

## Demographics, Criteria and Mechanism of Human Brain

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### Short Communication

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### DESCRIPTION

The concept of brain death has been a topic of interest and controversy for many years. It is essential to understand the criteria and mechanism of brain death, as it has significant implications for end-of-life decisions and organ donation. Medical law ramifications of different operational definitions of death are clear (in medical jurisprudence and medical law). In the past, clinical death which refers to the permanent cessation of key physical processes, most notably breathing and heartbeat was used by both the legal and medical sectors to define death<sup>[1,2]</sup>. This ability of the medical profession to revive patients who have no respiration, heartbeat, or other external indications of life has increased. With the widespread use of life support systems and the growing availability and demand for organ transplants, this became more urgent. The mechanism of brain death is complex and involves a cascade of events that ultimately lead to the complete and irreversible loss of brain function. The most common causes of brain death include traumatic brain injury, intracranial hemorrhage, and hypoxic-ischemic injury. Brain death can only be diagnosed once the cause of the injury has been identified and determined to be irreversible. When the brain experiences a severe injury, it triggers a series of biochemical and physiological changes that damage the brain cells and disrupt the normal functioning of the brain. This includes a decrease in cerebral blood flow, oxygen delivery, and glucose metabolism. As a result, the brain cells start to die, and the brain tissue swells, leading to increased intracranial pressure<sup>[3,4]</sup>.

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The criteria for brain death are typically based on a set of clinical and neurological tests. The most widely accepted criteria for brain death include the following [5]:

**Absence of brainstem reflexes:** This includes the absence of pupillary and corneal reflexes, oculocephalic reflex, and gag reflex.

**Absence of spontaneous breathing:** This is confirmed by apnea testing, which involves disconnecting the patient from the ventilator and monitoring for the absence of breathing.

**Lack of responsiveness:** The patient should not respond to any external stimuli or commands.

**Flat Electroencephalogram (EEG):** This indicates the absence of any electrical activity in the brain.

The increase in intracranial pressure further impairs blood flow and oxygen delivery to the brain, leading to further brain cell death. This process continues until the brain has suffered irreparable damage, and the brain cells can no longer function or communicate with each other. Once brain death has occurred, the body's vital organs, such as the heart, lungs, and kidneys, can no longer function without support. This is why it is critical to diagnose brain death accurately and promptly, as it has significant implications for end-of-life decisions and organ donation [6,7].

All nations with active organ transplantation programmes have legislation guiding the decision of death in place since the 1960. Finland became the first nation in Europe to recognize brain death as an official definition (or sign) of death in 1971, but Kansas had also passed a law along these lines previously.

In the United States, 5% of pediatric in-hospital deaths and 2% of all adult in-hospital deaths are attributable to brain death. Out of a total of more than 15,344 children who died in Pediatric Intensive Care Unit (PICU) there were more than 3,000 pediatric brain fatalities, according to a statewide assessment of PICUs in the United States in 2019. Brain death evaluations are performed infrequently, even in big PICUs, claims a nationwide research [8,9].

After receiving a diagnosis of death based on accepted legal standards, everyone is automatically an organ donor in some nations (for example, Spain, Finland, Wales, Portugal, and France). Elsewhere, consent from family members or next-of-kin may be required for organ donation.

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