

## Determination of Brain Death/Death by Neurological Criteria: The World Brain Death Project

*The first consensus recommendations on the topic aim to address variation in diagnosis at the international, national, and local levels.*

**Sponsoring Organization:** World Brain Death Project, assisted by international professional societies including the World Federation of Intensive and Critical Care, World Federation of Pediatric Intensive and Critical Care Societies, World Federation of Neurology, World Federation of Neurosurgery, and the World Federation of Critical Care Nurses

### Background and Objective

An international panel of 45 experts have issued the first consensus recommendations for the evaluation and diagnosis of brain death/death by neurological criteria (BD/DNC) to address variation in diagnosis at the international, national, and local levels.

### Key Points

The consensus recommendations address the science, concept, and clinical criteria for brain-death determination. Due to the lack of relevant high-quality data, the authors did not issue GRADE recommendations. They make strong recommendations based on expert consensus and conditional or weak recommendations when evidence and clinical consensus were unclear or further data or incorporation of local practices is needed.

- The group recommends that BD/DNC be defined as “the complete and permanent loss of brain function as defined by an unresponsive coma with loss of capacity for consciousness, brainstem reflexes, and the ability to breathe independently.”
- BD/DNC should be primarily a clinical determination.
- At a minimum, before initiating BD/DNC testing, a clear neurologic diagnosis with the potential to cause permanent loss of all brain and brainstem function should be established, ideally with neuroimaging or actual evidence of intracranial hypertension. Additionally, the group suggests that minimums of 36°C core temperature and (in adults) 100 mm Hg systolic blood pressure or of 60 mm Hg mean arterial pressure should be present. Pharmacologic paralysis should be excluded and the influence of central nervous system–depressing medications and toxic-metabolic effects considered before brain-death testing. A minimum 24-hour wait is also recommended following resuscitated cardiac arrest.
- Specific minimum criteria for determining absence of consciousness, brainstem reflexes, and apnea are provided, as are recommendations for potential ancillary tests and situations where confounding is present and ancillary testing should be performed. Recommended clinical exam components include (1) mid-position or dilated and unreactive pupils; (2) absent corneal, oculocephalic, oculo-vestibular, cough, and gag reflexes; (3) no facial movement to noxious stimuli; (4) no brain-mediated motor responses; (5) apnea testing.

### COMMENT

With continued improvement in organ support, the once-straightforward determination of death is becoming increasingly complex. This initial effort to develop international consensus recommendations for BD/DNC is an important step toward standardizing best practices and ensuring public confidence in BD/DNC determination. — **Craig Williamson, MD**

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