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Door-In Door-Out

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Conflict of Interest

None

Door-In Door-Out

- Define Door-In Door-Out (DIDO)
- Impact
- Rural vs Urban
- Systems and Quality Improvement
- Challenges
- Independent Predictors longer DIDO

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Door-In Door-Out

- What is DIDO?
  - DIDO is the time from arrival at the hospital to the time the patient is discharged for transport to another facility for all strokes requiring higher level of care.
  - DIDO is a DNV and GWTG metric.
    - This metric requires a 120 minute time frame to assess, diagnose, treat and discharge the patient to a thrombectomy capable center or comprehensive stroke center (CSC).

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Door-In Door-Out

- Studies have shown that the average time from PSC to arrival at the CSC averages 120 to 180 minutes – with 100 to 120 minutes involving the PSC DIDO process (Holl et al, 2021) Stamm et al, 2023).
- A meta-analysis by Stamm et al (2023), only 27.3% of patients had a DIDO time of 120 minutes or less.

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Door-In Door-Out

- The immediate goal of DIDO is to ensure a quick and timely transfer of a patient with a stroke or suspected stroke requiring immediate transfer to a higher level of care for definitive treatment – Thrombectomy Capable or Comprehensive Stroke Center.

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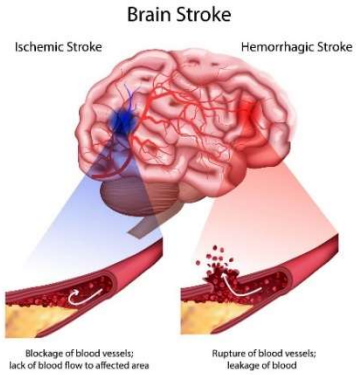
Impact



- Acute Ischemic stroke (AIS) accounts for 85% of all strokes.
- 13% of AIS patients require an interhospital transfer (Holl et al, 2021) (Stamm et al, 2023)
- Interhospital transfer is often required to ensure rapid access to time-dependent therapies for AIS – IV thrombolysis and mechanical endovascular reperfusion (MER) (Stamm et al, 2023).

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Impact

- Patients with hemorrhagic stroke or AIS may be transferred for neurosurgical or neuro critical care services (Stamm et al, 2023).
- A stroke program that has an augmented system that can provide the right patient to the right hospital can increase treatment rates, mitigate disability, and reduce death by stroke annually by 20,000 nationwide (Holl et al, 2021).
- DIDO is the most important period of time for long-term outcomes of LVO stroke patients treated with MER. Reduced DIDO helps improve patient outcomes (Ahmed et al, 2024).

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Rural vs Urban

- There is considerable geographic variation in overall DIDO times by state and subgroup
- Urban hospitals have substantially higher DIDO times compared to rural locations
  - Patients with hemorrhagic stroke hospitalized at rural hospitals have 2X the mortality than in an urban setting
  - ED clinicians in rural areas may be quicker to transfer hemorrhagic patients than in urban hospitals

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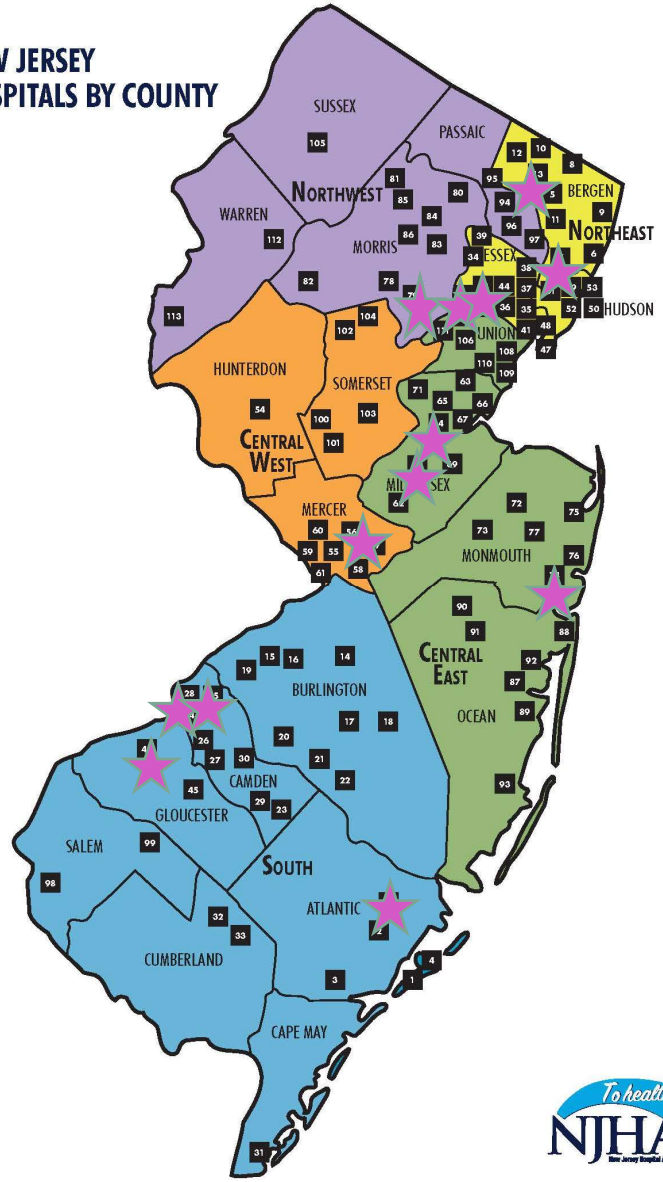
Rural vs Urban

- Patients with AIS undergoing MER from rural areas had worse functional outcomes than those from urban areas
  - Due to longer times to reperfusion in rural vs urban patient

NEW JERSEY HOSPITALS BY COUNTY



To health!
NJHA
New Jersey Hospital Association

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Systems & Quality Improvement

- Interfacility transfer process is paramount to achieve and maintain a timely DIDO process – interprofessional and interfacility communication and improved information sharing (Holl et al, 2021).
  - Overall, AIS transfers from hospitals participating in GWTG – stroke registry had an overall median DIDO time of 174 minutes (Stamm et al, 2023).

Systems & Quality Improvement

- The subgroup with AIS eligible for MER had the faster DIDO median time of 132 minutes.
  - This may be explained by the effective and time-dependent nature of MER and established protocols for screening, identification, and rapid transfer (Stamm et al, 2023)

Systems & Quality Improvement

- The subgroup with hemorrhagic stroke had a faster DIDO time than AIS.
  - This is thought to be as a result of having a streamlined transfer algorithm for this patient population.
  - Also quicker compared to AIS is likely because additional workup and treatment including CT scan and administration of IV thrombolytics, adding considerable time or hindering transfer (Stamm et al, 2023)

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Systems & Quality Improvement

- Prenotification by EMS has been associated with significantly shorter DIDO times overall in the subgroup with AIS eligible for MER.
  - Prenotification has been previously associated with reduced DIDO times in AIS thrombolysis (Stamm et al, 2023)

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Independent Predictors of Longer DIDO

- Female sex
- Black race
- Hispanic ethnicity
- Higher age – sense of urgency lower than with younger patients
- EMS prenotification (Stamm et al, 2023).

Independent Predictors of Longer DIDO

- Onset-to-door time longer than 4.5 hours
- Right-sided occlusion and M2 occlusion
- Vessel imaging to EMS notification time - largest component –decision-making, consultations and transfers of information; i.e. interpreting imaging, explaining findings and obtaining consent for treatment (van de Wijdeven et al (2023)

Independent Predictors of Longer DIDO

- Walk-in arrival mode
- CT to EMS notification
- CTA acquisition at PSC
  - Obtaining CTAs was associated with a mean of 36 minute delay after CT (Kuc et al, 2023)
- Administration of IV thrombolytic
- Intubation at PSC
- EMS notification by PSC (van de Wijdeven et al, 2023) (Prabhakaran et al, 2021).

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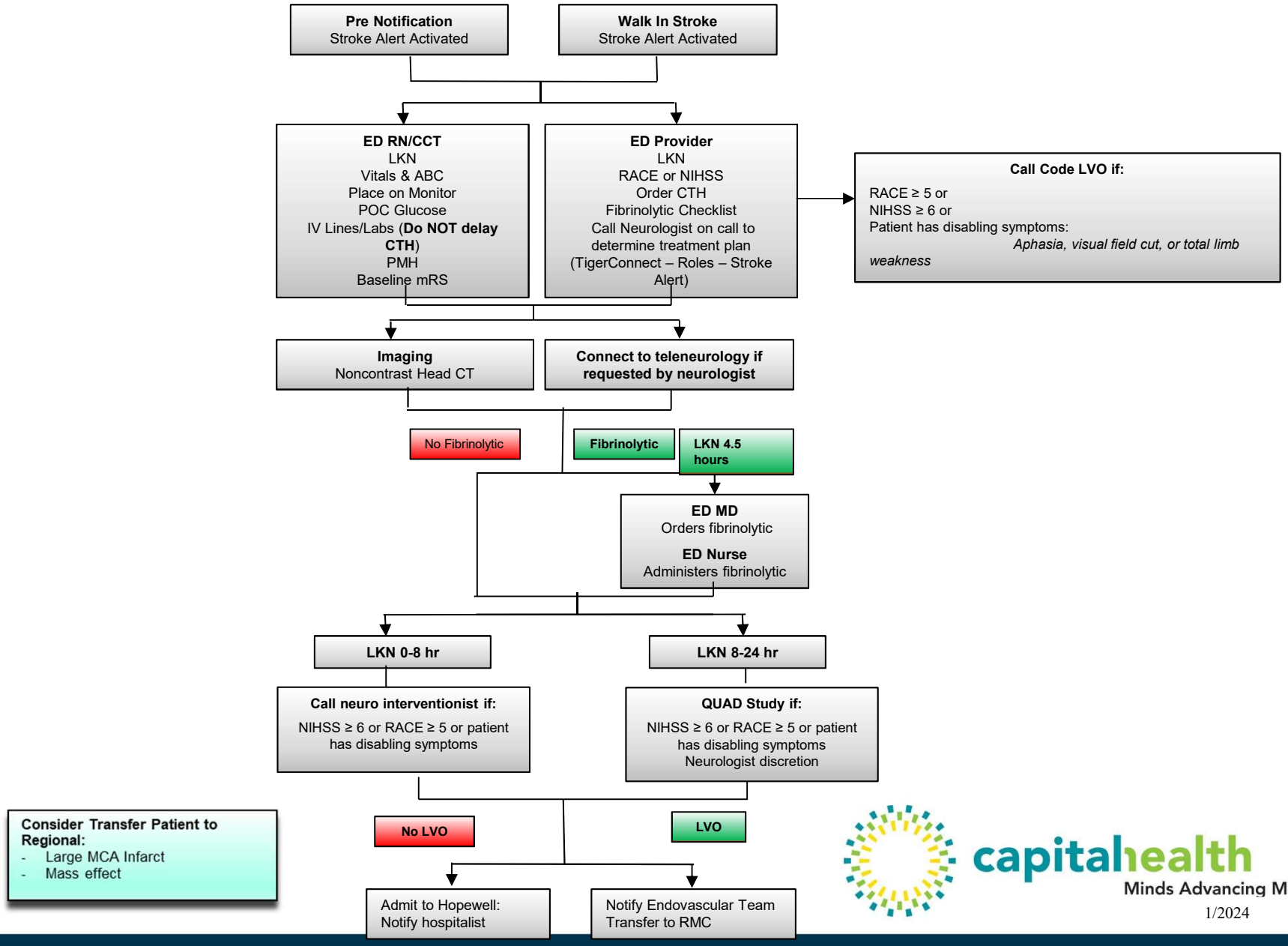
HW: Evaluation & Management of Acute Ischemic Stroke Patients 0 – 24 hours from Last Known Normal



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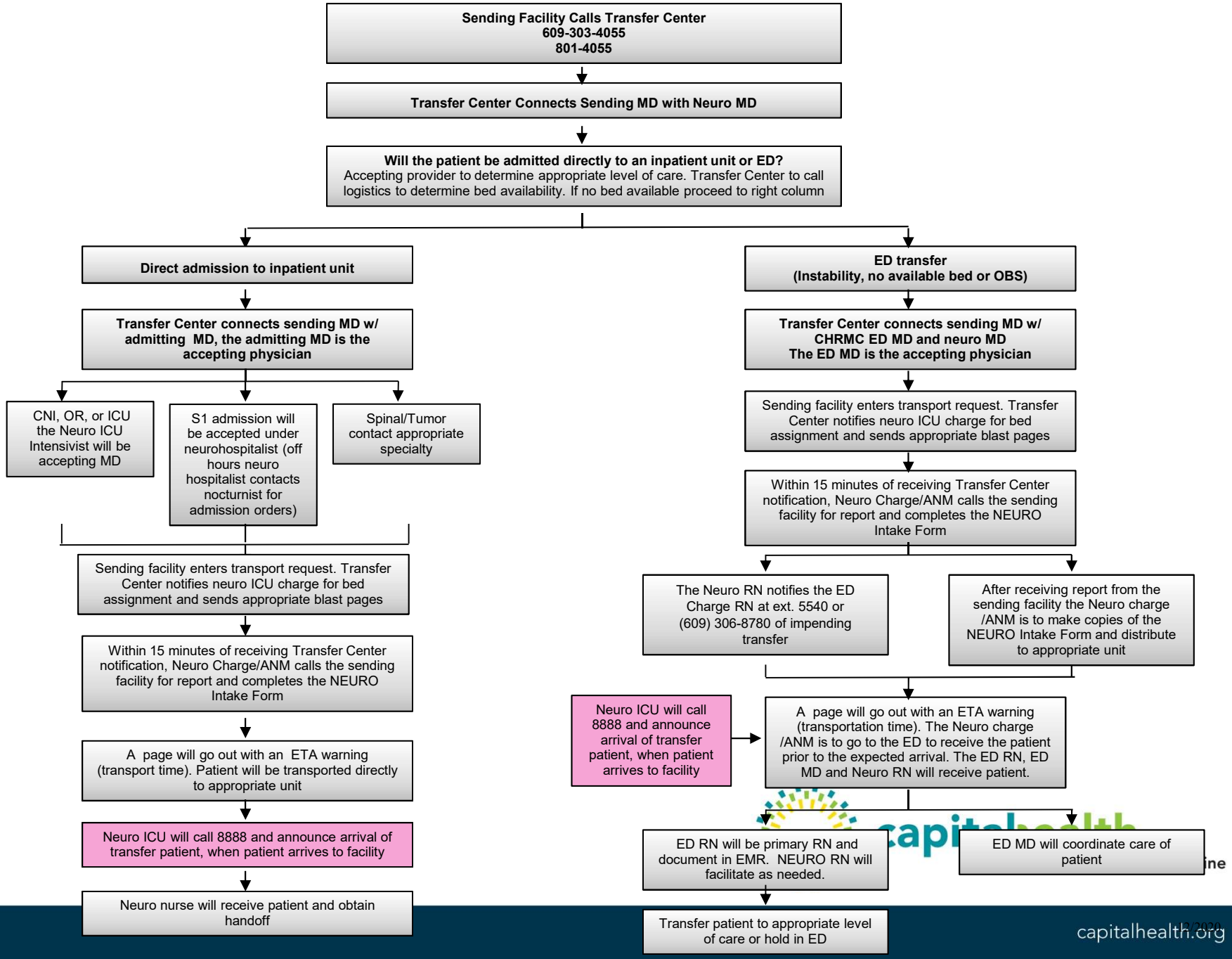
1/2024

Capital Health Neuro Program Transfer Process



Case Study #1

- Patient arrived via EMS at 20:17 - 61 year old male presents to the ED after being found on the ground with severe left-sided weakness.
- LNK per wife is 17:30. Family found him at 20:00 on the floor calling for help having weakness on the entire left side. Stroke alert called upon patient arrival. NIHSS 18.
- TNK given at 20:36 – DTN 29 min

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Case Study #1

- MD called the Transfer Center at 20:48, Endovascular MD will perform the thrombectomy
- Neuro Intensivist accepts patient at 20:57
- Transportation request entered at 21:10
- EMS notification 21:16
  - EMS clears previous job from HPW at 21:54
  - On scene at 21:57
  - Left HPW at 22:16 to transport to Regional
- DIDO 119 minutes

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Case Study #2

- 73 year old male arrived via private vehicle at 08:38. Triaged at 08:45 with patient reporting left arm and left leg tremors X3 episodes that occurs while standing, bilateral weakness and intermittent slurred speech that began at 7am. Denies vision changes, numbness/tingling, difficulty walking, falls, takes warfarin.
- Patient is feeling generalized weakness, had difficulty walking around, and needed a wheelchair to be brought here. NIHSS 2.
- CT ordered at 09:05. Not TNK candidate as he is on warfarin.

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Case Study #2

- 09:28 received notification fro the radiologist of possible hyperdensity on the tip of the basilar artery. CTAs ordered at 09:32 and completed at 10:16. (44 min)
- At 10:45, the MD received notification of a left PCA occlusion and immediately called the on-call interventionalist.
  - No intervention but transfer to Neuro ICU for neurochecks in case of progression – current NIHSS 0 and no neuro deficits.
- MD called the Transfer Center at 10:45 (29 min) – already spoke to the interventionalist.

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Case Study #2

- Neuro Intensivist accepts patient at 10:47
- Transportation request entered 11:00
- EMS notification 11:09
- EMS notification 11:09
  - On scene 11:32
  - Left HPW at 11:56 to transport to Regional
- DIDO 198 minutes

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Challenges

- AIS patients who require transfer to a CSC experience significant delays in onset-to-reperfusion time
  - 14% transfer delay
  - 40% clinical contraindications for MER exclusion
- Patients with AIS who are transferred have an increased adjusted mortality rate relative to patients directly presenting to a CSC (Holl et al, 2021)

Challenges

- Delay in CT when out of the 24 hour stroke alert window
  - Priority CT head
- Initial contact with the Transfer Center
- Improving communication between healthcare workers
- Delay in entering the Transportation Request

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Questions?

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Thank You

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