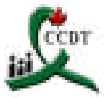

Checklist for Neurological Determination of Death (NDD) – Infants age < 1year, Term Newborns > 36 weeks gestation

<u>Section One: Minimum Clinical Criteria</u>

a. Deep unresponsive coma with the following established etiology: ______________________________

b. Confounding factors precluding the diagnosis? Yes❒ No ❒

c. Temperature (core) _____

d. Brainstem Reflexes:

Bilateral absence of motor responses: (excluding spinal reflexes)	Yes❒	No ❒	
Absent cough:	Yes❒	No ❒	
Absent gag:	Yes❒	No ❒	
Absent suck (newborns only):	Yes❒	No ❒	Not applicable ❒
Bilateral absence of corneal responses:	Yes❒	No ❒	
Bilateral absence of vestibulo-ocular responses:	Yes❒	No ❒	
Bilateral absence of oculo-cephalic responses:	Yes❒	No ❒	
Bilateral absence of pupillary response to light: (pupils mid size)	Yes❒	No ❒	
Apnea:	Yes❒	No ❒	
At completion of apnea test: pH_______ $PaCO_2$ ______mmHg			
$PaCO_2$ 20 mmHg above the pre-apnea test level	Yes❒	No ❒	

<u>Section Two: Ancillary Tests</u>

Ancillary tests, as defined by the absence of intracranial blood flow, should be performed when ***any*** of the minimum clinical criteria cannot be completed, **or** unresolved confounding factors exist.

Ancillary testing has been performed: Yes❒ No ❒
Date: ______________Time: _______________

Absence of intracranial blood flow has been demonstrated by:

Cerebral Radiocontrast Angiography ❒
Radionuclide Angiography ❒
Other ____________________

<u>Section Three: Examination Interval, Declaration and Documentation</u>

The first and second physician's determinations (a full clinical examination including the apnea test) should be performed at different points in time. For infants, there is no fixed examination interval. For newborns, the first exam should be delayed until 48 hours after birth and the interval between examinations should be 24 hours.

This patient fulfills the criteria for neurological determination of death:

Physician Print name: ___________________________ Signature: ______________________________

Date: ________________________________ Time: ___________________________________

<u>Section Four: Standard End-of-Life Care</u>

Is this patient medically eligible for organ and/or tissue donation?	Yes❒	No ❒
Has the option for organ and/or tissue donation been offered?	Yes❒	No ❒
Has consent been obtained for donation?	Yes❒	No ❒

Checklist for Neurological Determination of Death–Infants < 1 Year, Term Newborns > 36 Weeks Gestation

Age Definitions

Infants: 30 days, < 1 year (corrected for gestational age);
Term Newborns: >36 weeks gestation, age < 30 days (corrected for gestational age).

Overarching Principles

The legal time of death is marked by the first determination of death.
Existing law states that for the purposes of post-mortem donation, the fact of death shall be determined by two physicians. For these age groups, the first and second physician's determinations, as defined by a full clinical examination including the apnea test, must be performed at two different points in time. For infants, there is no fixed interval regardless of the primary etiology. For term newborns, the first examination should be delayed 48 hours after birth and the interval should be   24 hours, regardless of primary etiology.

Physicians Declaring Neurological Death

Minimum level of physician qualifications to perform NDD is full and current licensure for independent medical practice in the relevant Canadian jurisdiction. This excludes physicians who are only on an educational register. The authority to perform NDD cannot be delegated. Physicians should have skill and knowledge in both the management of patients with severe brain injury and in determination of neurological death in the relevant age groups. For the purposes of post-mortem donation, a physician who has had any association with the proposed transplant recipient that might influence the physician's judgment shall not take part in the declaration of death.

Minimum Clinical Criteria

Established Etiology: Absence of clinical neurological function with a known, proximate cause that is irreversible. There must be definite clinical and/or neuroimaging evidence of an acute central nervous system (CNS) event that is consistent with the irreversible loss of neurological function. NDD may occur as a consequence of intracranial hypertension and/or primary direct brainstem injury.

Deep Unresponsive Coma: a lack of spontaneous movements and absence of movement originating in the CNS such as: cranial nerve function, CNS mediated motor response to pain in any distribution, seizures, decorticate and decerebrate responses. **Spinal reflexes**, or motor responses confined to spinal distribution, may persist.

Confounding Factors:

1. Unresuscitated shock
2. Hypothermia (core temperature <34 degrees Celsius for infants and < 36 degrees Celsius for newborns, by central blood, rectal, or esophageal/gastric measurements)
3. Severe metabolic disorders capable of causing a potentially reversible coma. If the primary etiology does not fully explain the clinical picture, and if in the treating physician's judgment the metabolic abnormality may play a role, it should be corrected or an ancillary test should be performed.
4 Peripheral nerve or muscle dysfunction or neuromuscular blockade potentially accounting for unresponsiveness, or
5. Clinically significant drug intoxications (e.g. alcohol, barbiturates, sedatives); therapeutic levels and/or therapeutic dosing of anticonvulsants, sedatives and analgesics do not preclude the diagnosis.

   Specific to Cardiac Arrest: Neurological assessments may be unreliable in the acute post-resuscitation phaseafter cardiorespiratory arrest. In cases of acute hypoxic-ischemic brain injury, clinical evaluation for NDD should be delayed for 24 hours or an ancillary test could be performed.

   Examiners are cautioned to review confounding issues in the context of the primary etiology and examination. **Clinical judgment is the deciding factor.**

Apnea Test:
Optimal performance requires a period of preoxygenation followed by 100% O_2 delivered via the trachea upon disconnection from mechanical ventilation. The certifying physician must continuously observe the patient for respiratory effort. **Thresholds at completion of the apnea test: $PaCO_2 \geq$ 60 mmHg and $\geq$ 20 mmHg above the pre-apnea test level and pH $\leq$ 7.28 as determined by arterial blood gases.** Caution must be exercised in considering the validity in cases of chronic respiratory insufficiency or dependence on hypoxic respiratory drive.

Ancillary Tests

Demonstration of the global absence of intracranial blood flow is considered the standard for determination of death by ancillary testing. The following prerequisite conditions must be met prior to ancillary testing: i) established etiology, ii) deep unresponsive coma, iii) absence of unresuscitated shock and hypothermia. Currently validated techniques are 4-vessel cerebral angiogram or radionuclide cerebral blood flow imaging. EEG is no longer recommended. NDD can be confirmed by ancillary testing when minimum clinical criteria cannot be completed or confounding factors cannot be corrected.