

ARIC Cohort Stroke Form Instructions
STR, VERSION G
QxQ, 10/08/2021

General Instructions

- A. The abstractor must be familiar with the ARIC Instructions for Completion of forms.
- B. Several types of responses are used:
Record text answers.
Record number, such as a date, time, medical record number, or measurement.

To answer most questions you will have several choices, the simplest of all being Yes = Y, No = N, or Unknown = U. In that case, "Yes" or "No" will be marked only if there is no doubt due to information in the hospital record. If nothing is written down that definitely answers the question, "U" should be recorded. If the response categories are just Yes = Y or No = N, information not recorded is then marked as "No".

<u>No</u>	<u>Yes</u>
Rule out	Likely
Suggestive	Apparent
Equivocal	Consistent with
Suspicious	Probable
Questionable	Definite
Possible	Compatible with
Uncertain	Presumably
Reportedly	Highly suspicious
Could be	Borderline
Perhaps	Slight/mild*
Could represent	Representing
May (well) represent	Thought to be
May be	Subtle
Minimal	Minor
Low probability	Would favor
trace	marked
might be	
versus	no longer seen
somewhat	
can be	
concerning for	
worrisome for	

*In Question 29.d. (referring to valve disease) mild = No.

- C. Complete only the appropriate questions.
- D. Be sure to follow correct skip patterns, i.e., follow form logic.
- E. To record dates, fill in 2 or 4 digit numbers for month/day/year. Zero is automatically filled in

the data entry system for the left box for any single digit numbers (e.g., 03 for March and 06/08/45 for June 8, 1945). If part of the date is missing, record = for that part. For example, if the only information regarding date is June 1945, record 06/=/1945.

F. For all times to be recorded on the STR form, use 24-hour clock notation. For example:

12:00 pm = Noon = 12:00
12:00 am - Midnight = 24:00

If an exact time cannot be recorded (i.e., is not given in the chart), the best estimate should be given. If a time cannot be clearly estimated, the following guidelines for estimating times may be used in conjunction with the admission time. Use these only as a last resort. For no mention of the time of day, please see below.

3:00	The middle of the night
8:00	Early morning/upon awakening
9:00	Morning
10:00	Late morning
12:00	Midday OR Noon
12:00	No mention of time of day
12:00	Noon
12:00	Earlier today OR Noon
12:00	Today
12:00	Yesterday
14:00	Early afternoon
15:00	Afternoon or midafternoon
16:00	Late afternoon
18:00	Supper time
19:00	Early evening
21:00	Evening AND/OR last night
22:00	Late evening
22:00	Symptom at bedtime

G. To record other time frames, use the following guidelines:

≥ 3 days	Several days
2 days	Few days
≥ 4 hours and < 6 hours	Several hours
≥ 2 hours and < 4 hours	Few hours
2 hours	Short time ago

"X days postoperative": the first postoperative day is the calendar day after the surgery

H. For timing purposes, when a patient was out of the hospital but not discharged (e.g., weekend pass), events will be considered in-hospital (an extension of the hospitalization).

I. It is appropriate to use information from the NIH scale to record neurological deficits. NIH scale takes precedence over contradicting information. (see APPENDIX I for the NIH scale.)

- J. Whenever you have questions about the medical information recorded in the hospital record, consult with your surveillance director/MD consultant.
- i. Field center surveillance staff complete the following items on the Stroke form:
1.a, 1b, 2, 14, 15, 23-29a, 55a., 63-63a6
 - ii. Field center staff complete Items 23 - 29.a, and 55.a based on review of both the record of the present admission and earlier records, if available.
 - iii. If a cohort case is CEL eligible only on the basis of a ICD-9 code 438, or ICD-10 code I69.x review the chart and determine whether there is any evidence for an acute stroke or new *neurological symptoms/signs** leading to admission or developing during admission. If there is evidence, or you are unsure, copy the full chart.
 - iv. If upon review of the chart there appears to be no evidence of an acute stroke, or new neurological symptoms/signs, then send to the Central Abstractor at Minnesota only the discharge codes, history and physical, discharge summary, CT scan, cerebral angiogram, carotid ultrasound, MRI reports, consult reports, labs and any other items you think relevant. Do not change the way you fill out the CEL form.
 - v. As a general rule, if the size of the chart is very large and you are not sure what to do, call the Central Abstractor to discuss ways to avoid copying it all. Generally the following parts of a medical record are not required for completing the STR Form by the Central Abstractor: intake and output sheets, respiratory therapy sheets, nutrition department, social worker forms, physician orders and nursing notes. Pages of chest x-ray reports are usually not of use.
 - vi. All stroke transfers are eligible for abstraction regardless of ICD code
- Send STR Form and medical record(s) electronically via Liquid Files using the url link below:
<https://cscex.csc.unc.edu/filedrop/Stroke>
- vii. Field centers should add an electronic label for the Event ID to the top of the first page of the packet (using AdobeAcrobat). Add the letter S to the ID number, to use as the file name, when saving the file as a .pdf before electronically transmitting (e.g., 1234567S). Make sure each page is labeled with an event ID number.

Retain a copy of the medical record in your files.

* The STROKE Q x Q's indicate that neurological symptoms include: weakness, paralysis, numbness, tingling, visual disturbance, speech abnormality, difficulty swallowing, difficulty chewing, difficulty hearing, dizziness, vertigo, gait difficulty, incoordination, severe headache, seizures or decreased level of consciousness. Neurologic signs include: coma, paralysis, Babinski, syncope (unless clearly of cardiac origin), etc.

Procedures for Preparing Stroke Records for Electronic Transmission

- **Redact the following before sending to Minnesota:**
 1. All names and initials: patient (participant), physicians, nurses, relatives, and other names.
 2. Patient address
 3. Addresses other than the patient (participant)
 4. Telephone numbers: patient (participant), spouse, etc.

5. Place of employment: name, address, phone number
6. Name of insurance company: address, phone number, policy number, all information about insurance.
7. Social security # of the patient (participant)
8. Medicaid/Medicare number
9. Hospital name and address
10. Batch # that transcriptionists use.
11. Medical record numbers
12. Birth month and day

- **Do not blind:**

1. Birth year
2. Race
3. Sex
4. Age
5. Marital Status
6. Admission date
7. Discharge date
8. Room number

List of Stroke Duplicate Materials for Transmission to MN Central Stroke Abstractors

- Cardiac Echo Reports (TEE/TTE)
- Cardiology consults
- D/C Summary
- Death Summary (autopsy, if available)
- EEG reports
- EKGs/ECGs
- EMS reports/ED records (i.e. ED MD notes, triage notes)
- Face sheet with ICD codes, admit, and /dc dates
- H&P
- Lumbar puncture reports and lab results of CSF test
- Neurology consultations (incl. neurosurgery, vascular surgery of head, interventional radiology)
- Neuro imaging and procedures (i.e. CT/CTA/MRI/MRA of head/neck, Angiogram, Carotid Ultrasound, Brain Perfusion scan)
- Operative Reports (i.e, Craniotomy, Carotid Endarterectomy)
- Physician progress notes (written or dictated)
- Tele Strips that document A-fib/A-flutter
- Therapy reports/notes (PT/OT/ST/Stroke Scales)

General Instructions for Central Abstractor Completing Stroke Form:

Items 1a, 1b 2, 14, 15, 23-29a, 55a, 63-63a6 will have been completed by Surveillance Staff at the originating Field Center. Review the entire record carefully, and begin with Item 16.

Note: Item 29.a. will be completed at the Field Center. For items 29.a-k. and 30. a-e, consult MD advisor if in doubt.

Hierarchy: Take information from the history/findings of the neurologist, resident, attending physician, ER physician or nursing notes/EMS, in that order. The underlying purpose of hierarchy is to capture information rather than to miss it, as long as the information appears accurate. However, if there is conflicting information for items relating to timing of event, use the rules of hierarchy, as long as it makes sense. In general, when there is discrepancy of presence versus possible presence versus no mention of a condition, take the presence regardless of hierarchy, as long as it makes sense. (e.g. NIH Stroke Scales or OT/PT/ST may provide valuable information when you are trying to determine absence/presence or duration of a sign/symptom).

The stroke abstractor enters the form into the data entry system (see APPENDIX G).

Retain a copy of the medical record.

Detailed Instructions for Items 1 – 63

- 1.a. **Hospital Number:** Record the 2 digit code number assigned to this hospital. See APPENDIX C for a list. If outside the study community, use the appropriate code (96-99), but do not enter hospital and location.
- b. **Medical Record Number:** This number will be found stamped or typed on almost every page of the hospital record. The easiest place to find it is both on the medical record folder and in the upper right/left hand corner of the face sheet.

List the number from left to right. Do not add zeroes to the right of the number. Enter only digits and letters; omit dashes and spaces. The medical record number ought not to change from admit to admit. The encounter (or account) number does change. Do not use it.

2. Record "Yes" if chart has been obtained. Record "No" if record cannot be obtained.

Questions 3-13 deleted from the stroke form version F.

Note: *The diagnosis and procedure ICD codes, gender, race, transfer information and arrival information formerly items 6-13 in previous versions of the stroke form are now available in the DMS as a "STROKE REPORT". If information in the report conflicts with what the stroke abstractor sees in the chart, the stroke abstractor contacts that field center abstractor to review the difference together and to come to a resolution of the correct information.*

14. **Date of Discharge (for nonfatal case) or Death:** This information will be found on the face sheet or the discharge summary. If the patient died, record the date of death.
15. **Discharged:** Indicate vital status.
16. **Timing of Death:** If dead, estimate or calculate the length of time between the onset of new neurologic symptom and death. Chronic symptoms should not be considered here, nor deaths due to causes other than neurologic events. If death occurred <24 hours from symptom onset, answer Question 46c as "Yes". For each applicable symptom in Questions 31-45, choose response as <24 hours, rather than "Unknown".
17. **ICD Code Selection:** Review ICD codes. The diagnosis and procedure ICD codes are available in CDART DMS in a report (Stroke Report). For ICD-9 codes: 430-434, 436, OR ICD-10 codes: I60.x, STRG QxQ

I61.x, I62.x, I63.x, answer "Yes" and proceed to Question 19. Otherwise, proceed to Question 18.

18. The purpose of this question is to eliminate patients who did not have strokes, but who had only transient focal neurologic deficits. If "Yes", proceed with abstraction to Question 19. If you skip out through this question, it is unnecessary to complete the rest of the form. See description of neurologic symptoms below under question 19. If symptoms come and go, but no symptom lasts at least 24 hours, then answer "No". ICD-9 code 438, OR ICD-10 code I69.x is an old stroke. If there are unchanged residual symptoms circle Question 18 "Yes" and Question 19 "No", then go on to Question 20. If a change occurred in a residual symptom (i.e., worsening), answer Question 19 as "Yes". Exactly 24 hours is taken as greater than 24 hours.

- 19.a. Neurologic symptoms or signs on admission: Symptoms are complaints expressed by the patient or relayed by the patient's family or friends. Signs are physical exam findings observed by a physician.

Neurological symptoms include: weakness, paralysis, numbness, tingling, visual disturbance, speech abnormality, difficulty swallowing, difficulty chewing, difficulty hearing, dizziness, vertigo, gait difficulty, incoordination, severe headache, seizures (convulsion), or decreased level of consciousness.

Neurologic signs include: coma, paralysis, Babinski, syncope (unless clearly of cardiac origin), *etc.* Do not consider carotid bruit as Yes here.

For our purpose, we are interested in new or acute findings (that is, not previously evaluated). Thus, for instance, a diabetic with long standing peripheral neuropathy who has had tingling in his feet for years would not have the same significance as someone who suddenly developed numbness in one leg.

If a patient is presenting for evaluation of neurologic symptoms that have not been previously evaluated and have occurred in the past two months, mark "Yes", even if the symptoms have resolved. If you are uncertain, consult the MD advisor. If the patient had an old stroke with no new or recent symptoms, mark "No".

If in doubt about whether the finding is new, answer "Yes" and continue to Question 21.

- b. If there are not new symptoms or signs present on admission or occurring in the recent past, indicate the admission diagnosis.
20. New neurologic symptoms in hospital: The purpose of this question is to identify new symptoms that began in the hospital (and ultimately, in-hospital stroke). Refer to neurological symptoms described above (Question 19). If the patient did not have new neurologic symptoms on admission, and did not develop them in the hospital, it is unnecessary to continue filling out this form.

Symptoms starting in the ER or EMS (ambulance) are considered as in-hospital onset.

21. When did the above new symptoms begin? Fill in boxes with month, day, and year. Treat month, day, year as separate items, *e.g.*, fill in year even if month and day are not given. If there are multiple new symptoms, indicate the beginning of the first of the new symptoms. Within reason, fill in a date. For example, if it says "two weeks ago," subtract 14 days from the admit date. If asymptomatic at bedtime, but awakened with symptoms, use the date of the day the symptoms

were evident. **If there are multiple TIAs (greater than 10 seconds in duration) occurring prior to admission, consider the first episode the start of the event.**

22. Was the onset of symptoms sudden or rapid? Mark "No" if symptoms were progressive in nature over a period longer than 24 hours. The following are examples of when to mark "Yes" response, and which description to specify. If symptoms occurred rapidly or suddenly, it should be pretty obvious from the history that the patient was doing something (*i.e.*, drinking coffee) when he suddenly became symptomatic (dropped his cup and noticed he couldn't move his right hand). This would also include someone who awoke from sleep with a deficit. If a patient drops his cup of coffee and notices something wrong with his right hand which felt tingly and then over the next few minutes he realized he could no longer move it, mark "Yes". Stepwise progression is a little harder to document and may involve either stepwise worsening ("stuttering onset") of a simple symptom or several symptoms. This usually occurs over several hours to a day. For example, a patient may have a "funny sensation" on the right side of his body or feel dizzy prior to retiring in the evening. When awakening in the morning he may be weak and have some speech difficulty. Then a couple of hours later he may suddenly be a lot worse. If symptoms begin or progress over weeks to months, mark "No". If onset is not described, mark "Unknown". If you are not sure, consult the MD advisor. If asymptomatic at bedtime, but awakened with symptoms, use the date of the day the symptoms were evident.
23. Is there a history of previous stroke? This refers to events preceding the present acute illness and hospitalization. Synonyms for "stroke" may include some of the following: cortical infarction, intracranial hemorrhage, cerebral thrombosis, cerebral artery occlusion, cerebral infarction, subarachnoid hemorrhage, apoplexy, cerebrovascular accident (CVA), intracerebral hemorrhage. Answer "Yes" if one or more of the sources listed above makes explicit mention of previous "stroke" or states: a history of "probable stroke", a history "consistent with stroke", a diagnosis of "CVA vs. TIA", reversible ischemic neurological deficit (RIND), or partially reversible ischemic neurological deficit (PRIND) lasting > 24 hours. Answer "No" if absence of stroke is explicitly mentioned, if symptoms lasted less than 24 hours, if stroke was "possible" or "questionable" only, or if the patient had "TIA" only with no documented residual findings. "No previous cerebrovascular disease" = no. (This means patient was normal within 24 hours after onset of symptoms and therefore did not have a stroke.) Answer "U", otherwise, or if the only information about old stroke is from a CT scan. *If a physician states history of old stroke based on a MRI/CT scan of head, answer "Yes" to history of stroke. Do not say "Yes" on the basis of a MRI/CT scan report alone.* This information is needed to distinguish first events from recurrent events in subsequent data analysis. (See APPENDIX A for additional clarification.) If there is good documentation of a patient's history, the abstractor can answer "No", even if the absence of a stroke is not explicitly stated. Take information from the history of the neurologist, resident, attending physician, ER physician or nursing notes/EMS, in that order.
- 24.,25. Date and Time: Enter month and year for first event and most recent *one*. If there was only one previous event, complete Items 24 and 25 with the same date (*i.e.*, the first and most recent event were the same). If specific dates are not given, use information available to calculate date. For instance, if stroke occurred "eight years ago" subtract eight from current year. If range is given for date of stroke (e.g., 5-7 years) choose the smaller number (5 years) and subtract from the current year.
26. Is there a history of previous TIA (Transient ischemic attack)? This refers to events preceding this acute illness. If admitted for first TIA, answer "No". If TIA preceded current event, answer "Yes". Synonyms for "TIA" may include: acute cerebrovascular insufficiency, spasm of cerebral arteries, insufficiency of basilar, carotid, or vertebral arteries, or neurological deficit lasting less than 24

hours. If TIA is not mentioned, but symptoms lasted less than 24 hours, answer "Yes" to TIA. Amaurosis fugax (or transient monocular blindness) = TIA. (See APPENDIX A). Reported (by patient or family) but unevaluated TIAs should be answered "No". If there is good documentation of a patient's history, the abstractor can answer "No", even if the absence of TIA is not explicitly stated. Take information from the history of the neurologist, resident, attending physician, ER physician or nursing notes/EMS, in that order.

27. Date and Time: Enter month and year for first event and most recent. If there was only one previous event, complete parts (a) and (b) with the same date (*i.e.*, the first and most recent event were the same). If specific dates are not given, use information available to calculate date. For instance, if TIA occurred "eight years ago", subtract eight from current year. If a range is given for date of stroke (e.g., 5-7 years) choose the smaller number (5 years) and subtract from current year.
28. Is there a history of previous MI?
This information may be found in the history and physical exam done by the admitting physician or in the nurses admitting interview. This question refers to events that occurred prior to this hospitalization. Take information from the history of the resident, the cardiologist, the attending physician, the ER physician or nursing notes, in that order. Historical questions generally refer to any time before 72 hours prior to admission or documented as longstanding. Answer "Yes" or "No" only if mentioned, otherwise check "Undetermined". If information states silent MI, record that as a "Yes" to previous MI. An abnormal ECG, alone, stating "old MI" cannot be used for positive previous history, unless the physician verifies it. If conflicting information is recorded in two or more sources, choose the information from the most reliable source. If "No cardiac problems" or information indicates "No heart disease", "No history of cardiovascular disease", "No adult illness", "No medical history", or "Previously well", you may check "No" instead of "Undetermined". (*i.e.*, APPENDIX A). If there is good documentation of a patient's history, the abstractor can answer "No", even if the absence of MI is not explicitly stated. If there is no clear indication of an MI (an old MI is not mentioned) answer unknown, regardless of what is written about chest pain.
29. This question is designed to ascertain non-atherosclerotic etiologies (causes) for stroke or diseases that may mimic or present as stroke. Parts (a) through (f) specifically are an attempt to establish the presence of a "non-carotid embolic source", a mechanism where blood clots could form in the heart and travel through blood vessels to the brain, causing a specific type of stroke. To be documented the item must have been present within four weeks prior to or during this hospitalization. For items 29.a-k. and 30. a-e, consult MD advisor if in doubt.
- a. Was there any evidence of MI?
To check "Yes" here there must be a history of severe chest pain, diagnostic or evolving ECG, or positive isoenzyme CK-MB, or elevated troponin, either four weeks before or during this admission. We need strong evidence of MI, chest pain, an evolving or diagnostic ECG, and/or positive enzymes. If there is an MI code, but no evidence of MI, this can be checked "Unknown". Admitting diagnosis of "R/O MI" alone is not sufficient evidence.
- b. Intracardiac Thrombus
This refers to a blood clot seen within the heart. It may also be called "intraventricular thrombus" (or clot) or "ventricular aneurysm with clot", or "left atrial thrombus". Check to see if an echocardiogram, autopsy or cardiac CT was done. These should specify if intracardiac thrombus was present. Echocardiogram is the most frequently used clinical study to evaluate the heart for this problem. Rarely cardiac CT has been used for the same

purpose. If an autopsy was performed, read the section that pertains specifically to the heart on gross examination. Coronary artery thrombosis or coronary thrombotic occlusion is not intracardiac thrombus. If a right atrial thrombus is noted, discuss with the MD advisor.

Intracardiac tumor. This is also called atrial myxoma (**right or left**) and should be reported on echocardiogram, cardiac CT, or autopsy, if present (see above).

- c. Atrial fibrillation or flutter. This may also be called paroxysmal atrial fibrillation. This does not include paroxysmal tachycardia, supraventricular tachycardia (SVT), sinus tachycardia, or paroxysmal atrial tachycardia (PAT). Check all ECGs interpretations for atrial fibrillation or flutter. It may be abbreviated as A.F., A.fib or At.fib. If present on any ECG, check "Yes". **If the patient is on anticoags for Afib, say "Yes"**

Atrial fibrillation/flutter has important implications for stroke, regardless of the "timing" issue. Therefore, if any ECG shows atrial fibrillation/flutter, answer "Yes", even if the atrial fibrillation/flutter became apparent after the stroke occurred. The only exception would be if AF occurred as part of a terminal process, *i.e.*, minutes before death in a patient who previously had no record of cardiac arrhythmias.

- d. Valvular heart disease. Other descriptions include:

Rheumatic heart disease - abbreviated RHD, R.Ht. dis; this includes rheumatic valvular disease of mitral, aortic, tricuspid or pulmonary valves.

Answer "Yes" to history of any valve disease but if described as mild, the response is "No". Mild to moderate = "No". Moderate = "Yes". 2+ and higher = "Yes". Statements regarding history of valve disease without a description of severity = "No".

Mitral valve disease - Mitral Stenosis(MS), or mitral regurgitation (MR). Insufficiency=Regurgitation. Isolated mitral valve prolapse, without regurgitation = "No". Calcified mitral valve alone, with no statement about stenosis = "No".

Tricuspid valve disease is generally a "No" response, unless a "right-to-left shunt" is present. Discuss with MD advisor, if uncertain.

Artificial - artificial heart or prosthetic heart valve (*i.e.*, Starr Edwards Valve, Bjork Shiley valve). Do not include porcine heart valves here. Bioprosthetic **valves and TAVR procedure = "No"**.

Consider the following in this question. Patent foramen ovale (PFO) = "Yes". LVAD = "Yes". Interatrial septal defect = consult MD advisor. Atrioseptal aneurysm = "No".

- e. Subacute bacterial endocarditis (infective endocarditis). This is an infection of the heart valves, abbreviated as SBE, which may predispose to emboli. The patient likely would be treated with IV antibiotics. This must be specifically diagnosed by a physician to answer "Yes". If patient has acute bacterial endocarditis (abbreviated ABE) or maurantic endocarditis, a "Yes" response is also indicated.
- f. Systemic Emboli are emboli to the systemic arterial circulation, *i.e.* limbs, brain, kidney. They are to be distinguished from pulmonary emboli, which got to the pulmonary

circulation, *i.e.* lungs only. A renal embolus or a femoral artery embolus is a systemic embolus. Pulmonary embolus = No. Although a cerebral embolus is technically a systemic embolus, we are looking for evidence to support the diagnosis of cerebral embolism (the presence of other systemic emboli). However, if cerebral embolus is the only type of embolus documented by invasive (cath lab) angiography, this is sufficient evidence to answer "Yes". The origin of a systemic embolus may be the heart. If a "paradoxical embolus" (a systemic embolus arising "paradoxically" from the systemic veins and travelling through a septal defect in the heart) is noted in the chart, check "Yes". Also, check "Yes" if a blood clot is documented blocking a blood vessel by invasive (cath lab) angiography. Read any non-cerebral or non-pulmonary angiograms for documentation of embolus. "Rule out or possible embolus" should be coded as "No". "Consistent with" or "probable embolus" should be coded as "Yes". Thromboembolus = systemic embolus.

g.1. Hematologic Abnormality

Hypercoagulable states include promyelocytic leukemia, *protein S deficiency*, *protein C deficiency*, *antithrombin III deficiency*, *Factor V leiden*, *resistance to activated protein C*, polycythemia vera, dysproteinemias, antithrombin III deficiency, lupus anticoagulant positive or other blood conditions specifically termed hypercoagulable or described as causing hyperviscosity by a physician. Include Disseminated Intravascular Coagulability (DIC) if it resulted in a hypercoagulable state. Include DVT if caused by a hypercoagulable state (e.g., cancer related).

g.2. Hematologic Abnormality

Hemorrhagic conditions include blood diseases that lead to defects in clotting, such as thrombocytopenia, leukemia, aplastic anemia, liver disease, vitamin K deficiency and anticoagulation therapy.* Hemorrhagic conditions may also be side effects from use of anticancer drugs which destroy the bone marrow. You may also see the term "hemorrhagic diathesis" which means a tendency to bleed. Include DIC if it resulted in a hemorrhagic state. DO NOT USE LAB VALUES TO DETERMINE PRESENCE OF ABSENCE OF ABNORMALITY, LOOK FOR THE WORDS.

Antiphospholipid antibody syndrome = Yes".

* Although anticoagulant drugs such as Heparin and Coumadin may cause a hemorrhagic condition, these are asked about specifically in Question 30. If they are the only reason for hematologic abnormality, answer this question "No". All other conditions listed above would be recorded as "Yes".

h. Brain tumor. Synonyms include neoplasm of brain, glioma, meningioma, astrocytoma, oligodendroglioma, pituitary adenoma, metastases to the brain, neuroma or subarachnoid cyst. Answer "Yes" if any of these are mentioned as being present by physician or in CT report. "Rule out brain tumor" with no evidence should be coded as "No". "Probable" or "consistent with brain tumor" should be coded as "Yes".

i. Trauma is described as blunt trauma to the head with LOC (loss of consciousness), contusion (brain), or concussion. Check the admitting history for mention of trauma.

Trauma may cause a basilar skull fracture (with or without cerebrospinal fluid leak or rhinorrhea), a subdural hematoma (also called subdural hemorrhage - abbreviated SDH), or less commonly an epidural hematoma.

Include subdural hematomas as "Yes", even in the absence of documented trauma.

Note: Subarachnoid blood is also commonly seen in association with trauma. This type of SAH (subarachnoid hemorrhage) should be distinguished from primary SAH which results not from trauma, but from aneurysm rupture that occurs spontaneously. If SAH occurs in the presence of trauma, answer "Yes" on this question. If SAH is present and there is no history or evidence of trauma answer "No". If trauma followed a stroke answer "No" (e.g., a fall after the onset of neurological symptoms).

j.,k. Record other nonstroke disease processes that cause:

i) Focal Neuro Deficit

- a) Central nervous system:
 - multiple sclerosis
 - hyper- or hypo-glycemia
 - vasculitis, systemic lupus erythematosus
 - giant cell arteritis
 - tertiary syphilis
 - CNS abscess
 - radiation to head
 - Todd's paralysis
 - Benign positional vertigo

- b) Peripheral nervous system:
 - peripheral neuropathy
 - diabetic neuropathy
 - myopathy/muscular dystrophies
 - Guillain Barre Syndrome
 - polyneuropathy
 - entrapment neuropathy
 - i.e.*, carpal tunnel syndrome
 - radicular problems
 - i.e.*, cervical or lumbar radiculopathy
 - Bell's palsy

ii) Coma

severe metabolic conditions as
end stage renal disease
end stage liver disease
acute intoxications from drugs or alcohol
hypoxia or anoxia - e.g., following cardiac arrest
electrolyte disturbances of sodium, calcium, magnesium, or phosphorous
encephalitis

If other conditions are present and not listed above, or you are unsure of the significance of the disease, discuss with MD advisor.

30. Procedures: The indicated procedures or treatments may lead to stroke in or out of the hospital.

The first four procedures are invasive tests that could lead to clot formation or dislodgement of

plaque, both of which may result in stroke. Answer "Yes" only if these procedures occurred prior to the neurologic event. If the neurologic symptoms had multiple onsets, answer in relation to the most important.

The same logic applies to treatment with anticoagulants such as Heparin and Warfarin (Coumadin). These are anticoagulant medications which may lead to a hemorrhagic complication, such as cerebral (brain) hemorrhage. If anticoagulants are being used to treat something other than the acute neurologic syndrome that this form is evaluating, answer "Yes". If the patient presents with acute neurologic syndrome, and is placed on Heparin or Coumadin as treatment for this condition, answer "No". The same logic applies to treatment with thrombolytic agents. Consult MD advisor, if uncertain.

Another central abstractor needs to verify a "Yes" response to Question 30e. Consult MD advisor, if uncertain.

Synonyms and definitions of these medications are summarized below:

- a. Cardiac catheterization. Catheter is placed in the heart chambers or coronary arteries for visualization. Also called coronary angiogram, coronary angiography. PTCA or PCI = "Yes"
- b. Open heart surgery. Includes coronary artery bypass grafts (CAB or CABG), valve replacements or commissurotomy (mitral or aortic), repair of septal defect (ASD, patent foramen ovale).
- c. Cerebral angiography. Also called cerebral angiogram, carotid angiography/angiogram, or 4 vessel angio. If only the carotids are visualized, this may be referred to as a 2 vessel angio. Also include vertebrobasilar angiograms. Answer "Yes" to angio's performed for the purpose of some intervention. (e.g...aneurysm clipping/coiling/repair).
- d. Carotid endarterectomy. Surgical revascularization in the **neck** of a carotid artery obstruction.
- e. Therapy with Heparin or Warfarin. This is "full dose" therapy, and does not include subcutaneous (SQ) Heparin, Lovenox, or a single dose. However, Therapeutic dosing of Lovenox is considered "Yes" whereas prophylactic use is "No". Typically, a therapeutic dosing is calculated as 1mg/kg BID or 1.5 mg/kg QD.
Answer "Yes" to Apixaban, Dabigatran, Eliquis, Pradaxa, Rivaroxaban, Xarelto.
Answer "No" to Plavix and ASA.
- f. Therapy with thrombolytic agents. Intravenous or intracardiac lysing (clot dissolving) agents used in the early stages of acute MI: TPA (tissue plasminogen activator, streptokinase, urokinase, APSAC (anisoylated plasminogen streptokinase activator complex), alteplase. Other similar products which enter the market after the date of writing should be included. tPA for acute ischemic stroke should not be recorded, because it did not precede the stroke. (It may cause subsequent hemorrhagic stroke, but we focus on the first event).

- 31.-46. The next series of questions is to determine the specific neurologic signs or symptoms of stroke. These symptoms may have occurred prior to hospitalization, and prompted the patient to seek medical care, or may have occurred while the patient was in the hospital for a different illness. If a symptom is present, additional questions may be asked regarding duration or affected body part. See each instruction below. Include symptoms and signs

not noted in initial exams that become evident in subsequent exams in physician progress notes.

SEVERAL OF THE QUESTIONS, IF ANSWERED "Yes", REQUIRE THAT ADDITIONAL INFORMATION MUST BE SPECIFIED. FOR MOST QUESTIONS, DISTINGUISH WHETHER THE DURATION OF SYMPTOMS FROM ONSET LASTED < 24 HOURS OR GREATER THAN OR EQUAL TO 24 HOURS. IF THE PATIENT DIED, THE DURATION IS FROM ONSET TO DEATH. IF THE SAME SYMPTOM BECAME MORE SEVERE (E.G., MARKED WEAKNESS PROGRESSING TO PARALYSIS), DO NOT JUDGE THE "WORSENING" TO BE A NEW SYMPTOM: DURATION STILL SHOULD BE FROM ONSET OF ORIGINAL COMPLAINT. IF THE PATIENT'S SYMPTOMS RESOLVED, DURATION IS FROM ONSET UNTIL COMPLETE RESOLUTION. PARTIAL RESOLUTION SHOULD BE DISREGARDED FOR CALCULATING DURATION. IF THE SYMPTOMS COME AND GO, BUT NO SYMPTOM LASTS AT LEAST 24 HOURS, THEN ANSWER "No".

For discrepancies regarding duration, defer to the most expert person (e.g., neurologist or attending), if credible.

31. Headache. The occurrence of headache should be described as part of the history. We are interested in headache that is acute in onset or different in character, as opposed to a long standing history of headache with no change in pattern. If the patient had a new or an acute headache mark "Yes" and indicate whether "Severe" or "Mild/Moderate". Headache of interest here is a significant headache (which might indicate an intracranial process) rather than an inconsequential, mild headache. Pain rating scale: 8-10 (severe); 5-7 (moderate).
32. Vertigo is a sense of dizziness where the patient feels a spinning sensation like they are on a merry-go-round. This is different from a sense of light headedness or a sensation of passing out. Answer "No" if patient is said to have syncope, presyncope or dizziness. A duration > 24 hours may be assumed if vertigo is experienced on consecutive days.
33. Convulsions = Seizures. These may be described as generalized tonic clonic (abbreviated "GTC sz") or "partial complex" (PCS) with or without "secondary generalization" (2^o gen). For postictal paralysis (Todd's paralysis), answer the applicable weakness questions as present and record in Question 29j,k.
34. Stiff neck/nuchal rigidity. Synonyms = meningismus, (+) meningeal signs. A complaint of "stiff neck" is insufficient to count as "Yes" unless there is also stiffness to flexion. "Neck supple" or "full ROM" count as "No". Pain on chin to chest flexion generally = Yes.

Limitation on leg extension. This would be mentioned in the physical exam and refers to as a test for meningeal irritation. A positive Brudzinski or Kernig sign occurs if a patient has pain along his spinal column that results from either neck flexion or leg extension. These may simply be referred to as "meningeal signs". If present, mark "Yes".

35. Coma, unconsciousness, stupor. These refer to altered states of consciousness and may also be referred to as "depressed level of consciousness", "decreased LOC", "patient unarousable" "patient obtunded", "patient lethargic" or "patient unresponsive". Syncopal episode generally = "No" here, but "Yes" in Question 46b.

This does not include altered states of cognition such as dementia, Alzheimer's disease, mental confusion, or persistent vegetative state. The question does not refer to the quality of conscious behavior but to the quantity of consciousness.

36. Aphasia. This refers to language difficulty where the patient either has difficulty producing speech and can't get the words out (Broca's aphasia) or the wrong words come out (Wernicke's aphasia). These are different from dysarthria (see Question 40 below) which is slurred speech. This is tested by tasks of repetition, comprehension, reading, writing, and naming. If paraphasic errors are noted, answer "Yes".

"Dysphasia" = yes

"Inability to speak" = yes

"Speech difficulty" alone is insufficient (= no). Record in Question 46b

37. Pre-retinal/subhyaloid hemorrhage. These would be noted on admitting physical exam or neurology/ophthalmology consultants' physical exam as part of the funduscopic exam of the eyes.

38. Hemianopia. This refers to inability to see in a particular visual field. For instance, a patient can't see to the right. This is different from being blind in the right eye. Other descriptions would include visual field cut, homonymous hemianopia (or hemianopsia) (abbreviated HH), quadrantonopia or other field cuts involving both eyes. Absent corneal reflex, nystagmus, decreased extraocular muscle strength, or abnormal pupils are "No".

This would be noted under physical exam for eyes or cranial nerve II. If it states visual fields (V.F.), are full or full to confrontation, answer "No".

"Visual difficulty" is too general to score as "yes" without elaboration or a diagnosis (= "no.")
Record statements about gaze preference in Q46b, not here.

39. Diplopia. This means double vision, seeing "two" of something. Do not include blurred vision or a visual field cut (Question 38). If the patient is alert, and double vision or diplopia are not specifically mentioned, record "No".

40. Dysphagia, dysarthria, dysphonia, tongue deviation. All of these indicate abnormality of cranial nerve(s) (CN), and should be noted under CN IX, X, XI or XII of the neurologic exam. If the chart says CN II to XII intact, check "No" to this question.

"Inability to speak" = "no" here, "yes" in Q36.

Dysphasia = "no" here, "yes" in Q36

"Speech difficulty" alone is insufficient (= no). Record in Question 46b.

Dysphagia = difficulty swallowing

Dysarthria = slurred speech occurs when patient is actually able to talk, but sounds drunk; this is different from aphasia (see Question 36 above and APPENDIX F).

Dysphonia = change in quality of voice.

Tongue deviation = deviation to one side when patient is asked to protrude tongue.

Under CN XII it may say "tongue to (R) (or (L))". This would be considered a positive; check "Yes" response.

Deceased gag reflex is included here unless there is a comatose state (see Appendix D).

41. Facial weakness may be noted under cranial nerve exam for CN VII, under general appearance or under motor exam. Frequently, facial weakness is described as a decrease or flattening of the nasolabial fold on the side of the weakness. Right facial weakness may be noted as CN VII, decreased on (R) or abbreviated as decreased NLF (nasolabial fold) on (R), and facial droop. Ptosis is not adequate for this question. It should be recorded in Question 46.a.

Record the side involved.

42. Weakness. The symptoms should be acute in onset. Generally, the entire limb is involved, worse distally (fingers and toes) than proximally (shoulder and hips). "Drift" or "pronator drift of arm" = weakness.

Do not consider "generally weak" or "generalized weakness" here. Only localized findings are of interest.

Other synonyms include: hemiparesis, hemiplegia, monoparesis/monoplegia, UE = upper extremity, LE = lower extremity, (R) = right, (L) = left. If chart says "weak R side", assume body not face.

If there is weakness, paresis, or paralysis, record the affected limb and duration. "Arm" refers to any part of the extremity, including fingers or hand. Similarly "leg" includes any part of the lower extremity such as toes and/or foot.

Most grading systems for strength are on a scale of 0 - 5, where 5 is normal. Asymmetric differences in extremity strength or anything < 5 is abnormal.

A finding of dysmetria is recorded in Question 46b, not here.

43. Facial numbness, and other kinds of sensory loss or abnormal sensation. May involve one whole side of face or just the cheek and chin. Perioral numbness means numbness around the mouth and would be considered a positive response, unless resulted from hyperventilating. For perioral numbness, unless it is reported that one side is affected, choose answer B (both sides).

Record the side affected.

Include tongue numbness in this question.

44. Loss of sensation. This may be described as numbness, marked tingling, or abnormal sensation. We are interested in acute, not chronic, unchanged sensations. Generally, the entire limb is involved, worse distally (fingers and toes) than proximally (hips and shoulder).

Other synonyms include: hemianesthesia, paresthesia, analgesia, hemisensory.

UE = upper extremity, LE = lower extremity, (R) = right, (L) = left

If there is a sensation deficit, record the affected limb and duration.

A physical finding of "extinction" is a "Yes" response.

If chart indicates a sensory deficit on a "side" assume body not face.

45. Gait disturbance. Here we are looking primarily for ataxic or staggering gait (acute changes). This would be described under cerebellar or coordination portion of neurologic exam. We are not interested in abnormalities in gait that are simply the result of leg(s) weakness (=No). We are not interested chronic gait problems (=No).

Include truncal ataxia as "Yes".

Answer "No" for patients with: Parkinson's Disease and shuffling gait, hemiparetic gait (but answer "Yes" for weakness in Q42), foot drop, or "unsteady" gait.

If not tested, check "No".

Answer **no** here for "gait difficulty," "imbalance," "difficulty with ambulation," and "gait problem", but include in Q46b, if acute. Chronic conditions are not of interest. All of them are too nonspecific to score as ataxia.

46. a. Cranial Nerve III Palsy. May be written: CNIII(3), 3rd Cranial Nerve. Synonym for palsy is paralysis. Paralysis of the 3rd Cranial Nerve affects muscles of the face used in raising eyebrows, eyelids (i.e., ptosis), eyeball movements, etc. Typically, one eye is involved. Record statements about gaze preference in Q46b.
- b. Other neurologic signs/symptoms: apraxia, acalculia, dyscalculia; agnosias - prosopagnosia, topographnosia, finger agnosia; agraphia; neglect syndrome or unilateral neglect (i.e. hemi-neglect); bulbar or pseudobulbar palsy; dysconjugate gaze; decerebrate/decorticate posturing; hyperreflexia, *absent* corneal reflex, photophobia, syncope. Record *positive* or equivocal Babinski, papilledema, Horner's, *nystagmus*, internuclear ophthalmoplegia, gaze preference to one side or gaze deviation, dysmetria of a limb, ataxia involving one or more limbs, gait disturbance, gait difficulty, imbalance, difficulty with ambulation, and gait problem.

The following would not be included here (or elsewhere): dizziness; blurred vision; pain syndromes; delirium; frontal release signs, confusion, dementia, carotid bruits, nausea, vomiting.

Consult physician if questions arise. Acute changes in memory, cognitive status or behavior may be recorded here in some circumstances.

- c. Neuro signs and symptoms lasting > 24 hours or death in < 24 hours. This is a global question which can be answered by reviewing responses to question 16 or questions 31-46b. If **any** sign or symptom lasts > 24 hours, or if the patient died within 24 hours of the onset of new symptoms, answer "Yes". Exactly 24 hours is taken as greater than 24 hours.
47. Lumbar puncture (L.P.) Also called "spinal tap", "spinal" or "tap". Check physician progress notes for procedure note, as well as laboratory results, for first nontraumatic LP after onset of symptoms. Use results of first LP, if all traumatic. If a report is available, check "Yes"; if none, check "No". Record date. (A traumatic tap is when the needle hits a blood vessel on route to spinal cord. First tube might be bloody and the next, clearer.)

If physician states LP was traumatic, check "Yes". Check the appropriate box for appearance and RBCs. If two tubes were sent for cell counts, please record results of both. Record the results of the first tube sent under Tube 1 (even if Tube #2 was actually sent first), and the results from the last tube sent under Tube 2. For example, frequently tubes 1 and 4 are sent for cell counts. Record this under Tube 1 and Tube 2, respectively. If only one tube was counted, record the results under Tube 1 regardless of what number the tube was. Note: These results apply to only one spinal tap. If more than one LP was performed, choose the first nontraumatic tap only.

L.P. (Lumbar Puncture)

47.g Record L.P. (Lumbar Puncture) diagnosis.

A. Normal study. All of the following must be true, if the specified test was performed:

spinal fluid is clear and colorless

WBC < 10, at least 90% mononuclear unless traumatic, then expect 1 WBC:700 RBC

protein normal

glucose normal

RBC should be < 100; unless traumatic; then must decrease between 1st and last tube.
Clotted blood indicates traumatic tap as well.

Other studies done, should be normal. This includes cultures, AFB, cryptoantigen, myelin basic protein, oligoclonal bands, protein electrophoresis.

B. Exclusionary criteria include:

infection - increased WBC without evidence of old hemorrhage; (+) cultures; (+) AFB, (+) VDRL, or (+) crypto antigen
Neoplasm - (+) cytology with or without increased protein

Only use this response if it appears likely that stroke-like deficits were caused by this pathology. If in doubt, consult with MD.

C. Unrelated pathology includes:

traumatic tap - grossly bloody or pinked tinged fluid that clears by final tube. Associated with proportionate increased WBC (1:700 CBC) and increased protein

D. Bloody, Nontraumatic; xanthochromia

48. Cerebral angiogram. Indicate if done **after** neurologic event. If this procedure was performed more than once, use the report you judge to be most pertinent for this case (*i.e.*, the one most helpful to arrive at a diagnosis). If cerebral angiography preceded symptom onset record "No" here, and "Yes" in 30.C (if performed within a week prior to onset of neurologic event). If removal of clot is performed/attempted (thrombectomy, embolectomy), always answer 48a "YES", even if not successful.

48. c. Record angiography diagnosis.

Angiography

A. Normal study - no abnormalities identified

B. Exclusionary pathology

Neoplasm - may be described as tumor blush or displacement of vessels due to "avascular mass"

Vasculitis - including moya moya

Subdural hematoma

Ruptured AVM

C. Unrelated pathology:

Unruptured aneurysm or AVM

Carotid artery stenosis/ulceration

Cerebral artery thrombosis/embolism

Vertebrobasilar artery disease - including stenosis/tortuosity

Generalized small vessel disease

Chronic white matter ischemic changes

D. Aneurysm - this should be described in vicinity of recent hemorrhage or associated with clot.

E. Avascular mass without evidence of ruptured aneurysm/AVM

48.d.1.,e.1. Stenosis: Fill in appropriate code for both right and left internal carotid **artery of the neck**.

If the carotid is injected during a procedure without any comment/finding, answer "NOT STUDIED". If more than one lesion, select most stenotic plaque within internal carotid. The following qualitative terms should be answered as follows:

<u>Term</u>	<u>Answer</u>
Slight/Mild/Minimal	0 - 29%
Moderate	30 - 69%
Subtotal/high grade/tight/significant	70 - 89%
Severe (occluded = 100%)	> or equal to 90%

Record the exact stenosis for right and left internal carotid **artery of the neck**. If the exact stenosis is not clear, the existing categorical question should be specified in 48.d. and 48.e. *If the range is smaller than 5% take the lower figure. If a range of stenosis overlaps two categories choose the one where most of the range falls. The "Bulb" is considered a part of the "internal carotid artery".*

- If report indicates “normal” exam, choose answer B.
- If report states “Less than 50% stenosis”, choose answer B.
- If report states “60-79% stenosis”, choose answer C.
- If report states “No plaque”, “no stenosis”, do not record zero in the “specify percentages” boxes.

Do not count CT angiograms as “Yes” here. If a description of brain tissue is included, record findings in Question 49 and Question 50 if applicable. If CTA of neck performed and provided information on the carotid arteries, record this in Question 53.

Do not count MRI angiograms as "Yes" here, unless it is an invasive procedure. However, if a description of brain tissue is included record findings in Question 52. If MRA of neck were done and provided information on the carotid arteries, record this in Question 53.

49., 50. CT Scan (first) and CT Scan (last). This would include ACTA, EMI, CT, CAT scans, but not brain scans of the nuclear imaging (radionuclide) type. Indicate if done. If so, mark appropriate time sequence on form to relate CT to onset of symptoms

If a CT angiogram provides a description of brain tissue, record findings here if a patient gets both a CT head and a CTA head at the same time/same trip to radiology **with brain tissue findings**, consider them as separate tests.

49.d., 50.d. Record first and last CT diagnosis. Pick only one diagnosis: focus on the acute event and look for the strongest evidence if there is more than one finding indicated in the report.

Computed Tomography (CT)

- A. Normal study - must check timing to determine when study was done in relation to symptom onset.
If \leq 48 hours and normal, code D.
- B. Exclusionary pathology includes:

tumor; evidence of trauma such as fractured bones, coup and contrecoup injuries, soft tissue swelling over area of hematoma; subdural hematoma, epidural hematoma, and abscess or granuloma.
- C. Unrelated pathology or findings include:
old stroke
old surgery
unruptured aneurysm
generalized atrophy, encephalomalacia
description of old surgery
hydrocephalus
normal variants - cavum septum pellucidum, calcification of falx/tentorium
age appropriate atrophy
atrophy normal for age

Do not include these findings:

Intracranial Atherosclerosis
Dural Calcifications

- D. Normal study, but done within 48 hours of symptom onset.
- E. Subarachnoid hemorrhage - blood seen in Fissure of Sylvius, between the frontal lobes, in basal cisterns or within a ventricle with no associated intraparenchymal hematoma
- F. Intracerebral hematoma - blood clot within the brain parenchyma. Occasionally these occur within secondary rupture into the ventricle or subarachnoid space. "Hypertensive" or "spontaneous hemorrhage" would be included. Typical locations include basal ganglia, cerebellum, thalamus and pons. Traumatic = "No". Sometimes, subarachnoid hemorrhage and intracerebral hematoma (hemorrhage) are both present. You will have to determine and record only the primary condition that led to the secondary condition. Consult if needed.
- G. Ischemic infarction - these are described as areas of low density (attenuation) in a typical vascular distribution. If "possible" infarction, use your best judgment of the quality of evidence and radiologist's language. Hemorrhagic infarction should be recorded as "Infarction" if it is clear that infarction preceded the hemorrhage. If unclear, consult.
51. Prehospital CTs/MRIs. There may be evidence of other CT(s)/MRI(s) performed prior to this admission but after the onset of the neurologic event. The interpretation might be recorded in the physician's or consultant's progress notes, or a formal report of that CT/MRI may be in the chart. Frequently, outside CT/MRI Scans will be officially read by the radiologist at the second hospital and dictated as if it were done there. Identify this report by comparing the date of scan to the date of admission. If "Yes", complete Questions b - d.
51. d. Record Pre-admission CT diagnosis or MRI.
52. Magnetic Resonance Imaging. Again, if done at any time and reported in the chart, it is important to note the interval between symptom onset and MRI. If this procedure was performed more than once use the report you judge to be most helpful to arrive at a diagnosis (*i.e.* look for the strongest evidence). *If MR angiography provides a description of brain tissue, record the information here.*
52. d. Record MRI diagnosis.
- A. Normal study - must check timing to determine when study was done in relation to symptom onset.
If ≤ 48 hours and normal, code D.
- B. Exclusionary pathology includes:

tumor; evidence of trauma such as fractured bones, coup and contrecoup injuries, soft tissue swelling over area of hematoma; subdural hematoma, epidural hematoma, abscess or granuloma, and M.S. plaques.
- C. Unrelated pathology or findings include:
old stroke
old surgery
- STRG QxQ

unruptured aneurysm
 generalized atrophy, encephalomalacia
 description of old surgery
 hydrocephalus
 normal variants - cavum septum pellucidum, calcification of falx/tentorium
 age appropriate atrophy
 atrophy normal for age

Do not include these findings:

Intracranial Atherosclerosis
 Dural Calcifications

- D. Normal study, but done within 48 hours of symptom onset.
- E. Subarachnoid hemorrhage - blood seen in Fissure of Sylvius, between the frontal lobes, in basal cisterns or within a ventricle with no associated intraparenchymal hematoma
- F. Intracerebral hematoma - blood clot within the brain parenchyma. Occasionally these occur within secondary rupture into the ventricle or subarachnoid space. "Hypertensive" or "spontaneous hemorrhage" would be included. Typical locations include basal ganglia, cerebellum, thalamus and pons. Traumatic = "No". Sometimes, subarachnoid hemorrhage and intracerebral hematoma (hemorrhage) are both present. You will have to determine and record only the primary condition that led to the secondary condition. If unclear, consult with the MD.
- G. Ischemic infarction - these are described as areas of low density (attenuation) in a typical vascular distribution. If "possible" infarction, use your best judgment of the quality of evidence and radiologist's language. Hemorrhagic infarction should be recorded as "Infarction" if it is clear that infarction preceded the hemorrhage. If unclear, consult with the MD.
- 53. B-Mode/Doppler. Also frequently referred to as "non-invasive studies" (of carotids). If done at any time and reported in the chart, indicate the test performed. If this procedure was performed more than once, use the report you judge to be most pertinent for this case (*i.e.*, the one most helpful to arrive at a diagnosis). Another term for B-mode is "real time" scan. *If MRI angiography or CTA of the neck were done and it provides information on the carotid arteries, record this here. If ultrasound and MRA/CTA provide measurements of carotid stenosis, pick the more informative test. If there is a disagreement in stenosis percentage among tests, choose your answer according to the following hierarchy: ultrasound (first), MRA (second), CTA (last). Consult physician as needed.*
- 53.c.,d. Record Ultrasound diagnosis for left and right internal carotid.
Make use of ultrasound done at anytime during this admission and reported in the chart.
- 53.c.1.,d.1. Record the exact stenosis for right and left internal carotid **artery** of the **neck**.
If the exact stenosis is not clear, the existing categorical question should be specified in Questions 53.c and 53.d.

U.S. - The following qualitative terms should be answered as follows:

<u>Term</u>	<u>Answer</u>
Slight/Mild/minimal	0 - 29%
STRG QxQ	

Moderate	30 - 69%
Subtotal/high grade/tight/significant	70 - 89%
Severe (occluded = 100%)	> or equal to 90%

Record the exact stenosis for right and left internal carotid **artery** of the **neck**. If the exact stenosis is not clear, the existing categorical question should be specified in 53.c. and 53.d. *If the range is smaller than 5% take the lower figure. If a range of stenosis overlaps two categories choose the one where most of the range falls. The "Bulb" is considered a part of the "internal carotid artery".*

- If report indicates "normal" exam, choose answer B.
- If report states "Less than 50% stenosis", choose answer B.
- If report states "60-79% stenosis", choose answer C.
- If report states "No plaque", "no stenosis", do not record zero in the "specify percentages" boxes.
- If the reports states both a percent AND a term that differ, when grading stenosis, use the percent.

Moderately severe = E

Moderate-severe = F

Moderate-moderately severe = F

54. Craniotomy. This is any operation performed post event by a neurosurgeon that involves opening the skull. This might be done to evacuate/remove a hematoma, clip an aneurysm, or relieve intracranial pressure, etc. If this procedure was performed more than once, post event, use the report you judge to be most pertinent for this case (*i.e.*, the one most helpful to arrive at a diagnosis). A burr hole is a craniotomy.

54. c. Record Craniotomy diagnosis.

Craniotomy

- A. Normal
- B. Exclusionary pathology includes
tumor, subdural hematoma, epidural hematoma, trauma, abscess, AVM
- C. Unrelated pathology - includes incidental aneurysm/AVM
- D. Ruptured aneurysm - should describe evidence for recent bleed, or clot
- E. Intracerebral hematoma - if source is related to ruptured aneurysm, code D. If there is no apparent source and blood is primarily intraparenchymal, code E.

55. Autopsy. May be referred to as "post-mortem exam" or "post". First check to see if patient died. If so, in Death Note (last progress note in chart), it should state if permission for autopsy was granted. If autopsy available, photocopy and include in materials for review.

55.b-f. Record Autopsy diagnosis.

- 56. Abstractor Number: Stroke abstractor enters their three digit staff code number.
- 57. Date Abstracted: Stroke abstractor enters the date abstraction was completed.
- 58.-62 Record additional forms required by circling "Yes" corresponding to each form required, and "No" for form not required. These items will be autofilled by the DMS whenever data is available.
- 63. Item deleted and captured on the CEL form.
- 63a.1-63a.6. Items deleted and captured on the CEL form.

APPENDIX A

TABLE OF RESPONSE

BY TYPE OF PAST HISTORY

	Question 23 Stroke	Question 26 TIA	Question 28 MI
No prior IHD/CHD	NA	NA	NO
Previous well	NO	NO	NO
No heart disease	NA	NA	NO
No adult illness	NO	NO	NO
Negative medical history	NO	NO	NO
No cardiovascular disease	NO	NO	NO
No cardiac problems	NA	NA	NO
No neurological problems	NO	NO	NA
PRIND < 24 hours	NO	YES	NA
PRIND > 24 hours	YES	NO	NA

NA = Not applicable

APPENDIX B

DETAILED INSTRUCTIONS FOR QUESTIONS 47 - 54

Record results of specific tests and diagnoses into the space provided on Questions 47-54. Review the available data and enter the appropriate diagnostic code in Items 47.g, 48.c, 48.d, 48.e, 49.d, 50.d, 51.d, 52.d, 53.c-d., and 54.c. A complete list of diagnostic definitions is attached. In addition, there are specific examples and instructions for each code on the following pages.

Some similarities exist for all procedure codes except autopsy. For instance, any "normal study" will be coded as A (except for a normal CT done within 24 hours of symptom onset). In addition, there will be two possible responses for "nonstroke" pathology for each procedure. The first will include "exclusionary findings". These refer to specific diagnoses, whose presence would eliminate a possible stroke case from analysis. These include disease processes such as CNS tumor, infection, vasculitis and head trauma which may mimic stroke by producing focal neurologic signs and symptoms. These exclusions are described on the last page of the stroke criteria and mentioned specifically under each procedure below. Exclusionary diagnoses are coded as B for all procedures. The second type of nonstroke pathology includes all other types of unrelated findings and should only be coded if none of the other categories apply. This category is called "unrelated pathology" and coded C for all procedures with the exception of autopsy.

L.P. (Lumbar Puncture)

A. Normal study. All of the following must be true, if the specified test was performed:

spinal fluid is clear and colorless

WBC < 10, at least 90% mononuclear unless traumatic, then expect 1 WBC:700 RBC

protein normal

glucose normal

RBC should be < 100; unless traumatic; then must decrease between 1st and last tube. Clotted blood indicates traumatic tap as well.

Other studies done, should be normal. This includes cultures, AFB, cryptoantigen, myelin basic protein, oligoclonal bands, protein electrophoresis.

B. Exclusionary criteria include:

infection - increased WBC without evidence of old hemorrhage; (+) cultures; (+) AFB, (+) VDRL, or (+) crypto antigen

Neoplasm - (+) cytology with or without increased protein

Only use this response if it appears likely that stroke-like deficits were caused by this pathology. If in doubt, consult with MD.

C. Unrelated pathology includes:

traumatic tap - grossly bloody or pinked tinged fluid that clears by final tube. Associated with proportionate increased WBC (1:700 CBC) and increased protein

D. Bloody, Nontraumatic; xanthochromia

Angiography

- A. Normal study - no abnormalities identified
- B. Exclusionary pathology
 - Neoplasm - may be described as tumor blush or displacement of vessels due to "avascular mass"
 - Vasculitis - including moya moya
 - Subdural hematoma
 - Ruptured AVM
- C. Unrelated pathology:
 - Unruptured aneurysm or AVM
 - Carotid artery stenosis/ulceration
 - Cerebral artery thrombosis/embolism
 - Vertebrobasilar artery disease - including stenosis/tortuosity
 - Generalized small vessel disease
 - Chronic white matter ischemic changes
- D. Aneurysm - this should be described in vicinity of recent hemorrhage or associated with clot.
- E. Avascular mass without evidence ruptured aneurysm/AVM

Stenosis: Fill in appropriate code for both right and left internal carotids. If more than one lesion, select most stenotic plaque within internal carotid. The following qualitative terms should be answered as follows:

<u>Term</u>	<u>Answer</u>
Slight/Mild/Minimal	0 - 29%
Moderate	30 - 69%
Subtotal/high grade/tight/significant	70 - 89%
Severe (occluded = 100%)	> or equal to 90%

Record the exact stenosis for right and left internal carotid. If the exact stenosis is not clear, the existing categorical question should be specified in 48.d. and 48.e. *If the range is smaller than 5% take the lower figure. If a range of stenosis overlaps two categories choose the one where most of the range falls.*

- If report indicates "normal" exam, choose answer B.
- If report states "Less than 50% stenosis", choose answer B.
- If report states "60-79% stenosis", choose answer C.
- If report states "No plaque", "no stenosis", do not record zero in the "specify percentages" boxes.

Computed Tomography (CT)

- A. Normal study - must check timing to determine when study was done in relation to symptom onset. If ≤ 48 hours and normal, code D.
- B. Exclusionary pathology includes:

tumor; evidence of trauma such as fractured bones, coup and contrecoup injuries, soft tissue swelling over area of hematoma; subdural hematoma, epidural hematoma, and abscess or granuloma.

- C. Unrelated pathology or findings include:
old stroke
old surgery
unruptured aneurysm
generalized atrophy, encephalomalacia
description of old surgery
hydrocephalus
normal variants - cavum septum pellucidum, calcification of falx/tentorium
age appropriate atrophy
atrophy normal for age

Do not include these findings:

Intracranial Atherosclerosis
Dural Calcifications

- D. Normal study, but done within 48 hours of symptom onset.
- E. Subarachnoid hemorrhage - blood seen in Fissure of Sylvius, between the frontal lobes, in basal cisterns or within a ventricle with no associated intraparenchymal hematoma
- F. Intracerebral hematoma - blood clot within the brain parenchyma. Occasionally these occur within secondary rupture into the ventricle or subarachnoid space. "Hypertensive" or "spontaneous hemorrhage" would be included. Typical locations include basal ganglia, cerebellum, thalamus and pons. Traumatic = "No". Sometimes, subarachnoid hemorrhage and intracerebral hematoma (hemorrhage) are both present. You will have to determine and record only the primary condition that led to the secondary condition. Consult if needed.
- G. Ischemic infarction - these are described as areas of low density (attenuation) in a typical vascular distribution. If "possible" infarction, use your best judgment of the quality of evidence and radiologist's language. Hemorrhagic infarction should be recorded as "Infarction" if it is clear that infarction preceded the hemorrhage. If unclear, consult.

MRI -

- A. Normal study - must check timing to determine when study was done in relation to symptom onset. If ≤ 48 hours and normal, code D.
- B. Exclusionary pathology includes:

tumor; evidence of trauma such as fractured bones, coup and contrecoup injuries, soft tissue swelling over area of hematoma; subdural hematoma, epidural hematoma, abscess or granuloma, and M.S. plaques..
- C. Unrelated pathology or findings include:
old stroke
old surgery
unruptured aneurysm
generalized atrophy, encephalomalacia
description of old surgery
hydrocephalus
normal variants - cavum septum pellucidum, calcification of falx/tentorium
age appropriate atrophy

atrophy normal for age

Do not include these findings:

Intracranial Atherosclerosis
Dural Calcifications

- D. Normal study, but done within 48 hours of symptom onset.
- E. Subarachnoid hemorrhage - blood seen in Fissure of Sylvius, between the frontal lobes, in basal cisterns or within a ventricle with no associated intraparenchymal hematoma
- F. Intracerebral hematoma - blood clot within the brain parenchyma. Occasionally these occur within secondary rupture into the ventricle or subarachnoid space. "Hypertensive" or "spontaneous hemorrhage" would be included. Typical locations include basal ganglia, cerebellum, thalamus and pons. Traumatic = "No". Sometimes, subarachnoid hemorrhage and intracerebral hematoma (hemorrhage) are both present. You will have to determine and record only the primary condition that led to the secondary condition. Consult if needed.
- G. Ischemic infarction - these are described as areas of low density (attenuation) in a typical vascular distribution. If "possible" infarction, use your best judgment of the quality of evidence and radiologist's language. Hemorrhagic infarction should be recorded as "Infarction" if it is clear that infarction preceded the hemorrhage. If unclear, consult.

U.S. - The following qualitative terms should be answered as follows:

<u>Term</u>	<u>Answer</u>
Slight/Mild/minimal	0 - 29%
Moderate	30 - 69%
Subtotal/high grade/tight/significant	70 - 89%
Severe (occluded = 100%)	> or equal to 90%

Record the exact stenosis for right and left internal carotid. If the exact stenosis is not clear, the existing categorical question should be specified in 53.c. and 53.d. *If the range is smaller than 5% take the lower figure. If a range of stenosis overlaps two categories choose the one where most of the range falls.*

- If report indicates "normal" exam, choose answer B.
- If report states "Less than 50% stenosis", choose answer B.
- If report states "60-79% stenosis", choose answer C.
- If report states "No plaque", "no stenosis", do not record zero in the "specify percentages" boxes.

Moderately severe = E

Moderate-severe = F

Moderate-moderately severe = F

Craniotomy

- A. Normal
- B. Exclusionary pathology includes

tumor, subdural hematoma, epidural hematoma, trauma, abscess, AVM
- C. Unrelated pathology - includes incidental aneurysm/AVM
STRG QxQ

- D. Ruptured aneurysm - should describe evidence for recent bleed, or clot
- E. Intracerebral hematoma - if source is related to ruptured aneurysm, code D. If there is no apparent source and blood is primarily intraparenchymal, code E.

APPENDIX C HOSPITAL CODES

List of Active Catchment Area Hospitals as of 09/28/2015

Site	Name	Hospital Type	Notes
Forsyth County			
11	Wake Forest Baptist Med Center(used to be North Carolina Baptist)	Teaching	
12	Novant Health Forsyth Medical Center (used to be Forsyth County Memorial)	Nonteaching	
14	Novant Health Kernersville Medical Center (used to be Kernersville Medical Center)	Nonteaching	Added in 2013
15	Novant Health Clemmons Medical Center (used to be Clemmons Medical Center)	Nonteaching	Added in 2014
96	Hospital outside study area	--	
Jackson			
21	University of Mississippi Med Center	Teaching	
23	St. Dominic's Hospital	Nonteaching	
24	Merit Health Central Med Center	Nonteaching	Name change 2015
25	Mississippi Baptist Hospital	Nonteaching	
27	Merit Health Madison Hospital	Nonteaching	JHS only (name change in 2015)
28	Merit Health Rankin Hospital	Nonteaching	JHS only (name change in 2015)
97	Hospital out of study area	--	
Minnesota Townships			
30	Abbott-Northwestern Hospital – Allina Health	Teaching	Name change 2015
36	Park Nicollet Medical Center	Teaching	Name change 2015
40	North Memorial Medical Center	Teaching	
98	Hospital out of study area	--	
Washington County			
51	Meritus Medical Center	Nonteaching -	Name change in 2013
99	Hospital out of study area	--	

Inactive Hospitals

13	Medical Park (Novant Health Medical Park Hospital)		
22	Veterans Administration Hospital	Teaching	
24	Hennepin County Medical Center	Teaching	
26	Merit Health Hospital	Nonteaching	Name change 2015
31	Riverside Medical Center	Teaching	Closed
32	Fairview Southdale Hospital – Fairview Health Services	Nonteaching	Name change 2015
33	Fairview- Ridges	Non-teaching	Closed
34	Hennepin County Medical Center	Teaching	
35	Mercy Hospital – Allina Health	Nonteaching	Name change 2015
37	Metropolitan	Non teaching	Closed
38	Midway	Non teaching	Closed
39	Mt. Sinai	Non teaching	Closed
41	St. Paul Ramsey	Non teaching	Closed
42	St. John's Northeast	Non teaching	Closed
43	St. Mary's	Non teaching	Closed
44	Unity Hospital – Allina Health	Nonteaching	Name change 2015
45	University of Minnesota Medical Center, Fairview	Teaching	
46	VA Medical Center	Teaching	
47	Fairview	Non teaching	
48	Phillips Eye Institute	Non Teaching	
52	Western Maryland Center	Nonteaching	
53	VA Medical Center, WV	Nonteaching	
54	University of Maryland	Teaching	
55	Frederick Memorial	Nonteaching	
56	Johns Hopkins Hospital	Teaching	
57	Washington Hospital Center	Nonteaching	

58	George Washington University	Teaching
59	Georgetown University	Teaching
60	Saint Joseph Medical Center	Nonteaching
61	Washington Adventist	Nonteaching
62	Sinai Hospital	Nonteaching
63	Union Memorial	Nonteaching

APPENDIX D

COMA

In general, the coma exam is very simple. Most neurologists will comment on five things:

- 1) Level of consciousness - (stupor, lethargy, coma: *i.e.*, Question 35).
- 2) Pupillary position and reactivity -- (not on STR Form - can put under Question 46 "Other")
- 3) Extraocular response -- to either Doll's maneuver or ice water (not on stroke form; may list under Question 46 as "Other")
- 4) Tone and posturing (list under Question 46)
- 5) Breathing pattern (list under Question 46)

Only one of these five points is considered in the stroke form.

What is more important when coma is present is how to interpret the other symptoms requested by the stroke form. As a general rule, a person in a coma is unable to experience symptoms. This includes headache, vertigo, double vision, etc. Most signs are unable to be elicited because of the comatose state. For instance, if someone is in a coma, he/she cannot talk. An examiner, (physician, etc.) therefore cannot assess whether or not a comatose patient is aphasic. Therefore, the correct response for aphasia during coma is unknown, which is recorded as "No".

On some occasions, focal signs are obvious -- even in coma. If a patient is spontaneously moving one side of his body, or withdraws to stimuli on one side but not the other; this asymmetry would constitute hemiparesis, or weakness on one side. On a Q by Q basis, the following principles apply when coma is present:

- 31) HA at onset - may be present prior to coma onset.
- 32) Vertigo - may be present prior to coma.
- 33) Seizures - these may occur at any time in association with CNS injury. Please note, however, that decreased LOC is normal following a seizure and is called a "postictal" state. If the "coma" under consideration refers only to the postictal state mark "No" under coma.
- 34) Meningeal Signs - these can be tested and determined despite the presence of coma. If present, mark "Yes".
- 36) Aphasia - in the setting of coma this cannot be assessed. Always mark "No" unless there is evidence of aphasia prior to or following coma. In all other circumstances mark "No".
- 38) Hemianopia - cannot be tested if patient is comatose. In stupor or lethargy, if there is asymmetry in response to visual threat, mark "Yes".
- 39) Diplopia - it is common for semi-comatose patients to have "dysconjugate gaze". Do not consider this "Yes" unless the patient, prior to or following coma, was able to complain of double vision.
- 40) Dysphagia/Dysarthria/Dysphonia - cannot test in coma. Ignore absent gag reflex when there is coma.
- 41) Weakness of face - Central VII may be mentioned and can be recorded. Otherwise mark "No" when there is coma.
- 42) Weakness of limbs - mark "Yes" in coma only if there is asymmetry in response to painful stimuli and/or asymmetry in spontaneous movements.

43) Facial sensation - probably not testable when there is coma unless specifically established by clinician.

44) Sensory loss of limbs - answer "Yes" in coma only if there is obvious asymmetry between sides. This may be difficult to distinguish from weakness. If the patient grimaces to pain on one side and withdraws on that side, but has no response to pain on the other side (no withdrawal and no grimaces) mark "Yes."

45) Gait - obviously cannot be tested in comatose patient - mark "No".

APPENDIX E -Removed

APPENDIX F

GLOSSARY

Acalculia: loss of ability to do math reckoning.

Adiadochokinesia: inability to perform rapidly alternating movements.

Agraphia: inability to write.

Alexia or Visual Aphasia: loss of ability to understand written word.

auditory: lack of comprehension of spoken word

jargon or paraphasia: words may be fluent but inappropriate

amnesic: loss of memory of special words with hesitant and fragmentary speech

nominal aphasia: (anomia, dysnomia) - loss of ability to name objects

semantic aphasia: loss of meaning of words

Amaurosis fugax: monocular (one eye) transient blindness.

Analgesia: loss of pain sensation.

Aneurysm: saccular dilation of blood vessel. If it ruptures, it causes SAH.

Anisocoria: inequality of the diameter of pupils.

Anosmia: loss of smell.

Anoxia: lack of oxygen which can cause tissue damage if prolonged.

Aphasia: inability to express thoughts properly through speech (expressive aphasia) or loss of verbal comprehension (receptive aphasia).

Apraxia: inability to perform certain movements (without loss of motor power, sensation or coordination); loss of learned behavior, *e.g.*, dressing (inability to dress oneself).

Astereognosis: loss of ability to recognize common objects by touching and handling them with eyes closed.

Ataxia: lack of coordination of limb movements.

Atrophy: loss of tissue.

Autotopagnosia: inability to recognize one's self or part of one's self.

AVM: arteriovenous malformation - abnormal collection of blood vessels - prone to cause hemorrhage. If large, may exert mass effect.

Babinski reflex: on plantar stimulation large toe extends upward on involved side.

Bolt: peripheral monitor used to measure ICP.

Brudzinski: flexion of leg when neck is flexed. This is a sign of meningeal irritation.

Bruit: blowing sound heard with a stethoscope above blood vessel; caused by turbulent blood flow. These may occur over an aneurysm or area of stenosis.

Bulbar palsy: involvement of brain stem.

Burr hole: hole drilled through skull.

CAD: coronary artery disease.

Carotid artery: arteries that supply front and middle portion of brain. These travel on either side of neck from clavicle bone to jaw.

Carotid endarterectomy: surgical removal of clot or plaque from carotid artery.

Clonus: spasm with rapidly alternating rigidity, relaxation. May be sustained (continuous) or non-sustained.

Coma: decreased level of consciousness to the point of unresponsiveness to external stimuli, unable to be aroused.

Computerized tomography: "CAT Scan" or CT. A radiographic procedure to visualize the brain.

Conjugate movement: describes normal appearance of how the eyes move together. Dysconjugate movement is seen in certain neurologic conditions or in a "lazy eye" where eyes don't move together.

Craniotomy: surgical procedure that involves entering the cranial cavity.

CSF: cerebrospinal fluid.

CVA: cerebrovascular accident (an old term for stroke).

Decerebrate: posturing response to stimuli with extension of upper and lower extremities; frequently seen in coma.

Decorticate: posturing response to stimuli with flexion of upper extremities and extension of lower extremities.

Diplopia: double vision.

Dizziness: sensation of unsteadiness with feeling of movement in head.

Dysarthria: difficult and defective speech due to impairment of the tongue or other muscles essential to speech causing slurred speech.

Dysconjugate gaze: see conjugate movement.

Dysdiadochokinesia: Inability to perform rapid alternating movements normally.

Dysesthesia: unpleasant cutaneous sensation (burn, tickle, etc.).

Dysmetria: Incoordination of attempted voluntary muscle movements.

Dysphagia: difficulty in swallowing.

Dysphasia: an uncommonly used term for aphasia

Dysphonia: difficulty with phonation.

Edema: swelling.

Embolism: this is a blood clot that forms in one part of the body and travels in the blood stream to another part of the body. A thrombosis of an artery may break off of the "parent" vessel (*i.e.*, carotid artery) and form an embolus that eventually lodges in a vessel of smaller size in an end organ (*i.e.*, brain).

EOM: extraocular muscles or movement.

Fasciculations: irregular, inconstant, isolated contractions of fiber bundles within a muscle.

Flaccid: describes muscle tone which is lax.

Frontal release signs: "primitive" reflexes that result from disinhibition of frontal lobe, includes snout, palmomental, suck, grasp reflexes.

Glabellar reflex: patient cannot refrain from blinking when tapped on forehead between their eyes.

Hematoma: collection of blood outside of a vessel.

Hemianopsia: see homonymous hemianopsia (below).

Hemiparesis: weakness involving half of the body.

Hemiplegia: paralysis involving half of the body.

Herniation: a process which occurs when there is swelling or mass effect from other processes (tumor, brain hemorrhage) that leads to loss of brain function and death over several hours.

Hoffman sign: finger reflex - contraction of thumb and/or fingers when distant phalanx of middle finger (hand prone and relaxed) forcibly flexed by examiner.

Holme's sign: excessive flexion rebound after muscle extension pressure released.

Homonomous hemianopsia: impairment of half of the field of vision (of both eyes) on the side of the lesion.

Hypoalgesia: decreased pain, diminished sensitivity to pain.

Hypoesthesia: decreased tactile sensation.

ICP: intracranial pressure.

ICP monitor: intracranial pressure monitor - may be a bolt or ventriculostomy.

IHD: ischemic heart disease.

Infarction: area of tissue (cell) death.

Ipsilateral: situation on or pertaining to same side.

Ischemia: lack of blood flow.

Kernig: inability to straighten leg when hip is flexed. This is a sign of meningeal irritation.

Locked in: lesion in basis pontis that causes patient to be quadriparetic with intact cognition and eye movements only.

LP: lumbar puncture (spinal tap)

MAE: moves all extremities.

Mass effect: results from inability of the cranial cavity (area inside of skull) to expand. Thus any mass such as blood (hematoma), tumor, or swelling, exerts a mass effect or pressure on the brain itself.

Meninges: membranes covering brain, consists of three layers.

dura: thick outer layer.

pia: innermost layer - wrapped around brain

arachnoid: middle membrane - vascular layer

Meningismus: patient exhibits signs of meningeal irritation such as stiff neck, Kernig or Brudzinski.

Myoclonus: clonic spasm of muscle or group of muscles.

Neglect syndrome: occurs in nondominant hemisphere events such as stroke. Affected patients will ignore their nondominant (usually left) side.

Nystagmus: oscillating or jerking movements of the eyes.

Occlusion: refers to complete blockage of an artery or vein.

Oriented X3: oriented to person, time, place.

Ox4: oriented to person, time, place; also includes situation.

Paraplegia: paralysis of legs and lower part of body - both in motion and sensation.

Paresis: weakness

Paresthesia: unpleasant cutaneous sensation, *i.e.*, numbness or tingling.

Parosmia: any disease or perversion of the sense of smell.

PERL: pupils equal, react to light.

PERRL(d+C)A: pupils equally round and reactive to light (direct and consensual) and to accommodation.

Plegia: paralysis

PM&R: physical medicine and rehab.

Post ictal: after an ictus or event, usually refers to period immediately following a seizure.

PRIND: partially reversible ischemic neurological deficit.

Proprioception: position sensation.

Ptosis: drooping of upper eyelid.

Quadriplegia: paralysis of all four limbs.

Reflexes:

<u>Scale A</u>	<u>Scale B</u>
N = normal reaction	2
1+ = slightly hyperactive	3
2+ = markedly increased non-sustained clonus	
3+ = one that shows sustained clonus	4
1- = reflex slightly decreased	
2- = reflex markedly decreased	1
3- = reflex absent except on reinforcement	
0 = reflex cannot be obtained at all	

RIND: reversible ischemic neurologic deficit (symptoms last > 24 hours). Not widely used anymore.

Romberg sign: patient unable to stand with feet placed close together and eyes closed.

SAH: subarachnoid hemorrhage, blood in space around the brain.

Scotoma: a blind or partially blind area in visual field.

Scotomata: optic nerve lesion producing impaired vision in one eye only.

SDH: subdural hematoma, blood clot outside of brain, but pressing against brain.

Seizure: convulsion; abnormal electrical activity of brain causing jerking movements.

Snout reflex: mouth puckers when chin tapped.

Spastic: muscles stiff, movements awkward (of the nature of or characterized by spasm).

Stenosis: narrowing of a blood vessel, frequently from atherosclerotic buildup.

Suck reflex: sucking occurs reflexively when something is placed in their mouth.

Syncope: faint, swoon.

Thrombosis: clot of blood that obstructs or blocks an artery or vein.

TIA: transient ischemic attack.

Tinnitus: ringing sound in ear.

Todd's paralysis: focal weakness or paralysis following a seizure, usually lasting minutes to days, but resolving. Mimic a stroke.

Tomography: see computerized tomography.

Trapezium: shoulder muscles.

Tremors: involuntary movements resulting in rhythmic movement of a joint.

Vasospasm: a complication of SAH where subarachnoid blood irritates blood vessels causing them to constrict. As a result, blood flow is decreased. This can lead to ischemic infarction (stroke).

Vegetative: loss of all cognitive function. Patient appears alert and awake, but does not interact with environment.

Vertebrobasilar arteries: arteries in back of neck that supply brain stem and back of brain vessel.

Vertigo: abnormal sense of spinning-type movement.

Ventricles: fluid (CSF) filled cavities within the brain.

Ventriculostomy: catheter inserted into ventricles with the brain to relieve and or monitor ICP.

Xanthochromia: yellowish colored spinal fluid.

APPENDIX G

GUIDELINES FOR DATA ENTRY COHORT STROKE FORM

General Instructions for Central Abstractors:

1. Data entry of STR Form will be done by the Central Abstractors.
2. STR Forms that require physician review will have record materials copied and sent to the Statistical Coordinating Center. STR Forms that "skipout" after abstraction will have materials retained in files, but not sent to the Coordinating Center.
3. The Minneapolis field center personnel send the stroke abstraction data packets electronically to the Coordinating Center following current protocol. Each packet ID number will be identified with an M added to the end of the electronic file number (e.g., 222222SM].
4. The Coordinating Center personnel will send an email acknowledging receipt of the materials.
5. The electronic copies of the packets will be retained at the Minneapolis field center.

APPENDIX H

GUIDELINES FOR TRANSFER AND STORAGE OF ARIC STROKE FILES

Electronic transfer of STR files:

Each of the three ARIC field centers transfers STR files electronically via Liquid Files, <https://cscceex.csc.unc.edu/filedrop/Stroke>. The field centers are responsible for redacting STR medical records prior to electronic transfer. At the end of each surveillance year, an inventory list of STR event ID numbers for the year is reconciled with the STR MRs archived for secure electronic storage.

Off-site storage of STR files from 1987-2011:

Hard copies of STR files for years 1987-2011 are securely stored at the UMN AHC storage facility off Como Avenue in St. Paul, MN. Starting with year 2012, only MN STR files will continue to be stored as hard copies at the storage facility. The two groups (STR cases and skip-outs) are filed by data year, by site, and then by event ID number in adjacent areas at the AHC storage facility to be stored indefinitely.

Electronic Storage of STR MRs beginning with 2012:

To reduce the need for physical storage space at the UMN AHC storage facility, redacted STR medical records from the ARIC field centers, excluding MN, are stored electronically in 'BOX' (a secure cloud management and file sharing application).

The electronic STR files are organized by event ID number to include all cases and skip-outs beginning with data year 2012. Each electronic file name reflects the appropriate event ID number; and the event ID number is to be recorded on the first page of the associated electronic pdf.

N I H STROKE SCALE

Patient Identification. _____-_____-_____

Pt. Date of Birth ____/____/____

Hospital _____(____-____)

Date of Exam ____/____/____

Interval: Baseline 2 hours post treatment 24 hours post onset of symptoms ±20 minutes 7-10 days
 3 months Other _____(____)

Time: ____:____ []am []pm

Person Administering Scale _____

Administer stroke scale items in the order listed. Record performance in each category after each subscale exam. Do not go back and change scores. Follow directions provided for each exam technique. Scores should reflect what the patient does, not what the clinician thinks the patient can do. The clinician should record answers while administering the exam and work quickly. Except where indicated, the patient should not be coached (i.e., repeated requests to patient to make a special effort).

Instructions	Scale Definition	Score
<p>1a. Level of Consciousness: The investigator must choose a response if a full evaluation is prevented by such obstacles as an endotracheal tube, language barrier, orotracheal trauma/bandages. A 3 is scored only if the patient makes no movement (other than reflexive posturing) in response to noxious stimulation.</p>	<p>0 = Alert; keenly responsive. 1 = Not alert; but arousable by minor stimulation to obey, answer, or respond. 2 = Not alert; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped). 3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.</p>	_____
<p>1b. LOC Questions: The patient is asked the month and his/her age. The answer must be correct - there is no partial credit for being close. Aphasic and stuporous patients who do not comprehend the questions will score 2. Patients unable to speak because of endotracheal intubation, orotracheal trauma, severe dysarthria from any cause, language barrier, or any other problem not secondary to aphasia are given a 1. It is important that only the initial answer be graded and that the examiner not "help" the patient with verbal or non-verbal cues.</p>	<p>0 = Answers both questions correctly. 1 = Answers one question correctly. 2 = Answers neither question correctly.</p>	_____
<p>1c. LOC Commands: The patient is asked to open and close the eyes and then to grip and release the non-paretic hand. Substitute another one step command if the hands cannot be used. Credit is given if an unequivocal attempt is made but not completed due to weakness. If the patient does not respond to command, the task should be demonstrated to him or her (pantomime), and the result scored (i.e., follows none, one or two commands). Patients with trauma, amputation, or other physical impediments should be given suitable one-step commands. Only the first attempt is scored.</p>	<p>0 = Performs both tasks correctly. 1 = Performs one task correctly. 2 = Performs neither task correctly.</p>	_____
<p>2. Best Gaze: Only horizontal eye movements will be tested. Voluntary or reflexive (oculocephalic) eye movements will be scored, but caloric testing is not done. If the patient has a conjugate deviation of the eyes that can be overcome by voluntary or reflexive activity, the score will be 1. If a patient has an isolated peripheral nerve paresis (CN III, IV or VI), score a 1. Gaze is testable in all aphasic patients. Patients with ocular trauma, bandages, pre-existing blindness, or other disorder of visual acuity or fields should be tested with reflexive movements, and a choice made by the investigator. Establishing eye contact and then moving about the patient from side to side will occasionally clarify the presence of a partial gaze palsy.</p>	<p>0 = Normal. 1 = Partial gaze palsy; gaze is abnormal in one or both eyes, but forced deviation or total gaze paresis is not present. 2 = Forced deviation, or total gaze paresis not overcome by the oculocephalic maneuver.</p>	_____

N I H STROKE SCALE

Patient Identification. _____-_____-_____

Pt. Date of Birth ____/____/____

Hospital _____(____-____)

Date of Exam ____/____/____

Interval: Baseline 2 hours post treatment 24 hours post onset of symptoms ±20 minutes 7-10 days
 3 months Other _____(____)

<p>3. Visual: Visual fields (upper and lower quadrants) are tested by confrontation, using finger counting or visual threat, as appropriate. Patients may be encouraged, but if they look at the side of the moving fingers appropriately, this can be scored as normal. If there is unilateral blindness or enucleation, visual fields in the remaining eye are scored. Score 1 only if a clear-cut asymmetry, including quadrantanopia, is found. If patient is blind from any cause, score 3. Double simultaneous stimulation is performed at this point. If there is extinction, patient receives a 1, and the results are used to respond to item 11.</p>	<p>0 = No visual loss. 1 = Partial hemianopia. 2 = Complete hemianopia. 3 = Bilateral hemianopia (blind including cortical blindness).</p>	<p>_____</p>
<p>4. Facial Palsy: Ask – or use pantomime to encourage – the patient to show teeth or raise eyebrows and close eyes. Score symmetry of grimace in response to noxious stimuli in the poorly responsive or non-comprehending patient. If facial trauma/bandages, orotracheal tube, tape or other physical barriers obscure the face, these should be removed to the extent possible.</p>	<p>0 = Normal symmetrical movements. 1 = Minor paralysis (flattened nasolabial fold, asymmetry on smiling). 2 = Partial paralysis (total or near-total paralysis of lower face). 3 = Complete paralysis of one or both sides (absence of facial movement in the upper and lower face).</p>	<p>_____</p>
<p>5. Motor Arm: The limb is placed in the appropriate position: extend the arms (palms down) 90 degrees (if sitting) or 45 degrees (if supine). Drift is scored if the arm falls before 10 seconds. The aphasic patient is encouraged using urgency in the voice and pantomime, but not noxious stimulation. Each limb is tested in turn, beginning with the non-paretic arm. Only in the case of amputation or joint fusion at the shoulder, the examiner should record the score as untestable (UN), and clearly write the explanation for this choice.</p>	<p>0 = No drift; limb holds 90 (or 45) degrees for full 10 seconds. 1 = Drift; limb holds 90 (or 45) degrees, but drifts down before full 10 seconds; does not hit bed or other support. 2 = Some effort against gravity; limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity. 3 = No effort against gravity; limb falls. 4 = No movement. UN = Amputation or joint fusion, explain: _____</p> <p>5a. Left Arm</p> <p>5b. Right Arm</p>	<p>_____ _____</p>
<p>6. Motor Leg: The limb is placed in the appropriate position: hold the leg at 30 degrees (always tested supine). Drift is scored if the leg falls before 5 seconds. The aphasic patient is encouraged using urgency in the voice and pantomime, but not noxious stimulation. Each limb is tested in turn, beginning with the non-paretic leg. Only in the case of amputation or joint fusion at the hip, the examiner should record the score as untestable (UN), and clearly write the explanation for this choice.</p>	<p>0 = No drift; leg holds 30-degree position for full 5 seconds. 1 = Drift; leg falls by the end of the 5-second period but does not hit bed. 2 = Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity. 3 = No effort against gravity; leg falls to bed immediately. 4 = No movement. UN = Amputation or joint fusion, explain: _____</p> <p>6a. Left Leg</p> <p>6b. Right Leg</p>	<p>_____</p>

N I H STROKE SCALE

Patient Identification. _____-_____-_____

Pt. Date of Birth ____/____/____

Hospital _____(____-____)

Date of Exam ____/____/____

Interval: Baseline 2 hours post treatment 24 hours post onset of symptoms ±20 minutes 7-10 days
 3 months Other _____(____)

<p>7. Limb Ataxia: This item is aimed at finding evidence of a unilateral cerebellar lesion. Test with eyes open. In case of visual defect, ensure testing is done in intact visual field. The finger-nose-finger and heel-shin tests are performed on both sides, and ataxia is scored only if present out of proportion to weakness. Ataxia is absent in the patient who cannot understand or is paralyzed. Only in the case of amputation or joint fusion, the examiner should record the score as untestable (UN), and clearly write the explanation for this choice. In case of blindness, test by having the patient touch nose from extended arm position.</p>	<p>0 = Absent.</p> <p>1 = Present in one limb.</p> <p>2 = Present in two limbs.</p> <p>UN = Amputation or joint fusion, explain: _____</p>	<p>_____</p>
<p>8. Sensory: Sensation or grimace to pinprick when tested, or withdrawal from noxious stimulus in the obtunded or aphasic patient. Only sensory loss attributed to stroke is scored as abnormal and the examiner should test as many body areas (arms [not hands], legs, trunk, face) as needed to accurately check for hemisensory loss. A score of 2, "severe or total sensory loss," should only be given when a severe or total loss of sensation can be clearly demonstrated. Stuporous and aphasic patients will, therefore, probably score 1 or 0. The patient with brainstem stroke who has bilateral loss of sensation is scored 2. If the patient does not respond and is quadriplegic, score 2. Patients in a coma (item 1a=3) are automatically given a 2 on this item.</p>	<p>0 = Normal; no sensory loss.</p> <p>1 = Mild-to-moderate sensory loss; patient feels pinprick is less sharp or is dull on the affected side; or there is a loss of superficial pain with pinprick, but patient is aware of being touched.</p> <p>2 = Severe to total sensory loss; patient is not aware of being touched in the face, arm, and leg.</p>	<p>_____</p>
<p>9. Best Language: A great deal of information about comprehension will be obtained during the preceding sections of the examination. For this scale item, the patient is asked to describe what is happening in the attached picture, to name the items on the attached naming sheet and to read from the attached list of sentences. Comprehension is judged from responses here, as well as to all of the commands in the preceding general neurological exam. If visual loss interferes with the tests, ask the patient to identify objects placed in the hand, repeat, and produce speech. The intubated patient should be asked to write. The patient in a coma (item 1a=3) will automatically score 3 on this item. The examiner must choose a score for the patient with stupor or limited cooperation, but a score of 3 should be used only if the patient is mute and follows no one-step commands.</p>	<p>0 = No aphasia; normal.</p> <p>1 = Mild-to-moderate aphasia; some obvious loss of fluency or facility of comprehension, without significant limitation on ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided materials difficult or impossible. For example, in conversation about provided materials, examiner can identify picture or naming card content from patient's response.</p> <p>2 = Severe aphasia; all communication is through fragmentary expression; great need for inference, questioning, and guessing by the listener. Range of information that can be exchanged is limited; listener carries burden of communication. Examiner cannot identify materials provided from patient response.</p> <p>3 = Mute, global aphasia; no usable speech or auditory comprehension.</p>	<p>_____</p>
<p>10. Dysarthria: If patient is thought to be normal, an adequate sample of speech must be obtained by asking patient to read or repeat words from the attached list. If the patient has severe aphasia, the clarity of articulation of spontaneous speech can be rated. Only if the patient is intubated or has other physical barriers to producing speech, the examiner should record the score as untestable (UN), and clearly write an explanation for this choice. Do not tell the patient why he or she is being tested.</p>	<p>0 = Normal.</p> <p>1 = Mild-to-moderate dysarthria; patient slurs at least some words and, at worst, can be understood with some difficulty.</p> <p>2 = Severe dysarthria; patient's speech is so slurred as to be unintelligible in the absence of or out of proportion to any dysphasia, or is mute/anarthric.</p> <p>UN = Intubated or other physical barrier, explain: _____</p>	<p>_____</p>

NIH STROKE SCALE

Patient Identification. ____-____-____

Pt. Date of Birth ____/____/____

Hospital _____(____-____)

Date of Exam ____/____/____

Interval: Baseline 2 hours post treatment 24 hours post onset of symptoms ±20 minutes 7-10 days
 3 months Other _____(____)

<p>11. Extinction and Inattention (formerly Neglect): Sufficient information to identify neglect may be obtained during the prior testing. If the patient has a severe visual loss preventing visual double simultaneous stimulation, and the cutaneous stimuli are normal, the score is normal. If the patient has aphasia but does appear to attend to both sides, the score is normal. The presence of visual spatial neglect or anosagnosia may also be taken as evidence of abnormality. Since the abnormality is scored only if present, the item is never untestable.</p>	<p>0 = No abnormality.</p> <p>1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities.</p> <p>2 = Profound hemi-inattention or extinction to more than one modality; does not recognize own hand or orients to only one side of space.</p>	<p>_____</p>
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