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Brain Death (DBD Pathway) also known as Death by Neurologic Criteria (DNC Pathway)

Establishing brain death involves a rigorous, standardized process to ensure the diagnosis is accurate and ethically sound. Here are the **key steps** typically followed in the U.S., based on guidelines from major medical organizations:

1. Establish Clinical Context

- Confirm a **catastrophic brain injury** of known cause (e.g., trauma, stroke, anoxic injury).
- Ensure the condition is **irreversible** and not due to treatable causes.

2. Rule Out Confounding Factors

Before testing for brain death, clinicians must exclude:

- **Drug intoxication or sedation**
- **Severe metabolic or endocrine disturbances**
- **Hypothermia** (core temperature must be $\geq 36^{\circ}\text{C}$ or 96.8°F)
- **Shock or hypotension**
- **Neuromuscular blockers** or other conditions mimicking brain death (e.g., Guillain-Barré syndrome)

3. Perform a Neurological Examination

This includes:

- **Coma:** No response to verbal or painful stimuli.
- **Absence of brainstem reflexes:**
 - No pupillary response to light
 - No corneal reflex
 - No oculoccephalic reflex ("doll's eyes")
 - No oculovestibular reflex (cold caloric)
 - No gag or cough reflex
- **No motor response** to pain (excluding spinal reflexes)



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4. Apnea Test

This test checks for spontaneous breathing:

- The patient is pre-oxygenated and disconnected from the ventilator.
- CO₂ is allowed to rise to a threshold (usually ≥ 60 mmHg or a 20 mmHg rise from baseline).
- **No respiratory effort** confirms absence of brainstem respiratory drive.

5. Optional: Ancillary Tests

Used when parts of the clinical exam or apnea test can't be completed:

- **EEG** (electroencephalogram) showing no electrical activity
- **Cerebral blood flow studies** (e.g., radionuclide scan, angiography)
- **Transcranial Doppler** or **CT angiography**

6. Repeat Evaluation (if required)

Some institutions or state laws require a second exam after a set interval, especially in pediatric cases.



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Donation after Cardiac Death (DCD) Pathway

1. Decision to Withdraw Life Support

- **Family:** Decides to allow a natural death for the patient who has suffered irreversible brain injury but does not meet brain death criteria
- **Attending Physician:** Confirms the prognosis and discusses the decision with the family

2. Referral to Organ Procurement Organization (OPO)

- **Hospital Staff:** Refers the patient to the OPO once the decision to withdraw life support is made
- **OPO Coordinator:** Verifies if the patient is a registered donor and discusses donation options with the family

3. Preparation for Withdrawal of Life Support

- **Hospital Medical Team:** Prepares the patient for terminal extubation in the operating room (OR) according to hospital policy
- **OPO Coordinator:** Coordinates with the transplant team and ensures all necessary tests and preparations are completed

4. Withdrawal of Life Support

- **Hospital Medical Team:** Carries out the terminal extubation in the OR
- **Transplant Team:** Restricted from the OR during extubation and until death is declared.

5. Declaration of Death

- **Hospital Medical Team:** Declares death based on cardiac criteria (absence of heartbeat) after a specified period
- **OPO Coordinator:** Ensures the declaration of death is documented and coordinates the next steps.

6. Organ Recovery

- **Transplant Team:** Begins organ recovery shortly after death is declared



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- **Transplant Team:** Utilizes techniques like normothermic regional perfusion (NRP) to increase the number of organs for transplant and improve recipient outcomes
- **OPO Coordinator:** Oversees the recovery process and ensures organs are placed for transplant

7. Post-Recovery

- **Transplant Team:** Utilizes techniques like machine perfusion (MP) to increase the safe time from recovery to transplant and to enhance assessment of organ quality for transplant to expand the number of organs for transplant and improve recipient outcomes.
- **OPO Coordinator:** Manages donor care and coordinates with recipient hospitals

Each step involves collaboration between the hospital medical team, the OPO, and the transplant team to ensure a smooth and respectful process.

Additional Resources from the American Academy of Neurology:

[Pediatric and Adult Brain Death/Death by Neurologic Criteria Consensus Guidelines](#)

Report of the AAN Guidelines Subcommittee, AAP, CNS, and SCCM

Approved by the Guidelines Subcommittee on January 23, 2023, by the Quality Committee on February 11, 2023, and the American Academy of Neurology Institute Board of Directors on July 20, 2023. The Neurocritical Care Society affirmed the value of this consensus guideline on September 28, 2023.