Recognizing And Reacting To Strokes (CVAs) And TIAs

by Pat Leonard

EMT Objectives

After reading this article, the EMT will be able to:

- list the types of patients who are most at risk of having a stroke (CVA);
- recognize the signs and symptoms of stroke;
- list the various types of strokes and conditions that might mimic them;
- explain how to assess, manage and transport the stroke patient.

Introduction

Thirteen years ago, in the Spring 2003 issue of *The Gold Cross,* our CEU article was on the topic of strokes. Written by Charles Prestigiacomo, MD, that article was one of the most comprehensive that has ever appeared in this publication. In fact, for the EMT who wishes to obtain a more thorough understanding of the epidemiology and physiology of "brain attacks," we've converted the entire article into a PDF document and made it available on our website: www.leopub.com.

Some of the material contained in Dr. Prestigiacomo's article also appears in this one, but our focus here will be slightly different. Rather than examining the brain and its structures, divisions and functions, we will look at the stroke patients EMTs are likely to encounter in the field: who they are and the signs and symptoms they present.

Strokes are common – on average, someone in the United States has a stroke every 40 seconds – yet the typical EMS team responds to only four to ten stroke patients per year. It has been estimated that emergency personnel forget about one-half of the stroke care instructions by 12 months after a training session. Also, because the availability of acute stroke care, and the recommended prehospital assessment and care protocols, are continually updated, EMTs should refamiliarize themselves on stroke care basics as frequently as twice a year. This article will cover those basics.

But first, let's update a few statistics on strokes:

Rate Down, Total Incidents Up

As Dr. Prestigiacomo noted in his 2003 article and an accompanying sidebar, the treatment of cerebrovascular accidents (CVAs) was evolving rapidly. What had been considered throughout history to be an untreatable "stroke" of God's hand (hence the name), was in the 21st Century being treated rapidly, aggressively and effectively. As a result of these treatments and a few other factors, CVAs have gone from being America's third-leading cause of death in 2003, to fifth place as of 2014 – behind heart disease, cancer, respiratory diseases and accidents. *(Figure 1).*

At the same time that CVA fatalities have been declining, so has the ***overall*** rate of stroke occurrences. Studies show that, thanks to an increased use of medications that attenuate stroke risk, the incidence of strokes has decreased over the past few decades. Control of diabetes mellitus and high cholesterol and smoking cessation programs, particularly in combination with hypertension treatment, also appear to have contributed to the decline in stroke mortality.

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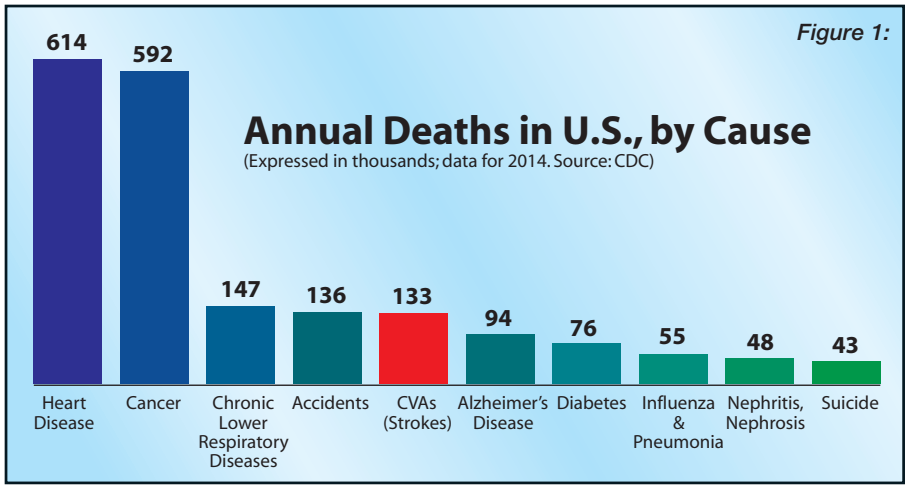
Figure 1:



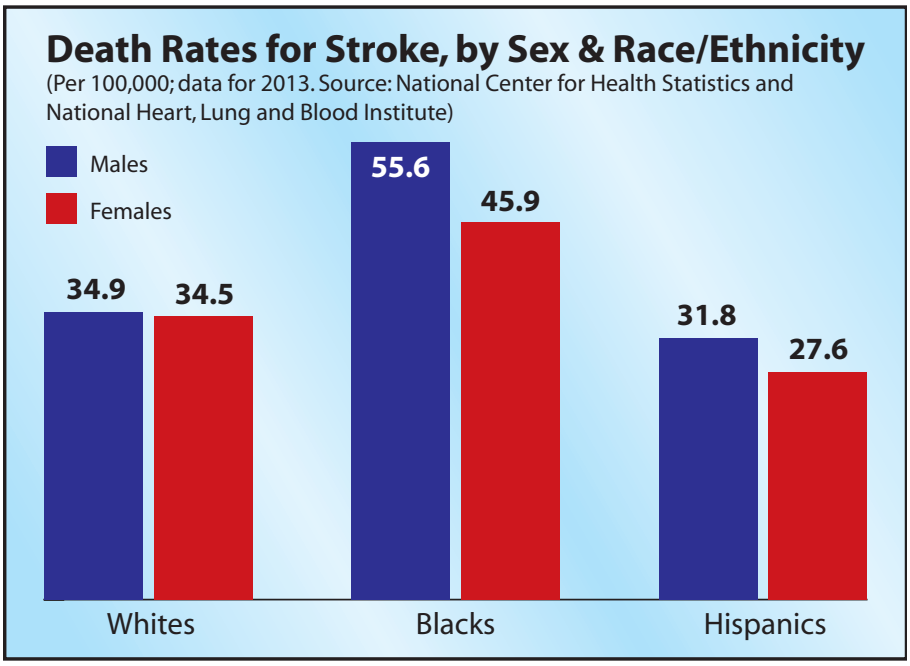
That's the good news. The bad news is that these decreases have not been uniformly distributed across all age and ethnic groups. Stroke rates have declined for whites, but not for blacks. *(Figure 3)* And while ischemic stroke rates have declined significantly in people aged 60 and over, they have remained largely unchanged in those aged 45 to 59. Also, through age 75, women generally have lower incidence rates than men *(Figure 2)*, but more women than men actually die of stroke each year because of the larger number of elderly women. Women accounted for 58% of US stroke deaths in 2013.

Women have lower incidence rates of stroke, but more women than men actually die of stroke due to the larger number of elderly women.

Nor is the incidence of strokes evenly distributed nationwide. Residents of southeastern states have a considerably higher incidence of strokes and stroke fatalities than the nation at large *(Figure 4, next page)*. (As a whole, New Jersey has a lower-than-average incidence rate, except for the southwestern counties of Cumberland, Gloucester and Salem.)

Furthermore, as the average age of the population increases, the total number of incidents will go up – even as the incident rate stabilizes or declines. Projections show that by 2030, an additional 3.4 million people aged 18 and over will have had a stroke, a 20.5% increase in prevalence from 2012. The highest increase (29%) is projected to be in Hispanic men.

Figure 2:

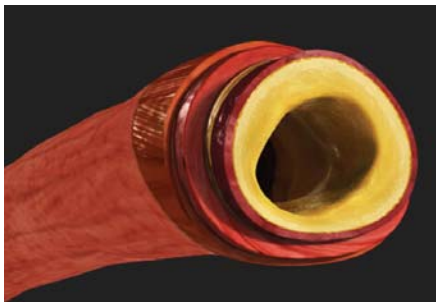


Types of Stroke

There are two major types of stroke: ischemic and hemorrhagic.

- **Ischemia** is a local decrease in blood supply due to mechanical means such as a narrowed or plugged artery. Most often this is caused by a build-up of plaque in the arteries, a well-known condition called atherosclerosis. *(Photo 1)* The cells within the area become ischemic, or oxygen-starved. If the condition is not reversed, the cells infarct, or die.

Photo 1 - Athersclerosis



A cerebrovascular accident occurs when a blood vessel in the brain becomes obstructed by a clot (thrombus) which may have formed in a narrowed artery or may have originated in a different site and traveled through the blood stream to the vessels of the brain. Once obstructed, the area of brain cells becomes ischemic, and if the condition is not reversed, infarcts. *(Figure 5, next page)*

A clot that originates at one site and travels to another is called an embolus. *(Plural: emboli)* Emboli can be fat globules, air bubbles or most commonly, bits and pieces of atherosclerotic plaque such as lipid debris that have detached from a diseased carotid artery or elsewhere. The bloodstream moves the embolus to another site, such as a pulmonary artery or the brain where it becomes

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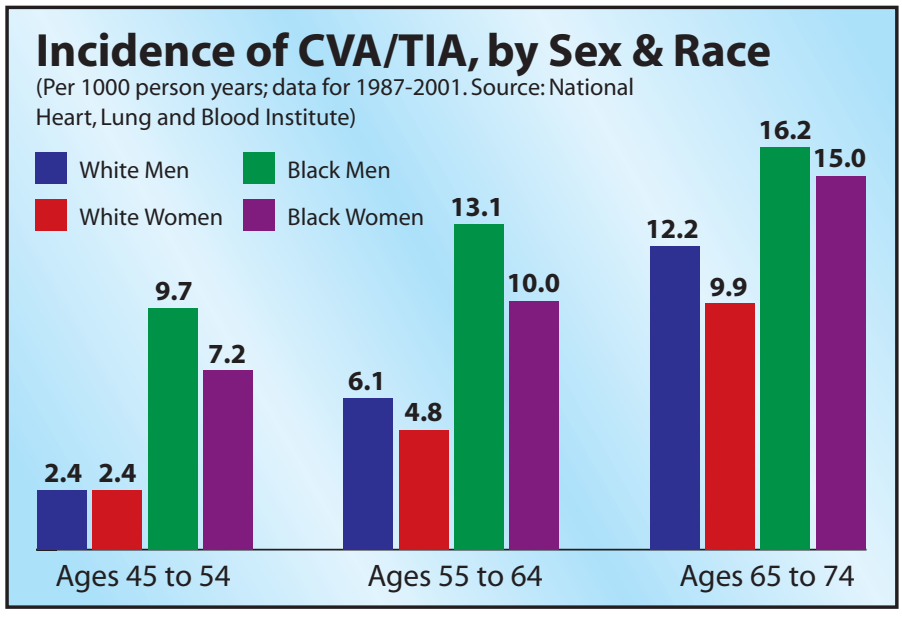
Figure 3:



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lodged. Patients with a cardiac condition called atrial fibrillation can develop clots within the heart's atrium which then break off and embolize into the cerebral circulation. Other patients at risk of developing thrombi and possible CVA include women who take birth control pills which makes the blood more prone to form clots. *(For a list of individuals at risk for a stroke, see Figure 6.)*

For stroke management, "time lost is brain lost." After an ischemic stroke, the amount of irreversible damage increases steadily as long as brain regions remain without sufficient blood supply. In those parts of the affected region that have no blood flow, neurons begin to die in less than ten minutes. In those areas with less than 30% of normal blood flow, neurons begin to die within an hour. In those areas with 30–40% of normal blood flow, some neurons begin to die within an hour, but others can be revived for many hours.

● **Hemorrhagic** CVA occurs when there is a sudden rupture of a blood vessel in the brain. This may be caused by the effects of severe hypertension or drug use (e.g., cocaine), which results in bleeding within the brain. Hemorrhage may also be the result of a ruptured aneurysm, or a tear of a weakness along a wall of an artery supplying the brain.

Ischemic CVAs occur far more frequently than hemorrhagic CVAs (roughly 85% of strokes are ischemic), but hemorrhagic CVAs are usually more deadly. One recent study showed that the mortality rate after a stroke (both types) was 10.5% at 30 days, 21.2% at one year, 39.8% at five years, and 58.4% at the end of follow-up. Mortality rates after a hemorrhagic stroke were 67.9%; after an ischemic stroke the mortality rates were 57.4%.

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Although it is not your job as an

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Figure 4:

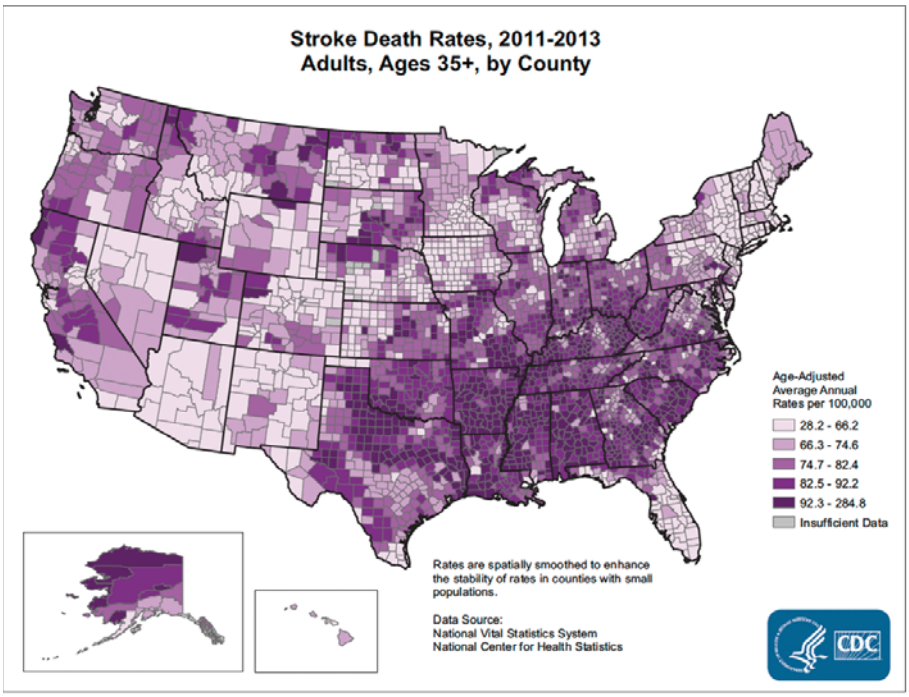


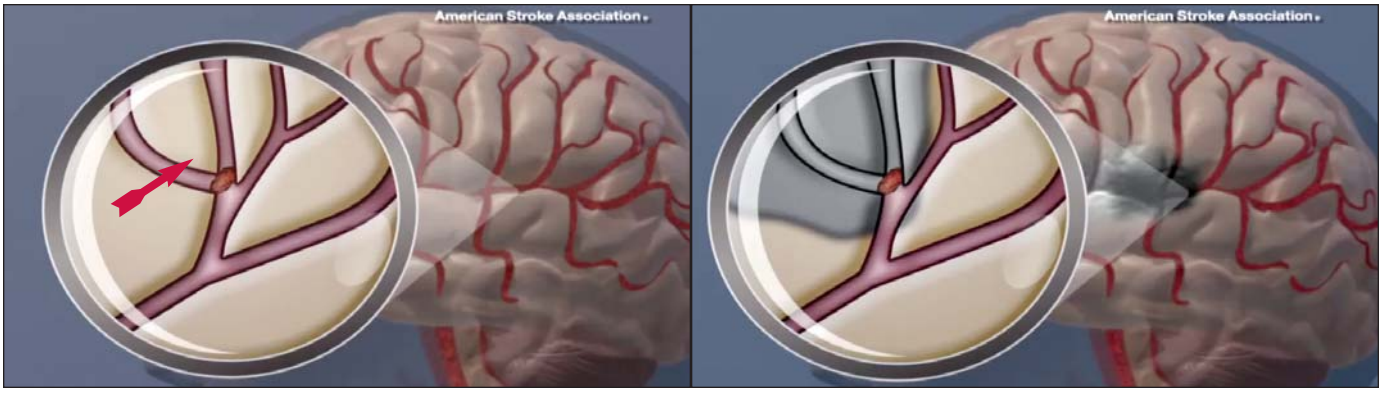
Figure 6:

Risk Factors For Stroke

In addition to the factors of race and sex illustrated in Figures 2 and 3, individuals with the following conditions and/or lifestyle choices are at greater risk of suffering a CVA or TIA:

- High blood pressure
- Diabetes
- Heart rhythm disorders (especially atrial fibrillation)
- High cholesterol
- Smoking/tobacco use
- Physical inactivity
- Family history of strokes
- Chronic kidney disease
- Previous CVA or TIA
- Women on birth control and/or with a history of migraines

Figure 5:



An ischemic cerebrovascular accident (CVA) occurs when blood circulation to an area of the brain is blocked *(left enlargement)* and vital brain tissue dies due to lack of oxygen and nutrients. The sensitive cells of the brain are permanently damaged after only four to five minutes without oxygen and glucose. When an area of the brain is deprived of these nutrients, that portion of the brain dies *(right illustration)* and the function it provided is altered.

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EMT to distinguish between types of stroke in the prehospital field, it is imperative that you recognize signs and symptoms of stroke, understand a CVA may be in progress and take immediate steps to maximize the functional outcome of the patient.

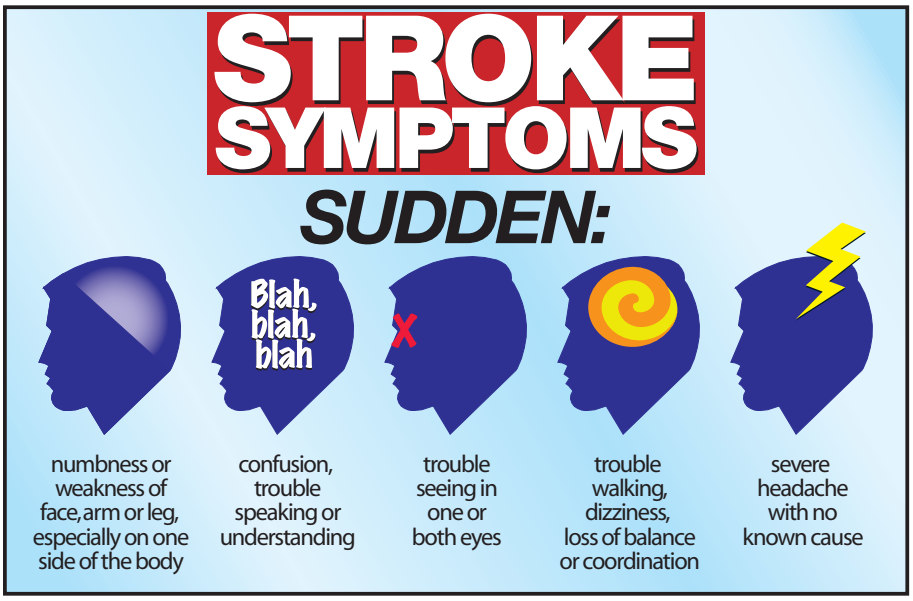
Signs & Symptoms of Stroke

EMTs cannot assume that victims know how to recognize potential strokes. A survey by the American Heart Association found that only 55% of patients ***who have already had a stroke*** could identify even one stroke warning sign.

Stroke symptoms depend on the area of the brain that is affected, which is most often the middle cerebral artery or one of its branches. Symptoms can include: numbness, weakness or paralysis on one side of the body (usually contralateral hemiplegia) or face; confusion, difficulty speaking or writing, or difficulty understanding, difficulty seeing and/or visual field defects; gait deviations. *(Figure 7; also see Photo 2, next page)*

Unlike an ischemic stroke, hemorrhagic strokes can present with a sudden onset of severe ("thunderclap") headache. During assessment, a patient may report "the worst headache" of his life. The sudden increase in blood volume within the rigid skull causes a rapid increase in intracranial pressure which may result in a loss of consciousness, or even death.

Figure 7:



Transient Ischemic Attack

At times, symptoms of CVA occur and disappear within 24 hours of onset. The EMT is dispatched for "possible CVA" and arrives to discover the patient speaking and moving about normally. This situation, though not a CVA per se, represents a temporary obstruction of blood flow through a narrowed vessel, thus a relatively mild period of hypoxia to a part of the brain. The temporary condition is aptly termed a transient (or "passing") ischemic attack (TIA). Patients may sometimes describe a "veil" or "window shade" partly covering the vision of one eye which resolves spontaneously after several minutes. This in fact represents the temporary blockage, or occlusion, of the retinal artery to the eye by an embolus. There may also be dizziness, imbalance and generalized weakness. Patients experiencing new onset or recurrent TIAs need medical evaluation urgently as left untreated, the condition may result in a CVA.

Evaluation And Management

Recognizing a stroke may be difficult. As an EMT, you need to evaluate clues from the patient, family/witnesses and the surrounding environment. Note that many other disease processes may mimic stroke, such as tumors, infections (meningitis), head injury and hypoglycemia. It is not your role, however, to distinguish between the many things that can mimic stroke. Rather, you must recognize the possibility that a CVA is in progress and then provide the necessary in-field supportive treatment and rapid transportation to a facility that can effectively treat acute stroke. *(See list, page 15)* In New Jersey, advanced life support (ALS) is usually dispatched for suspected CVA.

Numbness, weakness or paralysis on one side of the body are all signs of stroke. So is a persistent gaze to one side or other.

- **Assessing the Scene**: Try to extract as much information from the scene as possible, especially if the patient is unable to communicate with you and no witnesses to the

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Ramsey Ambulance Corps

Theresa J. Tighe
Sea Isle Vol. Amb. Corps

Jim Rivicki
Upper Greenwood Lake VAC

Shirley Schenck
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Lenny Baum
JRW Oakland FAS

Andrea Raffetto
Spring Lake First Aid Squad

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Avon First Aid & Safety Sqd.

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Point Boro First Aid

Thomas Hamburg
Point Boro First Aid

Mort Schmerling
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Steve Levine
Marlboro FA&RS &
Englishtown-Manalapan FA

Resolutions of Condolence have been adopted by the EMSCNJ.

John Tymon
Chair - EMSCNJ
Pastoral Committee

event are present. ***Time of onset of symptoms is very important.*** Therefore, assess the scene for clues as to when the event may have occurred.

● **Initial Assessment**: At times, the general impression of the patient may clearly suggest a stroke: A patient who is not moving his left arm and leg, and is persistently looking to the right, must be quickly triaged as a strong candidate for CVA. Numbness, weakness or paralysis on one side of the body are all signs of stroke. So is a persistent gaze to one side or the other. After assessing the mental status, obtain the chief complaint, if possible. Ask the patient what is wrong. Pay particular attention to his speech pattern to determine if his words are slurred or incomprehensible. Does what he says make sense?

Photo 2: Signs of CVA include facial droop and asymmetrical arm drift.

While assessing the A-B-Cs, look for possible airway obstructions such as dentures, blood or saliva. If there are snoring or gurgling respirations, be prepared to suction. When assessing for breathing, put a nonrebreather mask with 100% oxygen on any patient with a depressed level of responsiveness. Be prepared to use positive pressure ventilations (bag-valve-mask with oxygen) if the patient is breathing inadequately.

After assessing the A-B-Cs, quickly evaluate the conscious patient for CVA by performing the Cincinnati Prehospital Stroke Scale. *(Figures 8 & 9)* This is a rapid method which within seconds assesses the patient's facial muscles, arm movement and speech function.

● Ask the patient to smile and show you his teeth. (Don't just ask for a smile; some people's normal smile is asymmetrical. To show his teeth requires a patient to strongly contract facial muscles on both sides

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of the mouth. Weakness on one side produces a lopsided grin revealing more upper teeth on the stronger side.) If you see a degree of facial asymmetry or lopsidedness, this is an abnormal finding.

To show his teeth requires a patient to strongly contract facial muscles on both sides of the mouth.

- Ask the patient to close his eyes and hold out his arms. Again, if one arm drifts down or does not move equally, the finding is abnormal.
- Ask the patient to repeat: "You can't teach an old dog new tricks." Abnormal findings include slurring of words (dysarthria), saying inappropriate words (dysphasia), or not speaking at all (aphasia).

Any abnormal findings on the Cincinnati Prehospital Stroke Scale should make you aware that the patient is probably having (or has had) a CVA and should be treated as a high priority patient. Definitive treatment critically depends upon arriving at the hospital within a short time of onset. Complete the focused history and detailed physical exam en route.

- ***SAMPLE History:*** When obtaining a complete SAMPLE history, you need to identify certain parameters either from the patient, witnesses or family. It is vital to note the time signs and symptoms began. If there were no witnesses at the time of onset, find out who the last person was to see the patient without symptoms and determine when that was. Carefully document this time as it could determine if a patient can be treated with current intravenous or intraarterial therapies.

It is also important to note if the patient had headaches or seizures associated with the onset of symptoms. The presence of headache or seizure activity is usually associated with hemorrhagic CVA.

A list of the patient's medications is very important in this situation as it can provide further clues to assist in the diagnosis. If the patient is on anticoagulants (e.g., Coumadin® or Lovenox®) or antiplatelets (e.g., aspirin, Ecotrin®, Plavix®, Ticlid®), find out why and how long the patient has taken these meds. Though these meds have many indications for use, including TIAs, they may also result in intracranial hemorrhage. If the patient is taking such medications, determine if there has been recent trauma, since minor head trauma while taking these medications can result in potentially life-threatening intracranial hemorrhages.

Obtaining a past medical history should include whether the patient has a history of hypertension, prior CVA or TIA, diabetes, or coronary

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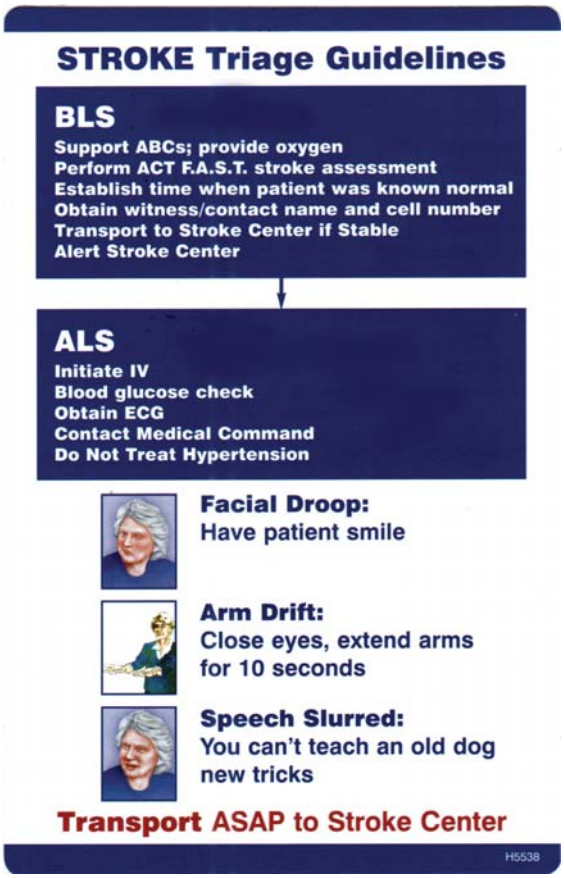
Figure 8:



Pocket Guide: NJDOH/OEMS has published reference cards for emergency responders who encounter a patient suffering from a suspected stroke or (on the flip side) a myocardial infarction. To request cards for your squad, contact Tom Hendrickson at 609-633-7777.

Is It A Stroke… or Bell's Palsy?

The two most common causes of acute facial paralysis are Bell's palsy and ischemic stroke. Bell's palsy is a facial weakness that most often affects patients in their 20s-to-50s, and from which patients typically recover within six months. Because acute stroke is a time-critical illness, the distinction between stroke and Bell's palsy must be made quickly to avoid unnecessary delays in treatment. As an EMT, your objective is not to make a diagnosis but to rule out the possibility that your patient's condition is caused by Bell's palsy and nothing more. The most effective way to do that is to look for associated signs and symptoms of stroke: weakness/numbness in the arm or leg; slurred speech; double vision; difficulty swallowing; incoordination; vertigo. If the patient has any of these features present on exam, it's most likely a stroke. If your patient's symptoms developed over hours or days, and involves upper and lower facial weakness *only* (i.e., otherwise normal), it's most likely Bell's palsy.

Typical Presentation of Bell's Palsy and Acute Stroke

	Bell's Palsy	Acute Stroke
Typical Age	20s-50s	> 60
Time Course	Hours to a Few Days	Seconds to Minutes
Upper Face	Always Affected	Usually Not Affected
Lower Face	Always Affected	Always Affected
Associated Symptoms	Typically None (Rare facial numbness)	Weakness, numbness, speech difficulty, slurred speech, double vision, facial numbness, difficulty swallowing, vertical ataxia

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artery disease.

● ***Physical Examination:*** Careful assessment of vital signs is important in helping a physician to diagnose the problem. For instance, a patient with left-sided weakness and a blood pressure of 220/100 may have sustained a hypertensive intracerebral hemorrhage and not an ischemic CVA. EMTs should be aware that blood pressure will sometimes be very high. (When taking a blood pressure of a possible stroke patient, pump-up the cuff to at least 200 mmHg before auscultating a pressure.) The pulse will be bounding on palpation. Pupils may be unequal or unreactive.

A past medical history should include any history of hypertension, CVA or TIA, diabetes, or coronary artery disease.

A focused physical examination was already initiated with the use of the Cincinnati Prehospital Stroke Scale. The presence or absence of a gaze preference is important to clinicians at the receiving hospital.

Figure 9:

Cincinnati Prehospital Stroke Scale

Try to elicit one of the following signs. Abnormality in any one is strongly suggestive of stroke.

- **Facial Droop**: Have patient smile and show his teeth:
  Normal: both sides of face move equally well
  Abnormal: one side of face does not move as well as the other side
- **Arm Drift**: Have patient close eyes and hold both arms straight out for 10 seconds:
  Normal: both arms move the same or both arms do not move at all
  Abnormal: one arm does not move or one arm drifts down
- **Abnormal Speech**: Have the patient repeat:
  "You can't teach an old dog new tricks."
  Normal: patient uses correct words with no slurring
  Abnormal: patient slurs words, uses the wrong words or is unable to speak

Stroke patients may not be able to express themselves and/or may not understand what is happening around them, or what you are saying or asking them to do. Nonetheless, they may be quite aware that something is dreadfully wrong. At all times reassure the patient and keep him as calm as possible. Always explain what actions are being taken to help him.

● ***Transport:*** Once you have assessed the patient and suspect he might be having some type of CVA, transport him immediately. Conscious patients should be placed on the litter in a position of comfort. (Protocols differ on patient positioning: some suggest laying the patient flat to facilitate oxygen flow to the brain; some recommend elevating the head 20-30° to protect against aspiration; still others recommend the lateral recumbent position. Use your best judgment to evaluate each patient's condition and act accordingly.) Unconscious, unintubated (non-trauma) patients need to be transported with an oropharyngeal or nasopharyngeal airway in place.

Although ALS should be dispatched, do not delay transport waiting on scene. Also, it is important to alert the receiving hospital and provide pertinent information so that the necessary personnel can be ready to quickly evaluate the patient and initiate treatment, if necessary.

New Jersey's Acute Care Hospitals, by County

Atlantic County
Atlanticare Reg. Medical Center - City Campus
Atlanticare Reg. Medical Center - Mainland Campus
Shore Medical Center

Bergen County
Englewood Hospital and Medical Center
Hackensack University Medical Center
Bergen Regional Medical Center
The Valley Hospital
Holy Name Medical Center
Hackensack-UMC at Pascack Valley

Burlington County
Virtua - West Jersey Hospital Marlton
Virtua Memorial Hospital of Burlington County
Lourdes Medical Center of Burlington County

Camden County
Cooper Hospital University Medical Center
Our Lady of Lourdes Hospital
Kennedy University Hospital - Cherry Hill Division
Kennedy University Hospital - Stratford Division
Virtua - West Jersey Hospital Voorhees

Cape May County
Cape Regional Medical Center, Inc

Cumberland County
Inspira Medical Centers, Inc

Essex County
Clara Maass Medical Center
East Orange General Hospital
Saint Barnabas Medical Center
Hackensack-UMC Mountainside
University Hospital
Newark Beth Israel Medical Center
Saint Michael's Medical Center

Gloucester County
Kennedy University Hospital - Washington Twp Division
Inspira Medical Center Woodbury

Hudson County
CarePoint Health - Bayonne Medical Center
CarePoint Health - Hoboken University Medical Center
Carepoint Health - Christ Hospital
Jersey City Medical Center
Palisades Medical Center
Meadowlands Hospital Medical Center

Hunterdon County
Hunterdon Medical Center

Mercer County
RWJ University Hospital - Hamilton
Capital Health Med. Center - Hopewell
Capital Health System at Fuld
St. Francis Medical Center

Middlesex County
Anthony M. Yelencsics Community Hospital
Robert Wood Johnson University Hospital
Saint Peter's University Hospital
Raritan Bay Medical Center - Old Bridge Division
Raritan Bay Medical Center - Perth Amboy Division
University Medical Center of Princeton at Plainsboro

Monmouth County
CentraState Medical Center
Bayshore Community Hospital
Monmouth Medical Center
Jersey Shore University Medical Center
Riverview Medical Center

Morris County
Saint Clare's Hospital/Denville Campus
Saint Clare's Hospital/Dover
Morristown Medical Center
Chilton Medical Center

Ocean County
Ocean Medical Center
Monmouth Medical Center-Southern Campus
Southern Ocean Medical Center
Community Medical Center

Passaic County
St Mary's General Hospital
St. Joseph's Hospital and Medical Center
St. Joseph's Wayne Hospital

Salem County
Inspira Medical Center Elmer
The Memorial Hospital of Salem County

Somerset County
RWJ University Hospital - Somerset

Sussex County
Newton Medical Center

Union County
Trinitas Regional Medical Center
Robert Wood Johnson University Hospital at Rahway
Overlook Medical Center

Warren County
Hackettstown Regional Medical Center
St. Luke's Warren Hospital