



# QUICR Webinar: Rapid Imaging at PSCs for Thrombolysis

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# Faculty/Presenter Disclosure

[Thomas Jeerakathil]

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Health

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**Consulting Fees:** N/A

**Other:** N/A

# Objectives

- To discuss options and processes for rapid imaging in primary stroke centres

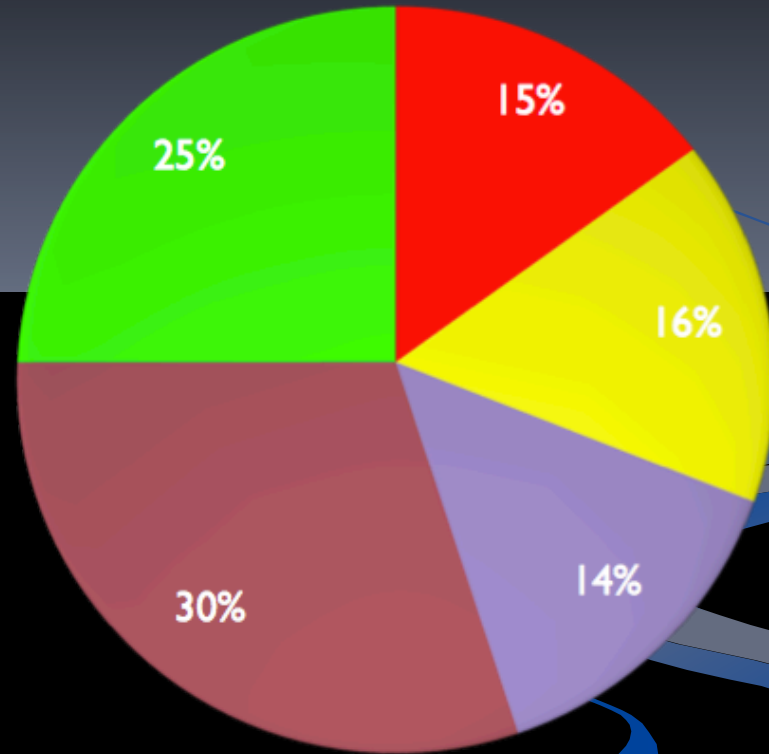
# Steve

- 69 year old male business owner with high blood pressure
- Awoke feeling 'unwell' with no focal symptoms
- Wife called EMS
- EMS arrival - unable to speak
- Paralyzed on the right side
- Right hemianopsia



# The Impact of Stroke

- Leading cause of disability in adults
- Causes 10% of all deaths in the world
- The cost to Alberta is approximately 300-400 million per year
- Stroke will present soon to an ED near you!



- Dead
- Major Disability
- Moderate Disability
- Minor Disability
- Full Recovery

2005



2010



Legend

★ Comprehensive Stroke Centres

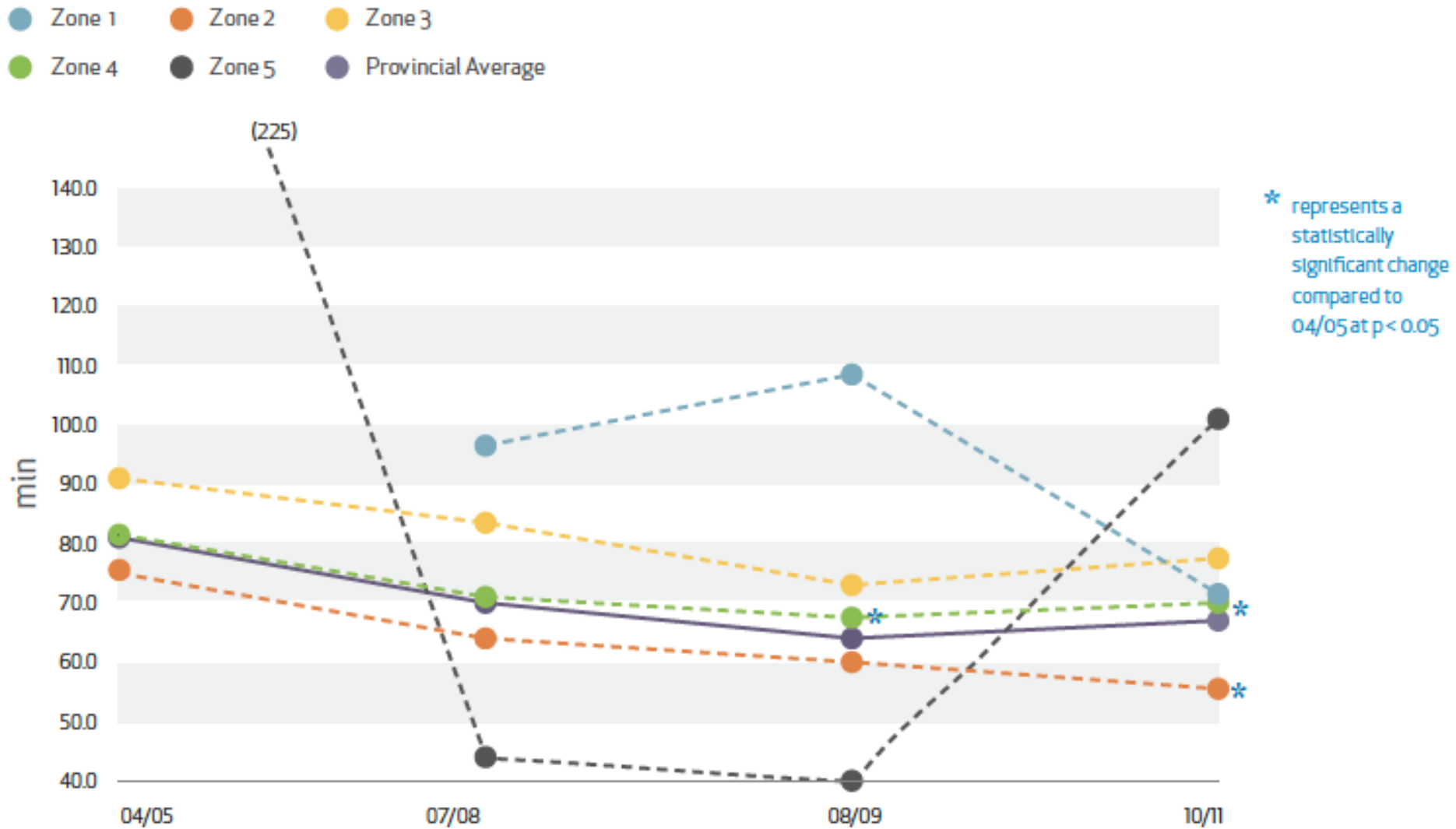
● Primary Stroke Centres

Northern Alberta Telestroke System

Southern Alberta Telestroke System

FIGURE 4.3

Median Door to Needle Times for Ischemic Stroke Patients Receiving IV or IV+IA tPA (minutes)

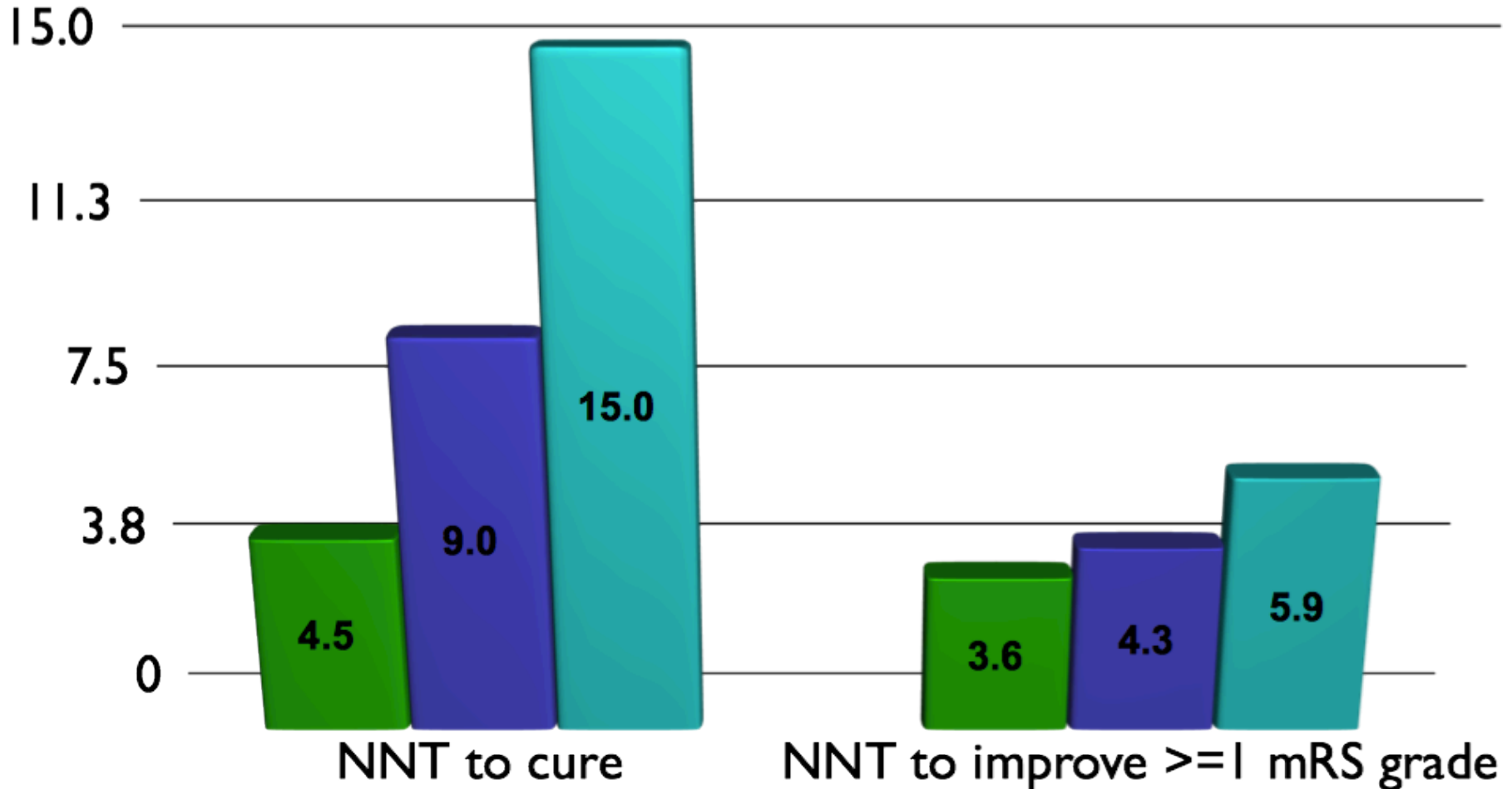


# Adjusted benefits of tPA by 90min epoch

0-90

90-180

180-270



NNT is number needed to treat

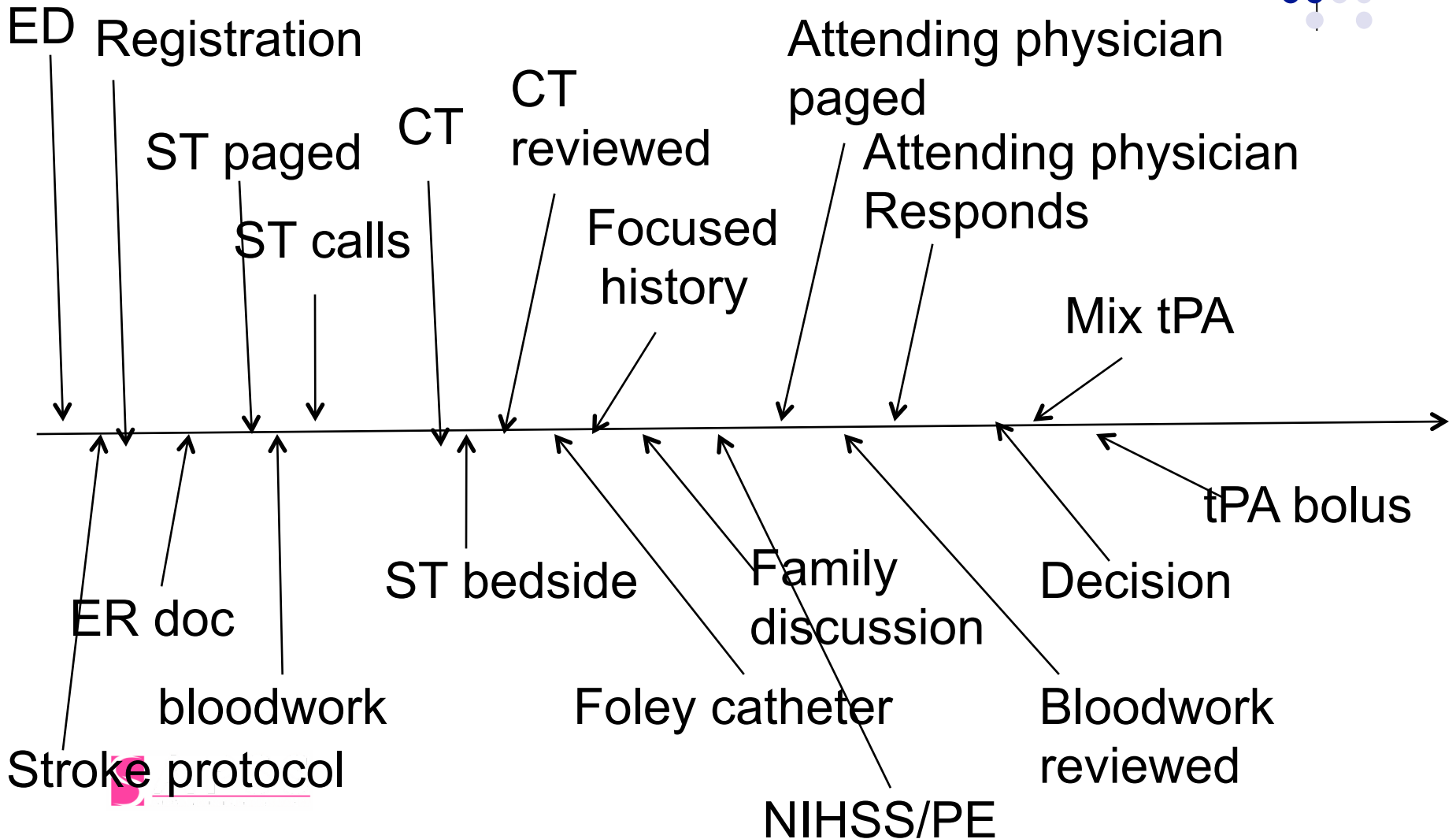
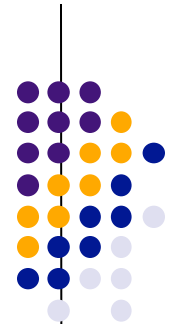
Lees, Lancet 2010; 375;1695-703



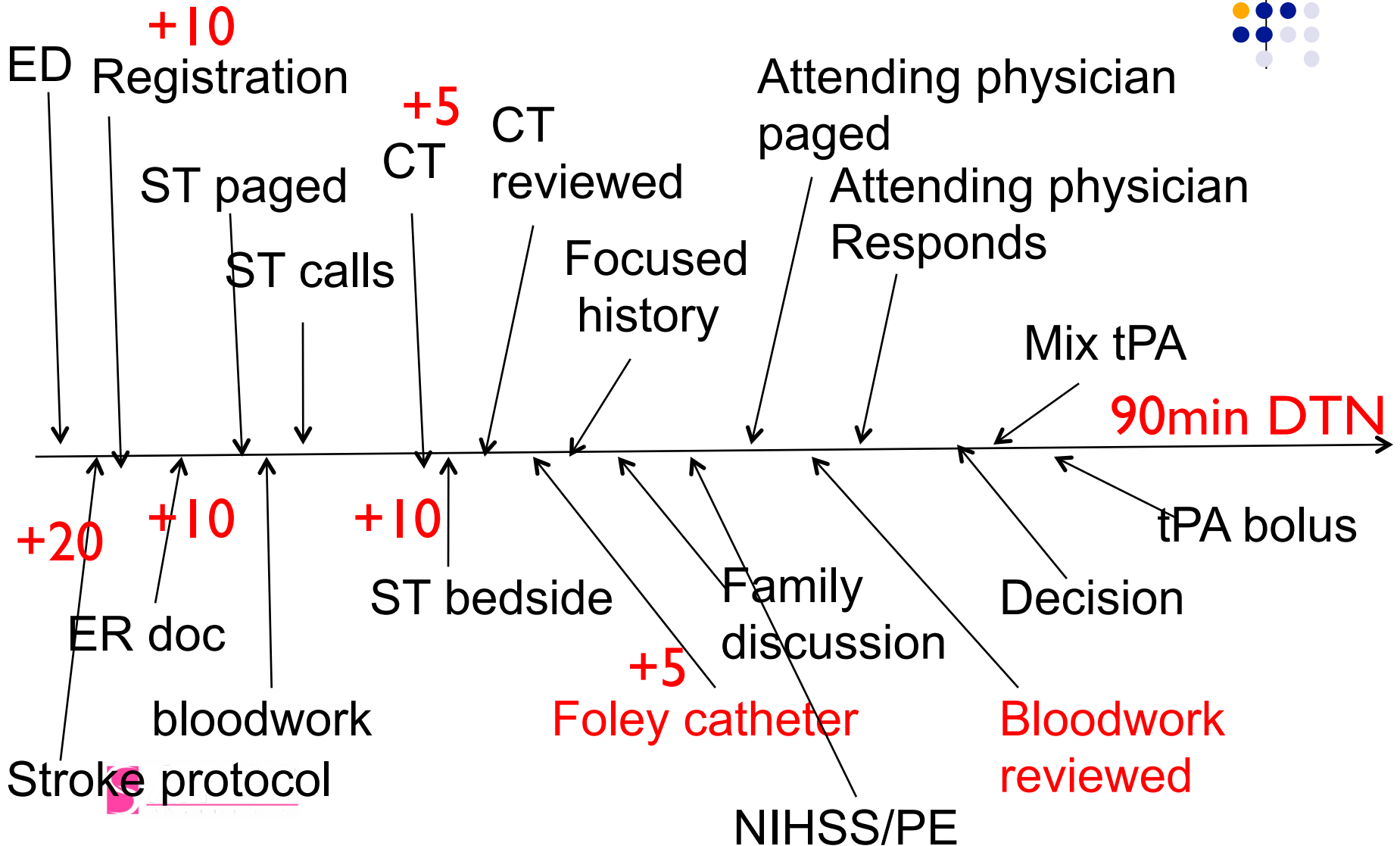
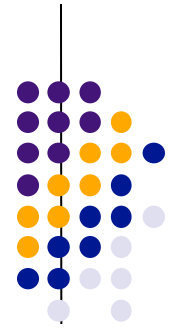
# Shorter DTN = better outcomes

- Every 15 min drop in DTN associated with a 5% reduction in mortality (OR 0.95;  $p < 0.0001$ )
- Those with DTN < 60 min have reduced risk of intracranial hemorrhage 4.7% vs 5.6%


# Timelines in tPA use

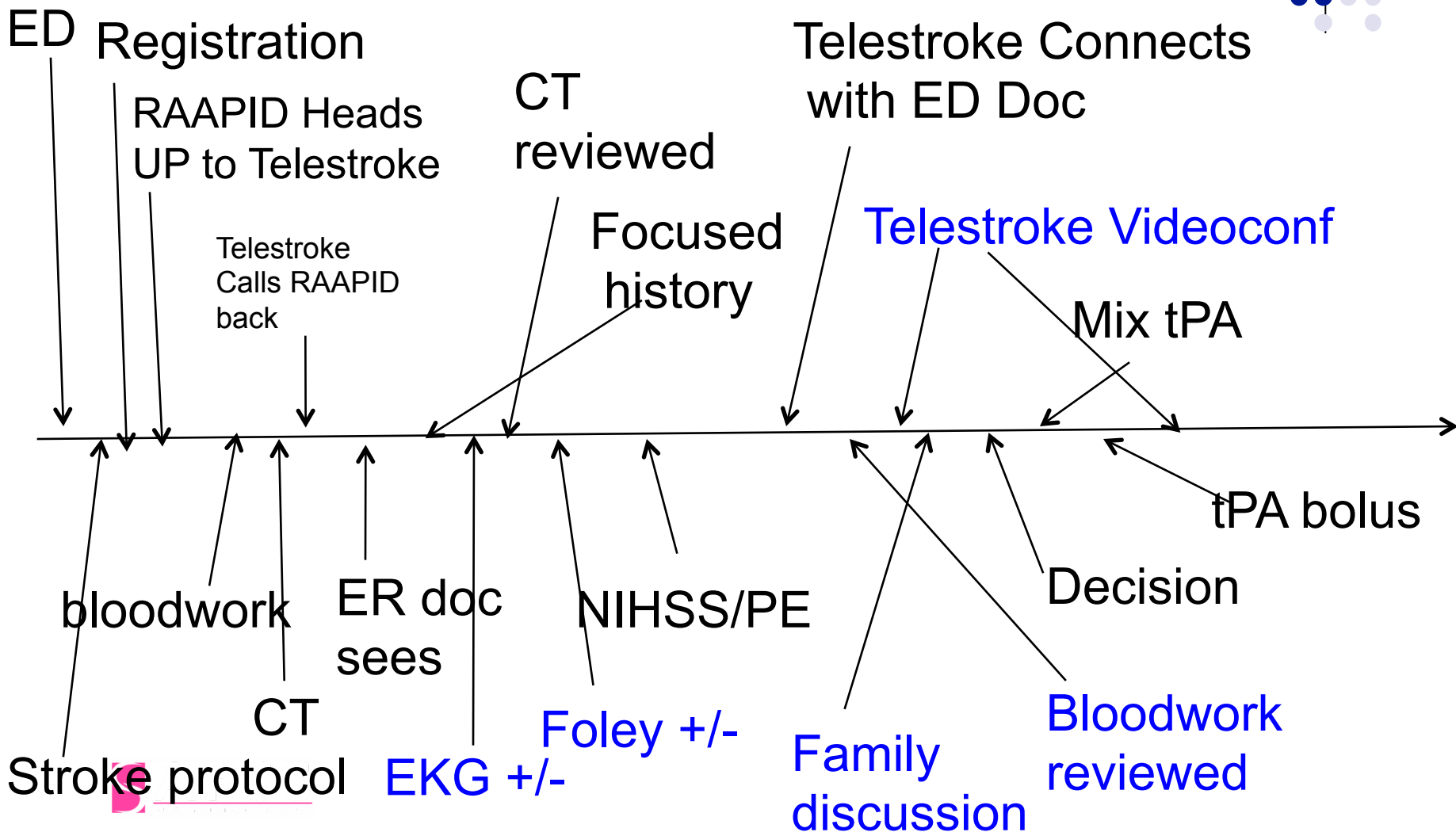


# Timelines in tPA use



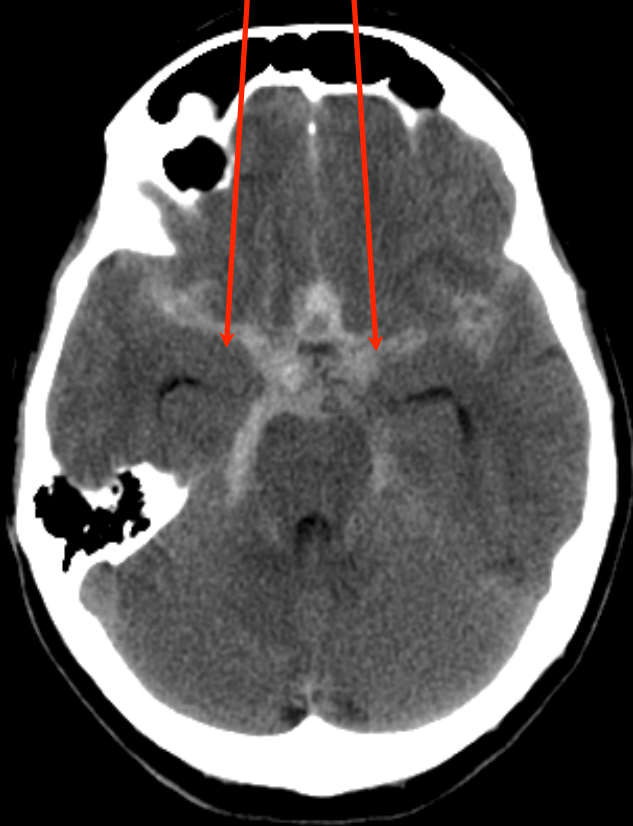
# Timelines in tPA use – Rural/Small urban

 Do, but not always pre-lytic



2 kinds of hemorrhagic stroke:

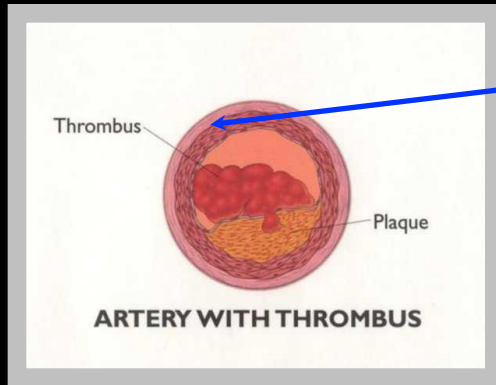
Aneurysmal  
Subarachnoid



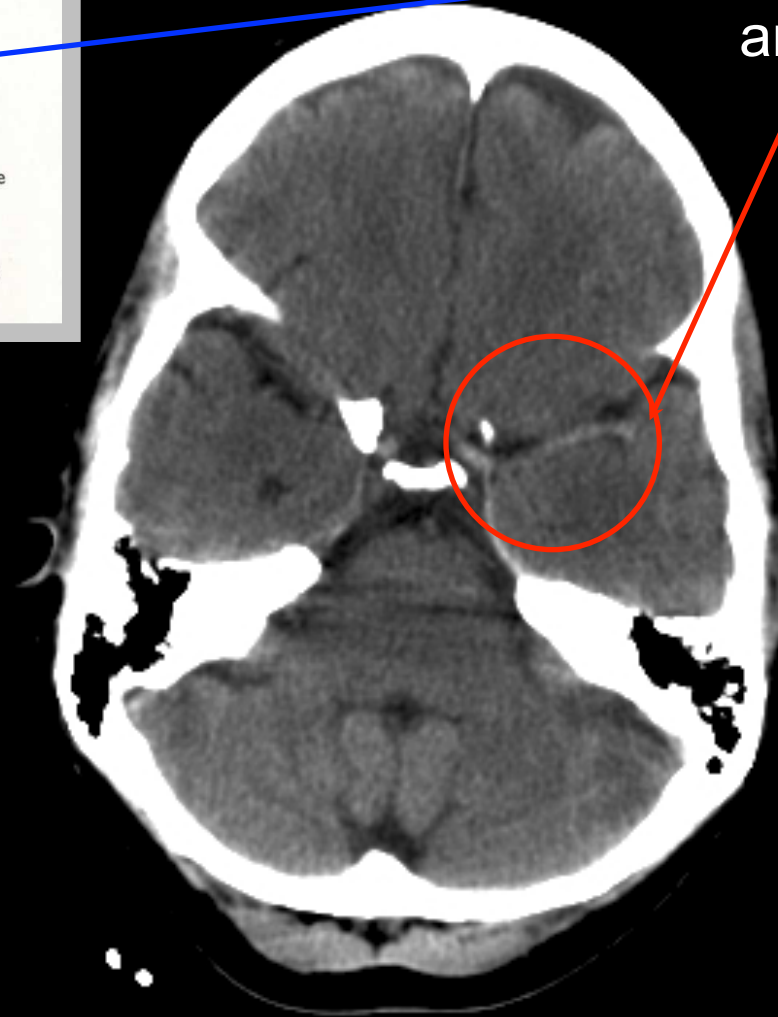
Intracerebral hematoma



# Ischemic Stroke:



Clot visible blocking the middle cerebral artery (inside artery)



Patient 1



# Technology: CT Angiogram – sometimes slows DTN but important information if done fast!

CTA speed is highly centre dependent  
Ideally the first scan is a rapid CT+CTA.  
Sometimes it makes more sense to initiate tPA with a plain CT then proceed afterwards with CTA.  
At UAH we give the bolus in scanner after plain CT and then go to CTA





# Questions :

- When do I let CT know about an acute stroke?
- When do I call my CT tech in after hours?
- When do I call my CTA tech in after hours?
- Is a CTA required every time pre-thrombolysis?  
Post?
- When do we push the plain CT and CTA images?  
Do I wait for post –processing?
- What is this stretcher to CT business?

# Answers

- When do I let CT know about an acute stroke?
  - ASAP (they will be able to schedule)
  - With prehospital site notification
  - Again as soon as the patient arrives in the ED

# Answer:

- When do I call my CT tech in after hours?
- With pre-hospital site notification ideally because of the response time required
- Failing the above then with patient arrival and acute stroke protocol activation

# Steve

- Steve arrives at a primary stroke centre where the in-house technologist can do a plain CT scan
- There is a call-back needed for a CTA technologist
- Since CT + CTA is becoming the new standard do we wait for the CTA tech to arrive before proceeding with both?

This CT tech  
received advanced  
notice



This CT tech did  
not



# Steve

- Steve arrives at a primary stroke centre where the in-house technologist can do a plain CT scan
- There is a call-back needed for a CTA technologist
- Since CT + CTA is becoming the new standard do we wait for the CTA tech to arrive before proceeding with both?
- **NO! Most tPA decisions can be made on plain CT. Do the plain scan AND call in the CTA tech**

# Questions :

- When do I call my CTA tech in after hours?
  - Ideally with pre-hospital notification
  - Definitely with patient arrival for an acute stroke protocol
  - Failing the above then at the time the plain CT is done



# Questions :

- Is a CTA required every time pre-thrombolysis?
  - No.
  - However CTA is an important part of the acute stroke workup
    - Can be very useful pre-thrombolysis if done v quickly (ie < 3 min)
    - V important post-thrombolysis to determine endovascular candidates
    - In the acute stroke setting do as quickly as possible

# Steve

- Steve's plain CT scan is finished
- The techs are able to do a CTA
- Should they wait until all the CTA images are post-processed before sending the CT and CTA images to PACS in one big file?

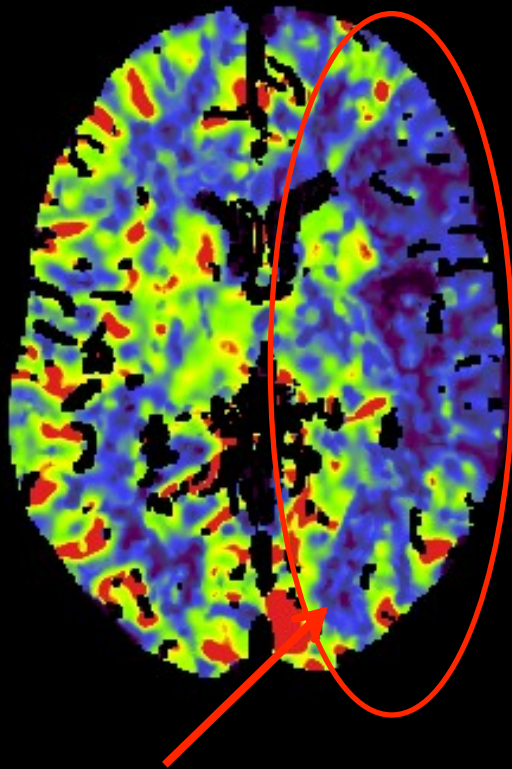
# Steve

- Steve's plain CT scan is finished
- The techs are able to do a CTA v. quickly
- Should they wait until all the CTA images are post-processed before sending the CT and CTA images to PACS in one big file?
- **NO!**
- **Acquire and push the axial plain images first**
- **Then acquire and push the CTA source images; post process afterwards**

# Questions :

- What is this stretcher to CT business?
  - Following the 'swarm' the patient goes to CT in the EMS stretcher without pausing much in the ED
  - From Foothills DTN data stretcher to CT can save up to 20 minutes
- Will they be giving tPA in my CT scanner?
  - Maybe. This is routinely done at the UAH after plain CT and pre-CTA.
  - It may not work as well for rural/small urban sites unless the ED physician is in the CT room talking to telestroke

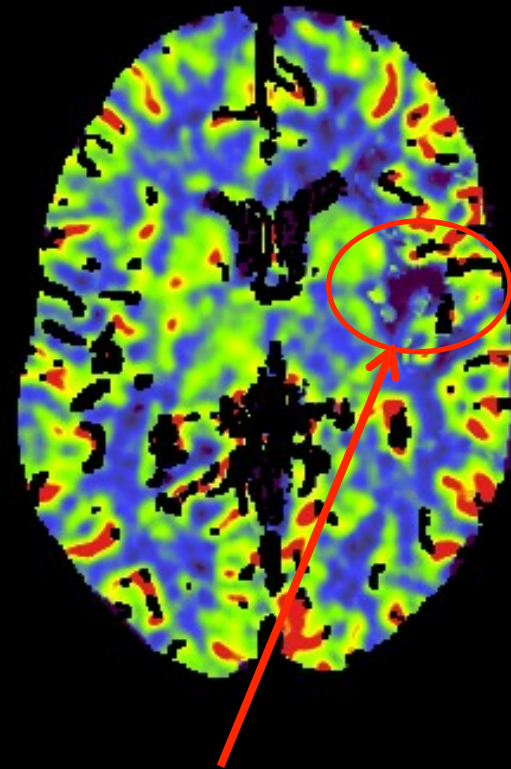
# CT Perfusion: blood flow to brain cell microvasculature



100.0



Brain at risk -  
in purple



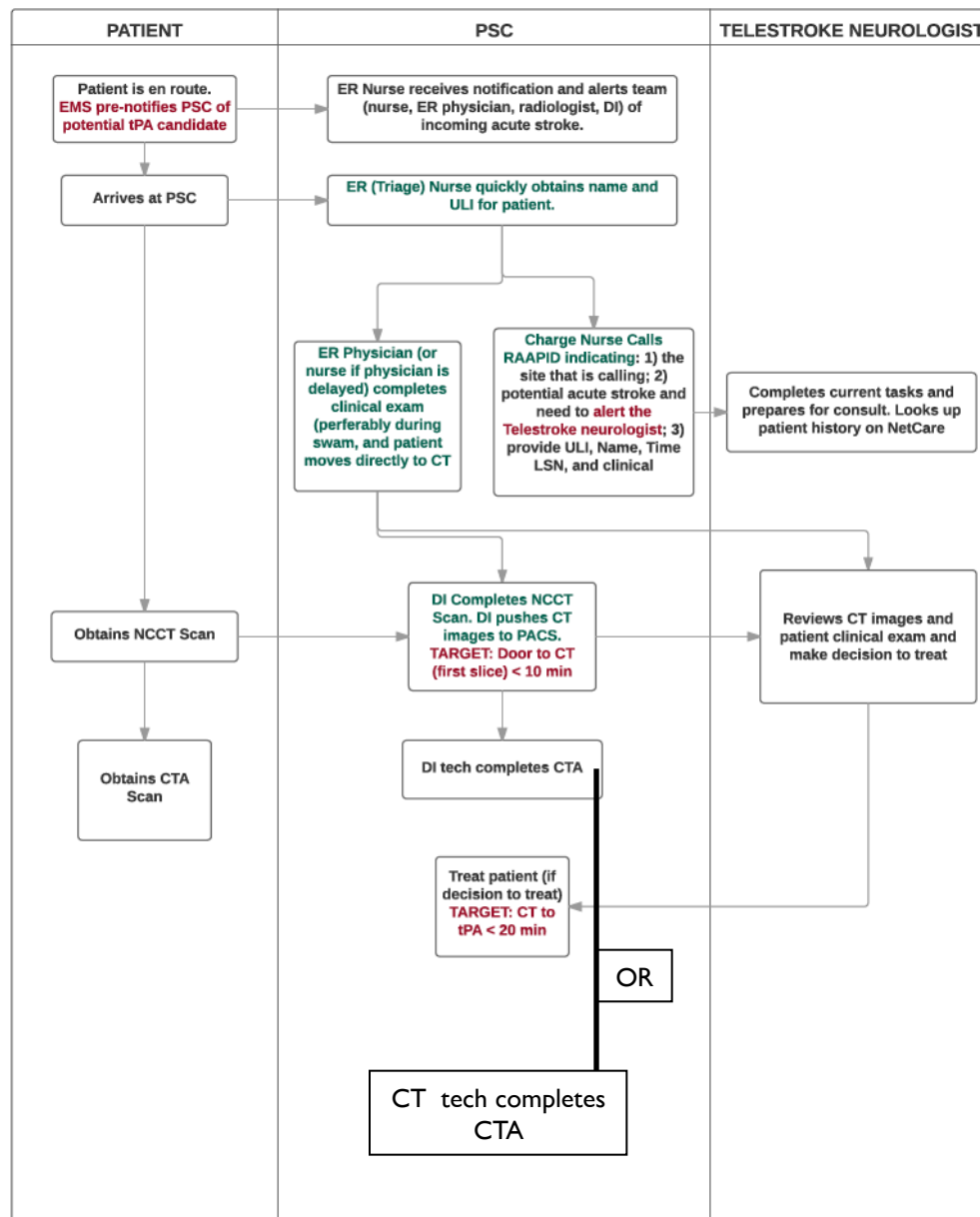
6.0




Brain  
infarcted

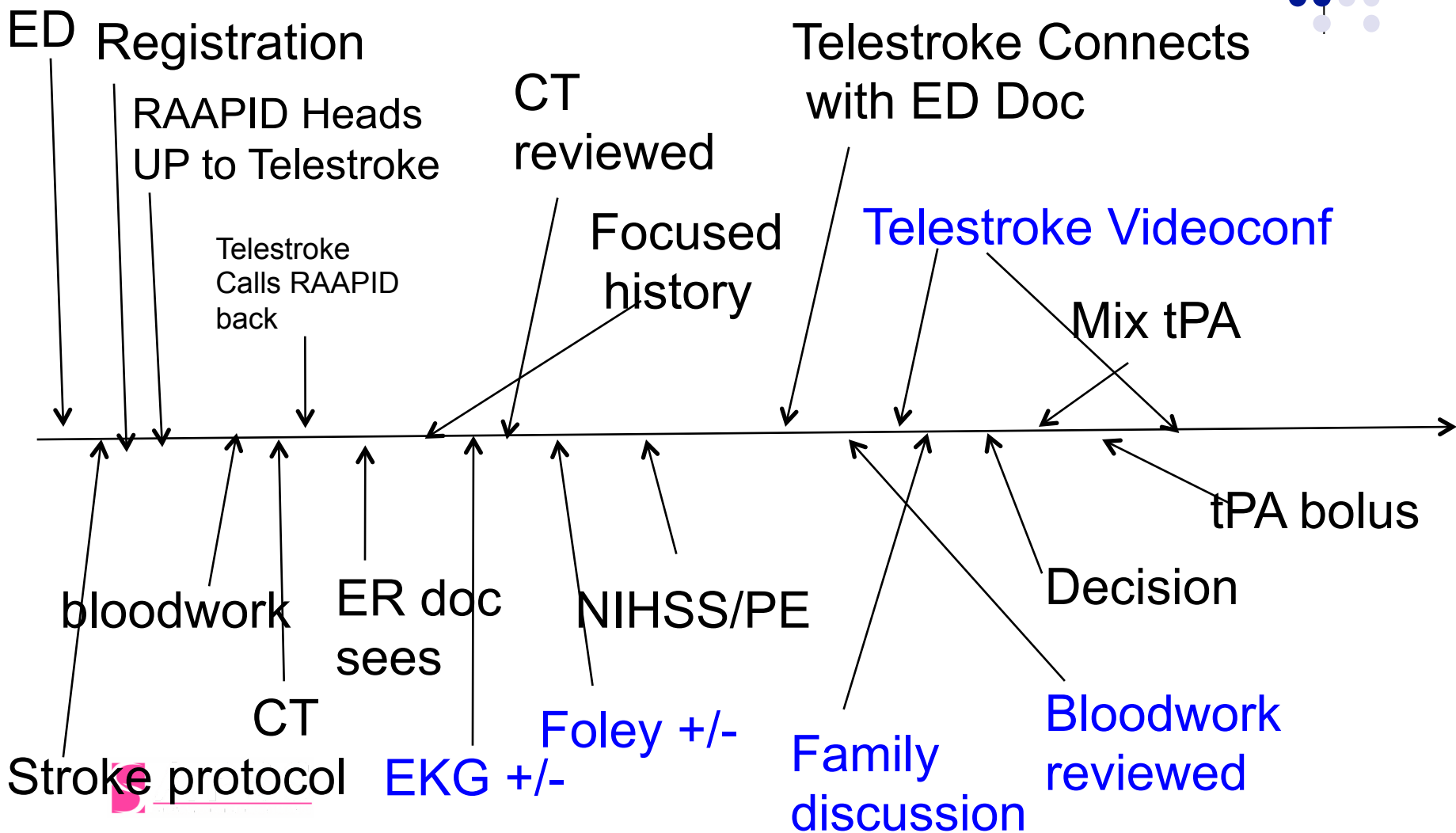
Patient I

Proposed Algorithm incomplete



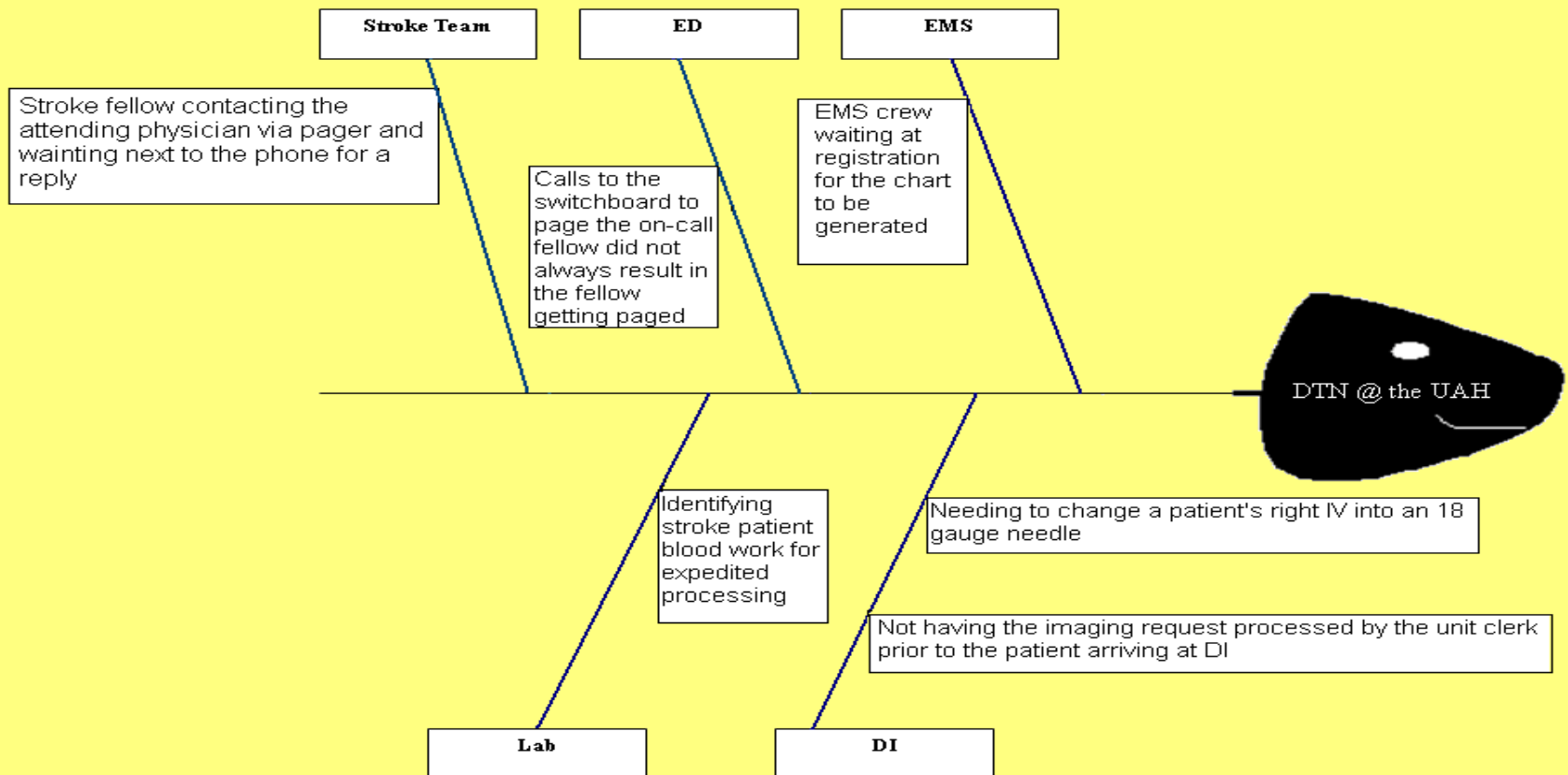
# Timelines in tPA use – Rural/Small urban

 Do, but not always pre-lytic



# Try mapping out the best process for your site

Title: Fishbone diagram for the Door to Needle Times at the UAH





Results- Go for the Gold!



# Summary

- Stroke is a major public health threat
- Alberta is a leader and still improving
- Early access to the appropriate DI tests can make a tremendous difference in stroke outcomes

# Thank-you!

Noreen Kamal

Michael Hill

The whole QUICR Collaborative!