Primary Stroke Center
Acute Stroke Network

Time is Brain
Disclosures

• No financial disclosures
• Will be discussing off-label uses
History

• Sacred Heart became JCAHO certified Primary Stroke Center in December 2003

• Recertified in 2005 and 2007
Primary Stroke Program based on

- Time is Brain
- Standardized protocols
- Best Practice
- Early Recognition of signs and symptoms of stroke
  - Pre-Hospital
  - Emergency Department
  - Public
Time is Brain!

- Every second 32,000 neurons die
- Every minute 1.9 million neurons die
- Every hour 120 million neurons die
- Completed stroke: Loss of 1.2 billion neurons

- Blockage of one blood vessel will cause ischemia within 5 minutes
Ischemic Penumbra

• The ischemic penumbra is the viable but threatened brain tissue between the normal tissue and the tissue of the infarct
• Acute stroke therapies focus on reversing or preventing ischemic damage. “Penumbral Salvage”
Importance of rapid intervention

- Penumbral Salvage
- Offer treatment to restore blood flow
- Minimize permanent disabilities
What is really happening in your community?

• The average time from symptom onset to the ED is 17-22 hours.

• What percentage of people over 50 who do not recognize s/s of stroke? 42%

• What percentage of people over 50 can not name a single stroke symptom? 17%

• Only 38% call 9-1-1

• Only 20-25% arrive within 3 hours
Public Awareness

2001 National Stroke Association survey showed:
21%-Unaware stroke can be prevented
30%-Concerned about suffering a stroke
37%-Did not know stroke occurs in the brain
40%- Knew someone who had a stroke
87%-Would call 911 if experiencing one-sided weakness
Modifiable Risk Factors

- **Risk Factors**
  - Hypertension – most important
  - Elevated cholesterol (statins reduce risk by 30%)
  - Diabetes mellitus – independent risk factor
  - Atrial Fibrillation (3-4x risk)
  - Previous stroke
  - Obesity and increased abdominal fat
  - Excessive alcohol (5+/day)
  - Smoking (2x risk ischemic; 4x risk hemorrhagic)
  - Oral contraceptives/HRT*

*Blood clots are a risk for all oral and patch contraceptives. Contraceptive patch has ↑ estrogen (risk of blood clots 1:2000) ASA/Feb. 17, 2006*
F – A – S – T
(a quick assessment)

• **Face** – smile

• **Arm** raise

• **Say** a phrase

• **Time** – call 9-1-1
Pre-hospital Stroke Scale

- **The Cincinnati Prehospital Stroke Scale**
- **Facial Droop:** (have pt show teeth or smile): Normal – both sides of face move equally Abnormal – one side of face does not move as well as the other side
- **Arm Drift:** (pt closes eyes and extends both arms straight out, with palms up, for 10 seconds):
  Normal – both arms move the same or both arms do not move at all (other findings, e.g. pronator drift, may be helpful)
  Abnormal – one arm does not move or one arm drifts down compared with the other
- **Abnormal Speech:** (have pt say “you can’t teach an old dog new tricks”):
  Normal – pt uses correct words with no slurring
  Abnormal – pt 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%
10 Steps for EMS Responders

1. Evaluate and monitor ABCs
2. Perform blood pressure monitoring (DO NOT treat hypertension in suspected stroke patient)
3. Perform glucose fingerstick (Check your State regulations)
4. Perform EKG/Cardiac monitoring
5. Administer 02, per local EMS protocol
6. Perform prehospital stroke scale/screen
7. Obtain medical history, medications and compliance; **determine time patient last seen normal**
8. If local protocol allows, take a family member to the hospital
9. Minimize scene time; procedures can be performed during transport
10. Transport patient to the nearest appropriate hospital per local transport protocols; notify receiving hospital en route
ACLS Provider Responsibilities
Stroke Chain of Survival

• All ACLS providers must have a basic awareness of emergency assessment and treatment of stroke:

1. R ecognize signs/symptoms of stroke (rapid recognition)

2. A ction to take for emergency response (rapid dispatch and transport to hospital)

3. C onsult with neurologist for stroke treatment and medication options (rapid diagnosis and treatment)

4. E ducation for patients and families
ACLS Protocol –
The 7 D’s of Stroke Care

- **Detection** of the onset of stroke symptoms
- **Dispatch** – EARLY activation of EMS system
- **Delivery** of victim to appropriate facility
  (Which outlying facilities have “drip and ship”)
- **Door** – ED triage
- **Data** – ED evaluation, including CT scan
- **Decision** – about potential therapies
- **Drug therapy** – current treatment options
Signs and Symptoms of Stroke

- Weakness of the FACE, ARM, or LEG
- Slurred Speech, difficulty speaking
- Visual changes (blurred or decreased vision)
- Dizziness, loss of balance or coordination
- Acute onset of severe headache
- Nausea or vomiting with any of the above symptoms
- Confusion or disorientation with above symptoms
Goals of Stroke Care – Time is Brain!

Time Benchmark
(AHA recommended timeframes)

• Door to Doctor 10 minutes
• Door to CT 25 minutes
• Door to CT Interpretation 45 minutes
• Door to needle 60 minutes
• Door to monitored bed 3 hours
Clinical Care: Roles and Responsibilities before Treatment

• **Rapid Assessment**
  – Airway
  – Breathing
  – Circulation/Cardiac function/rhythm
  – Bedside fingerstick glucose (hypoglycemia can mimic s/s stroke)
  – Rapid Neuro assessment

• **Baseline Information**
  – Vital Signs
  – B/P treatment priority! Blood pressure guidelines:
    (Systolic < 185, diastolic < 110, with treatment)
  – IV access (18-gauge needle preferred)
  – Labs (CBC, BMP, PT/INR)
  – Weight – for t-PA weight-based dosing (0.9mg/kg - max 90 mg)

• **Initial NIH Stroke Scale/ Glasgow Coma Scale**
# Acute Stroke Activation

**PATIENT TO REMAIN NPO** Send Completed NIH Stroke Scale with Patient

## PROTOCOL for ACUTE STROKE (0-3 hours)

<table>
<thead>
<tr>
<th>CT Time:</th>
<th>Time of Call to Neurologist:</th>
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</thead>
<tbody>
<tr>
<td>ED Arrival Time:</td>
<td>Call to Transport:</td>
</tr>
<tr>
<td>Transport to ER via:</td>
<td>Arrival:</td>
</tr>
<tr>
<td>ED Arrival Time:</td>
<td>Depart:</td>
</tr>
</tbody>
</table>

## PRESENTING CLINICAL DATA/MEDICAL HISTORY - ED Physician and RN to complete

### Date: M F WG HI: IV Contrast Allergy: [ ] Yes [ ] No Discuss w/ Neurology for Pre-Tx

### Allergies:

### Medications:

**Pt. Currently Taking:**
- Warfarin/Coumadin
- ASA
- Plavix
- Lovenox/Fragmin/Arixtra
- Aggrenox
- Other

### IV Access: Size: (Must be 18g or 20g for CTA) Must be in forearm or antecubital. Need second site if tPA administered

### Vitals: T _____ P _____ R _____ BP ____________

### Current Fingerstick Glucose: __________________________

### ECG Rhythm: _______________________________________

### O2 Sats:________@_______liters

### STROKE SYMPTOMS

- Motor: [ ] Left /5 arm /5 leg [ ] Right /5 arm /5 leg
- Sensory: [ ] Left ___ arm ___ leg [ ] Right ___ arm ___ leg
- LOC: __________
- Facial Palsy: __________
- Dysarthria: __________
- Dyslipidemia: [ ] No [ ] Yes
- Diabetes: [ ] No [ ] Yes
- Smoking: [ ] Never [ ] Current (w/i past 12 mon.) [ ] Former
- HTN: [ ] No [ ] Yes
- CAD: [ ] No [ ] Yes
- facial asymmetry
- Ipsilateral weakness
- expressive dysphasia
- Dysarthria
- Gaze deviation, visual field cut
- LOC change
- NIH Stroke Scale:

### Contraindication to Lytics:

- [ ] No [ ] Yes

### ORDER SECTION

### LAB/X-RAY – DO NOT DELAY TRANSPORT FOR RESULTS

<table>
<thead>
<tr>
<th>CBC w/ platelet</th>
<th>PTT</th>
<th>ECG</th>
<th>Head CT without contrast</th>
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<tbody>
<tr>
<td>BMP</td>
<td>CT/IR</td>
<td>CXR</td>
<td>Other:</td>
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</table>

### MEDICATIONS/DOSE

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<thead>
<tr>
<th>TIME</th>
<th>RN</th>
<th>INIT</th>
<th>MD</th>
<th>INITIAL</th>
<th>NOTES</th>
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</tbody>
</table>

### BP Management: If > 185/110 on two separate measurements 15 min apart:

- Give Labetalol 10 mg IV/1 min. Hold if HR < 50 If no effect
- Give Labetalol 20 mg IV/1 min. Hold if HR < 50 If no effect
- Give Labetalol 40 mg IV/1 min. Hold if HR < 50 If no effect
- Give Labetalol 80 mg IV/1 min. Contraindications: Severe CHF; 1st degree Heart block; Cardiogenic shock.

### IV tPA Alteplase (Activase): 0-3 hours symptom onset:

- Administer via infusion pump. No other medication is to be administered through the line
- After bag is empty instill 50ml normal saline into bag and infuse remaining (PA-Alteplase(Activase))
- For thrombolytic indications and contraindications see back of this sheet.

### VS Prior to transport: T _______ P _______ R _______ BP _______ Glucose _______

### Provider Signature: ______________________ RN Signature: ______________________

### WHEN FORM COMPLETE, FAX WITH LAB/EKG TO SHMC ED 509-474-3346 AND SEND FORMS WITH PATIENT
# Acute Stroke Activation

## ACUTE STROKE TIMELINE

<table>
<thead>
<tr>
<th>Time of Onset of Symptoms:</th>
<th>TIME</th>
<th>GOAL TIMES</th>
<th>TOTAL TIME ELAPSED</th>
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</thead>
<tbody>
<tr>
<td>1. PATIENT ARRIVAL IN ED</td>
<td></td>
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</tr>
<tr>
<td>2. NURSING ASSESSMENT:</td>
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<td></td>
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</tr>
<tr>
<td>- NIH Stroke Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- History</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fingerstick glucose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CODE STROKE ACTIVATION:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Call to Provider</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Call to Radiology; Lab</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Activate CT scanner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- EKG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Initiate IV’s</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 4. Dr. ARRIVAL IN ED/ASSESSMENT | 20 | 25 |

| 5. PATIENT TO CT SCANNER | 5 | 30 |

| 6. CT SCAN | 15 | 45 |

| 7. TRANSMISSION OF IMAGES | 5 | 50 |

| 8. INLAND IMAGING READ AND CALL BACK | 5 | 55 |

| 9. PATIENT RETURNS FROM CT SCAN |      |    |

| 10. NEUROLOGIST CALL BACK TO ED PROVIDER | 5 | 60 |

| 11. IV tPA INITIATED |      |    |

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Lincoln Hospital  
Code Stroke Audit Sheet  
8/20/08  
Patient Name
Signs/symptoms of stroke:
1. Weakness of face, arm, or leg on one side of the body
2. Confusion, trouble speaking or understanding what is being said
3. Visual changes, blurred vision, double vision
4. Sudden trouble walking, dizziness, or loss of coordination
5. Abrupt onset of severe headache - “WHOML”

What to do:
1. Call a “Code Stroke” - Ext. 45555
2. Determine when was the patient last seen normal
3. Do a neuro assessment
4. Take Vital Signs - report sB/P > 180 immediately
5. Start 18 gauge IV STAT
6. Draw Stroke Lab Panel STAT
7. Prepare for Emergent CT/CTA perfusion
   (accompany patient to monitor for changes!)
8. NPO - NOTHING by mouth until Swallow assessment performed by RN!!
Mechanism of Lysis

• Intravenous Thrombolysis: **Activase/Alteplase (IV - tPA)**
  – 0 – 4.5* hour window (additional exclusion criteria 3-4.5 hours)
  – Weight-based dosing: 0.9 mg/kg (maximum of 81 mg) infused over 60 minutes with 10% of the total dose administered as an initial intravenous bolus over 1 minute (maximum 9mg)
  – Dissolves all clots in the body, risk of hemorrhage
  – Neurological improvement not always seen immediately

• Intra-arterial Thrombolysis (IA - tPA)
  – 0 – 6 hour window
  – Infused directly at the site of the clot
  – IA-tPA opens occluded arteries in 67% of the patients, compared with 30% to 40% who had received IV t-PA

• **Post-Thrombolytic Care** – careful, vigilant monitoring for changes in neuro status and systemic or cerebral hemorrhage
Inclusion Criteria for Thrombolytics
All YES boxes must be checked before thrombolytic therapy can be given.

**YES**
- Age 18 or over
- Clinical diagnosis of acute ischemic stroke causing an acute measurable neurologic deficit
- **Negative CT scan of the head** ("negative" does not mean "no problem!")
- Time of symptom onset established as less than 4.5* hours before starting treatment
Contraindications

tPA Alteplase (Activase) is **contraindicated** if any of the following are present: *(Check if any contraindications present)*

- If CT demonstrates hemorrhage or early changes of recent major infarction such as sulcal effacement, mass effect, edema, thrombolytic therapy should be avoided.
- Isolated, mild neurological deficits, such as ataxia alone, sensory loss alone, dysarthria alone or minimal weakness
- *Rapidly improving neurological signs*
- Evidence of intracranial hemorrhage on pre-treatment evaluation
- Suspicion of subarachnoid hemorrhage
- Intracranial neoplasm, arteriovenous malformation or aneurysm
- *Serious head trauma or another stroke in previous 3 months*
- Previous intracranial hemorrhage
- Pre-thrombolytic uncontrolled systolic BP greater than 185 mmHg or diastolic BP greater than 110 mmHg
- Seizure at onset of stroke
- *Recent myocardial infarction (less than 1 month)*
- *Any major surgery, history of trauma or CPR within preceding 14 days*
- *Gastrointestinal or urinary bleeding within preceding 21 days*
- *Any bleeding diathesis*
- *Patient taking Warfarin (Coumadin) and INR greater than 1.7*
- Heparin administration within 48 hours preceding onset of stroke and aPTT outside the normal range
- Platelet count less than 100,000/mm3
- Fibrinogen less than 120mg/dL
- Blood glucose less than 50mg/dL or greater than 400mg/dL
- *Pregnancy or delivery within 14 days*
- Lumbar puncture or history of arterial puncture at a noncompressible site within preceding 7 days
- Known or suspected Bacterial Endocarditis

*May be appropriate for Intra-arterial tPA-Alteplase (Activase) Or Mechanical Clot Retrieval Device. Review these items with the stroke neurologist.*
3-4.5 hour additional Exclusion Criteria for IV tPA (Alteplase)

- Age greater than 80
- All patients receiving oral anticoagulants regardless of INR
- NIHSS>25
- History of stroke and diabetes
Neurology Consult

- Notify SHMC Emergency Department 474-3344
- Acute Stroke requiring Neurology Consult
- Acute Stroke requiring transfer
SECTION A – OBJECTIVES

1. Maintain airway and adequate oxygenation
2. Maintain hemodynamic parameters within established limits
3. Prevent and/or reduce ischemic brain damage
4. Transport early stroke presentations to Stroke Centers for intervention

SECTION B – POLICY/PROCEDURE

History
1. Onset and presentation of condition: If < 3 hours, patient may be a candidate for fibrinolytic therapy. 
   **Considerations:** Window for interventional radiology expands to 6 hours for intra arterial tPA and 1.2 for clot removal.
2. Past medical history, including possible risk factors such as CAD, PVD, smoking, HTN, obesity, ETO advancing age, post-menopausal women or surgical menopause, CVA/TIA.
3. Determine ischemic versus hemorrhagic stroke:
   a. **Ischemic Stroke:** No pain involved, usually lateralizing signs. Complete unconsciousness rare except for posterior infarct
   b. **Hemorrhagic Stroke:** Sudden onset with pain. Global symptoms more prominent. Nausea common. LOC varies, but coma more common
4. Current medications, including oral contraceptives, ASA, Coumadin, or other anticoagulants, herbal remedy

Assessment
1. Thorough neurological exam: LOC, Cincinnati Prehospital Stroke Scale (see references), GCS
2. Vital signs and any treatments: temperature
3. I & O's, labs and X-rays: glucose
4. Secondary survey

Management
1. **NPO**
2. IV of NS. Avoid excess free water. Avoid hypovolemia. No glucose-containing solutions unless patient hypoglycemic.
3. Check blood glucose on all stroke patients. Goal for glucose range is 80-130mg/dL. Refer to **IV Insulin Blood Glucose Control protocol**. Consider consultation with accepting physician prior to initiating
4. Temperature  >/= 99.5 ° F: Acetaminophen (Tylenol) 650mg PR q4hr prn
5. **Ischemic Stroke:**
   a. Maintain normocapnea
   b. If tPA has NOT been given: Treat for systolic BP > 220 or diastolic BP > 120
   c. If tPA HAS been given: Treat for SBP > 185, DBP > 100
   1. **Hypertension:**
      * Labetalol (Trandate) 10-20 mg IV over 1-2 minutes (may repeat or double dose) every min. MAX Dose = 300 mg /24hrs. (consider infusion per protocol)
Endovascular

- Mechanical clot retrieval/embolectomy
- Stenting

- Anterior cerebral circulation (0-8 hours)
- Posterior circulation (0-12 hours, up to 24 hours)
Merci™-Mechanical Clot Retrieval Device
Barriers

- Time constraints
- Delays
- Medstar not available

“No Divert” policy
Comprehensive Stroke Program

- Stroke Ready ED
- Neuro Critical Care/Stroke Unit
- 24/7 coverage Neurology, Neurosurgery, Radiology, Interventional Radiology, OR, Angio
- Neurovascular/Stroke Data Base
- Regional Referral Network
- Professional Education
- Research/Clinical Trials
- Community and Patient Education
- Outpatient TIA clinic (Jan 2009)
Quality Measures

• H&P to referring MD

• Quarterly review of timelines and interventions

• Monthly stroke case conferences with quarterly telehealth (NWTH) for regional sites
  (CME 1 credit available)
2008 Transfers to Sacred Heart

Total transfers: 149

Transfer sites: 37
St. Mary’s-Walla Walla
Samaritan-Moses Lake
Mt. Carmel-Colville
Pullman Memorial
Deaconess-Spokane
Whitman Hospital
Newport Community-Newport
Kennewick General
Lincoln Hospital-Davenport
Valley Medical Center-Spokane
Okanogan Douglas
Gritman Medical Center
Kadlec Medical Center
Quincy Valley Medical Center
East Adams Rural Hospital-Ritzville
Shoshone Medical Center
Holy Family Hospital
St. Joseph’s Hospital-Chewelah
Tri-state Memorial
Columbia Basin
Mid-Valley Hospital
Kootenai Medical Center Id.
St. Joseph’s-Lewiston Id.
St. Mary’s-Cottonwood, Id.
North Valley Hospital
St. Anthony’s-Oregon
Othello Community Hospital
Ferry County Memorial
Clearwater Valley Hospital
Lourdes Medical Center
Walla Walla General
North Valley Hospital
VA Hospital-Spokane
Heart Institute-Spokane
Eastern State Hospital
Grand Coulee Community Hospital
Bonner General Hospital
“Drip and Ship”

<table>
<thead>
<tr>
<th>Sites (21 total for 2008)</th>
<th>Disposition</th>
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<tbody>
<tr>
<td>Deaconess</td>
<td>Rehab</td>
</tr>
<tr>
<td>Whitman</td>
<td>Rehab</td>
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<tr>
<td>Whitman</td>
<td>Rehab</td>
</tr>
<tr>
<td>Mt. Carmel</td>
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</tr>
<tr>
<td>Okanogan</td>
<td>Home</td>
</tr>
<tr>
<td>Shoshone</td>
<td>Rehab</td>
</tr>
<tr>
<td>KMC</td>
<td>Rehab</td>
</tr>
<tr>
<td>Holy Family</td>
<td>Home</td>
</tr>
<tr>
<td>Samaritan</td>
<td>Rehab</td>
</tr>
<tr>
<td>St. Joseph’s</td>
<td>Home</td>
</tr>
<tr>
<td>Whitman</td>
<td>Rehab</td>
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<tr>
<td>Valley MC</td>
<td>Expired</td>
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<tr>
<td>Samaritan</td>
<td>Home</td>
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<tr>
<td>Valley MC</td>
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<tr>
<td>Valley MC</td>
<td>Home</td>
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<tr>
<td>North Valley</td>
<td>Rehab</td>
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## Interventions

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<th>Sites</th>
<th>Intervention</th>
<th>Outcome</th>
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<tr>
<td>East Adams</td>
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<tr>
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<td>Merci</td>
<td>Rehab</td>
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<tr>
<td>North Valley</td>
<td>IV tPA/Stent</td>
<td>Rehab</td>
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<tr>
<td>St. Anthony’s Id.</td>
<td>IA tPA/Mech clot disruption</td>
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<tr>
<td>St Mary’s Id.</td>
<td>CEA/Embolectomy</td>
<td>Home</td>
</tr>
<tr>
<td>Holy Family</td>
<td>Crani/Hematoma evac</td>
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<td>DMC</td>
<td>IA tPA</td>
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<td>Ferry County</td>
<td>Stent</td>
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# Hemorrhages

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<tr>
<th>Site</th>
<th>Intervention</th>
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<td>Expired</td>
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<tr>
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<td>St Mary’s</td>
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<td>Newport</td>
<td>Crani Hematoma evac.</td>
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2008 Acute Stroke Intervention Summary

Number of Acute Stroke tPA Interventions w/ historical perspective

2008 Distribution of ED Door to IV tPA Times

**tPA Totals for 2008**

- **ED** = 25 IV & 8 IA
- **Direct Admit** = 1 IA
- **In House** = 3 IV
- **Gtt/Ship** = 21

**Percent of Certified JC PSC w/ Door to IV tPA w/in 60 min = 26.4%**

**Other Intervention Totals for 2008** (in 23 patients)

- **Merci** = 16
- **Penumbra Embolectomy** = 8
- **PTA/Stent** = 5

**tPA Percentages for 2008:**

8.9% (25/280) of all Ischemic Stroke Patients who were admitted to ED received IV tPA
IV tPA - ED Timeliness Statistics w/ Historical Perspective

ED Arrival to ED MD Evaluation
NINDS Goal = 10 min

<table>
<thead>
<tr>
<th>Year</th>
<th>Avg Minutes</th>
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<tr>
<td>2002</td>
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<td>2007</td>
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</tr>
<tr>
<td>2008</td>
<td>2</td>
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ED Arrival to CT Scan
NINDS Goal = 25 min

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<td>2007</td>
<td>17</td>
</tr>
<tr>
<td>2008</td>
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ED Arrival to IV tPA
NINDS Goal = 60 min

<table>
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<th>Year</th>
<th>Avg Minutes</th>
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<tr>
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<td>80</td>
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<tr>
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<td>67</td>
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<tr>
<td>2006</td>
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<tr>
<td>2007</td>
<td>88</td>
</tr>
<tr>
<td>2008</td>
<td>62</td>
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</tbody>
</table>

Onset to IV tPA
Standard = up to 3 hours from onset

<table>
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<tr>
<th>Year</th>
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<tr>
<td>2008</td>
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</tr>
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</table>
10 JC Stroke Performance Measure Results
2008 Summary - Quarterly Comparison

1. DVT Px End Hosp Day 2
2. Antithrombotic @ DC
3. Anticoagulant @ DC for Afib
4. Eligible 0-2h patients rcvd IV tPA w/in 3h
5. Antithrombotic End Hosp Day 2
6. Cholesterol Med @ DC
7. Dysphagia Screen
8. Stroke Education
9. Smoking Cessation Counseling
10. Assessed for Rehab

SHMC Q1 2008
SHMC Q2 2008
SHMC Q3 2008
SHMC Q4 2008
Resources

**Northwest Telehealth**
  Pam Currier Telehealth Specialist  
  789-4960

**Northwest Regional Stroke Network**
  Chara Chamie, Network Coordinator  
  chara.chamie@doh.wa.gov  
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**Providence Sacred Heart Neuroscience Center**
  474-4567

**Providence Sacred Heart Stroke Coordinator**
  Julie Berdis, [Julie.Berdis@providence.org](mailto:Julie.Berdis@providence.org)

- [NIHSS Training & Certification-](https://www.learn.heart.org) (American Heart Association) or
- National Institute of Neurological Disorders and Stroke, National Stroke Association
Questions/Suggestions

• Annmarie Keck RN, CEN
  NW MedStar Clinical Outreach Educator
  keckam@nwmedstar.org

  Fax course evals & sign in:
  (509) 536-3874