Stroke Fellow On-Call Guide

Overview of Responsibilities

1. Staff all stroke alerts and non-urgent stroke/TIA consults seen by in-house resident (HUP, PPMC, PAH)
2. Provide telestroke services for Penn satellite hospital EDs (HUP Cedar, CCH, MCP, sometimes LGH)
3. Triage patient transfer requests from outside hospitals
4. Coordinate thrombectomy transfers within the Virtua system
5. Facilitate non-thrombectomy stroke transfers requiring a higher level of care (including the Virtua system)

Resident Staffing

- The downtown Penn hospitals (HUP, PAH, PPMC) have at least 1 neurology resident in house 24/7
- Non-stroke consults are staffed by an on-call senior resident (SAR) unless the in-house resident is a SAR
    - If a case you hear about as a stroke alert is something other than stroke, it is up to you/resident if it needs to be restaffed with the on-call SAR. If straight-forward (*i.e.,* seizure→give AED) then reasonable to save the resident an overnight restaffing. If it requires more thorough work-up and management, recommend them discussing with on-call SAR
- Residents are expected to call the fellow for all stroke cases, urgent and non-urgent
    - For stroke alerts, fellow decides which imaging should be ordered. At the beginning, you'll get head CT, CTA head/neck, and CTP for everyone more often. As the year progresses, you will forgo studies depending on patient story/exam
        - STAT MRIs are possible though not routinely obtained for acute decision making. Need for this will usually involve discussion w/ attending
        - Encourage the resident to tell you what studies they want before giving your input and explain your rationale if different
        - If resident hasn't called you by 10 minutes after the alert, call them for the preliminary story/exam
    - Non-urgent consults may inadvertently be staffed by on-call SAR. If there is no acute decision-making (antithrombotic change, urgent imaging, etc.) then it is reasonable to not have this restaffed overnight. Any patient that will ultimately be staffed by the Stroke team should be run by the fellow first to ensure appropriateness
- There are no telestroke capabilities at the downtown hospitals; residents are eyes and ears. If unsure about an exam, ask the resident to send a video or Facetime to evaluate the patient

Penn Downtown Hospitals

Hospital of the University of Pennsylvania (HUP)

Staff

- Monday-Friday: at least 1 resident (usually junior resident—JAR) in house seeing stroke alerts, non-urgent stroke/TIA consults, and non-stroke/general neurology consults (in house up to 28 hours w/ staffing)
    - 5PM-7:30AM
- Saturday and Sunday: 2 residents in house seeing stroke alerts, non-urgent stroke/TIA consults, and non-stroke/general neurology consults
    - 1 Day resident: 7:30AM-5PM
    - 1 Call resident 7:30AM-7:30AM (in house up to 28 hours w/ staffing)

Stroke Alert Notification

- ED Alerts: automated phone call, text message, Haiku alert
- Inpatient Alerts: text message

Imaging Availability

- CT, CTA, and CTP available 24/7
- MRI available 24/7 though timing varies on availability. STAT requests require a call to neuroradiology fellow on call and MRI tech

tPA Logistics

- ED alerts are stratified to "hot" (LKN <4.5 hours, tPA candidate) and "cold" (LKN >4.5 hours). *These designations are *rarely* correct, so verify timing*
- ED alerts provide the resident with a stroke packet that includes tPA checklist of inclusion/exclusion criteria. If considering tPA, have the resident go through the checklist to ensure patient is a candidate while you review HCT, labs, and decision-making with attending
    - ED pharmacist should stay with patient until neurology resident communicates a tPA decision. Have the pharmacist mix tPA *as soon as possible*

- There is variable participation of ED resident/attending. They typically stay until tPA decision is made but not always. ED provider should place tPA/patient orders—EMR order for tPA is *not* required. A verbal order from neurology is sufficient to push tPA.
- If considering tPA for an inpatient, maintain a low threshold to have the resident call a rapid response to expedite inpatient pharmacy and nursing support
- If you're in-house, consider enrollment in MOST

Thrombectomy Logistics

- See below for arranging a thrombectomy
- Patient will board in the ED/native unit (if inpatient) until neuro-IR/angio suite is ready
  - Calling the neuro-IR fellow for updates *will* speed up the process
- Ask the ED/primary team to prep the patient for IR while waiting for the team to assemble. These procedures *should not* delay transfer to IR (whatever isn't done will be done in the IR suite), so ask in this specific order: foley, A-line, intubate (rarely gets to this step; risks delaying transport if respiratory isn't readily available)
- Resident should stay with the patient until you arrive to facilitate this process and ensure no delays in transport to neuro-IR once the suite is ready.
  - Once you arrive, the resident should remain involved in helping execute your directions (you are still fielding calls). Once the patient gets to neuro-IR, you may dismiss the resident if they have pending consults

Disposition Considerations

- If stroke is the primary problem for ED patients, admit to Stroke Service
  - **Stroke Floor:** uncomplicated, stable patients
  - **INCU (Stepdown Unit):** post-tPA, uncomplicated post-thrombectomy, small hemorrhages, high-risk (perfusional, fluctuating exam, etc.) patients
    - q2 neuro checks possible (more frequent if post-tPA/thrombectomy)
    - Can titrate nicardipine gtts
    - Accepts trach patients if on stable vent settings for several days
  - **NICU:** post-tPA if no INCU beds (though typically board in the ED), medically complicated post-tPA despite INCU availability, complicated or intubated post-thrombectomy patients, most hemorrhage patients
- If stroke is *not* the primary problem for ED patients and they require admission, admit to most appropriate service with stroke following
  - Just because stroke symptoms brought them into hospital, stroke may not be their primary problem even if diagnosis is confirmed
    - Ex: stroke diagnosed in active cancer patient. The stroke is likely a symptom of their cancer and does not require a stroke admission for work-up. Stroke consult team can follow patient on a primary oncology service
- If uncomplicated TIA or diagnosis is uncertain, can admit to observation unit (Obs)
- Not all stroke alerts need to be staffed by the stroke attending. During morning fellow signout, decide which patients are vascular cases and should be seen by our team. The non-vascular patients should be staffed by the general neurology consult team. Communicate these decisions to the residents first thing in the morning (their signout is 7:30AM)

Penn Presbyterian Medical Center (PPMC, "Presby")

Staff

- Monday-Friday: 1 nightfloat resident (usually JAR) in house seeing stroke alerts, non-urgent stroke/TIA consults, and non-stroke/general neurology consults
  - 6:30PM-7AM
- Saturday and Sunday: 1 resident in house seeing stroke alerts, non-urgent stroke/TIA consults, and non-stroke/general neurology consults
  - Typically, a 24-hour call ~7AM-7AM
    - Variably split into day shift/night shift
  - Sometimes weekend day attending is stroke trained—residents staff directly with attending while they are in house

Stroke Alert Notification

- ED and Inpatient Alerts: no notification, await resident call
  - Can opt-in to receive PPMC Haiku alerts for ED stroke alerts

Imaging Availability

- CT, CTA, and CTP available 24/7

- MRI available until ~11PM each night. If STAT MRI is indicated, tech can be called in but requires discussion with neuroradiology

tPA Logistics

- No "hot/cold" stratification
    - High proportion of nursing home patients with difficult to obtain LKN.
- ED alerts provide the resident with a stroke packet that includes tPA checklist of inclusion/exclusion criteria. If considering tPA, have the resident go through the checklist to ensure patient is a candidate while you review HCT, labs, and decision-making with attending
    - ED pharmacist should stay with patient until neurology resident communicates a tPA decision. Have the pharmacist mix tPA *as soon as possible*
    - There is variable participation of ED resident/attending. ED provider should place tPA/patient orders—EMR order for tPA is ***not*** required. A verbal order from neurology is sufficient to push tPA.
- If considering tPA for an inpatient, maintain a low threshold to have the resident call a rapid response to expedite inpatient pharmacy and nursing support

Thrombectomy Logistics

- See below for arranging a thrombectomy
- There is an early activation in place for suspected LVO—most efficient when there is a stroke-attending in house. If high suspicion, ask resident to have ED call transfer center immediately to initiate transfer to HUP even if final decision hasn't been made. Transfers can be canceled if deemed not to be a thrombectomy candidate
- If ground transport ETA is >45 minutes, ask PennSTAR to fly (fastest is typically ~45 minutes)

Disposition Considerations

- Consult team only; no primary neurology service
- Stable non-tPA stroke patients are usually admitted to Medicine floor with neurology consult
    - There is no INCU/stepdown unit
- Medically unstable, all tPA patients, and almost all hemorrhages are admitted to NICU
- If uncomplicated TIA or diagnosis is uncertain, can admit to observation unit (Obs)

Pennsylvania Hospital (PAH, "Pennsy")

Staff

- Monday-Friday: 1 nightfloat resident (usually JAR) in house seeing stroke alerts, non-urgent stroke/TIA consults, and non-stroke/general neurology consults
    - 6:30PM-7AM
- Saturday and Sunday: 1 resident in house seeing stroke alerts, non-urgent stroke/TIA consults, and non-stroke/general neurology consults
    - Typically, a 24-hour call ~7AM-7AM
        - Variably split into day shift/night shift
    - Sometimes weekend day attending is stroke trained—residents staff directly with attending while they are in house

Stroke Alert Notification

- ED and Inpatient Alerts: no notification, await resident call
    - Can opt-in to receive PAH Haiku alerts for ED stroke alerts

Imaging Availability

- CT, CTA, and CTP available 24/7
- MRI available ~9PM each night. If STAT MRI is indicated, tech can be called in but requires discussion with neuroradiology though harder than PPMC

tPA Logistics

- ED alerts provide the resident with a stroke packet that includes tPA checklist of inclusion/exclusion criteria. If considering tPA, have the resident go through the checklist to ensure patient is a candidate while you review HCT, labs, and decision-making with attending
    - No dedicated ED pharmacist; have resident call pharmacy to mix tPA *as soon as possible*
    - There is variable participation of ED resident/attending. ED provider should place tPA/patient orders—EMR order for tPA is ***not*** required. A verbal order from neurology is sufficient to push tPA.
- All inpatient stroke alerts co-activate the Rapid Response Team

Thrombectomy Logistics

- See below for arranging a thrombectomy

- There is an early activation in place for suspected LVO—most efficient when there is a stroke-attending in house. If high suspicion, ask resident to have ED call transfer center immediately to initiate transfer to HUP even if final decision hasn't been made. Transfers can be canceled if deemed not to be a thrombectomy candidate
- There is **no helipad.** If ground transport ETA is unacceptably long, can consider having ED/resident call 911/EMS for ambulance for transfer though this is frowned upon by EMS

Disposition Considerations

- Stable non-tPA stroke patients are usually admitted to neurology floor
  - Stepdown unit exists though is physically separate from floor and NICU
- Medically unstable, all tPA patients, and almost all hemorrhages are admitted to NICU
  - Variable if MICU team (for all intubated patients) vs. neurology inpatient team (patients who require close monitoring) is primary
  - No in-house neuro-intensivists
- If uncomplicated TIA or diagnosis is uncertain, can admit to observation unit (Obs) though if there is no other problem the primary team is the same neurology inpatient team as full admission
- If angio services are needed, transfer to HUP

Penn Satellite Hospitals

Hospital of the University of Pennsylvania—Cedar Avenue (HUP Cedar, formerly Mercy)

Staff

- No in-house neurology presence
- Stroke team manages ***only*** ED stroke alerts via telestroke/phone consultation
- Inpatient stroke patients and non-urgent ED strokes are managed by Penn Neurohospitalist teleneurology
  - Refer them to the general neurology consult phone number on Rolodoc

Stroke Alert Notification

- No notification, await ED provider call via transfer center

Imaging Availability

- CT and CTA available 24/7
- No CTP capabilities
- MRI seems readily available

tPA Logistics

- If you have access to head CT via RAPID and story/exam is consistent with stroke, it is reasonable to recommend tPA without a telestroke (slows down time to revascularization in straightforward cases)
  - Use of RAPID in this scenario allows you to rule out hemorrhage efficiently. Should still formally review imaging in PACS especially if considering thrombectomy
- If case is not straightforward, proceed with telestroke (see below)

Thrombectomy Logistics

- See below for arranging a thrombectomy
- There is **no helipad.** If ground transport ETA is unacceptably long, can consider having ED/resident call 911/EMS for ambulance for transfer though this is frowned upon by EMS

Disposition Considerations

- Stable non-tPA stroke patients and post-tPA patients can remain at HUP Cedar
- Medically unstable stroke patients (tPA or not) can be transferred to HUP (INCU vs. NICU), especially if local team is uncomfortable with patient's status
- Neurohospitalist teleneurology should be consulted for non-acute work-up and management

Penn Medicine Chester County Hospital (CCH)

Staff

- Local in-house neurology group during daytime hours
- All acute stroke alerts (ED and inpatient) are managed by Stroke team 24/7

Stroke Alert Notification

- No notification, await ED/primary team provider call via transfer center

Imaging Availability

- CT, CTA, and CTP available 24/7
- MRI seems confined to daytime hours

tPA Logistics

- If you have access to head CT via RAPID and story/exam is consistent with stroke, it is reasonable to recommend tPA without a telestroke (slows down time to revascularization in straight forward cases)

- Use of RAPID in this scenario allows you to rule out hemorrhage efficiently. Should still formally review imaging in PACS especially if considering thrombectomy
- If case is not straightforward, proceed with telestroke (see below)
  - Telestroke is not available for inpatient stroke alerts

Thrombectomy Logistics
- See below for arranging a thrombectomy
- Flying is the most efficient mode of transportation and should be the default option weather and helicopter availability permitting

Disposition Considerations
- Stable non-tPA stroke patients and post-tPA patients can remain at CCH
- Medically unstable stroke patients (tPA or not) can be transferred to HUP (INCU vs. NICU), especially if local team is uncomfortable with patient's status
- Hemorrhages are almost always transferred to HUP via neurosurgery
- Inpatient neurology should be consulted for non-acute work-up and management

Penn Medicine Medical Center at Princeton (MCP)

Staff
- Local in-house neurology group during daytime hours
- ED stroke alerts are managed by Stroke team between 5PM and ~8AM

Stroke Alert Notification
- No notification, await phone call directly from ED provider

Imaging Availability
- CT and CTA available 24/7
- CTP available 8AM-8PM 7 days per week
- MRI seems confined to daytime hours

tPA Logistics
- If you have access to head CT via RAPID and story/exam is consistent with stroke, it is reasonable to recommend tPA without a telestroke (slows down time to revascularization in straight forward cases)
  - Use of RAPID in this scenario allows you to rule out hemorrhage efficiently. Should still formally review imaging in PACS especially if considering thrombectomy
- If case is not straightforward, proceed with telestroke (see below)

Thrombectomy Logistics
- See below for arranging a thrombectomy
- Flying is the most efficient mode of transportation and should be the default option weather and helicopter availability permitting

Disposition Considerations
- Able to admit most patients; transfers are typically only for thrombectomy
- Inpatient neurology should be consulted for non-acute work-up and management

Virtua System

Virtua Our Lady of Lourdes (Lourdes, VOLOL)

Staff
- One Neurohospitalist in-house 7 days a week ~8AM-5PM
  - On weekends, may leave earlier pending work-load. They will inform you of their departure (fellow becomes first call for acute stroke alerts ED and inpatient).
- Variable APP coverage overnight
- ED is the most common call

Stroke Alert Notification
- ED and Inpatient Alerts: no notification, await provider call via Virtua Transfer Center

Imaging Availability
- CT, CTA, and CTP available 24/7
- MRI available until ~11PM each night. If STAT MRI is indicated, tech can be called (done by local team though may request to speak with you)

tPA Logistics
- All tPA decisions are made by separate neurology group (Specialists on Call—SOC)
- If hearing about a stroke patient within the tPA window, best to interrupt and ensure SOC is evaluating the patient for tPA while you are evaluating for thrombectomy

Thrombectomy Logistics

- VOLOL is a thrombectomy capable center; if hybrid suite is available then case can be done locally (always confirm)
    - Patients board in the ED/native unit (if inpatient) while awaiting hybrid team/neuro-IR to arrive
- Ask Virtua Transfer Center to "activate the hybrid team" and inform them neuro-IR fellow will call back to coordinate with anesthesia team
    - Stroke fellow is not responsible for coordinating hybrid team or discussing with anesthesia; NeuroIR fellow needs to call Virtua Transfer Center to do this
- Call neuro-IR fellow to discuss case

Disposition Considerations

- Thrombectomy patients are typically admitted to CC1
    - Covering provider varies between a medicine resident (covering entire hospital overnight solo) vs. neuroscience APP

Virtua Spokes: Marlton, Memorial (also called Mount Holly), Voorhees, Willingboro

Staff

- Variable in-house neurology consult presence during daytime hours
- ED is the most common call; Stroke team manages all acute stroke alerts

Stroke Alert Notification

- ED and Inpatient Alerts: no notification, await provider call via Virtua Transfer Center

Imaging Availability

- CT and CTA available 24/7
- No CTP capabilities
- MRI variably available

tPA Logistics

- All tPA decisions are made by separate neurology group (Specialists on Call—SOC)
- If hearing about a stroke patient within the tPA window, best to interrupt and ensure SOC is evaluating the patient for tPA while you are evaluating for thrombectomy

Thrombectomy Logistics

- Ideally, Virtua patients requiring thrombectomy should be transferred to VOLOL for intervention
    - If the hybrid suite is not available, patient is an acute research candidate, or there is a family request then patient can be transferred to HUP
- Virtua spokes are implementing an early activation system for suspected LVO
    - If patients meet specific criteria Virtua Transfer Center will call you with patient details once imaging is done to evaluate thrombectomy candidacy (see attached algorithm)
- If patient is transferring to VOLOL for thrombectomy, ask Virtua Transfer Center to add the VOLOL intensivist to the call for them to accept the patient (patient is admitted under their service).
    - Once accepted ask Virtua Transfer Center to "activate the hybrid team" and inform them neuro-IR fellow will call back to coordinate with anesthesia team
        - Stroke fellow is not responsible for coordinating hybrid team or discussing with anesthesia
    - Ask Virtua Transfer Center for ETA. Most likely answer will be an ETA for transport arrival to the spoke so you will need to then ask how long of a drive from spoke to VOLOL. Actual ETA from spoke to VOLOL is total of these 2 guesses—you'll almost always be wrong but still worth trying
        - Can try asking Virtua Transfer Center to call you once transport provides official ETA or when transports arrives at spoke though this is *rarely* successful
        - Will most likely require multiple calls for semi-accurate ETA updates
- Call neuro-IR fellow to discuss case
- Call APP at VOLOL (if overnight) or Penn Neurohospitalist (daytime) to sign out the patient before patient arrives
    - If no neurology coverage, call MICU or CC1 on call resident to sign out patient and ensure appropriate imaging studies are ordered for patient to undergo upon arrival to VOLOL
- If patient is transferring to HUP for thrombectomy, have the Virtua Transfer Center call the Penn Transfer Center to initiate the process. Make sure PennSTAR is included on the call. Once Penn Transfer Center is connected, process is the same as a within Penn transfer
    - Many Virtua spokes will drive patients from ED to local fields for helicopter transport. Therefore, when arranging transport with PennSTAR always ask if flight is an option especially if ground transport is >45 minutes

Disposition Considerations

- Stable non-tPA stroke patients and post-tPA patients can remain at spoke

- Medically unstable stroke patients (tPA or not) can be transferred to VOLOL (or HUP), especially if local team is uncomfortable with patient's status
- Hemorrhages are frequently transferred to VOLOL via neurosurgery
- Inpatient neurology should be consulted for non-acute work-up and management

VA Hospital

Staff

- Penn Neurology consult attending in-house during the day
- Stroke team manages all acute stroke alerts

Stroke Alert Notification

- No notification, await phone call directly from ED provider

Imaging Availability

- CT and CTA available (seems 24/7)
    - Unable to see images until patient arrives (if come with discs)
    - HUP neuroradiology can use their VA PACS login to show you the images if performed at VA prior to transfer
- No CTP capabilities
- Limited MRI availability

tPA Logistics

- The VA is not able to administer tPA--in the ED or inpatient settings
- If tPA is indicated based on ED reported exam and ED reported review of head CT with no glaring contraindications, initiate a Level 0 transfer (INCU vs. NICU pending bed availability)
    - Make sure inpatient team (Stroke team for INCU or Stroke JAR for NICU) and inpatient pharmacist are ready to meet the patient ASAP with tPA
- *Confirm last known normal immediate on arrival*--it is frequently incorrect and often the patient is not ultimately a tPA candidate

Thrombectomy Logistics

- See below for arranging a thrombectomy
- If patient is coming over for both tPA and possible thrombectomy, CTA/CTP if needed are obtained *after* final tPA decision is made in the INCU/NICU

Disposition Considerations

- The VA rarely calls for non-tPA/thrombectomy cases so we assume incidental strokes are otherwise admitted there

Arranging a Thrombectomy

- If patient is transferring from an OSH, tell the Penn Transfer Center and PennSTAR you are accepting the patient as a **"Level 0 to the HUP ED scanner with a Rhoads 2 bed."**
    - Once all parties confirm your request, ask PennSTAR for an ETA.
        - Telling PennSTAR to go with whatever mode of transport is fastest, specifically noting "flight or ground" to be most effective. This is especially important for PPMC as their default is ground given its proximity. Asking them to fly 10 blocks from PPMC seems ridiculous but can save lots of time so always ask
- At the beginning of the year, review the case with your attending on call to make sure they agree with the transfer before getting too far in the process. Later in the year, discussion becomes more of an FYI once all logistics are set though they are always available at anytime to assist with decision making.
- Once the decision is made to pursue thrombectomy and transport is set, the next call is to the neuro-IR fellow to discuss the clinical data and imaging
    - Neuro-IR will want to know LKN, NIHSS, vessel occluded, ASPECTS, COVID status, family contact for consent (unless patient is consentable), and ETA
        - Notable medical history should be relayed as it may change their mode of access and anesthesiology's sedation/airway management plan
    - Neuro-IR fellow activates the angio team and discusses case with neuro-IR attending
- After neuro-IR fellow is activated, send a message to the "Acute Stroke Team (HUP)" Cureatr group
    - Include the same information conveyed to neuro-IR fellow *in addition* to anticipated repeat imaging/direct to angio plan and orders the resident should place (neuro-IR consult order, imaging studies, COVID swab, etc.)
        - Case cannot be booked/prepped without a STAT neuro-IR consult order; make sure this order is placed in the pre-admission encounter at HUP and not in the OSH Epic encounter
    - Message automatically goes to the covering NICU fellows, NICU nursing, on-call neurology resident, neuro-IR team, and stroke QI/PI team

- Updates regarding ETA, patient arrival, exam change, and plan changes can be shared through this tread

NICU nursing may ask if they are required to meet at the ED, especially if anticipated plan is to go direct to neuro-IR upon arrival.

THERE IS NEVER A SITUATION IN WHICH NICU NURSING SHOULD NOT MEET STROKE TEAM AND PATIENT IN THE ED. ALWAYS ANSWER YES TO THIS QUESTION.

- Stroke team meets the patient and transport at the HUP ED scanner.
  - Immediately upon arrival, NICU nurse is expected to call admissions/bed management to admit the patient to HUP. (Sometimes you have to double check and make sure this step is done.)
  - Any issues/delays in admitting the patient should not delay requested repeat imaging. CT tech can override the need for the patient to be admitted--you may need to remind them in the moment
- Pending exam on arrival, decision will be made to repeat imaging, go directly to neuro-IR for thrombectomy, or admit patient without intervention (decision re: floor vs. INCU vs. NICU is patient specific and decided by fellow and attending).
  - If going for thrombectomy but neuro-IR/angio suite is not ready, the patient boards in the NICU (unless they came in through the HUP ED as discussed above) if there is more than a few minutes delay.
    - Calling the neuro-IR fellow for updates while boarding *will* speed up the process
    - Ask the NICU to prep the patient for IR while boarding. These procedures *should not* delay transfer to IR (whatever isn't done will be done in the IR suite), so ask in this specific order: foley, A-line, intubate (rarely gets to this step; risks delaying transport if respiratory isn't readily available)
- Resident should stay with the patient until they get to neuro-IR. Once the patient gets to neuro-IR, you may dismiss the resident if they have pending consults
  - Consult resident writes a consult note for all thrombectomy patients (using .strokenote template and completing the Stroke Navigator)
- Fellow writes stroke note (.bcais). Typically sign your note and attending will take it over in the morning; if the thrombectomy is early in the morning and will be staffed by an attending soon then pend the note and attending will take over during staffing.
- After thrombectomy is completed, three-way signout is performed between stroke fellow, neuro-IR fellow, and NICU fellow. This should be done *after* the post-thrombectomy dual energy head CT is completed so proper recommendations re: BP goal and antithrombotics can be discussed
  - If not in-house, neuro-IR fellow calls stroke fellows once imaging is done. Stroke fellow then conference calls the NICU fellow
  - NICU fellow has a post-thrombectomy signout note they complete. They will be asking for BP goals, need/timing of repeat imaging (HCT vs. MRI), and antithrombotic plans. Neuro-IR fellow provides specifics re: the procedure
    - BP goals are attending and TICI outcome specific, but typically advise NICU to use the post-thrombectomy orderset where SBP <180, DBP <105
    - If there is hemorrhage on the post-procedure HCT, don't forget to consider the need for tPA/anticoagulation reversal
      - Repeat HCT at 6 hours is common unless hemorrhage has concerning features
- Consider all non-tPA (>4.5 hours) thrombectomy transfers for TIMELESS--the transfer delay helps study logistics

Telestroke

- All done through Caregility; let the attending know you're setting up for a telestroke so they can join
  - Can be done from a mobile device if on your way home/into the hospital
- Only required for tPA decision-making; thrombectomy/transfer decisions can usually be made without telestroke
  - At the very least a head CT should be done before the telestroke so you can make a tPA decision immediately after your evaluation. Usually also have CTA +/- CTP; if not and are giving tPA make sure you communicate prioritizing tPA administration before additional imaging
- If case is straightforward and there is no hemorrhage on head CT, do not delay tPA administration by completing a telestroke.
  - Usually the calling ED is ok with this strategy. Sometimes they will still request a telestroke while they are mixing/giving tPA. Not worth pushing back on this request.
- Attending is usually watching your telestroke, especially early on though even most of the year during reasonable hours. Texting decision-making off screen can expedite the process; if the case requires more discussion, tell the patient/provider you are going to review imaging before making a treatment decision. Then mute your camera and microphone (don't leave the call) and discuss with the attending
- Co-sign your note (.telestroke) to on-call attending

Outside Hospital Transfer Requests

- Any hospital may request patient transfer; stroke fellow listens to all requests for stroke transfers (not responsible for neurosurgery, general neurology, or NICU transfer requests)
- Requests for transfer due to referring hospital being unable to provide a service HUP can provide should always be accepted
    - Make sure you agree with recommended testing. Transferring a patient under the promise of a test you later decide is not indicated can be upsetting to families
- Patient/family requests to be at Penn or requests a second opinion should be accepted within reason
    - Ex: adequate work-up has been unrevealing for stroke mechanism and angio is recommended. Family is apprehensive about invasive procedure and request second opinion before deciding (even if OSH can perform recommended testing) ✓
    - Ex: adequate stroke work-up is complete but patient/family is not ready to make a trach/PEG decision without a second opinion ✗
        - No additional stroke management or work-up is being provided
- Transfer requests for continuity of care are common "patient gets all their care at Penn." Whether stroke is the most appropriate primary service for them is nuanced; discuss with attending if unsure.
    - This is most common with oncology patients. Many times patients are accepted to another primary service but they have no beds so try to come in through stroke. This really isn't appropriate if stroke is not their primary issue with ongoing work-up needs
- **Levels of Transfer Acceptance**
    - Level 0: ASAP/immediate transfer (think thrombectomy)
        - Typically not floor transfers
        - Bed will be made available
    - Emergent: patient will arrive within 8 hours though bed availability may be limiting. Does not go through insurance
        - Can be floor or INCU
        - This is the slowest option for OSH ED patients
    - Routine/Elective: frequently a polite way to decline a patient without saying no
        - Requires insurance authorization which can take days and is not guaranteed
            - May be asked to medically justify why the transfer is warranted. If a reason cannot be given insurance typically declines
        - Transfer only occurs whenever a bed becomes available
        - Most frequently floor, sometimes INCU
- Stroke fellows cannot accept primary NICU patients for an indication other than post-tPA or thrombectomy.
    - If a stroke transfer request sounds unstable with ICU needs or is in an outside ICU (transfers must be lateral or upgrades, cannot downgrade a patient on transfer), ask the Penn Transfer Center to connect the on-call NICU attending to accept the patient
        - This applies if you are trying to accept a patient to INCU but there are no beds available and patient cannot wait for INCU bed to open
        - Remain on the call in case NICU attending has questions for you

Logging In

- All the Penn sites (downtown and satellites) use PennChart/Epic.
    - If logged in to the VPN through your work laptop, you can login to PennChart directly from your desktop as if you were in the hospital
    - If using a personal computer, you can access PennChart through remote access (www.pennmedaccess.uphs.upenn.edu)
    - Both VPN and remote access require DUO Mobile be previously setup on a phone you have readily available
- Though MCP uses PennChart, they do not use SECTRA for their imaging PACS. MCP imaging can be accessed by clicking the hyperlink in the radiology reports under the imaging tab
    - Will automatically download their PACS system. May require you to repeatedly click "Allow" on several prompts; if after allowing everything nothing opens, close all the windows and retry. Now that software is downloaded it should open easier
- Virtua uses their own Epic with different login credentials than Penn
    - Can access their remote login from any computer: www.citrix.virtua.org
        - Requires ENTRUST app previously setup on a phone you have readily available
        - If trying to log on from the hospital, ENTRUST works more smoothly and faster if hospital/UPHS Wi-Fi is turned off phone

    - Recommend using Google Chrome to access Virtua Epic but Microsoft Edge works as well
    - Select any login context and stick to it--OLLH Emergency is my default. Leave the other 2 fields blank upon login
        - Once logged into Epic, you can find any patient by searching in the top left corner (ensure search correct hospital) or opening up the ED folder for the appropriate hospital in the bottom left under patient lists
- Virtua PACS has a similar process to MCP for accessing imaging--follow the hyperlinks in the radiology reports
    - If radiology report is not available and all you see is a hyperlink to the imaging order, there is a button under the tabs that says "Images" that will open up the PACS system without linking to a specific image
- Virtua has a habit of randomly locking your login credentials--check them frequently. There is phone support overnight (the number is 856-355-1234)

General Tips/Things to Know

- Always ask for help from the attending if you are unsure of what to do
    - At the beginning of the year, the attending should be called for everything. As the year progresses, calls become less frequent though they are ***always*** available to you throughout the year and are ***always*** happy to help no matter what time it is
    - All tPA decisions (whether given or not) and transfers for thrombectomy should always be discussed with the attending for medical-legal reasons
- Outside hospital providers are usually non-neurologists when calling to report a patient's history/exam. When asking for subtler features like neglect, you usually have to specifically ask how they tested for neglect because often they will either not test it or assess for it incorrectly
- When transferring a patient to the HUP NICU or stroke floor, always make sure to give a heads up to the in-house team (NICU fellow, on call resident, etc) to avoid surprise admissions
- Always ensure PennSTAR is on the line if accepting a transfer within the Penn system--if they can't do the transfer themselves they will follow-up and send out ETA updates
- When on consults, you will get called by the residents at PPCM and PAH for stroke alerts and some stroke consult questions if a non-stroke-trained attending is running the service; PPMC also has an excellent stroke NP named Tony Pinto who you'll hear from
    - Run case/advice by attending if you aren't sure about your recs
- Don't forget to consider DAPT as an acute therapy--timing per POINT/CHANCE interpretation varies from attending to attending so it's fine if your practice pattern deviates from attending
- It is the fellow's responsibility to complete the imaging section of the stroke navigator for all stroke alerts/consults.
    - Gently remind the residents to fill out the other sections if you notice they aren't being done.
- During call weekends, it's helpful to remind the attending who needs a 24-hour NIHSS documented in the stroke navigator post-thrombectomy
- Don't feel like you need to have an answer to everything immediately. It is totally acceptable to call back after "reviewing case with your team" before giving recommendations
- Always get the name and date of birth from the Transfer Center before allowing them to connect you
- Remember to consider patients for clinical trial enrollments--the research coordinators are always available so reach out with questions and for assistance with enrollment/consent (www.pennstroke.org has all inclusion/exclusion criteria and consent forms)
- If you have multiple things going on at the same time (telestroke, stroke alerts to staff, trial enrollment, etc.) reach out to attending for help. They will staff alerts directly with the residents or perform a telestroke until you become available
- NICU consults covered by a neurology resident +/- a neurology NICU attending shouldn't be seen by the resident (thrombectomy patients being the exception)
    - Neurosurgery primary NICU patients should be seen by the resident
- NICU may call overnight about a new consult--these are rarely time sensitive (usually ICH being transferred) so be mindful about if the resident needs to see them overnight or if it can wait to be seen and staffed in the morning
    - Same applies for neurosurgery floor consults
- Outside imaging may be available in our system in Penn Image Exchange (PIX)
    - If you link to PIX through a patient chart, it searches by MRN and may not find any imaging. Switching to search by name (last name, first name) usually yields better results
    - If there is imaging in PIX, have residents work on crossing studies over into our SECTRA for review/posterity
    - Outside imaging disks can be uploaded into SECTRA via PIX
- SECTRA IDS 7 is far superior to SECTRA Uniview—its slower to load but worth it

Acronym Key

HUP = Hospital of University of Pennsylvania (Main Penn Hospital, 34th and Spruce)
PAH = Pennsy = Pennsylvania Hospital (Old City Penn Hospital, 8th and Spruce)
PPMC = Presby = Penn Presbyterian Medical Center (West Philly Penn Hospital/Trauma Center, 38th and Market)
PCAM = Perelman Center for Advanced Medicine = Outpatient Clinics across from HUP
CCH = Chester County Hospital (Penn satellite hospital southwest suburbs, telestroke site)
MCP = Princeton = Princeton Medical Center (Penn satellite hospital, telestroke site in Princeton, NJ)
HUP Cedar = HUP54 = (formerly Mercy) = (West Philly telestroke site, partly affiliated with Penn, EMS is not supposed to bring stroke patients here still get walk ins)
LGH = Lancaster General Hospital (Penn satellite 1.5 hours west of Philadelphia)
VOLOL = OLOL = Virtua Our Lady of Lourdes = Lourdes = main Virtua hospital (thrombectomy capable; send Virtua spoke site patients here)
Level 0 = ASAP transfer via flight (or ground if no flight available or ground is faster for some reason per PennSTAR)
PennSTAR = thrombectomy and stroke transfer EMS company with flight capability
LTM = long term monitoring = continuous EEG
Silver 9 = Silverstein 9 = main neuro floor unit
Rhoads 2 = NICU = NeuroICU
INCU = stepdown unit = certain beds on Silver9 with q2h neuro check capabilities (and q1h post tPA)
JAR = Junior Neurology Resident = PGY2
SAR = Senior Neurology Resident = PGY3
SSAR = Super SAR = PGY4