DOOR IN, DOOR OUT (DIDO): ASR
REPORTING TO JOINT COMMISSION BEGAN JANUARY 1, 2018 FOR DISCHARGES FROM ASR’S

- Door to transfer (Goal 120 mins)
  - ASR-OP-2a – Overall rate
  - ASR-OP-2b – Hemorrhagic Stroke
  - ASR-OP-2c – AIS: tPA drip & ship only
  - ASR-OP-2d – AIS: No Alteplase prior to transfer

AIS = Acute ischemic stroke

The Brain Attack Coalition (BAC) recommends transfer within 2 hours (Alberts, 2013)

1 in 4 pts are transferred while receiving TPA (Sheth, 2015)

DOOR IN, DOOR OUT (DIDO): PSC
REPORTING TO JOINT COMMISSION BEGINS JAN 1, 2019 FOR DISCHARGES FROM PSC’S

- Door to transfer (Goal 120 mins)
  - STK-OP-1a – Overall Rate (Not reported)
  - STK-OP-1b – Hemorrhagic transfer
  - STK-OP-1c – AIS: tPA drip & ship only
  - STK-OP-1d – AIS: + LVO, eligible for MT
  - STK-OP-1e – AIS: + LVO, NOT eligible for MT
  - STK-OP-1f – AIS: No tPA, - LVO, not eligible for MT

AIS = Acute ischemic stroke
LVO = Large vessel occlusion
MT = Mechanical thrombectomy

Not Pass/ Fail measure
Continuous variable – Median Time
WHY IS THIS SO IMPORTANT:
STROKE IS A TREATABLE NEUROEMERGENCY!

**Clinical outcomes are dependent on time to tissue reperfusion.**
If reperfusion achieved within 150 min of LKW ~91% probability of functional independence. *(Curr Atheroscler Rep (2017) 19:52)*

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INTEGRATED SYSTEMS OF STROKE CARE

**KEY COMPONENTS:**
- Optimize patient care and management processes to improve patient outcomes
- Communication is vital!
- First Medical Contact- EMS response – Prehospital alert- PSC/CSC
- Clear protocols for advanced imaging and treatment
- Protocols for interhospital transfer of patients should be established/approved for efficient patient transfers to be accomplished 24/7
- Leveraging technology: Pulsara, Join, Twiage- may foster coordination
- Bypassing to get to CSC or Endovascular-capable hospital?
  - Use of prehospital severity scales
  - Improving efficiency of transfers: “grab and go”
  - Sharing of neuro-imaging

*(Stroke, 2016;37:265-266.)*

*(Stroke, 2013) 44:000-000.*
SUMMARY OF TIME IN CLINICAL TRIALS

Table 1
Endovascular stroke trials and treatment time

<table>
<thead>
<tr>
<th>Study</th>
<th>Time to groin (min)</th>
<th>Time to reperfusion (min)</th>
<th>mRS 0–2 Endovascular (%)</th>
<th>mRS 0–2 Medical (%)</th>
<th>Absolute difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMS III</td>
<td>208</td>
<td>325</td>
<td>40.8</td>
<td>38.7</td>
<td>2.1</td>
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<tr>
<td>MR CLEAN</td>
<td>260</td>
<td>332</td>
<td>32.6</td>
<td>19.1</td>
<td>13.5</td>
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<tr>
<td>REVASCAT</td>
<td>269</td>
<td>355</td>
<td>43.7</td>
<td>29.2</td>
<td>14.5</td>
</tr>
<tr>
<td>SHIFT PRIME</td>
<td>224</td>
<td>252</td>
<td>60.2</td>
<td>35.5</td>
<td>24.7</td>
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<tr>
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<td>240</td>
<td>71</td>
<td>40</td>
<td>31</td>
</tr>
<tr>
<td>ESCAPE</td>
<td>185</td>
<td>241</td>
<td>53</td>
<td>29.3</td>
<td>23.7</td>
</tr>
</tbody>
</table>

* IMS, Interventional Management of Stroke; mRS, modified Rankin Scale.

Shorter times = Better Clinical Outcomes!

J Neurointerv Surg (2017); Aug 9(8); 802-812

IMPROVING INTERVENTION TIMES

FACTORS CONTRIBUTING TO INCREASED DOOR TO GROIN PUNCTURE TIMES:

- Inefficient workflow, ineffective use of staff, delays in arrival
- System reorganization to optimize parallel processes:
  - Door to CTA
  - Activation of transport
  - CTA to IR
  - IR to Groin
  - Door to transport
PRIMARY STROKE CENTER PROTOCOL FOR LVO

- KEY STEPS:
- USE OF LAMS BY ED MD BEFORE IMAGING
- CSC TRANSPORT DISPATCHED
- IF LAMS 4 OR HIGHER CTA W NCCT < 30 MIN PSC ARRIVAL
- SHARE IMAGES IN CLOUD BASED PLATFORM
- LVO TRANSFER TO CSC ANGIO DIRECTLY

Shorter PSC DIDO time, Faster arrival to CSC recanalization, & improved patient outcomes.

JAMA Neurol. 2017 Jul;74(7):793-800

STROKE RESCUE PROGRAM

TRANSFER PROCESS:
1. TRANSPORT 1 (INITIAL PHONE CALL FROM PSC TILL EMS ARRIVAL AT PSC)
2. ED TIME (EMS PSC ARRIVAL TO PSC DEPARTURE)
3. TRANSPORT 2 (PSC DEPARTURE TO CSC ARRIVAL)

TOTAL TRANSPORT TIME TARGET SET AT LESS THAN 60 MINUTES

Norton Healthcare

Current State Process Map

Current process has multiple Non-value added steps contributing to patient care delays.
Goal Door In Door Out (DiDo) is 90mins.
Only meeting that goal 18% of patient transfers (2016)

We learned:
Multiple phone calls are not needed to transfer the patient. Bedside handoff is completed at receiving facility.

Only Value added phone calls to get patient Transferred.

Current Average 123mins!
Validated Root Causes

**Why wait to call EMS**
- Why?
- Because we don’t have a bed
- Why?
- No confirmation call back with assignment
- Why?
- House Sup. Needs to contact ICU nurse
- Why?
- ICU nurse needs report

5 Whys Why EMS delay?
- What we got

5 Whys Why EMS delay?
- What we want

**5 Hows** How are we going to decrease transfer time?

- Reduce transfer time
- How are we going to do that?
- Eliminate all non value added phone calls
- How are we going to do that?
- Dummy Bed Assignment for EMS
- How are we going to do that?
- Create a standardized handoff report
- How are we going to do that?
- 2 phone call Approval process

NAH Transfer Times
2016 YTD tPAs

- Out the Door
- DTN

Minutes

Number of tPAs

DM
A
IC

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New Process Map

1. Call EMS for Transport
2. NL Cell (House Supervisor, RNs or MDs, or MDs, as needed)
   a. Responsible for receiving and assigning patients. NL who received patient will be told to call 911 and give address. NL will call EMS when ready.
   b. If patient is not ready, NL will call back in 20 minutes.

Receiving House Supervisor
a. Will call NL for assignment. If unable to assign, call NL during first phone call.
   b. If patient is not ready, NL will call back in 20 minutes.

Discharge patient from EPIC

Call Access Center

Access Center (AC):
- Priorities to be assigned (ALS)
- NS calls back on instructions NS with ED MD
- ED NS accepts, AC immediately transfers NS to appropriate ED Hospitalist
- ED nurse receives patient information (ED) from bed board, ED RN reviews, this is transferred
- ED NS calls back with bed info

Emergency Center (EC) will call ED with bed 
- ED RN calls ED with bed report and phone # for report.

Transferring facility personnel:
- Great RN for the receiving ward
- RNs will rubber stamp
- RN available to provide brief trauma
- RNs report to be given at bedside open service
- RNs are notified to order at bedside

Ensure patient is discharged from EPIC.

NORTON TO NORTON STROKE TRANSFER PROCESS

Patient destination has been decided by ED nurses and neurologist and/or neurosurgeon.
ED call Access Center to start transfer process.
Triage (if necessary) and send patient to ED.
ED nurse calls Access Center to start transfer process once decision is made.

Transfering facility must call EMS for transport.

For all ischemic strokes going for intervention and critical hemorrhagic strokes:
- Need ALS truck with paramedics. Transport lights & sirens. Nurse to ride along.
- If pt is determined to be stable and NOT in need of intervention, lights & sirens are not needed.
FY18 LVHN ISCHEMIC TRANSFER DOOR IN DOOR OUT (DIDO)

Transport put on standby at first contact to transfer center
Fastest mode of transport identified
Air crew released to join ground when needed
Early activation of NIR team for MT
Stroke Alert upon arrival at CSC

NOTE: Includes transfers only, excludes hemorrhagic strokes, data from LVHCC Stroke Alert/tPA Log
DOOR IN, DOOR OUT (DIDO): DISCUSSION

- WHAT PRACTICES / PROCESSES DOES YOUR HOSPITAL USE TO REDUCE TIME?
- HAVE YOU CREATED A PROCESS MAP?
- DO YOU HAVE WRITTEN PROTOCOLS?
- TIMELINESS OF CTA RESULTS?
- WHO MAKES THE DECISION TO TRANSFER PATIENT (ED OR NEUROLOGIST)?
- WHO COORDINATES THE TRANSFER?
- EDUCATION OF TRANSPORT TEAMS?

DOOR IN, DOOR OUT (DIDO): DOCUMENTATION

- ABSTRACTION:
  - Presence of LVO?
  - MER eligible?
  - Time the patient departed from the emergency department?
IMPROVING COMPLEX CLINICAL SYSTEMS

• **KEY TAKEAWAYS:**
  • EXPLICIT GOAL OF REDUCING DIDO
  • VISIBLE LEADERSHIP SUPPORT
  • INNOVATIVE STANDARDIZED PROTOCOLS
  • COLLABORATIVE, INTERPROFESSIONAL TEAMS
  • DATA FEEDBACK TO MONITOR = ITERATIVE EVALUATION
  • FOSTER PERSISTENCE
  • REMAIN PATIENT FOCUSED

Circulation. 2006; 113: 1079-1085

NEED FOR SPEED: TIME IS BRAIN!

THANK YOU!
REFERENCES

References


OPTIMIZING TRANSPORT

Optimal Transport Destination for Ischemic Stroke Patients With Unknown Vessel Status

Use of Prehospital Triage Scores

Eckland Schrann, MBBS, PhD; Martin Elings, MD; Christian H. Nolte, MD; Matthias Enders, MD; Ludwig Schrann, MD

Background and Purpose—Patients with acute ischemic stroke (AIS) and large vessel occlusions may benefit from direct transportation to an endovascular capable comprehensive stroke center. This study aimed to evaluate the impact of prehospital triage on door-to-needle times for AIS patients with large vessel occlusion. The authors used a regression analysis to assess the impact of prehospital triage on procedure times for AIS patients with large vessel occlusion.

Methods—The study included a retrospective analysis of data from a single-center registry of AIS patients treated with endovascular therapy. The primary endpoint was door-to-needle time, defined as the time from hospital arrival to the administration of thrombolytic therapy. The secondary endpoints were door-to-ballon time, defined as the time from hospital arrival to the administration of endovascular therapy, and door-to-recovery time, defined as the time from hospital arrival to discharge from the hospital.

Results—In total, 235 AIS patients were included in the study. The median door-to-needle time was 45 minutes (interquartile range, 26-71 minutes). The median door-to-ballon time was 100 minutes (interquartile range, 52-140 minutes). The median door-to-recovery time was 112 hours (interquartile range, 72-150 hours).

Conclusion—Prehospital triage can significantly improve door-to-needle times for AIS patients with large vessel occlusions. Prospective studies are needed to further evaluate the impact of prehospital triage on clinical outcomes in AIS patients.

Figure 1: Decision tree for the model. The decision tree is based on a decision tree model, which identifies the optimal route for transporting AIS patients with large vessel occlusions. The model incorporates patient-specific factors, such as time of day, distance to the nearest hospital, and the availability of endovascular capabilities. The optimal route is determined by a series of decision nodes, each representing a specific factor, until the final decision is made. The optimal route is then followed by the hospital, resulting in improved door-to-needle times for AIS patients.
STRATIS REGISTRY

- PROSPECTIVE MULTICENTER OBSERVATIONAL STUDY OF MT FOR ACUTE STROKE
- 55 SITES/ 1000 PATIENTS
- ONSET TO REVASCULARIZATION: 202 MIN FOR DIRECT; 311 MIN FOR TRANSFER
- CLINICAL OUTCOME BETTER FOR DIRECT GROUP W/ 60% FUNCTIONALLY INDEPENDENT VS 52% IN TRANSFER GROUP
- INTERHOSPITAL TRANSFER ASSOC. W/ SIGNIFICANT DELAYS & LOWER CHANCE OF GOOD OUTCOME

Circulation. (2017); 136:2311-2321

WHAT MIGHT THIS LOOK LIKE:

Fig. 2 This multidisciplinary and inter-departmental performance improvement (PI) initiative aimed to reduce door-to- groin (DTG) time at our facility. The PI initiative found that parallel processes can reduce DTG by as much as 50%, and a 90% mean DTG target was achieved after standard protocol implementation.
Protocol-driven process significantly improve efficiency of care in time-sensitive stroke interventions.