, defined by body mass index, waist circumference, or waist-to-hip ratio, was a significant risk factor for ischemic stroke (stroke due to lack of blood flow, rather than due to clotting) regardless of sex or race.

Fact 2 Obesity/ Overweight are associated with secondary risk factors for stroke.

- High blood pressure is the leading cause of stroke, and death rates due to stroke are more than 38 percent. One can minimize his/her risk of stroke by maintaining a healthy weight and blood pressure through eating well and being physically active. The American Heart Association recommends that adults get at least 150 minutes of moderate or 75 minutes of vigorous physical activity such as an intense aerobics class a week. Make a goal of getting 30 minutes of physical activity, five times a week to keep your body moving.^{4,5}
- Individuals who are affected by obesity have a greater chance of suffering from sleep disordered breathing, known as sleep apnea.⁶ Those with sleep apnea have a greater risk of high blood pressure, irregular heart rhythms and stroke.⁷
- Diabetes is an individual risk factor for stroke. Help decrease your risk of diabetes and stroke by maintaining a healthy weight by eating well and being physically active.⁴
- Individuals who are affected by excess weight or obesity have an increased chance of enlargement of the left side of the heart, known as left ventricular hypertrophy. This is due to increased blood pressure and strain on the heart. Research studies have shown that left ventricular hypertrophy and high blood pressure are predictors of heart disease and stroke in both children and adults.²¹

- One out of every five individuals who are affected by excess weight or obesity is affected by a metabolic condition known as "Syndrome X." The factors that characterize this condition, such as high blood pressure or insulin resistance, can increase the individual's risk for developing more serious health problems including heart disease, diabetes, and stroke.³

Fact 3 Weight-loss can minimize one's risk of stroke.

- One way to help prevent having a stroke is by maintaining a healthy body mass index (BMI) and waist-to-hip ratio (WHR). 8-16 WHR is the measure of your waist (abdomen) in inches compared to the measure of your hips in inches. For both men and women, a waist-to-hip ratio of 1.0 or higher is considered "at risk" or in the danger zone for undesirable health consequences such as heart disease and stroke. By keeping the range of these numbers low, you can help to lower your risk of stroke.
- Research studies have shown that obesity is one of the risk factors that can be changed in order to help decrease your risk of having a stroke.¹²

Fact 4 Healthy lifestyle modifications can decrease stroke risk in adults and children.

- Two of the best ways to lower your risk of stroke are by eating a heart healthy diet with plenty of fruits and vegetables, eating sensible portions and being physically active on a regular basis.⁴
- Help to decrease your child's future risk of stroke and other chronic conditions by helping them maintain a healthy weight with a heart healthy diet and daily physical activity (The American Heart Association recommends at least 60 minutes a day for kids).⁴

References:

1. Falkstedt D, Hemmingsson T, Rasmussen F, Lundberg I. Body mass index in late adolescence and its association with coronary heart disease and stroke in middle age among Swedish men. *International Journal of Obesity*. 2007 May; 31(5):777-83. Epub 2006 Oct 17.
2. Baker JL, Olsen LW, Sorensen TI. Childhood body-mass index and the risk of coronary heart disease in adulthood. *New England Journal of Medicine*. 2007 Dec; 357(23):2329-37.
3. Endocrine Society. *Understanding Obesity*. Accessed online June 2010 from <http://www.obesityinamerica.org/understandingObesity/diseases.cfm>
4. American Heart Association. *Heart Disease and Stroke Statistics – 2011*.
5. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*: National Institutes of Health. *Obes Res*. 1998;Suppl 2:51S–209S.
6. Vgontzas AN, Tan TL, Bixler EO, Martin LF, Shubert D, Kales A. Sleep apnea and sleep disruption in obese patients. *Arch Intern Med*. 1994; 154:1705–1711.
7. Partinen M, Jamieson A, Guilleminault C. Long-term outcome for obstructive sleep apnea syndrome patients. *Mortality*. *Chest*. 1988;94: 1200–1204.
8. Abbott RD, Behrens GR, Sharp DS, Rodriguez BL, Burchfiel CM, Ross GW, Yano K, Curb JD. Body mass index and thromboembolic stroke in nonsmoking men in older middle age: the Honolulu Heart Program. *Stroke*. 1994;25:2370–2376.

9. Rhoads GG, Kagan A. The relation of coronary disease, stroke, and mortality to weight in youth and in middle age. *Lancet*. 1983;1:492–495.
10. Shinton R, Shipley M, Rose G. Overweight and stroke in the Whitehall study. *J Epidemiol Community Health*. 1991;45:138–142.
11. Rexrode KM, Hennekens CH, Willett WC, Colditz GA, Stampfer MJ, Rich-Edwards JW, Speizer FE, Manson JE. A prospective study of body mass index, weight change, and risk of stroke in women. *JAMA*. 1997;277:1539–1545.
12. Lapidus L, Bengtsson C, Larsson B, et al. Distribution of adipose tissue and risk of cardiovascular disease and death: a 12 year follow up of participants in the population study of women in Gothenburg, Sweden. *BMJ (Clin Res Ed)*. 1984;289:1257–1261.
13. Folsom AR, Prineas RJ, Kaye SA, Munger RG. Incidence of hypertension and stroke in relation to body fat distribution and other risk factors in older women. *Stroke*. 1990;21:701–706.
14. Terry RB, Page WF, Haskell WL. Waist/hip ratio, body mass index and premature cardiovascular disease mortality in US Army veterans during a twenty-three year follow-up study. *Int J Obes Relat Metab Disord*. 1992;16:417–423.
15. Walker SP, Rimm EB, Ascherio A, Kawachi I, Stampfer MJ, Willett WC. Body size and fat distribution as predictors of stroke among US men. *Am J Epidemiol*. 1996;144:1143–1150.
16. Pyorala M, Miettinen H, Laakso M, Pyorala K. Hyperinsulinemia and the risk of stroke in healthy middle-aged men: the 22-year follow-up results of the Helsinki Policemen Study. *Stroke*. 1998;29:1860–1866.
17. Kurth T, Gaziano JM, Berger K, Kase CS, Rexrode KM, Cook NR, Buring JE, Manson JE. Body mass index and the risk of stroke in men. *Arch Intern Med*. 2002;162:2557–2562.
18. Rost NS, Wolf PA, Kase CS, Kelly-Hayes M, Silbershatz H, Massaro JM, D’Agostino RB, Franzblau C, Wilson PW. Plasma concentration of C-reactive protein and risk of ischemic stroke and transient ischemic attack: the Framingham study. *Stroke*. 2001;32:2575–2579.
19. Sriram K, Benkovic SA, Miller DB, O’Callaghan JP. Obesity exacerbates chemically induced neurodegeneration. *Neuroscience*. 2002;115:1335–1346.
20. Daniels et al. American Heart Association Childhood Obesity Research Summit Report. *Circulation*. 2009;119:e489–e517.
21. Lauer RM, Clarke WR. Childhood risk factors for high adult blood pressure: the Muscatine Study. *Pediatrics*. 1989;84:633–641.
22. Winter Y, Rohrmann S, Linseisen J, Lanczik O, Ringleb PA, Hebebrand J, Tobias B. Contribution of Obesity and Abdominal Fat Mass to Risk of Stroke and Transient Ischemic Attacks. *Stroke*. 2008; 39: 3145-3151
23. Race- and Sex-Specific Associations of Obesity Measures With Ischemic Stroke Incidence in the Atherosclerosis Risk in Communities (ARIC) Study. Yatsuya H et al. *Stroke*. 2010; 41: 417-425