



RIVERSIDE MEDICAL CENTER, INC.



METRO PACIFIC HEALTH
THE HEART OF FILIPINO HEALTHCARE

DEPARTMENT: Medical Services Division		POLICY NUMBER: DPOTMH-MPP-MSD-P009 (01)	
TITLE/DESCRIPTION: NEUROLOGICAL DETERMINATION OF DEATH (NDD)			
EFFECTIVE DATE: May 6, 2025	REVISION DUE: May 5, 2028	REPLACES NUMBER: N/A	NO. OF PAGES: 1 of 7
APPLIES TO: Medical Services Division		POLICY TYPE: Multi disciplinary	

PURPOSE:

To establish a standardized, evidence-based approach for the determination of death based on neurological criteria (Neurological Determination of Death or NDD) that is consistent with medical ethics, current clinical standards, and applicable Philippine laws including the Organ Donation Act of 1991.

DEFINITIONS:

Neurological Determination of Death (NDD): Irreversible cessation of all functions of the entire brain, including the brainstem. Death is declared based on neurological criteria when the clinical and diagnostic assessments meet the required standards.

RESPONSIBILITY:

Physicians

POLICY:

1. The hospital recognizes NDD as a valid legal and medical declaration of death.
2. NDD must be diagnosed and documented in accordance with accepted international guidelines and national statutes.
3. NDD may only be declared by two qualified physicians, independent of the transplant team, and not involved in the care of the potential organ recipient.

I. Eligibility for Neurological Determination of Death (NDD)

A patient may be considered for NDD assessment if the following conditions are met:

- Presence of a catastrophic brain insult consistent with irreversible coma or devastating neurological injury, which may include but is not limited to:
 - Severe traumatic brain injury
 - Hypoxic-ischemic encephalopathy (e.g., post-cardiac arrest)
 - Massive cerebrovascular accident (e.g., brainstem stroke, large hemispheric infarcts)
 - Central nervous system infections or neoplasms resulting in diffuse cerebral dysfunction
- Exclusion of confounding factors that may interfere with accurate assessment of brain function:
 - Hypothermia: Core temperature must be $\geq 36.0^{\circ}\text{C}$
 - Drug effects: Absence of CNS-depressant medications, neuromuscular blocking agents, or sedatives at levels that could mimic brain death. Drug clearance should be confirmed by elapsed time, known half-life, or toxicology as necessary.
 - Metabolic or endocrine abnormalities: Significant electrolyte imbalance, hypoglycemia, or severe hepatic/renal dysfunction must be corrected or deemed non-contributory.

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- Shock or hypotension: Adequate perfusion must be ensured to avoid masking residual brain activity.

II. Preconditions for Neurological Assessment

Before initiating formal NDD testing, the following clinical prerequisites must be fulfilled:

- Confirmed Irreversible Brain Injury:
 - The cause of coma must be known, established, and deemed irreversible by clinical, radiologic, or laboratory evidence.
 - Imaging studies (e.g., CT/MRI) must support the diagnosis of a non-survivable brain injury.
- Exclusion of Mimicking Conditions:
 - Rule out other causes of coma, such as:
 - Drug intoxication
 - Locked-in syndrome
 - Guillain-Barré syndrome or other neuromuscular disorders
 - Hypothermia or metabolic coma
- Normalization of Physiologic Parameters:
 - Systolic blood pressure ≥ 90 mmHg or mean arterial pressure (MAP) ≥ 60 mmHg with or without vasopressor support
 - Arterial oxygen saturation $\geq 90\%$
 - Core temperature $\geq 36.0^{\circ}\text{C}$ (96.8°F)

III. Clinical Criteria for Neurological Determination of Death (NDD)

All of the following 3 components must be completely and consistently absent to clinically diagnose brain death:

- Coma (Irreversible and Unresponsive)
 - The patient must exhibit complete unresponsiveness to all external stimuli, including:
 - Glasgow Coma Scale (GCS) of 3
 - No eye-opening, verbalization, or motor response to noxious or non-noxious stimulation
 - The coma must be of known and irreversible etiology, as established in the preconditions.
- Absence of Brainstem Reflexes

All of the following brainstem functions must be absent:

 - Pupillary Response: Pupils fixed and non-reactive to bright light
 - Corneal Reflex: Absent response when cotton or saline contacts the cornea
 - Oculocephalic Reflex ("Doll's Eyes"): Absent eye movement when head is rapidly turned (ensure cervical spine stability)
 - Oculovestibular Reflex (Cold Caloric Test): No eye movement after instillation of 50 mL ice



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- water in each ear (after confirming tympanic membrane integrity)
- Gag Reflex: Absent response to posterior pharyngeal stimulation
- Cough Reflex: No response to tracheal suctioning
- Facial Motor Response: No grimace or facial movement in response to deep painful stimuli (e.g., supraorbital pressure)

Note: The absence of these reflexes must be persistent and reproducible. Document each finding in detail.

3. Apnea Test (Essential Test)

Performed to assess the absence of spontaneous respiratory effort:

Preparation:

- Core temperature $\geq 36.0^{\circ}\text{C}$
- Systolic BP ≥ 90 mmHg (or MAP ≥ 60 mmHg)
- Arterial PaCO₂ between 35–45 mmHg before testing
- Oxygenate patient with 100% FiO₂ for at least 10 minutes

Procedure:

- Disconnect the patient from the ventilator while administering passive oxygenation via catheter at the level of the carina (6 L/min)
- Observe the patient for respiratory movements (chest or abdominal excursions) for 8–10 minutes
- Terminate test early if:
 - Significant hypotension or hypoxia occurs
 - Cardiac arrhythmias develop

Interpretation:

- Positive test (confirms apnea):
 - No spontaneous respiratory movement
 - PaCO₂ ≥ 60 mmHg or increase of ≥ 20 mmHg from baseline
- Negative or indeterminate test: Repeat at a later time or proceed to confirmatory testing

IV. Confirmatory Tests for NDD (when clinical criteria are inconclusive or not fully performable)

Confirmatory testing is not routinely required but may be indicated in any of the following scenarios:

- Facial or cranial trauma precludes brainstem reflex testing
- High cervical spine injury limits oculoccephalic evaluation
- Confounding factors cannot be ruled out (e.g., drug effect)
- Apnea test is inconclusive or cannot be safely performed





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Acceptable Confirmatory Test:

1. Cerebral Angiography
 - Demonstrates absence of intracerebral blood flow (no filling of intracranial arteries)
2. Electroencephalogram (EEG)
 - Demonstrates electrocerebral silence over a minimum of 30 minutes, using standard montage and settings
3. Transcranial Doppler Ultrasonography
 - Shows reverberating flow or systolic spikes without diastolic flow in the intracranial arteries

Note: All test results must be interpreted by appropriately credentialed specialists, and copies of reports must be appended to the medical record.

V. Documentation Requirements

- Neurological Death Certification Form
- Detailed clinical notes describing the examination
- Time of death is recorded as the time apnea is confirmed or confirmatory test shows absence of brain activity.

VI. Physician Qualifications

Both certifying physicians must:

- Hold a valid medical license
- Be trained in critical care or neurology/neurosurgery
- Have no conflict of interest with organ procurement or transplantation

VII. Communication and Family Support

- The attending physician, preferably with a member of the multidisciplinary care team, must communicate the diagnosis of brain death in a clear, compassionate, and culturally sensitive manner to the patient's family or legal representative.
- Conversations must be held in private, using non-technical, respectful language, and ample time should be allowed for families to process the information and ask questions.
- Key components of communication must include:
 - The clinical criteria used to determine death
 - An explanation of the irreversible nature of brain death
 - Clarification that brain death is legally recognized as death in the Philippines
 - Options regarding organ donation (if applicable)
- Psychological support services (e.g., social workers, chaplains, grief counselors) should be made



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available immediately upon the declaration of NDD and throughout the grieving process.

- Documentation Requirements:
 - All communications, including the content of discussions, questions raised, responses provided, and the names of family members or representatives present, must be documented in the patient's medical record.
 - The date and time of family notification must be recorded and co-signed by the attending physician.

VIII. Special Considerations

A. Pediatric Patients

- For children below 18 years of age, the assessment of NDD must follow internationally accepted pediatric guidelines.
- The evaluation must be conducted by physicians with training in pediatric neurology or critical care.

B. Organ Donation

- Once NDD is formally declared and documented, the case must be referred to the hospital's Transplant Coordinator for further assessment and coordination.
- The team will initiate:
 - Review of donor eligibility
 - Completion of the Organ Donation Consent Form
 - Coordination with transplant units or external networks
- The integrity of the body must be maintained during this period, and family consent must be respected at all times.



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PROCEDURE (SOP): N/A

WORK INSTRUCTION: N/A

WORK FLOW: N/A

FORMS:

1. MSD-F034 (01)-Brain Death Certification Form
2. MSD-F035 (01)-Neurological Determination of Death Checklist
3. MSD-F036 (01)-Apnea Test Protocol
4. MSD-F037 (01)-Confirmatory Testing Guidelines
5. MSD-F038 (01)-Family Communication Script Template

EQUIPMENT: N/A

REFERENCES:

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2. Shemie, S. D., Hornby, L., Baker, A., Teitelbaum, J., Torrance, S., & Young, B. G. (2020). International guidelines for determination of death—Phase 1: The World Brain Death Project. JAMA, 324(11), 1078–1097. <https://doi.org/10.1001/jama.2020.11586>
3. American Academy of Neurology. (2010). Practice parameters for determining brain death in adults: Report of the Quality Standards Subcommittee of the AAN. Neurology, 74(23), 1911–1918.
4. Canadian Council for Donation and Transplantation (CCDT). (2006). Severe brain injury to neurological determination of death: A framework for decision-making.

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