Brain Death Exam Note
(appendix below)

Examination Number: ❑ First ❑ Second
Date: _____ Time: _____
Interval since last exam (hrs): _____

Prerequisites (ALL must be checked)

- ❑ Irreversible coma due to: _____
- ❑ Severe acid/base, electrolyte or endocrine abnormality ABSENT
- ❑ Neuroimaging explains coma
- ❑ Current temperature ≥35 ^{o}C: _____
- ❑ Current blood pressure in the acceptable range for age: _____
- ❑ CNS depressant medication effects ABSENT (if indicated, toxicology screen, serum sedative levels in low to midtherapeutic range, etc)
- ❑ Neuromuscular blockade effects ABSENT
- ❑ Spontaneous respirations ABSENT
- ❑ If patient was on a paralytic infusion, use train-of-four to assess degree of neuromuscular blockade

Clinical Examination (ALL must be checked)

- ❑ Motor movements to noxious stimulation of all four extremities (spinally mediated reflexes permitted) ABSENT
- ❑ Movement to noxious stimulation of supraorbital nerve, temporomandibular joint, or nasal passage ABSENT
- ❑ Pupillary reaction to bright light ABSENT
- ❑ Corneal reflex ABSENT
- ❑ Oculocephalic reflex (Doll's eyes) ABSENT **or** not performed due to concern for cervical spine injury
- ❑ Oculovestibular reflex (cold calorics) ABSENT
- ❑ Cough reflex with tracheal suctioning ABSENT
- ❑ Gag reflex with stimulation of posterior pharynx ABSENT

Apnea Test (ALL must be checked)

- ❑ Hemodynamically stable
- ❑ Pre-oxygenated with 100% FiO_2 for >10 minutes (ideal PaO_2 >200 mmHg)
- ❑ Initial arterial blood gas: _____
  - Ideally $PaCO_2$ 35- 45 mmHg
- ❑ Provide oxygen
  - ❑ Option 1: Self-inflating bag with patient valve **OPEN**, PEEP 5-10 cmH_2O
  - ❑ Option 2: T-piece with flow of 100% oxygen at 15 L/min
  - ❑ Option 3: Flow-inflating bag with 100% oxygen with PEEP 5-10 cmH_2O
- ❑ Disconnect from ventilator: at time _____
- ❑ Blood gas checked at 5 minutes and every 3-5 minutes thereafter
- ❑ Final Blood gas: _____

- End time: _____
- Spontaneous respirations absent during trial
- $PaCO_2 \geq 60$ mmHg **and** 20 mmHg rise over baseline $PaCO_2$

OR

- Apnea test aborted, reason: _____

Ancillary Studies (check all that apply)

- Ancillary study completed (check reason)
  - To reduce the observation period between clinical exams
  - Unable to complete clinical examination
  - Unable to complete apnea test
  - Medication effect PRESENT (examples- Phenobarbital level >10 mcg/ml, >24 hrs of pentobarbital within the past 2 weeks)
  - Other (please list):_____
- Type of ancillary study
  - Conventional 4 vessel angiogram: _____
  - Radionuclide angiography study: _____
  - Electroencephalogram:_____

- **Examination is not consistent with cessation of function of the brain and brainstem.**
- **First examination is consistent with cessation of function of the brain and brainstem.**
- **First examination is consistent with cessation of function of the brain and brainstem, but is incomplete due to inability to complete clinical exam or apnea test, or presence of medication effect. Will proceed with ancillary test.**
- **Second examination confirms unchanged and irreversible cessation of function of the brain and brainstem. The patient is declared brain dead at this time.**

Time of Death:
Name of Physician:

APPENDIX

Notification of Death

- ❑ WRTC contacted **prior** to the first brain death examination, **and** within 1 hr of time of death
  - ❑ 703-641-0100: Date: _____ Time: _____
  - ❑ 703-641-0100: Date: _____ Time: _____
- ❑ Family meeting with following team members present:
  - ❑ ICU attending
  - ❑ ICU fellow
  - ❑ ICU resident
  - ❑ Other:
  - ❑ WRTC rep
  - ❑ Social Worker
  - ❑ Primary service physicians
- ❑ Organ donation discussed
  - ❑ Yes- consent form signed by family
  - ❑ Yes- family declined
  - ❑ No- patient not a candidate per WRTC
- ❑ Autopsy discussed with family
  - ❑ Consent granted
    - ❑ Consent form signed
    - ❑ Consent form not signed
  - ❑ No
  - ❑ Undecided
- ❑ Primary Care Physician contacted (name and phone number): _____
- ❑ Consulting services contacted (list): _____
- ❑ Medical examiner contacted
  - ❑ Case released
  - ❑ Case not released (all tubes and lines must remain in place)

General Comments:

- At least 1 examination must be performed by an attending from the division of critical care medicine or by a fellow in the division of critical care medicine with direct supervision of critical care attending.
- When a second exam is indicated, it may be performed by:
  - Second critical care attending
  - Child neurology attending
  - Neurosurgical attending (in cases of trauma, or primary neurosurgical post-operative patients)

Number and Timing of Examinations:

- Observation and testing according to age:
  - <37 weeks gestation cannot declare brain death by neurologic examinations
  - 37 weeks gestation - 30 days of age: Two examinations separated by 24 hours
  - >30 days to 18 years: Two examinations separated by 12 hours
  - >18 yrs: Two examinations separated by 6 hours
  - Assessment of neurologic function may be unreliable immediately after cardiopulmonary resuscitation or other severe acute brain injuries and evaluation for brain death should be deferred for >24 hrs from the time of insult to the 1st exam.

Clinical Exam:

- If a sedative agent has been given, please wait 5 half-lives (assuming normal drug clearance) before proceeding with clinical examination or obtain ancillary study (cerebral radionuclide angiogram or conventional 4 vessel angiogram) if sedative agent has a prolonged half-life (i.e.- pentobarbital).
- The following movements are not brain generated and **ARE** consistent with brain death: facial myokymia, transient bilateral finger tremor, repetitive leg movements, ocular microtremor, cyclical constriction and dilation in light-fixed pupils, plantar reflexes, undulating toe sign, tendon/abdominal/cremasteric reflexes, triple flexion, or lazarus sign (flexion at waist +/- raising 1 or both arms, typically provoked by forced flexion of neck or rotation of torso)

Apnea test:

- Hemodynamic stability during apnea testing may be facilitated with a starting $PaCO_2$ between 35-45 mmHg and starting PaO_2 >200 mmHg
- Rate of $PaCO_2$ rise should be approximately 3 mmHg per minute. If this is not achieved, consider gently increasing the patient's body temperature (particularly if below 36.5 ^{o}C)
- $PaCO_2$ thresholds are typically achieved in 8-10 minutes, but the apnea test can continue longer if patient remains hemodynamically stable and has not reached target $PaCO_2$ by 8-10 minutes

Ancillary Testing:

- Ancillary studies are not a substitute for the neurologic examination.
- For all age groups, ancillary studies can be used to assist in making the diagnosis of brain death to reduce the observation period OR when
    - Components of the examination or apnea testing cannot be completed safely
    - If there is uncertainty about the results of neurologic examination
    - If a medication effect may interfere with the evaluation of the patient.
- If the ancillary study supports the diagnosis, the 2nd examination and apnea testing can then be performed.
- Patients undergoing EEG testing should be free of the effects of sedative medications. A time interval of 5 half lives since the discontinuation of the medication is required before a study can be performed. If impaired drug metabolism is suspected (renal or hepatic dysfunction), a cerebral radionuclide angiogram or conventional 4 vessel angiogram is required to make the diagnosis of brain death
- In patients with an **closed** anterior fontanel, a transcranial doppler can be used to guide decision to proceed with cerebral radionuclide angiogram or conventional angiography
- Cerebral radionuclide is ordered as "NM Brain imaging vascular flow study only"
- Time of death occurs at the completion of the 2nd examination.[1]