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Community Stroke Series



**AMAZING
THINGS
ARE
HAPPENING
HERE**

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ACT FAST: How to Identify and Treat Stroke

11.12.2018

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**Weill Cornell
Medicine**



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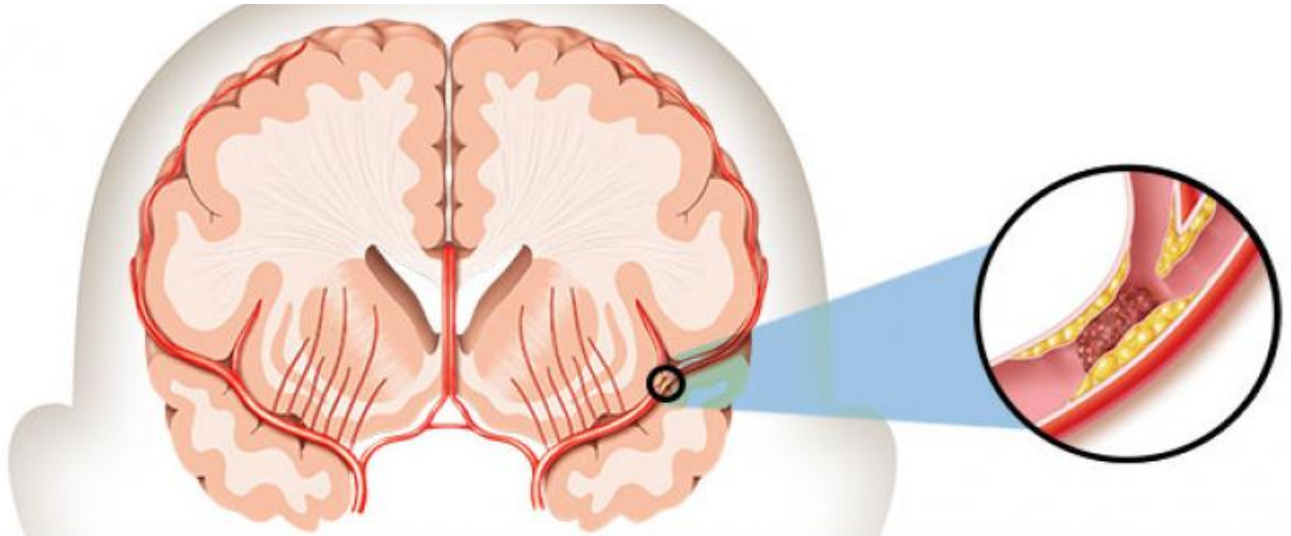
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Financial Disclosures: None



Stroke Overview



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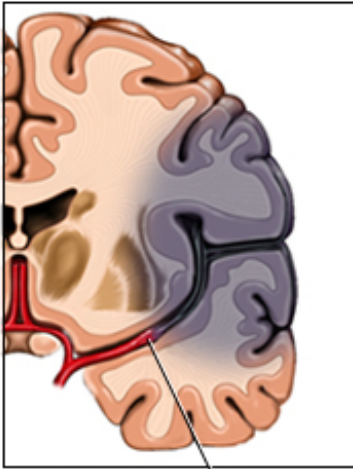
Stroke Statistics

- 800,000 Strokes in the US annually
- Fifth leading cause of death in the US
 - Every four minutes, a person dies of a stroke
- Leading cause of serious, long-term disability in the US
- Costs the US \$34 billion annually

Mozaffarian D et al. *Circulation* 2015; 131 (4): e29-322

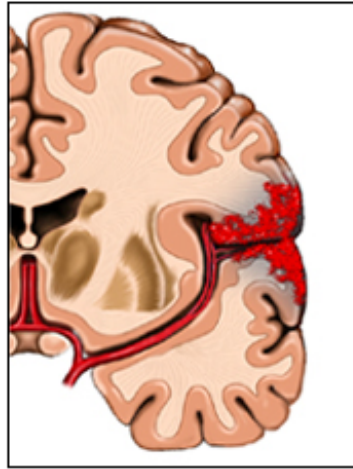
What is Stroke?

Ischemic stroke



A clot blocks blood flow to an area of the brain

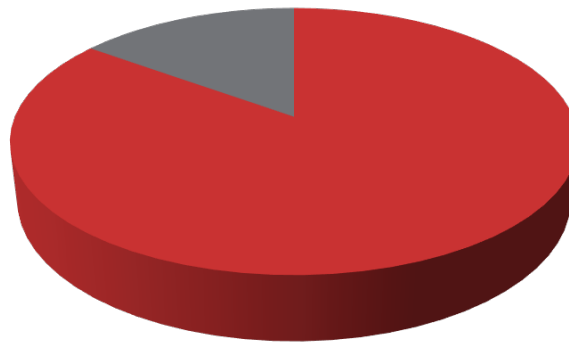
Hemorrhagic stroke



Bleeding occurs inside or around brain tissue

Stroke is the sudden death of brain cells due to lack of oxygen, caused by blockage of blood flow or rupture of an artery to the brain.

Types of Stroke



■ Ischemic Stroke (85%)

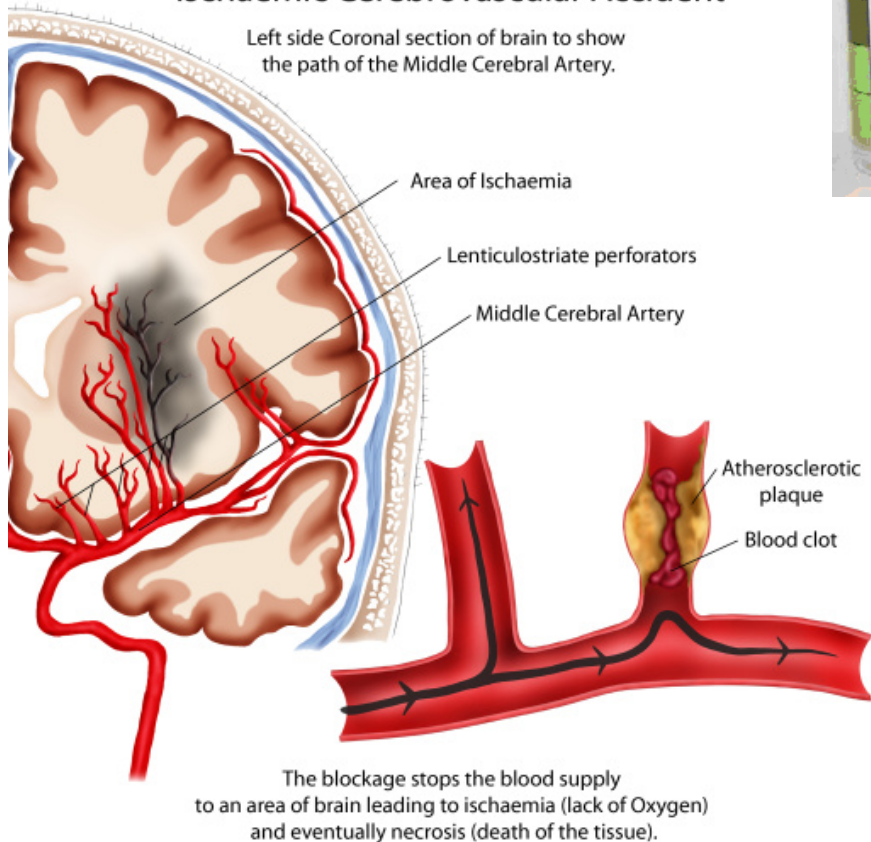
■ Hemorrhagic Stroke (15%)

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The Target Lesion – a blocked artery

Ischaemic Cerebrovascular Accident

Left side Coronal section of brain to show the path of the Middle Cerebral Artery.



“tPA”: Clot-buster drug to treat ischemic stroke, given through an IV

- Must be administered within 4.5 hours of stroke onset
- Better neurologic outcomes are associated with decreases in time to treatment
- AHA/ASA national quality improvement campaign: **treatment of ischemic stroke within 45 minutes of ED arrival**

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STROKE IS AN EMERGENCY... TIME IS BRAIN

Table 1. Time-to-treat impact on stroke outcomes

	Neurons lost ^a	Synapses lost	Accelerated aging
Per stroke	1.2 billion	8.3 trillion	36 yr
Per hour	120 million	830 billion	3.6 yr
Per minute	1.9 million	14 billion	3.1 wk
Per second	32,000	230 million	8.7 hr

Saver, Stroke, 2006

A Need for Improved Stroke Recognition and Response

- <10% of all stroke patients receive IV tPA¹
- 11% of tPA patients are treated within 90 min²
- Symptom onset-to-treatment time is 2 hours and 21 minutes in US³



1) Fassbender K et al. *Lancet Neurol* 2013; 12(6) 585-596

2) Wahlgren N et al. *Lancet* 2008; 372 (9646): 1303-1309

3) Lin CB et al. *Circulation: Cardiovasc Qual Outcomes* 2012; 5: 514-22

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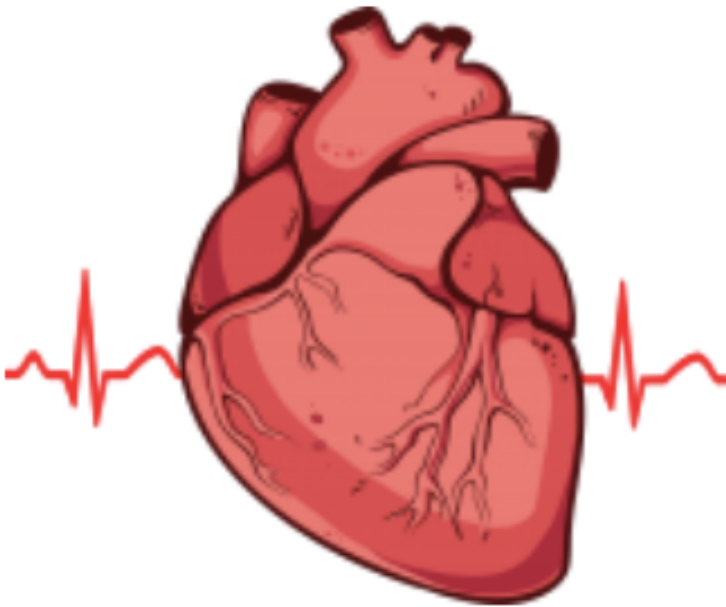
Reasons Patients Delay ER Arrival During Stroke

- “Waiting to get better”
- Didn’t want to “cause trouble” or “bother EMS”
- Failure to recognize symptoms; “didn’t know I was having a stroke”
- Lack of knowledge of what to do; “didn’t know to call 911”
- “Wasn’t sure anything could be done;” unaware of effective stroke treatments
- We need to better identify and respond to stroke symptoms, so we can treat more patients and prevent disability/death!
- Don’t be afraid to overreact to stroke

What are the symptoms of...

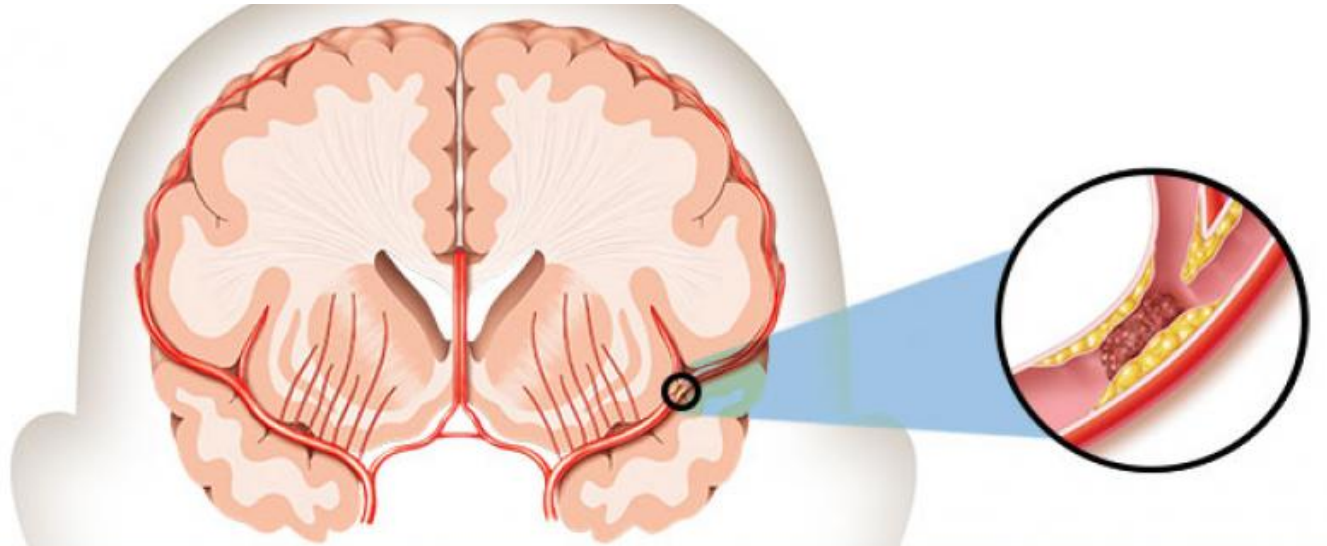
- Heart Attack?

- Stroke (Brain Attack)?



What are the Symptoms of Stroke?

- Occurs suddenly
- Usually affects one side/half of the body
- Weakness, numbness, dizziness, vision change, speech problems, facial drooping, confusion, neglecting half of body, headache



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How to Identify Stroke

B



sudden loss of
Balance

E



sudden loss of
vision in one or
both **E**yes

F



uneven **F**ace
(facial droop) or
uneven smile

A



sudden **A**rm
weakness

S



sudden slurred
Speech or
trouble speaking,
confusion

T



Time is
critical, **call 911**
immediately

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BE-FAST: T is for Time

- Balance, Eyes, Face, Arm, Speech, (TIME)
- If you observe someone with any of these symptoms, immediately call 911.
 - Do NOT drive the person to the nearest hospital yourself!



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Face

- Ask the person to smile and look for droopiness of the face or any asymmetry



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Arm

- Look to see if the arm is weak, limp at the side, or any other asymmetry. If unsure, ask the person to lift their arms for 10 seconds and see if one of the arms falls to the floor.

A



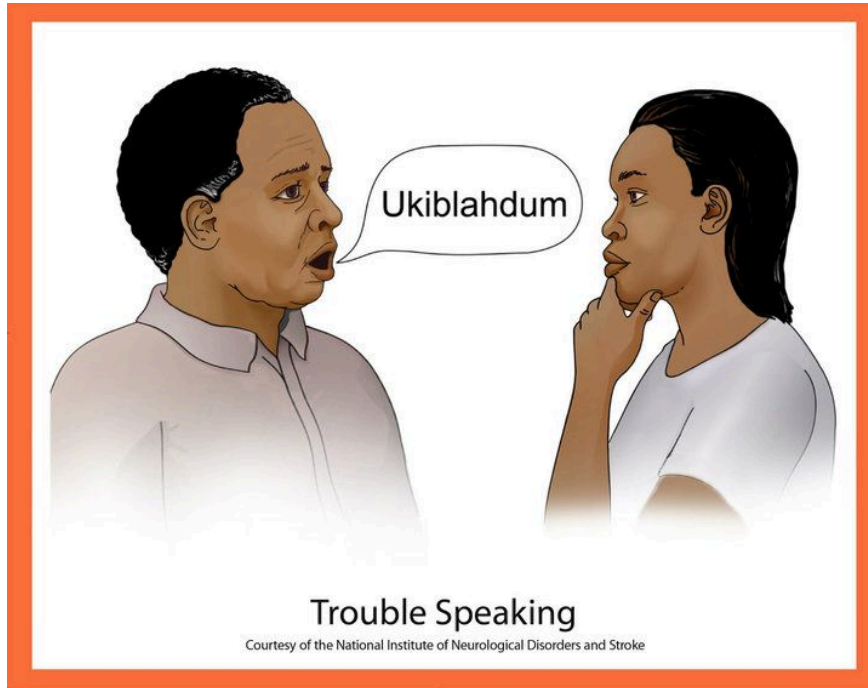
B



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Speech

- Check to see if the speech makes sense and is clear. Abnormal speech may sound drunk, slurred, or garbled; or it may not make sense or sound funny. Words can be mixed up or the person may be speaking gibberish/nonsense.



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Cincinnati Pre-hospital Stroke Scale

1. FACIAL DROOP: Have patient show teeth or smile.



Normal:
both sides
of the face
move equally



Abnormal:
one side of
face does not
move as well
as the other
side

2. ARM DRIFT: Patient closes eyes & holds both arms out for 10 sec.



Normal:
both arms
move the
same or both
arms do not
move at all



Abnormal:
one arm does
not move or
drifts down
compared to
the other

3. ABNORMAL SPEECH: Have the patient say "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

INTERPRETATION: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

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Balance

- A person with stroke may feel suddenly off balance, dizzy, or not be able to walk without falling over. Some people describe vertigo (the sensation of movement)



Eyes

- Patients can have a sudden change in vision, including double vision, visual blurring, or visual loss.

What It's Like



This is how a street scene looks with normal vision.

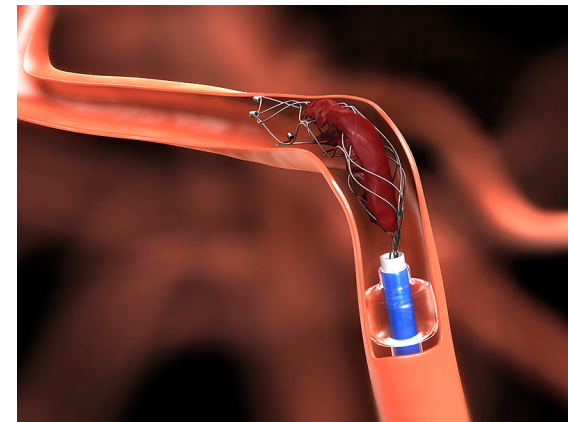


Example of a Hemianopia.



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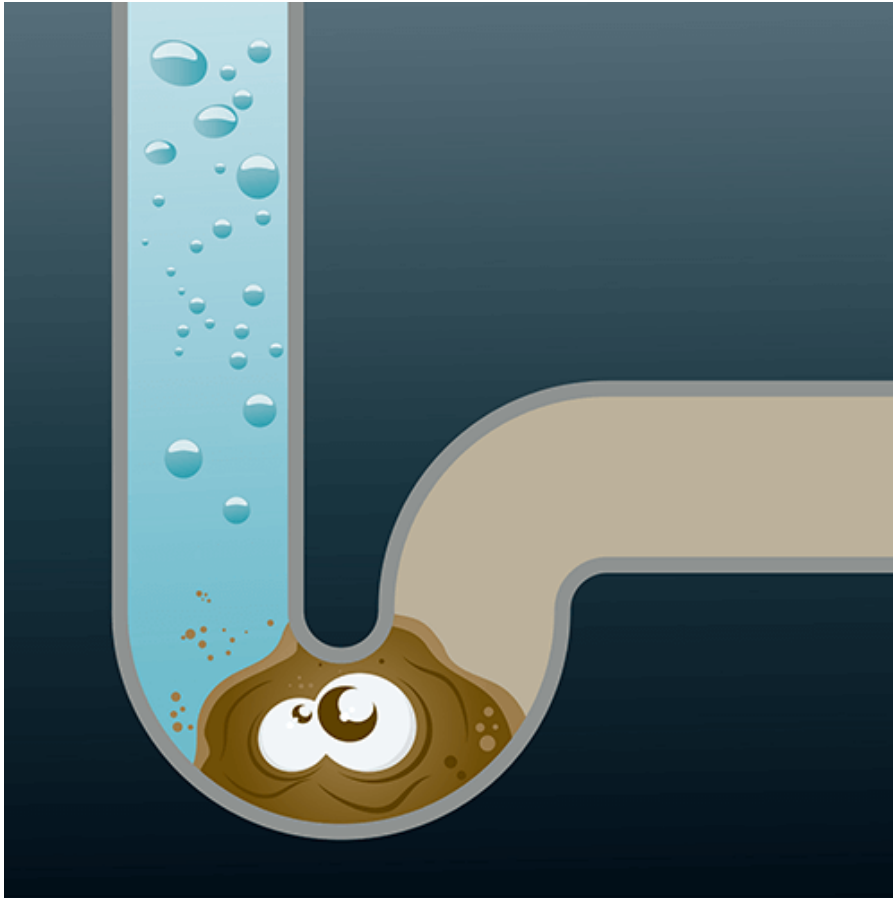
Acute Stroke Treatments



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Clogged Pipes

- We can open up clogged household pipes.

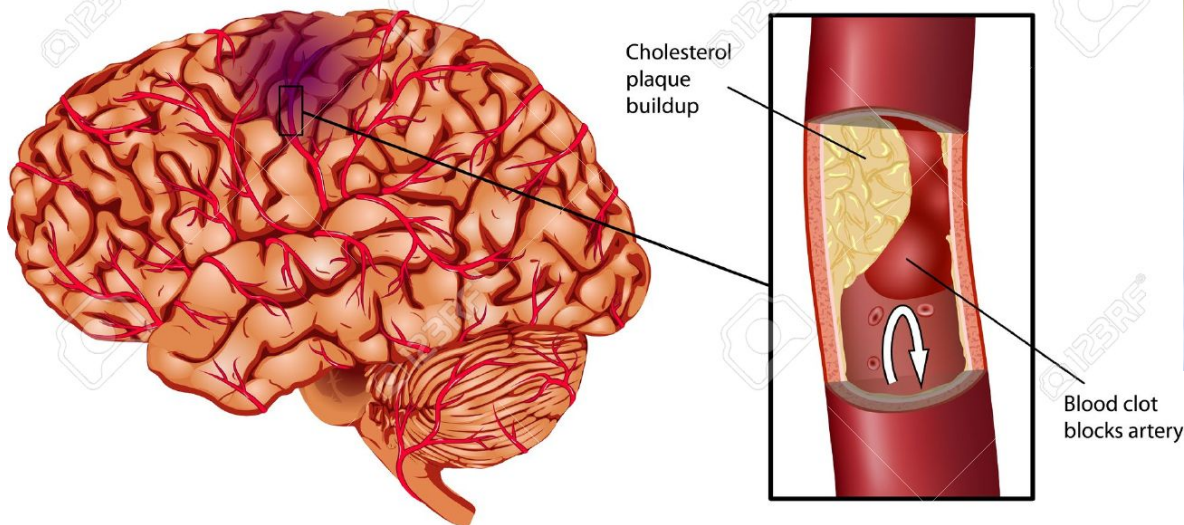


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Blocked Arteries

- We can open up your blocked artery in certain situations/people if there is a stroke.
 - But you **MUST** come to hospital **QUICKLY**!

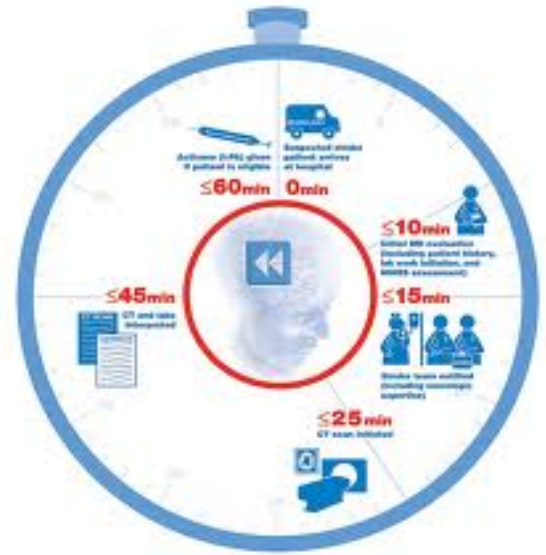
Ischemic Stroke



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Alteplase/Activase (tPA)

- A clot-busting medication (blood thinner) to break up the blood clot that is clogging an artery and causing a stroke.
- Only FDA-approved to be used within 3 hours of when the symptoms started.
 - Some may receive tPA up to 4.5 hours after stroke onset



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Risks/Benefits of TPA

- Improves disability measured 3 months after the stroke
 - 30-40% more likely to have minimal or no disability
 - When given within 3 hours of onset
 - In some patients, TPA may be safely given up to 4.5 hours from the start of stroke.
- Increased risk of brain hemorrhage (6.4%)
- You are 11 times more likely to be helped than harmed by TPA

Faster Treatment is Better

- The quicker we treat, the better the outcomes and the less the risk.
- Come to the hospital early!

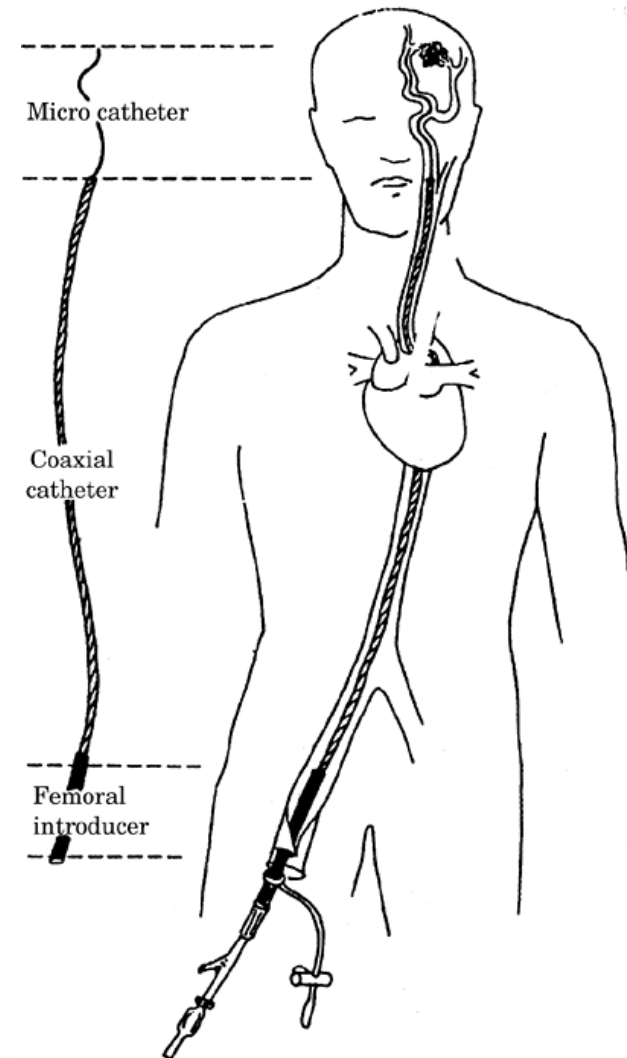
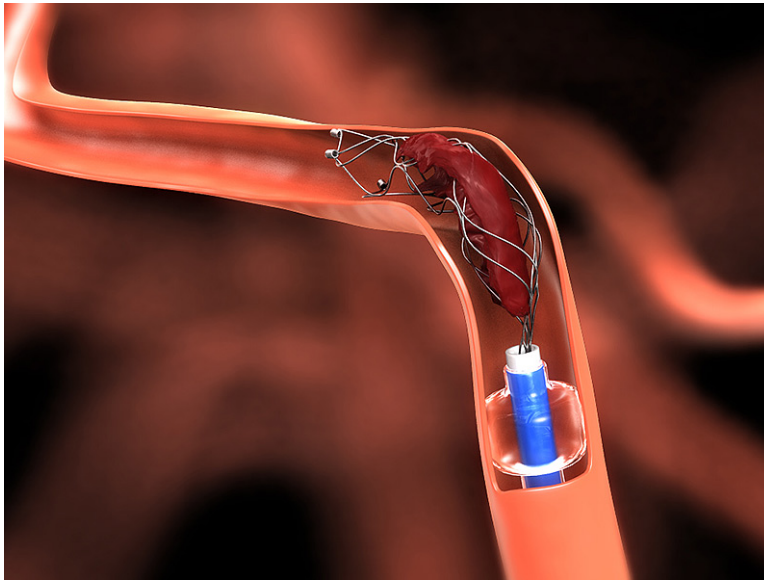
A small decrease in the time to tPA treatment:

- Reduces chance of death
- Leads to higher rates of walking independently
- Results in higher rates of discharge home from the hospital (rather than a nursing home or rehab facility).

Saver et al, 2013

Endovascular Clot Extraction (Mechanical Thrombectomy)

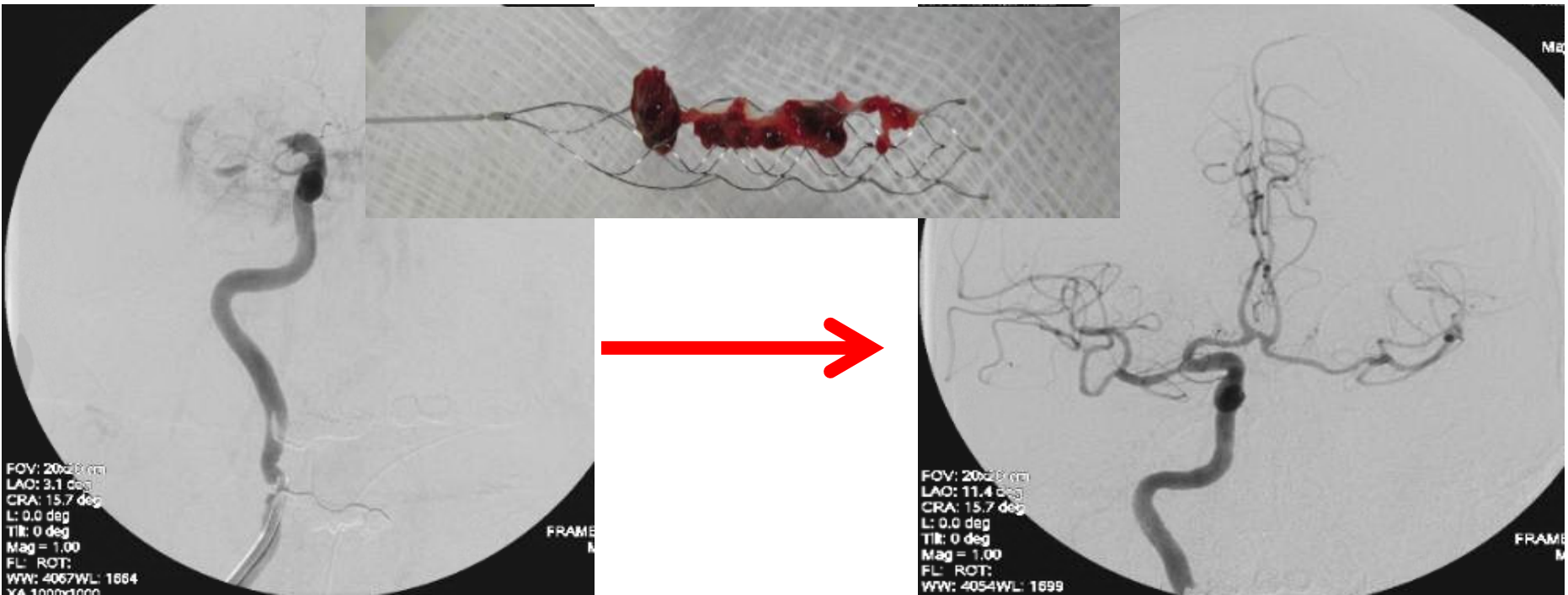
- A catheterization procedure can be performed with a stent device to capture and remove the blood clot from the artery causing the stroke.



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Example Endovascular Stroke Case

- An 80 year old woman with high blood pressure and atrial fibrillation developed left-sided weakness and visual loss (a severe stroke).
- After the removal of the blood clot, this patient returned to her normal self.



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Risks/Benefits of Mechanical Thrombectomy

- Clot extraction with a stent can be performed only within 6 hours from stroke onset and in patients with a severe stroke caused by a blockage in a large, brain artery.
 - Select patients may receive treatment up to 24 hours.
- Following clot extraction, you are 2.4 times more likely to be physically independent at 3 months after your stroke.
 - 46% independent with procedure vs 27% without
- There is no increased risk in death or brain hemorrhage with clot extraction.

Sources: JAMA 2015; 314(17): 1832-1843. Goyal M et al. Lancet 2016; 387:1723.



Mobile Stroke Unit (MSU): “ER on Wheels”

The NewYork-Presbyterian Mobile Stroke Unit

- Joint project of NYP (Weill Cornell Medicine and Columbia University Medical Center) and the FDNY
- “Brings the ER to a patient’s doorstep”
 - On-board CT scanner
 - Immediate neurologist consultation
 - tPA administration in field
- Operational as of October 3, 2016
 - **1st program on the East Coast**
 - **Currently with 3 units operational in Manhattan, Queens, and Brooklyn**
 - **40 minutes faster than standard care**



IV-tPA was administered on board the MSU, and Mr. Mandaro was discharged home (back to his normal self).

- “By noon I was fine, joking and taking selfies with friends”
 - Richard Mandaro, CBS2, November 7, 2017



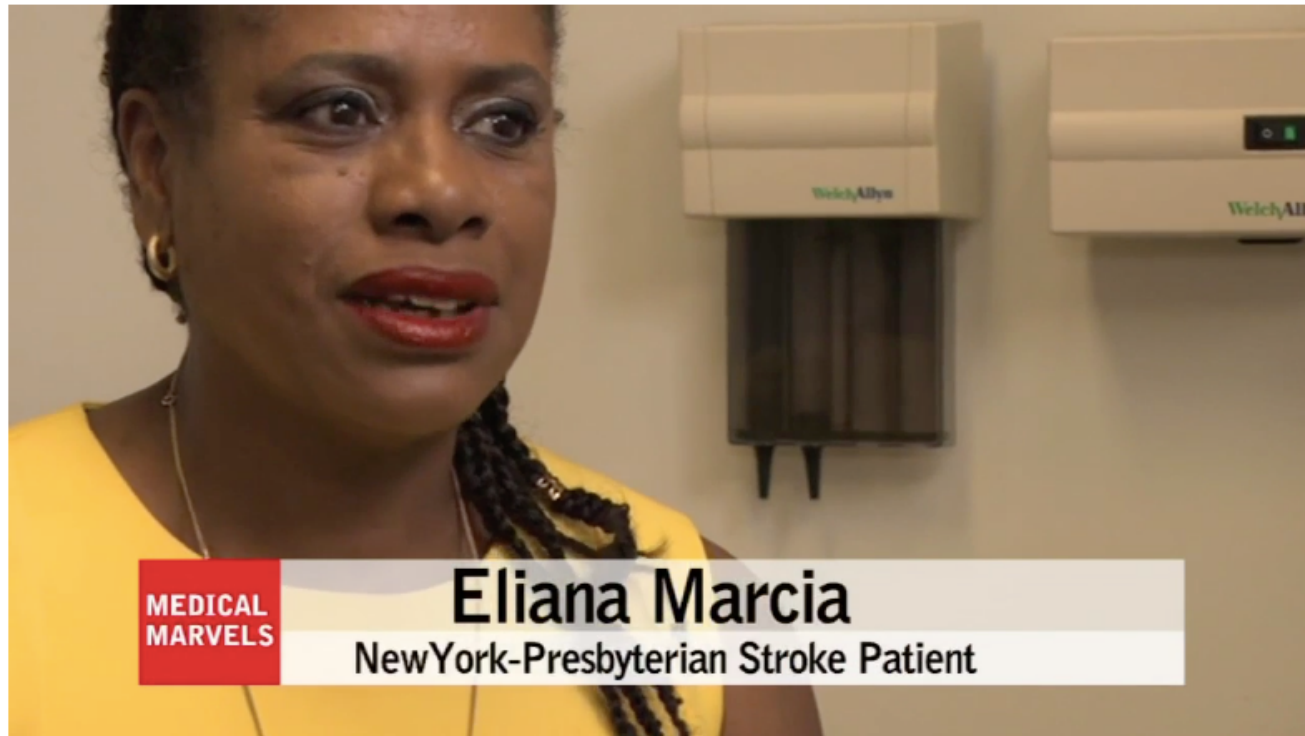
tPA was administered on board the MSU, Mr. Lichtenstein was discharged home (back to his normal self).

- “I feel so blessed about what happened. If I can educate someone or let people know about this, the outcome could really be positive”
 - A.C. Lichtenstein, New York Daily News, August 8, 2017



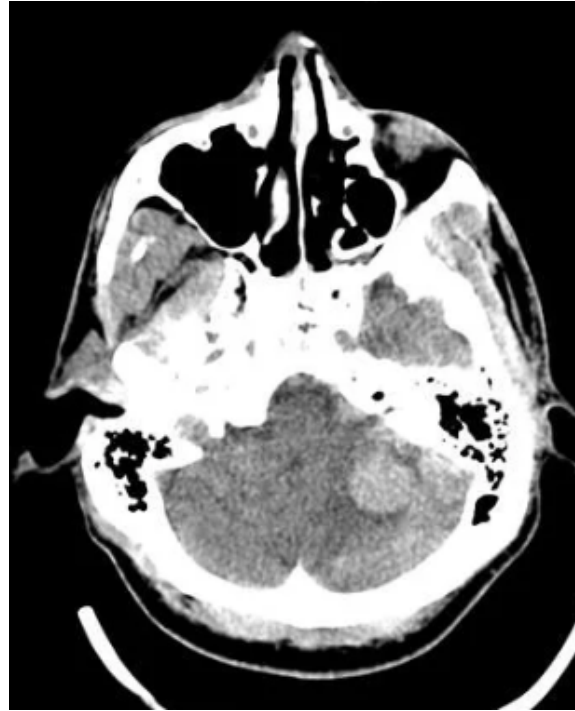
tPA was administered on board the MSU, Mrs. Marcia was able to talk and walk again after a short rehab stay

- “I am so happy, because I have my voice and can communicate. I feel better, like I have a second chance.”
 - Eliana Marcia, ABC7 Medical Marvels, July 19, 2017



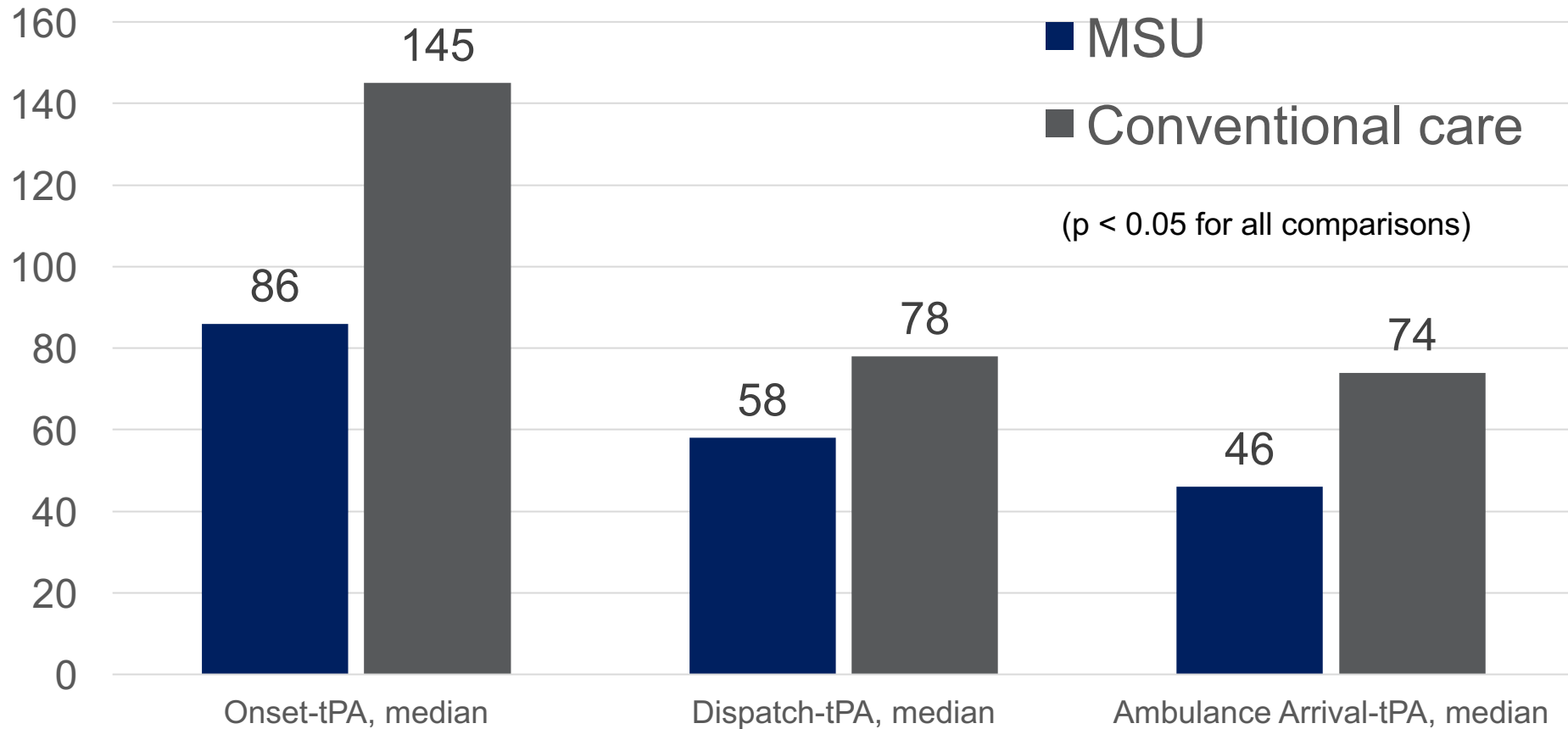
Montel Williams suffered a cerebellar hemorrhage while at the gym... he was treated on the NYP MSTU, and is now back to work!

- “That saved my life...I would have bled out on the spot.”
 - Montel Williams [*regarding the MSTU*], People.com, October 10, 2018



NYP MSU Treatment Times

Minutes



Kummer B et al 2018 (unpublished data)

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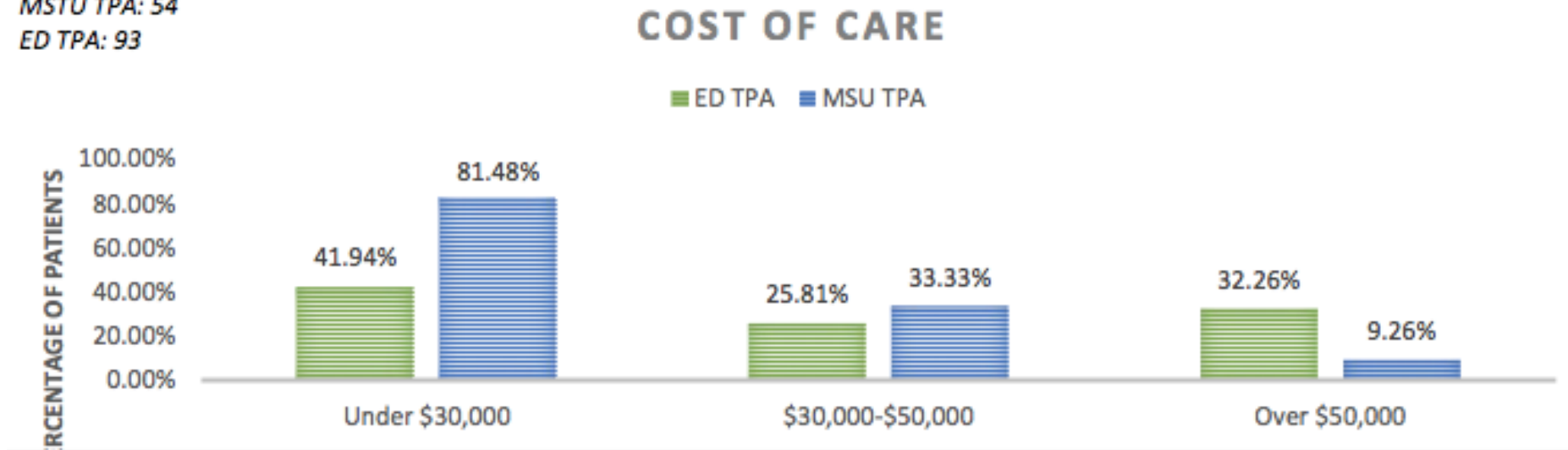


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Early Trends for Decreased In-Hospital Costs for the NYP MSTU Program compared to ED Controls at NYP

MSTU TPA: 54
ED TPA: 93



NYC MSTU Operational Summary

- Mobile Stroke Units provide standard of care for acute ischemic stroke up to 40 minutes faster than treatment in the ED
- There are currently 3 MSTUs operational in NYC: Manhattan, Queens, Brooklyn.
 - Their hours of operation are Monday-Friday, 9 AM-5 PM
- Please call 9-1-1 for any suspected stroke patients

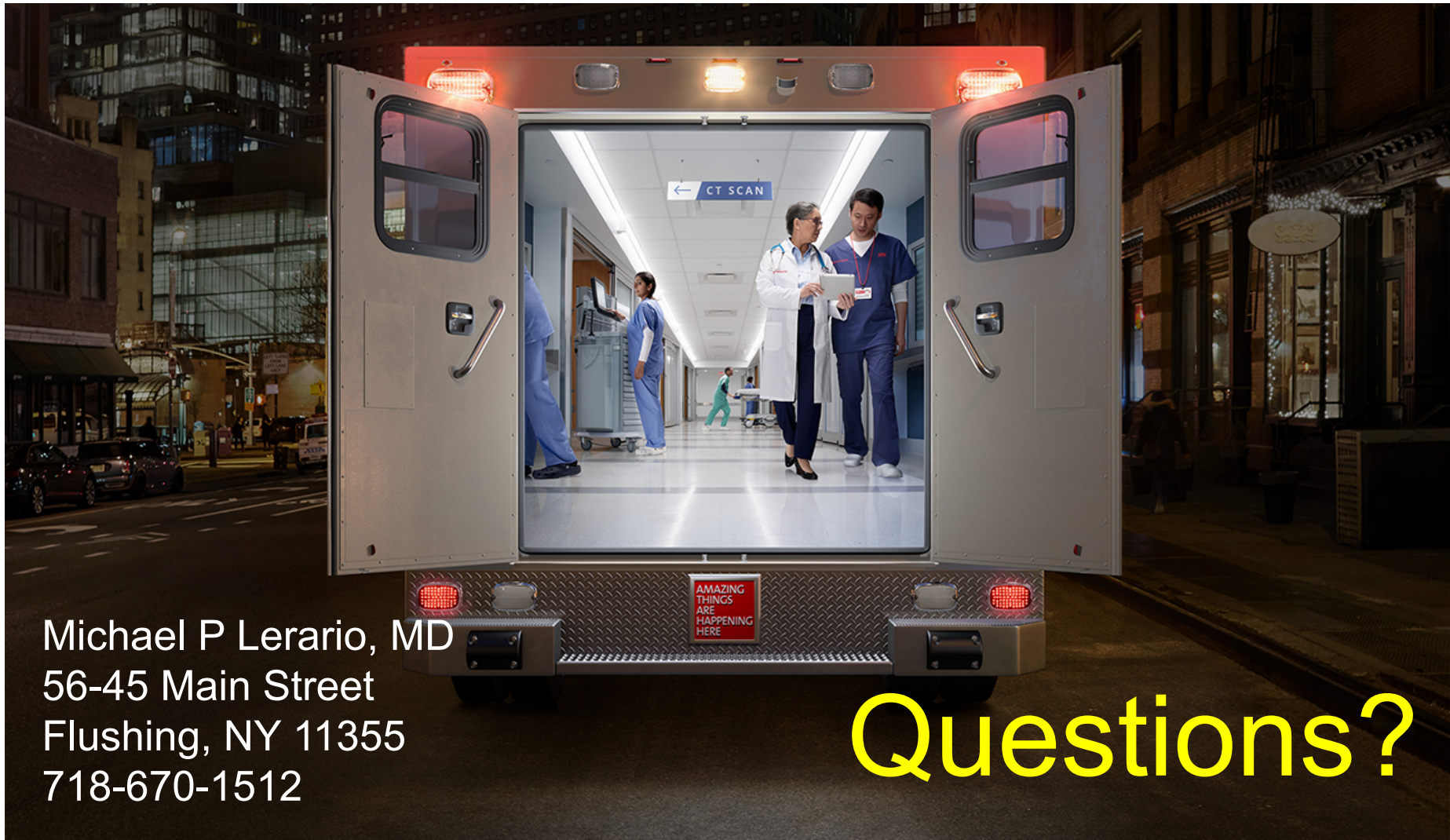


Review of Acute Stroke Treatment

- The faster you present to the hospital, the better the treatment options work.
- Treatment includes intravenous (IV) TPA, endovascular clot extraction with a stent, and more recently mobile stroke units.
- These can only be performed in a brief time period after the start of a stroke, so come to the hospital early!

What You Should Learn Today

- How to recognize if someone is having a stroke
 - BE-FAST
- What treatments are available for acute stroke
 - Stroke is a leading cause of death/disability if untreated
 - The faster we treat stroke, the more effective treatment is
 - tPA (clot buster) and endovascular clot retrieval (stent)
- How and why to activate the 9-1-1 system for a stroke patient
 - New York City has Mobile Stroke Units available through 9-1-1



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Questions?