



Causes of Stroke:

Relating Causes & Risk Factors

Risk factors – May / May Not be Controlled

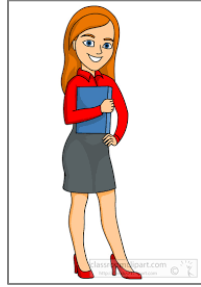
MODIFIABLE

- Health History
 - Overweight, Sleep apnea
 - Medical conditions
 - High blood pressure, Diabetes, Artery disease
 - Unhealthy cholesterol levels
- Lifestyle
 - Lack of exercise, Unhealthy diet
 - Smoking, Alcohol intake

NON-MODIFIABLE

- Age, Race, Gender
- Family history
- Prior Stroke, TIA or Heart Attack

Risk Factors: Not Within Your Control



- **Age**
 - Chances of stroke increase with age
- **Gender**
 - Females have more strokes than men
 - Live longer than men, oral contraceptives, pregnancy related
- **Race**
 - African-Americans have a higher risk of death from strokes compared to Caucasians
 - Likely related to higher risk of high blood pressure, diabetes, obesity
- **Family History**
 - Increased risk if immediate family has a stroke before 65
 - Genetic disorders (blood clots too easily)
- **Prior Stroke, TIA or Heart Attack**
 - Prior stroke -> increased risk of another
 - TIA -> 10x increase in stroke risk
 - Heart attack -> caused by plaque buildup, same happens in brain

Risk Factors: Within Your Control

#1
High Blood Pressure

Top 4 Modifiable Risk Factors

- **High Blood Pressure** – the higher the BP, the higher the risk
- **Smoking** – 53% increased risk compared to non-smokers
- **Diabetes** – doubles stroke risk
- **Artery Disease** – diagnoses of coronary (heart) or peripheral (legs) artery disease also means that the vessels in the brain are likely to be similarly affected

All of the above risk factors affect the structure of the vessels carrying blood and oxygen to the brain.

- Vessels become narrower, restricting blood flow and easier for clots to block → **Ischemic Stroke**
- Vessels can be stressed and can rupture → **Hemorrhagic stroke**

High blood pressure =
"HYPERTENSION"

What is High Blood Pressure?

Blood pressure is measured
in millimeters (mm) of
mercury (Hg)

- **High blood pressure** puts stress on blood vessels

- **Systolic** (top number) is pressure against the vessel walls when the heart beats
- **Diastolic** (bottom number) is the pressure when the heart rests between beats.

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

- Blood pressure rises as people age due to
 - Vessel walls becoming stiffer
 - Plaque builds up
- Risk of stroke doubles with every 20 mm Hg rise in systolic or 10 mm Hg diastolic
- If blood pressure is too high for too long
 - Ischemic stroke – clots are more likely to lodge in narrowed, stiff vessels
 - Hemorrhagic stroke – vessels will burst from excess pressure

Treating high blood pressure



Changes that matter

- Eat a well-balanced diet, low in salt
 - Vegetables, fruit, whole grains, fish, skinless poultry, ...
 - Avoid processed foods (often high in salt)
- Limit alcohol (men limit of 2 per day, women 1 per day)
- Enjoy regular physical activity
- Manage stress
- Maintain a healthy weight
- Quit smoking

Medications

- May require 1 , 2 or even 3 medications
- Dosages may need to be adjusted over time
- Take as ordered!



Smoking



- A proven risk factor for stroke and heart attack
 - Both smoking and secondhand smoke
 - Causes plaque buildup inside arteries (atherosclerosis)
 - While smoking, BP is temporarily increased
- Every 5 cigarettes = 12% increase in stroke risk
- Newer studies reporting increased risk in hemorrhagic strokes (subarachnoid hemorrhage)

- QUIT !
 - Quit ...smoking, vaping, second hand smoke, ALL nicotine
 - Benefits are many
 - Within in 20 minutes BP and heart rate recover from nicotine induced spikes
 - Sense of smoke and taste return, less short of breath
 - 5 years after quitting, risk of stroke return to normal

Diabetes



With diabetes:

- Over time, high blood sugar levels cause many other problems: damage to blood vessels, nerves, kidneys, eyes and more
 - Including damage to blood vessels of heart and brain
- “Good” cholesterol is too low and “bad” cholesterol is too high
- Common to also have high BP and be overweight

- Manage blood sugar
 - Check blood sugars frequently
 - A1C should be below 7%
 - Is a measure of average blood glucose over 3 months
 - Diet, exercise, weight

Artery Disease



- Cholesterol is a waxy substance in the body that helps build new cells



- HDL is called good cholesterol - Carries LDL back to the liver
- LDL is called bad cholesterol - Builds up inside of arteries
- Triglycerides - most common type of fat, it stores up fat in your body

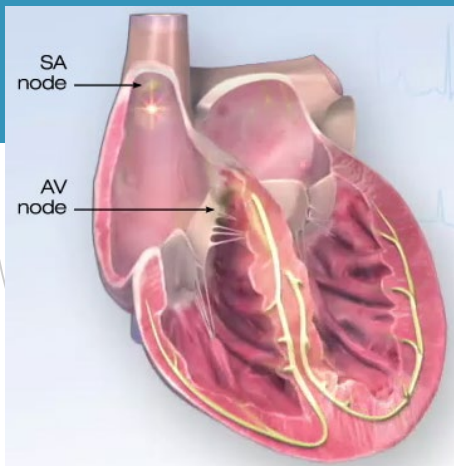
GOALS

- HDL – keep high
- Triglycerides & LDL – keep low

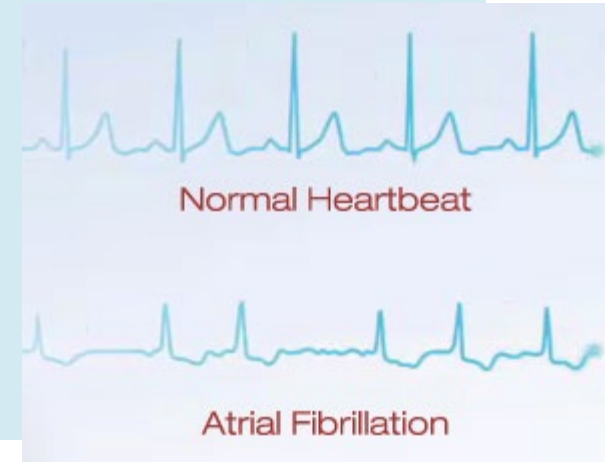
How

- Eat heart-healthy foods, Exercise regularly, Quit smoking, Lose weight, Drink alcohol only in moderation
- Medications – Statins
 - These meds help lower cholesterol levels

Atrial Fibrillation



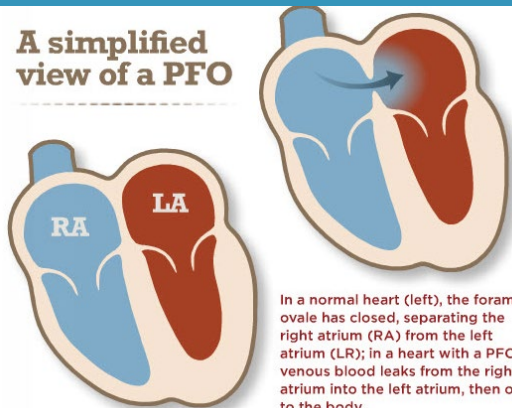
- A-fib is when the heart beat is irregular (arrhythmia)
 - Because the top part of the heart is quivering, blood clots will form
 - Then, the blood clot can travel up to the brain, causing an ischemic stroke
 - Very high risk of stroke in A-fib
 - Heart tends to beat fast too



- To prevent a stroke from A-fib, a blood thinner will be ordered
 - Common blood thinners
 - Warfarin (Coumadin)
 - Apixaban (Eliquis)
 - Rivaroxaban (Xarelto)
 - Medications to slow down the heart

Patent Foramen Ovale

A simplified view of a PFO



In a normal heart (left), the foramen ovale has closed, separating the right atrium (RA) from the left atrium (LA); in a heart with a PFO, venous blood leaks from the right atrium into the left atrium, then out to the body

- PFOs can lead to stroke, esp in younger ages
 - It's common to have tiny clots in the legs that travel up to the lungs, causing no harm
 - When there's a hole in the heart, those tiny clots can move over to the left side of the heart, then to the brain – causing a stroke

- Treatment
 - Blood thinners
 - Close the hole in the heart

Sleep Apnea



- Sleep apnea is when breathing starts and stops during sleep
 - Snoring is a common symptom - but not all snoring is apnea
 - Stress hormones are released, which leads to heart disease, stroke and high BP
 - Affects more men than women
- Obstructive sleep apnea
 - Associated with obesity

- Diagnosis
 - Sleep study
- Treatment
 - CPAP – machine delivers constant pressure to keep airway open
 - Lifestyle changes – avoid caffeine before bed, limit alcohol, physical activity

Obesity



© iStockphoto

- Excess body weight is linked with increase risk of high BP, diabetes, heart disease and stroke
- Metabolic syndrome – ¼ of all adults
 - Set of factors includes large waistline, high BP, high blood sugar, high triglycerides, low HDL

- How to maintain weight loss?
 - Set realistic goals
 - Understand how much and why you eat
 - Manage portion sizes
 - Make smart choices
 - Be physically active
- Even a loss of 5-10 pounds can reduce risk of stroke

Activity Level



- Inactivity is correlated with all other stroke risk factors

- How to be active

- Regular exercise, partner with someone
- Move more often, take extra steps
- Everyday activities – raking, shoveling, household chores

- After stroke – physical limitations may slow you down

- Focus on what you can do
- Begin with daily chores, moving frequently, count and increase your steps
- Steadily increase activity level

Risk Factors Unique to Women



- Older women, 55+
 - Relates to all other common stroke risk factors
 - Women tend to have strokes later, which makes them less likely to recover
 - 3rd leading cause of death.
 - Younger women
 - Some Birth Control Pills (especially if a smoker)
 - Pregnancy can increase risk too
 - High blood pressure, eclampsia (very high BP)
 - Gestational diabetes
 - Blood clots easier, especially towards end of pregnancy
-
- Older women,
 - Refer to general recommendations
 - Younger women
 - Don't smoke if on birth control pills
 - Good prenatal care – to recognize and treat complications of pregnancy & stay active

2021 Guideline for the Prevention of Stroke in Patients with Stroke and Transient Ischemic Attack

Top 10 Patient Messages

- 1. Ischemic strokes, which make up 85% of strokes, are caused by a lack of blood flow or oxygen to the brain.** Ischemic stroke survivors are at risk for another stroke if the cause of the first stroke is not treated. The new guideline is important for ischemic stroke survivors and those who care for them because it includes the most recent findings from studies on preventing future ischemic strokes.

The recommendations give health care professionals more information on medical treatments for stroke survivors. They can also help stroke survivors understand the steps they can take to reduce the chances of another ischemic stroke.
- 2. This guideline focuses on specific approaches to ischemic stroke prevention that best match the identified cause of the first stroke.** Causes of stroke include blockage of the small arteries in the brain, fatty deposit in the larger arteries leading to the brain and heart disease. It's important for your health care professional to identify the reason for the first stroke as quickly as possible to prevent future strokes.
- 3. Our understanding of treatments to help prevent future strokes has greatly increased.** Taking into account the cause of the first stroke and the results of newer studies, health care professionals can offer treatment options that are tailored to individual patient situations. This includes patients with carotid artery disease, atrial fibrillation and other heart conditions.
- 4. Controlling the risk factors for stroke is critical to preventing future strokes.** Achieving and maintaining healthy numbers for blood pressure, blood sugar and cholesterol (all risk factors for stroke) reduce the risk of a second stroke. Health care professionals should monitor these numbers and treat any problems. It's also important to manage and monitor your risk factors (e.g., by checking your blood pressure at home) and to understand how to take prescribed medications.

2021 Guideline for the Prevention of Stroke in Patients with Stroke and Transient Ischemic Attack

- 5. Lifestyle habits, including not smoking, limiting alcohol intake, eating a healthy diet, engaging in regular physical activity and avoiding prolonged periods of sitting or lying down are important to preventing a second stroke.** Low salt and/or Mediterranean diets are recommended for reducing the possibility of another stroke. Stroke survivors are encouraged to exercise or be active at least 10 minutes four times a week or have more vigorous activity at least 20 minutes twice a week. Stroke survivors who sit for long periods of time or who can't exercise by themselves are encouraged to find help exercising safely.
- 6. Changing your habits — for example by eating a healthier diet, doing more exercise and taking medications — requires more than just simple advice or a brochure.** Formal programs where physicians or other health care professionals help you change your routine and behavior can help stroke survivors make — and keep — needed changes.

Studies show that survivors who participate in cardiac rehabilitation programs that include an exercise program combined with education and counseling showed improvements in fitness, cholesterol levels and body weight, as well as decreases in future strokes.

- 7. Stroke survivors from historically under-resourced communities, including Black and Hispanic populations, may face social and economic difficulties, systemic racism and poor living conditions that contribute to ill health and make it difficult to make changes to prevent future strokes.** Health care professionals should evaluate these factors when managing stroke risk to address gaps in care. Further research is needed to determine the best methods for reducing care gaps after stroke for vulnerable populations.
- 8. Shared decision-making is a process where health care professionals describe treatment and prevention options, provide information on the risks and benefits of each option, and help patients choose the best treatment.** While the guideline provides important information for decision-making, it's important that stroke treatment and prevention planning address patients' wishes, goals, concerns and circumstances.
- 9. Irregular heartbeat problems like atrial fibrillation can put stroke survivors at high risk for a future stroke.** It may be important to look for these irregular heartbeats with monitoring by a health care professional, especially in older patients, because AFib can often be treated with medications such as blood thinners.
- 10. Most patients with an ischemic stroke (from a blood clot or other blockages in blood vessels in the brain) or a TIA (transient ischemic attack) need medication that reduces the risk of another stroke or TIA.** The medication prevents blood clots or prevents blockages in the blood vessels supplying blood flow to the brain. It's important to take these medications according to your health care professional's instructions.



American Stroke Association
A division of the American Heart Association.
Together to End Stroke®

What to do **instead** of having another **stroke**.

About one in four stroke survivors suffers a second one — but it doesn't have to be that way. Reduce your risk. Work with your doctor to create a secondary stroke prevention plan and stick with it.

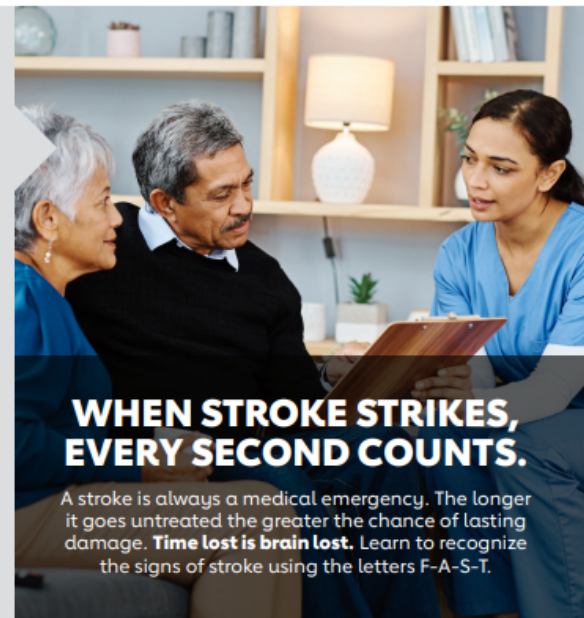
Lower your risk of a 2nd stroke

[Stroke.org/OnIsEnough](https://stroke.org/OnIsEnough)

PREVENTION CHECKLIST

I plan to take these steps instead of having another stroke:

- Know the cause of my stroke
- Manage high blood pressure
- Control cholesterol
- Reduce blood sugar
- Be active
- Eat better
- Lose weight
- Stop smoking
- Be involved in my treatment plan decisions
- Take medications as prescribed
- Join a program that includes exercise, education and counseling



WHEN STROKE STRIKES, EVERY SECOND COUNTS.

A stroke is always a medical emergency. The longer it goes untreated the greater the chance of lasting damage. **Time lost is brain lost.** Learn to recognize the signs of stroke using the letters F-A-S-T.

F.A.S.T.

Face
Drooping

Arm
Weakness

Speech
Difficulty

Time to
Call 911

stroke.org

Take-Away...

Identify Your
Risk Factors!
Work on Your
Risk Factors!



WHAT ARE YOUR RISK FACTORS?

- Do you have the top 4 – High BP, smoking, diabetes, artery disease?
- What are your lifestyle habits?

ARE YOU WORKING ON YOUR RISK FACTORS?

- Is your BP under control?
- Is your blood sugar under control
- Are you eating a healthy diet?
- Are you active? Exercising?
- Are you taking medications as ordered?

High Blood Pressure Symptoms
Sudden Death Unhealthy Brain
Clot Prevention
STROKE
Cerebrovascular
Healthcare
Diagnosis Artery
Disability
Medical Cause Headache
Prevent Blood Flow
Ischemic Dangerous Vessel
Clogged CVA Quickly Clot
Hemorrhagic Early Warning Signs
Sudden

Take-Away...

Know what to do
when you see
stroke
symptoms!

RECOGNIZE STROKE

- Know BEFAST
- Teach BEFAST to others 😊

CALL 911

- Best to call an ambulance
 - They will notify the hospital and doctor prior to arrival
 - Then the stroke team can be prepared and respond promptly

SPOT A STROKE



Balance

Watch for sudden loss of balance



Eyes

Check for blurry vision



Face

Look for face drooping



Arm

Check for arm weakness



Speech

Listen for speech difficulty



Time

Call **9-1-1** right away

