

Subject: BRAIN DEATH: DEFINITION/DETERMINATION	No. 600-112	Page: Page 1 of 5
Author: Department of Nursing	Effective Date: 07/26/90	Revised Date: 04/05

PURPOSE: The purpose of this policy is to provide licensed staff and medical personnel with a guideline to determine when a patient on a ventilator demonstrates clinical brain death.

POLICY STATEMENT:

According to KRS 446.400 the occurrence of human death shall be determined in accordance with the usual and customary standards of medical practice, provided that death shall not be determined to have occurred unless the following minimal conditions have been met:

1. When respiration and circulation are not artificially maintained, there is an irreversible cessation of spontaneous respiration and circulation; or
2. When respiration and circulation are artificially maintained, and there is a total and irreversible cessation of all brain function, including the brain stem, and that such determination is made by two (2) licensed physicians.

The criteria to determine brain death requires a clinical exam and a diagnosis or determination of death based on diagnostic criteria listed below and the performance of either the Apnea Test or Blood Flow Study.

The health care team will evaluate the situation and barring extenuating circumstances the team will remove supportive measures soon after the physician pronounces the death. Hospital staff will receive a written order from the physician to contact the Kentucky Organ Donor Affiliates (“KODA”) for possible harvesting of vital organs. If the patient is an organ donor, KODA will advise staff when to terminate supportive measures.

DEPARTMENTS AFFECTED: Nursing, medical staff

GUIDELINES:

The following guidelines for determining brain death in adults are accepted practice parameters of the American Academy of Neurology¹

- I. Diagnostic criteria for clinical diagnosis of brain death:
 - A. Prerequisites: Brain death is the absence of clinical brain function when the proximate cause is known and demonstrably irreversible.
 1. Clinical or neuroimaging evidence of acute CNS catastrophe that is compatible with the clinical diagnosis of brain death.

¹ American Academy of Neurology Practice Parameters: Determining Brain Death (Summary Statement), A Report of the Quality Standards Subcommittee of the American Academy of Neurology (1994).

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2. Exclusion of complicating medical conditions that may confound clinical assessment (no severe electrolyte, acid base, or endocrine disturbance)
3. No drug intoxication or poisoning
4. Core temperature \geq degrees C (90 degrees F)

B. The three cardinal findings in brain death are:

1. Coma or unresponsiveness – no cerebral motor response to pain in all extremities (nail-bed pressure and supraorbital pressure)
2. Absence of brainstem reflexes
 - a. Pupils
 - i. No response to bright light
 - ii. Size: midposition (4mm) to dilated (9mm)
 - b. Ocular Movement
 - i. No oculocephalic reflex (testing only when no fracture or instability of the cervical spine is apparent)
 - ii. No deviation of the eyes to irrigation in each ear with 50 ml of cold water (allow 1 minute after injection and at least 5 minutes between testing each side)
 - c. Facial sensation and facial motor response
 - i. No corneal reflex to touch with throat swab
 - ii. No jaw reflex
 - iii. No grimacing to deep pressure on nail-bed, supraorbital ridge, or temporomandibular joint
 - d. Pharyngeal and tracheal reflexes
 - i. No response after stimulation of the posterior pharynx with tongue blade
 - ii. No cough response to bronchial suctioning
3. Apnea testing (See attachment A)

II. Clinical observations compatible with the diagnosis of brain death that are occasionally seen and should not be misinterpreted as evidence for brainstem function:

- A. Spontaneous movements of limbs other than pathologic flexion or extension response
- B. Respiratory-like movements (shoulder elevation and adduction, back arching, intercostal expansion without significant tidal volumes)
- C. Sweating, blushing, tachycardia
- D. Normal blood pressure without pharmacological support or sudden increases in blood pressure
- E. Absence of diabetes insipidus

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- F. Deep tendon reflexes; superficial abdominal reflexes; triple flexion response
- G. Babinski reflex

III. Optional confirmatory lab tests

A confirmatory lab test is not mandatory but is desirable in patients in whom specific components of clinical testing cannot be reliably performed or evaluated.

The following is a list of suggested confirmatory tests

- A. Conventional angiography
- B. Electroencephalography
- C. Transcranial Doppler ultrasonography
- D. Technetium 99 hexamethylpropyleneamineoxime brain scan
- E. Somatosensory evoked potentials

IV. Two licensed physicians appropriately skilled in neurological assessments with one being a senior or chief level resident from neurosurgery, neurology, or trauma services will examine the patient and determine the patient's viability, and document their confirmed findings in the patient's medical record. The patient's primary physician will discuss the death of the patient with the patient's family or significant other.

V. Standard requirements for documenting brain death in the medical record are:

- A. Etiology and irreversibility of condition
- B. Absence of brainstem reflexes
- C. Absence of motor response to pain
- D. Absence of respiration with PCO₂ ≥60 mm Hg
- E. Justification for confirmatory tests and the result of the confirmatory test

Revised: 4/91; 12/92; 2/93; 8/94; 11/94; 4/96; 10/97; 1/98, 10/00, 5/01, 01/05

Reviewed By: Policy & Procedure Committee 11/01, 02/03, 04/05
Critical Care Committee 01/05
Medical Executive Committee 04/05

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Attachment A

BRAIN DEATH TESTING PROTOCOL

Patients Who Cannot Tolerate Apnea Testing Or Have Unknown Barbiturate Levels, May Be Tested Using SPECT Flow Study.

BRAIN DEATH TESTING PROTOCOL UTILIZING APNEA TEST

- Call KODA (581-8511) and the Chaplain
- Increase FIO₂ to 100% and add 5 cm PEEP (if not on any).
- Obtain ABG's in and normalize CO₂.
- If temperature is <97°F, place air filled warming system on patient and monitor temperature continuously via rectal probe. Set ventilator cascade temperature to 39°C till patient is normothermic.
- If PCO₂ >40 mm Hg with no spontaneous respirations and temperature is >97°F, call M.D. for apnea test.
- Notify respiratory therapy of impending apnea test.
- The physician will inform the family of the purpose and intent of the apnea test.

APNEA TEST

- Prerequisite: Core temperature ≥36.5°C or 97°F Systolic BP ≥90 mm (Hg)
- Disconnect patient from ventilator, supply 100% O₂ through red rubber catheter down endotracheal tube at 6 liters/minutes.
- Draw ABG's (PCO₂ must be greater than 60 mm Hg).
- Place patient back on ventilator.
- No respiratory movements or excursions observed with a documented PCO₂ above 60 mm Hg is indicative of brain death.

BRAIN DEATH TESTING PROTOCOL UTILIZING SPECT FLOW STUDY

- Call KODA (581-9511) and Chaplain.
- Increase FIO₂ to 100%.
- Notify Nuclear Medicine of need for Brain Death Test (after 4 p.m., call Radiology Resident on-call and have Nuclear Medicine called in).
- Order cerebral flow study/comments for brain death.
- The physician will inform family of purpose and intent of Brain Flow Study.
- Patient must have IV access.
- Prior to transport, Nuclear Med Tech will inject radioisotope.

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REFERENCE: Shields, Christopher B., M.D. "Kentucky Brain Death Legislation" March, 1987.

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