



UNIVERSITY of MARYLAND
MEDICAL CENTER

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Owner: Tyree Nutter: *ORGAN/TISSUE DONOR ADVOCATE*
Area: *Transplant Safety*
Policy Types: *Departmental Policy*
Applicability: *UMMC Downtown Campus*

Brain Death in Adults 18 Years of Age or Greater Older

I. POLICY

A. OBJECTIVES

1. The purpose of this policy is to state a uniform definition of death and the criteria and medical tests for the declaration of brain death in patients within the University of Maryland Medical Center (UMMC).

B. INDICATION FOR USE

1. This policy applies to all patients who are admitted to any inpatient unit or emergency department of UMMC.

C. DEFINITIONS

Death	Death means the irreversible cessation of the integrative functioning of the organism as a whole.
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II. RESPONSIBILITY

All Attending physicians	It shall be the responsibility of all physicians who have attending privileges to comply with the provisions of this policy in the care of individuals admitted to an inpatient unit or emergency room of UMMS.
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III. PROCEDURE

- A. Criteria to determine when death has occurred: Maryland law provides that an individual is dead if, based on ordinary standards of medical practice, the individual has sustained either:
 1. Irreversible cessation of circulatory and respiratory functions; or
 2. Irreversible cessation of all functions of the entire brain, including the brainstem.
- B. The diagnosis of brain death should be considered when
 1. A patient is in a deep coma due to either irremediable, irreversible medical conditions or a well-established irremediable structural brain damage; and
 2. Complicating reversible medical conditions that may confound the clinical assessment have been

excluded; e.g., severe electrolyte, acid-base or endocrine disturbances; severe hypothermia (core temperature of 32°C or lower); severe hypotension; drug intoxication or poisoning, and the prior administration of neuromuscular blocking agents.

3. The following recommendations are taken from the American Academy of Neurology (AAN) guidelines on the determination of brain death:
 - a. The legal alcohol limit of 0.08% may be a practical threshold below which an examination could reasonably proceed.
 - b. A core body temperature of >36 degrees **Celsius** should be achieved.
 - c. Neurological examination should be performed with a systolic blood pressure \geq 100 mmHg.

C. The diagnosis of brain death is a clinical diagnosis, and one complete examination testing all elements listed in E may be sufficient for this diagnosis. The time period of observation or necessity of repeat examination is left to the determining physician as needed to make the clinical diagnosis. These guidelines are directly relevant to adults age 18 or greater.

D. The determination of brain death must be made by an attending physician skilled and trained in clinical brain death assessment (i.e., physicians trained in the subspecialties of neurology, neurosurgery, and critical care medicine).

E. Clinical Exam and medical tests to determine when the criteria of the irreversible cessation of the brain and brain stem functions have been satisfied:

1. Cessation of brain and brain stem functions - Cerebral functions are absent.
2. Deep coma must exist with the complete loss of consciousness, vocalization, and volitional activity as evidenced by flaccid tone and the absence of spontaneous or induced movements including posturing (but excluding spinal reflexes, spinal withdrawal, or spinal myoclonus). Absence of response to noxious stimulus should include stimulus above the level of the foramen magnum.
3. Brainstem functions are absent. Absence of pupillary response to a bright light is documented in both eyes. When uncertainty exists, a magnifying glass should be used. Absence of ocular movements using oculocephalic or oculovesitbular testing. For caloric testing, each auditory canal is irrigated with approximately 50 ml of ice water. Movement of the eyes should be observed during 1 minute of observation. Absence of corneal reflex. Absence of facial muscle movement with noxious stimulus delivered above the neck. Absence of cough and gag reflexes. Apnea testing using standardized methods should then be performed at the conclusion of the clinical examination to confirm the absence of spontaneous respiratory efforts (See Attachment A, Apnea Test Protocol – Adults 18 Years of Age or Greater or See Attachment C, Apnea Test Protocol for Extracorporeal Membrane Oxygenation (ECMO) – Adults 18 Years of Age or Greater).
4. For adults age 18 or greater, consistent with III.C and the AAN guidelines, repeat examination is not required, including apnea testing.

F. **ANCILLARY Tests:** ANCILLARY laboratory testing (i.e. electroencephalogram (EEG) showing electrocerebral silence or cranial radionuclide angiogram or conventional angiogram demonstrating absence of perfusion through the cerebral arteries) do not prove brain death in the face of contradictory clinical findings. They should be used as follows:

1. **A clinical exam must be performed and documented BEFORE an ancillary test is ordered.**
2. ANCILLARY tests are appropriate in patients for whom specific components of clinical testing cannot be reliably performed or evaluated (e.g. calorics and oculocephalic testing is not feasible because of

lack of cervical spine clearance and perforated TM). ANCILLARY tests are not required for the clinical diagnosis.

- a. Brain death is a clinical diagnosis for adults.

G. DOCUMENTATION

1. The documentation of the clinical brain death exam will be placed in the medical record by the attending physician(s) performing the exam.
2. Each physician will record the specific documentation pertaining to the declaration of brain death; specifically:
 - a. the pathological process that caused brain death
 - b. the absence of reversible causes
3. The tests used to confirm brain death should be stated. If ancillary testing was used to establish the diagnosis of brain death, the attending physician interpreting the study will include written documentation of the results in the medical record prior to declaration of brain death. (Attachment B: Brain Death Evaluation - Adults 18 Years of Age or Greater, is available for use for documentation of death).
4. The time of death shall be the time of declaration of brain death by clinical examination or ancillary test.

H. NOTIFICATION OF FAMILY

1. The patient's family and other, if applicable, should be informed of the determination of the patient's death.
2. When a patient is declared brain dead, all medical interventions should be continued until the family has had an opportunity to consider organ donation.
 - a. If consent for organ donation is obtained, all medical interventions should be continued until vital organs are procured. The Operating Room staff will be notified by the LLF Coordinator of the pending organ donation following brain death recovery. The case will be scheduled for the OR the next day as first case. If circumstances prevent the case from waiting until the next morning, the case will be posted as a Code 2 and will take place as soon as possible. Space and OR nursing staff availability will be determined. Anesthesia will be required.
 - b. If the family refuses consent for organ donation, all medical interventions should be discontinued.
3. If possible, the family should be given the opportunity to spend time at the bedside, before medical interventions are discontinued. Appropriate psychological and spiritual support to the family and friends should be offered by making appropriate referrals (e.g., Social Work, Pastoral, and Palliative Care). If the family is having difficulty with acceptance of brain death, the following procedure should be followed.
 - a. Every effort should be made by the clinical staff to encourage acceptance of the patient's brain death including provision of support from Social Work, Pastoral, and Palliative Care, as appropriate.
 - b. If a resolution cannot be reached in a reasonable time frame, the following procedure will be instituted
 1. The Medical Director or designee and Nurse Manager of the Unit should be informed and

make every effort to affect a resolution.

2. If this is not effective, the Chief Medical Officer and Chief Nursing Officer of UMMC will be informed.
3. A meeting within 24 hours will be convened including all appropriate individuals (attending physician, Medical Director or designee, Nurse Manager or designee, Chief Medical Officer or designee, Chief Nursing Officer or designee, Risk Management, Office of the General Counsel, and any other involved parties such as Security, Social Work and Pastoral Care).
4. A decision will be made about time frame for discontinuation of medical interventions.
5. The family will be informed of such decision by the Chief Medical Officer or designee and/or Chief Nursing Officer or designee.
6. Medical interventions will be discontinued at the time conveyed to the family with provision of appropriate support from Social Work, Pastoral Care, and Security as needed.

IV. REPORTABLE CONDITIONS

None

V. DOCUMENTATION

None

VI. SUPPORTIVE INFORMATION

A. SEE ALSO

1. Attachment A – Apnea Test Protocol – Adults 18 Years of Age or Greater
2. Attachment B – Brain Death Evaluation - Adults 18 Years of Age or Greater Electronic Evaluation Form: Portfolio New Note: .STCBRAINDEATHEVALFORM
3. Attachment C – Apnea Test Protocol for Extracorporeal Membrane Oxygenation (ECMO) – Adults 18 Years of Age or Greater

B. REFERENCES

1. Evidence-based guideline update: Determining brain death in adults: Reports of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology* 2010; 74; 1911.

C. COMMUNICATION AND EDUCATION

This policy will be communicated to the appropriate UMMC personnel via the following channels:

1. The policy will be distributed to the applicable medical and Patient Care Services committees
2. Revisions will be communicated to Medical Staff and Patient Care Services, as appropriate.
3. This policy will be placed in the web-based policy management application on the UMMC Intranet.

DEVELOPER(S)

Organ Donation Committee Functional Team Leader/UMMC.

Attachments

A: Apnea Test Protocol - Adults 18 Years of Age or Greater

B: Brain Death Evaluation for Adults

C: Apnea Test Protocol for Extracorporeal Membrane Oxygenation (ECMO) – Adults 18 Years of Age or Greater

Applicability

UMMC Downtown Campus

COPY