Saskatchewan Health Authority

Organ & Tissue Donation

Resource Manual

2025

Saskatchewan Health Authority Donation Program

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Introduction

The Saskatchewan Donation Program (SDP) works with the Ministry of Health and allied healthcare members to create a culture which enables every Saskatchewan resident to make an informed decision about organ and tissue donation.

This resource manual offers a more detailed description around organ and tissue donation within critical care. Please also refer to the SHA Organ and Tissue Donation Policy and Procedure, included in the resource binder, for guidance. The resource manual was updated to reflect the 2023 Canadian Clinical Practice Guidelines (Shemie et al., 2023).

While efforts are made to keep the information and references up to date, changes can happen quicker than the manual can be updated. **If you have any questions please do not hesitate to contact the SDP Donor Coordinator on call through switchboard (306-655-8000).**

Land Acknowledgment

We, the Saskatchewan Organ and Tissue Donation Program, honour and respect the original land of the Métis, Cree, Assiniboine, Salteaux, Dene, Nakota, and Dakota. We recognize the ancestors of this province have lived in harmony long before colonization. As a program, we will continue to deepen our knowledge around the intertwined lives of the people, land, water, animals, and all beings. We hope to strengthen our relationship to provide the best care to the ancestors of Treaty 2, Treaty 4, Treaty 5, Treaty 6, Treaty 7, Treaty 8, and Treaty 10 territory, now called Saskatchewan.

Terminology

In the most recent Canadian Blood Services and Health Canada update, there have been changes to common terminology, including death determination by neurological criteria and death determination by circulatory criteria. The complete list can be found in the article “A brain-based definition of death and criteria for its determination after arrest of circulation or neurologic function in Canada: a 2023 clinical practice guideline., Shemie et al., 2023).

Death Determination by Neurologic Criteria (DNC): The process for determining death of an individual based on neurologic criteria.

The following prerequisites must be met prior to conducting a valid clinical assessment for DNC:

- Established cause of devastating brain injury severe enough to cause death **and**
- Supported by neuroimaging evidence, **and**
- Potential confounders of an accurate clinical assessment must have been considered and excluded (Foundational Medical Principle).

Death Determination by Circulatory Criteria (DCC): The process for determining death of an individual based on circulatory criteria.

DNC was previously known as Neurologic Determination of Death (NDD)

DCC was previously known as Death by Cardiocirculatory Determination (DCD)

Who Can Be a Donor?

Organ Donor

- To be an *organ donor*, the patient must have sustained a non-recoverable injury and be mechanically ventilated at the time the SDP is notified, or is undergoing MAID.
- Each patient's eligibility to donate is evaluated on a case-by-case basis by the Donor Coordinator and in conjunction with the Donor Physician.

Tissue Donor

- After death, one may have the ability to be a *tissue* donor. In Saskatchewan, we offer ocular tissue (cornea and sclera) for donation. Ocular donation does have stricter eligibility criteria than organ donation due to its life-enhancing, not life-saving ability.

Donating to Science

- Donating your body to science is done through the Bequeathal Program at the University of Saskatchewan. This does have to be coordinated prior to death. The contact number is: 1-306-966-4075

The Referral Process

The Canadian Blood Services (CBS) recommends that a donor coordinator, or health care professional well versed in the donation process, approach family to answer all questions appropriately and avoid confusion. Together, as a multidisciplinary team, we can coordinate to approach families and support their individual needs.

When to Refer for Organ Donation:

1. When the health care team is ***preparing*** to have an End of Life discussion with family regarding patient care.
2. Patient meets the following clinical triggers (referral indicators):

- G –GCS <5 or grave prognosis
- I –Injured brain/ non-recoverable illness or injury
- V - Ventilated
- E – End of life care, de-escalation of treatment or withdrawal of life sustaining therapy discussed

OR family members have questions or express interest in donation.

When to Refer for Tissue Donation:

1. After a patient has passed, or the death is imminent
2. Complete the *Ocular Donor Referral Assessment Form*. This must be completed on every death that is affiliated with the Saskatchewan Health Authority.

If you have any questions regarding the referral process, call the donor coordinator through Switchboard (306)655-8000

A timely referral is necessary to:

1. Determine medical suitability; *and*
2. Ensure a coordinator is onsite to approach families and provide information and assistance.

The *Human Tissue Gift Act* allows Donor Coordinators to view the health records of patients who are unable to provide consent themselves to ensure the patient would be a candidate for donation before families are approached and given the option for donation.

The goal is to ensure *all* patients and families have the opportunity to make an *informed* decision about their end-of-life care, free from bias

Bringing Attention to Bias

What does this look like in healthcare and among the donation process?

Recognizing unconscious bias among healthcare providers can be a difficult conversation, however crucial to our role. To normalize this conversation, Sean Polreis with the University of Saskatchewan, was consulted to provide his expertise.

Understanding Unconscious Bias

The human brain can do amazing things – write poetry, calculate the circumference of the earth, create blueprints for a skyscraper, or learn multiple languages. One thing our brains are very good at is looking for patterns and creating associations. Most of these processes take place without our awareness which allow us to come to very quick conclusions- without even knowing where those conclusions come from. Heuristic thinking allows us to navigate in a very complex world. While this

can be helpful in some circumstances – like when we need to decide whether to brake when we encounter a yellow light at an intersection – it can also lead us into poor communication and unfair decisions with people.

We all form these automatic associations – having unconscious bias is not a fault, it's a result of having a human brain and living in a complex social world. In fact, our socio-cultural experiences create the associations we make. Unconscious biases are created in our minds from all the experiences we have (interactions with others, movies, television, social media, parents, education, etc.), the cultures we are part of, the identities we hold, and the place in which we live, work, and play.

A couple quick caveats. Unconscious bias (frequently referred to as implicit or everyday bias) is different from *conscious* bias which involves associations that you are aware of. With practice and reflection, we can bring many of our unconscious biases to a conscious level. It's also important to note that our unconscious biases may not align with our consciously held beliefs and values. For example, I may have an egalitarian philosophy that anyone can be a doctor, but my unconscious bias may still give me a picture of a particular gender and ethnicity when someone mentions they have recently seen a neurologist.

Here are some great short videos discussing unconscious bias:

PwC Understanding Blind Spots video series - https://www.pwc.com/us/en/about-us/blind-spots.html.
Harvard University Implicit Bias modules & videos - https://outsmartinghumanminds.org/.
New York Times Who, Me? Biased? videos - https://www.nytimes.com/video/who-me-biased.
Short video of everyday bias researcher & author Howard Ross giving a personal example - https://www.youtube.com/watch?v=KVp9xCmDqPs.

Healthcare implications

There is an extensive amount of evidence showing that unconscious bias is widespread in healthcare & it does influence behaviour. This isn't a surprise – humans have unconscious bias, why would healthcare be any different from other professions? Unconscious bias may impact how we talk to patients or colleagues, the decisions we make, & ultimately health outcomes. An end-of-life discussion with the healthcare team, particularly around organ and tissue donation, is sensitive and critical.

Before these conversations occur, it would be a good time to try and be aware of possible unconscious biases that may impact how we approach the patient's family and loved ones. A few examples that might stimulate personal reflection:

- There was a decrease in the probability of donor selection & organ acceptance for donors at age 70 compared with age 69. This is referred to as left digit bias & may lead to lower supply of donor organs available.

Jacobson, C. E., Brown, C. S., Sheetz, K. H., & Waits, S. A. (2022). Left digit bias in selection and acceptance of deceased donor organs. *The American Journal of Surgery*, *224*(4), 1104-1108.

- The American Society of Transplantation has noted that the use of race in clinical algorithms is leading to "continuous mistrust between Black, Indigenous, & people of color (BIPOC) patients & healthcare providers."
  American Society of Transplantation. (April 21, 2021). *Racial Bias in Clinical Tools and Impact on Organ Transplantation.*
- A "patients' race, ethnicity, socioeconomic circumstances, and similar attributes do affect the way patients are treated at multiple points along the transplantation journey, from referral for evaluation at a transplant center to the speed with which a transplant occurs."
  National Research Council. (2022). *Realizing the promise of equity in the organ transplantation system*: 85.
- A study in *BMC Medical Ethics* looked at perspectives, attitudes, & acceptance of brain death (BD), donation after circulatory determination of death (DCDD), & dead donor rule (DDR) in relation to decision-making in the context of organ donation. They found a wide range of views regarding these concepts. These varying beliefs, both in the healthcare professions, & in the general public, have implications for organ & tissue donation.
  Skowronski, G., Ramnani, A., Walton-Sonda, D., Forlini, C., O'Leary, M. J., O'Reilly, L., ... & Kerridge, I. (2021). A scoping review of the perceptions of death in the context of organ donation and transplantation. *BMC Medical Ethics*, *22*(1), 167.

What can we do about it?

There is absolutely no shame in having unconscious bias. In fact, you might find it liberating when you start to become more aware of some of the unconscious biases you hold. It allows you to think about your responses, the decisions you make, and your communication with others - and change them if they may lead to inequity.

Our brains default to categorization – putting people and things into groups creates patterns that allow our brains to take shortcuts when making decisions. While this may serve a purpose, for example, in quickly determining a dangerous predator from a harmless herbivore, these same automatic associations can have harmful and negative effects when we have them about people. They can lead us into unfair assumptions, poor decisions, and inequitable treatment.

Fortunately, our brains also have the ability to pause & reflect on our initial thoughts in order to contemplate where they are coming from & whether they are accurate. Awareness is an essential part of a strategy of personal improvement. We need to accept that unconscious bias is a normal, natural, function of our human brains & try to become more aware of when we might be making assumptions that are unfair or may lead to negative outcomes. Taking a free, online Harvard Implicit Association Test is an interesting way to help stimulate this awareness (https://implicit.harvard.edu/implicit/langchoice/canada.html). There are over a dozen to choose

from. We need to consciously remind ourselves to treat everyone the same. We need to continuously be careful of assumption, be curious & humble, & try to avoid judgments. People are unique with their own values & beliefs & we need to approach others with cultural humility. We can also be careful of how we present information to others to avoid "priming" the other person's thought process. How we refer to a patient, for example, may create or reinforce a negative association or stereotype. For example, in the above left digit bias study, we could present age as a range – this can be an individual change or done at a systems level. Our goal should always be to improve ourselves & our healthcare system in any way we can.

Referral Data Tracking

The collaborative approach between Saskatchewan Ministry of Health, Health Canada, and Canadian Blood Services have decided that all organ and tissue missed referrals/ opportunities will be documented and reported. This is to track data, learn how we can improve as a country, and as a local health authority to support family's wishes.

Coroner Considerations

The Coroner's permission to recover organ and tissues is required when the death is a Coroner's case. The SDP works collaboratively with the Coroner's Office, MRP, and Major Crimes, to facilitate donation and the Coroner's investigation, if necessary.

Can donation occur when the death is a Coroner's case?

Yes, coroner involvement does not preclude the opportunity for organ or tissue donation even if the events of the death are suspicious or a homicide. As a DNC case, the Coroner may be notified at the legal time of brain death declaration. With DCC, the Coroner may be notified prior to the WLST.

What can the Coroner request with donor case?

If required, the donor coordinator speaks with the coroner, their office will decide:

- Whether donation may proceed.
- If there are any limitations to donation.
- If a physical exam or further examination is needed by the Coroner prior to recovery.
- If a Coroner's representative is needed in the OR during recovery.
- If additional blood or body fluid testing is required (vitreous humor draw may be collected by the donor coordinator).

Death and Organ Donation in Adults

- **Death occurs when brain function ends.** If the circumstances (G.I.V.E.) around a patient's death are consistent with the eligibility requirements for organ donation **and** the family/NOK

has confirmed that organ donation is consistent with the patient's wishes, organ donation after death may occur.

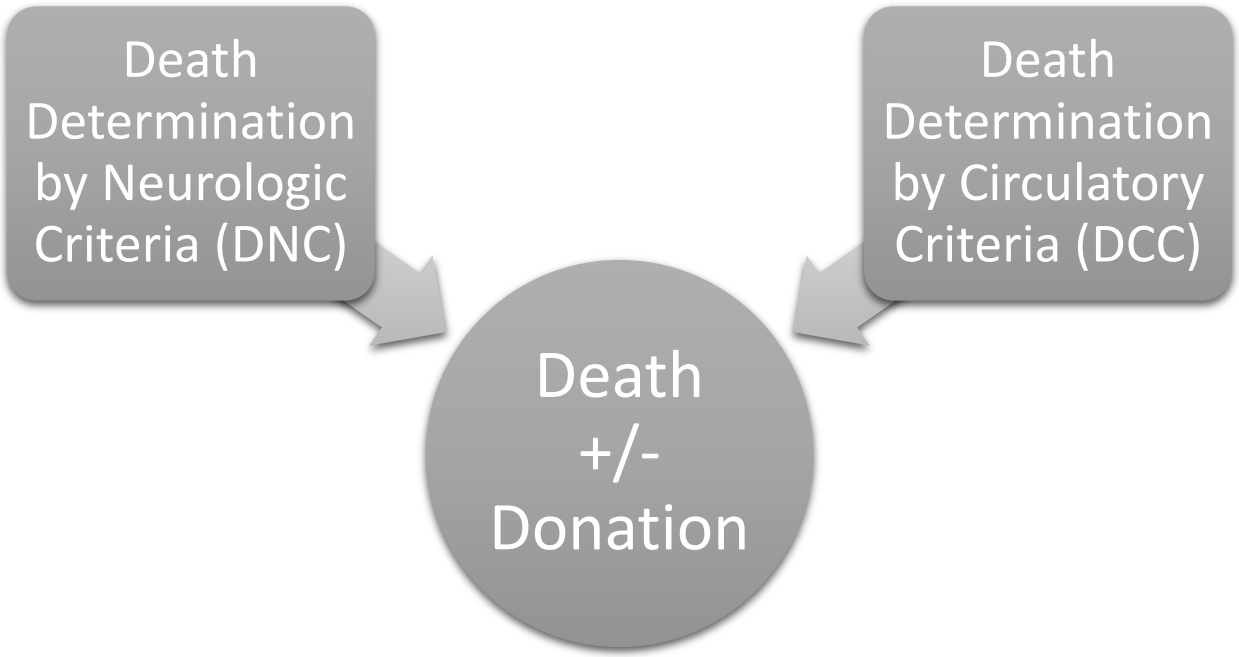
- If a patient is *fully accepted* into the MAiD program and expresses their wishes to donate, the MAiD physician can contact the Donation Program for a consult. Only at this time can the Donation Program determine suitability and discuss options to fulfill their wishes**.**

Note: *The decision to pursue possible organ donation after death must occur after there has been a decision to engage in end-of-life discussions with family/NOK* ***and prior*** *to any withdrawal of life-sustaining treatments (WLST). The organ donation work-up and management for allocation takes time (often 24-72h, however it can be longer)*

- There are three ways that death can occur:
    1. The brain sustains a serious injury and shuts down (i.e. swelling stops oxygenated blood flow into the brain)
    2. The heart stops beating = oxygenated blood flow into the brain also stops
    3. The lungs stop breathing = gas exchange stops occurring = the heart stops beating = oxygenated blood flow into the brain also stops

In all three cases, **the brain permanently dies without oxygen and death occurs**

This understanding of death creates two possible organ donation pathways:



Death Determination by Neurologic Criteria (DNC)

- **Death Determination by Neurologic Criteria (DNC), *formerly NDD,*** is primarily a clinical assessment that requires all three of the following:
    1. Absence of consciousness (lack of wakefulness and awareness in response to stimuli);
    2. Absence of brainstem function (cranial nerve testing) and;
    3. Absence of the capacity to breathe (formal apnea testing)

  Prior to conducting any part of the clinical assessment for DNC, the following prerequisites must be met:
    - There must be an established cause of devastating brain injury severe enough to cause death **and** is supported by neuroimaging evidence; AND
    - Potential confounders of an accurate clinical assessment must have been considered and excluded **see reverse of the Death Determination by Neurologic Criteria (DNC) Checklist Appendix B*

- **Clinical Assessment**: Must be completed by two staff physicians and documented on the *Death Determination by Neurologic Criteria (DNC) Checklist*. Both staff physicians may conduct the full clinical assessment concurrently. If completed at separate times, each staff physician must complete all components of the clinical exam. *See Appendix A for more detail*

The clinical assessment tests for the **absence** of the following:	
-Motor responses (excluding spinal reflexes)	-Bilateral corneal reflexes
-Cough/tracheal reflex	-Bilateral vestibulo-ocular reflexes
-Gag/pharyngeal reflex	-Bilateral pupillary response to light

The clinical assessment also tests for the absence of spontaneous breathing. This component is known as **apnea testing** and it is recommended that this be the *final* component of the clinical assessment.

- A baseline ABG is obtained before testing begins
- Ventilator support is temporarily stopped and the patient is observed for any signs of spontaneous breathing
- Passive oxygenation and/or CPAP via ventilator or BVM may be used to maintain oxygenation
- ABGs are drawn every 5 minutes until $PaCO_2$ is $\geq$ 60mmHg and/or $\geq$ 20mmHg above the baseline value **and** no spontaneous respiratory efforts have been observed (**absent hypercapnic respiratory drive = positive apnea test and absent brainstem reflexes**)

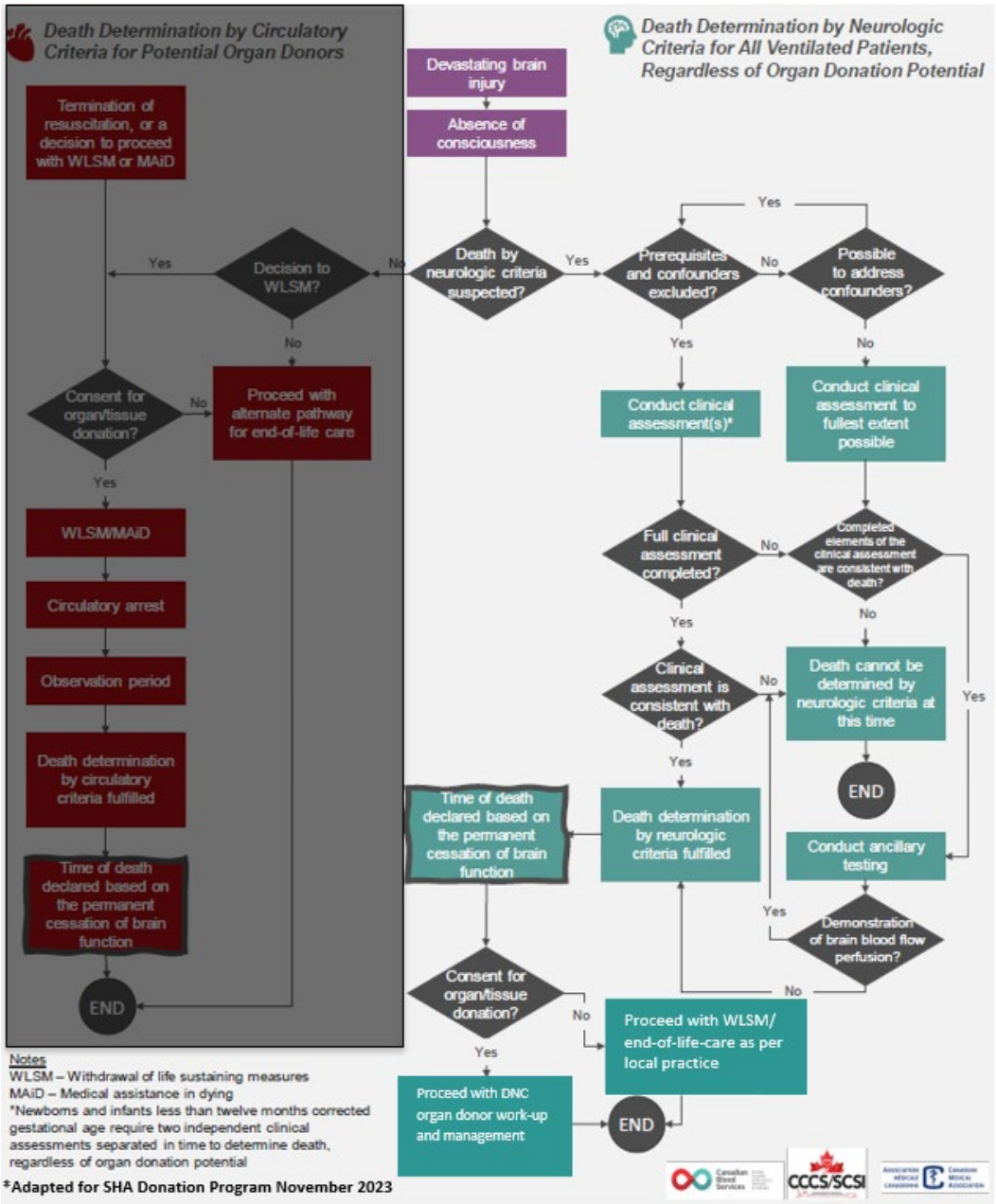
If the patient becomes unstable at any point the test must be stopped immediately and mechanical ventilation resumed

- **Ancillary Investigation(s):** If any portion of the clinical assessment, including apnea testing, cannot be completed and/or potential confounders cannot be excluded, ancillary investigation is required. Ancillary testing is also required for any isolated infratentorial brain injury without supratentorial involvement. The following ancillary investigations may be performed:

  -CT-Perfusion -Radionuclide Perfusion

  -CT-Angiography -Transcranial Doppler

- **Time of Death:** The legal time of death is the time of completion of the **last test** required to fulfill death determination criteria; either:
  - Date/Time blood sample was **taken** when PaCO2 reached target, **OR**
  - Date/Time ancillary test was **performed**



Death Determination by Circulatory Criteria (DCC)

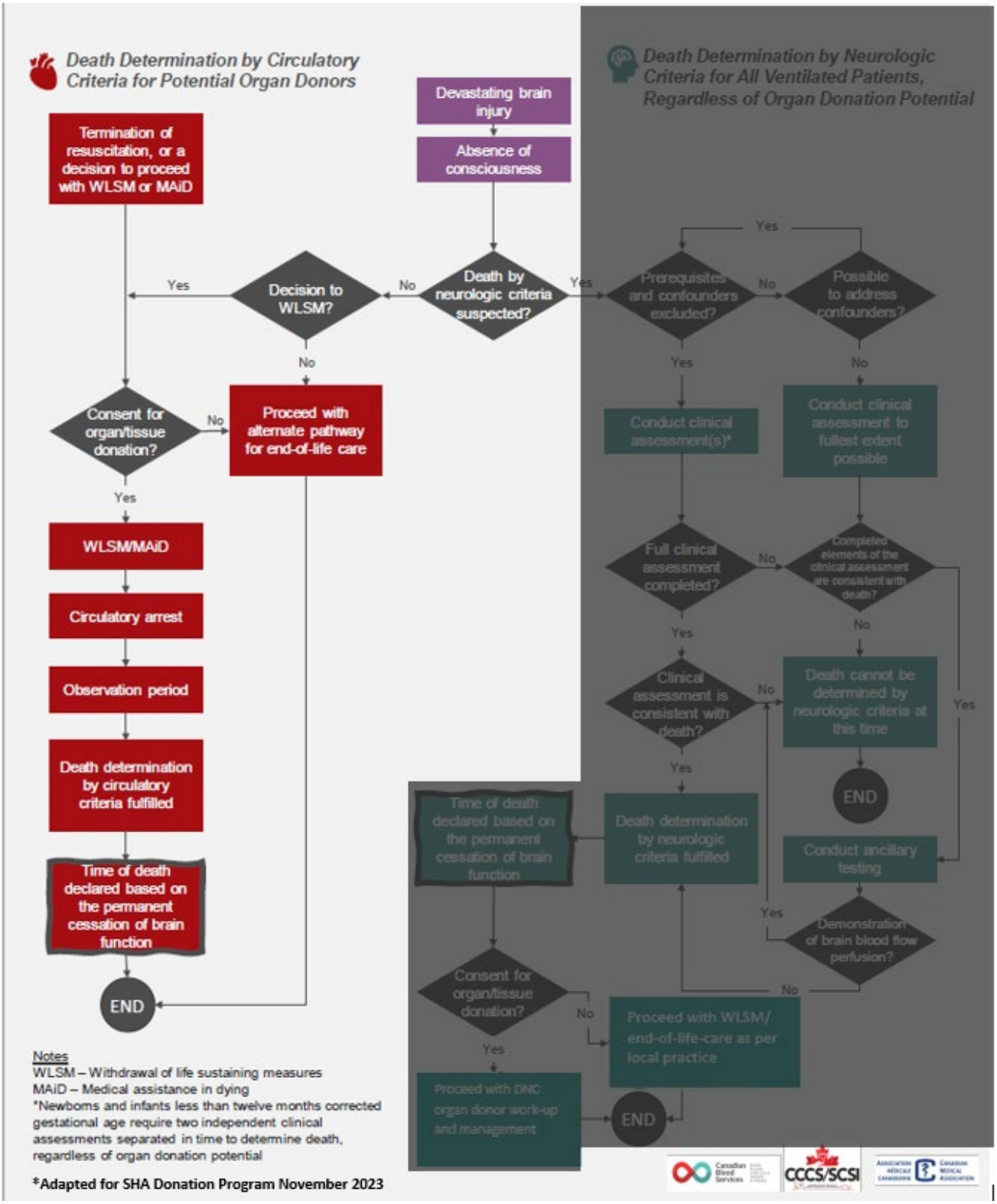
- **Death Determination by Circulatory Criteria (DCC)** ***formerly DCD*** is made based on the absence of extracranial circulation that leads to the permanent absence of intracranial circulation
    - Any potential organ donor that does not fulfill DNC is managed under the DCC pathway
    - A potential organ donor, that did not initially fulfill DNC, *may* proceed to DNC if their condition worsens, the assessment for DNC is completed in its entirety, and the results fulfill DNC. The potential organ donor would then be managed under the DNC pathway
- If the circumstances leading to the decision to WLST are consistent with the eligibility requirements for organ donation **and** the family/NOK has confirmed that organ donation is consistent with the patient's wishes, organ donation after DCC may occur
- **WLST:** Typical comfort care medications and practices are used to support natural death, family is encouraged to be with the patient, and staff involved in the donation/recovery are minimized and remain outside of the patient's room unless family requests information.
    - Sometimes medication may be requested by transplant recovery teams that will be of no benefit to the potential donor. For this reason, NOK consent may be requested by the MRP prior to administration.
    - A huddle is scheduled approximately 2 hours prior to the planned time to WLST. It is important that all team members that will be present for the WLST/organ recovery attend the huddle, including but not limited to:

-Bedside Nurse	-ICU CCA(s)	-STP Coordinator
-ICU Charge Nurse	-ICU physicians	-OR Nurse(s)
-ICU RT	-ICU SW	-Local Surgeon

- **Warm Ischemic Time:** Extubation and discontinuation of hemodynamic supporting infusions marks the start of the warm ischemic timer.
    - Each organ has different time limits for warm ischemic times. This means that after "X" minutes, an organ may no longer be considered for recovery/transplantation.
    - These time limits are based on research but largely dependent on the overall health of the potential donor, the circumstances of death, the organ itself, the retrieving/transplanting surgeon, the potential recipient, and many other factors.

Death cannot be easily predicted and sometimes a potential donor does not proceed to DCC within the allotted warm ischemic time limits. When this occurs, comfort care measures continue until natural death and the organ donation/recovery teams will step away after confirming with family/NOK that organ donation can no longer proceed.

- **Time of Death:** the DCC process has two times noted when declaring death. The first time is when the potential donor first meets death criteria (see Management of a Potential DCC Donor section) and the second time is at the end of the 5 minute hands-off period which confirms DCC has been met. The second/final time is the legal time of death


Death Determination by Circulatory Criteria for Potential Organ Donors
Death Determination by Neurologic Criteria for All Ventilated Patients, Regardless of Organ Donation Potential
Devastating brain injury
Absence of consciousness
Death by neurologic criteria suspected?
Yes
No
Prerequisites and confounders excluded?
Yes
No
Possible to address confounders?
Yes
No
Conduct clinical assessment(s)*
Conduct clinical assessment to fullest extent possible
Full clinical assessment completed?
Yes
No
Completed elements of the clinical assessment are consistent with death?
Yes
No
Clinical assessment is consistent with death?
Yes
No
Death cannot be determined by neurologic criteria at this time
END
Death determination by neurologic criteria fulfilled
Time of death declared based on the permanent cessation of brain function
Conduct ancillary testing
Demonstration of brain blood flow perfusion?
Yes
No
Consent for organ/tissue donation?
Yes
No
Proceed with DNC organ donor work-up and management
Proceed with WLSM/ end-of-life-care as per local practice
END
Decision to WLSM?
Yes
No
Termination of resuscitation, or a decision to proceed with WLSM or MAiD
Consent for organ/tissue donation?
Yes
No
Proceed with alternate pathway for end-of-life care
WLSM/MAiD
Circulatory arrest
Observation period
Death determination by circulatory criteria fulfilled
Time of death declared based on the permanent cessation of brain function
END
Notes
WLSM – Withdrawal of life sustaining measures
MAiD – Medical assistance in dying
*Newborns and infants less than twelve months corrected gestational age require two independent clinical assessments separated in time to determine death, regardless of organ donation potential
*Adapted for SHA Donation Program November 2023
CCCS/SCSI

Management of a Potential Organ Donor

- After the donor coordinator obtains consent from the NOK, a new order set will be completed by the MRP in consultation with the donor coordinator and donor physician (see Form #102850- Organ Donation Management of the Adult Organ Donor Order Set). ***The donation process from consent to potential OR takes 24-72h (sometimes longer).***

At the start of a potential donor's work-up, a Donor Coordinator will provide a "Multi-Organ Checklist – Working Sheet for Bedside ICU" which outlines general testing and frequency to help keep track.

- **Initial Potential Organ Donor Work-Up Includes:**
  - **Bloodwork**: assessing baseline organ function, infectious disease testing, and tissue typing/matching
    - The donor coordinator will bring serum collection tubes and requisitions which they will deliver to the lab. Collection does have to be completed within a specific timeframe. The donor coordinate will communicate when to draw.
    - Other specimens can be collected/sent to lab using your unit's usual processes
  - **Microbiology**:
    - Blood C&S is required from a *minimum* of two sites-
      - One from an existing line
      - One **must** be a venipuncture (reduce risk of potential line contaminate results)
    - Sputum/tracheal aspirate for C&S and possibly respiratory viruses +/- COVID
    - Urine C&S
  - **Other Lab and Diagnostic Tests**:
    - Blood group and screen/cross-match if not already up to date
    - Two urine samples, **collected at least 1h apart**, are sent for urinalysis and ACR
    - Possible portable CXR requesting lung measurements
    - Possible 12-lead ECG
- **Some Organ Specific Testing:**
  - **Heart:** *only considered for donation in a potential donor that meets DNC* criteria. There may be circumstances where the heart is ineligible for transplantation (i.e. donor age/Hx)
    - 12-lead ECGs daily
    - ECHO (TTE and/or TEE)
    - Possible angiography
  - **Lungs:**
    - RT to apply the Pulmovista for optimal PEEP settings (minimum 8 cmH_2O)
    - Possible bronchoscopy- will be suggested by donor coordinator

- CT chest
- Oxygen (O_2) Challenges q4h unless donor coordinator indicates otherwise

Oxygen challenges are required often but are simple to perform.
***If the potential donor may benefit from lung recruitment maneuvers prior to starting the O_2 challenge, request RT to assist**.*
When ready, draw an initial ABG on the current ventilator settings and note time on requisition. Once obtained, only increase the FiO_2 to 100% and then draw a second ABG after 10 minutes. Return the FiO_2 to the previous setting.

- **Liver, Kidneys, Pancreas, Bowel:**
  - Imaging may include ABD U/S and/or non-contrast CT
  - Will require liver and kidney measurements for organ donor workup

- **Ongoing testing:** Clinical status of potential donors can change. Frequent bloodwork helps to identify trends in organ function during the allocation process. Potential recipient transplant programs use this data to make decisions regarding risk-benefit to their patients. "Abnormal" lab results that indicate organ dysfunction does not necessarily exclude an organ from transplant eligibility.

frequency of testing may change as indicated by donor coordinator suggests or physician orders

- **Q6h Testing:**
  - O_2 Challenges
- **q6h Testing:**
  - Albumin, Urea/Creatinine
  - Troponin
  - Extended lytes (Na^{2+}, K^{+}, Cl^{-}, HCO_3, creatinine, urea, glucose, Ca^{2+}, Mg^{2+}, PO_4)
- **q12h Testing:**

- CBC
- APTT/INR
- Liver Panel (AST, ALT, ALP, GGT, total and direct bilirubin), Amylase
- CK
- Ionized calcium
- Serum osmolarity and protein
- ABG with lactate (if not performing O_2 challenges)

- **As Required Testing:**
  - New or repeat diagnostic imaging
  - Biopsies
  - Procedures such as bronchoscopies for tracheal samples, comment on organ anatomy and tissue appearance, and/or to improve oxygenation and ventilation (i.e. remove mucous plugs)

*****Call the Donor Coordinator for any significant changes to patient status or administration of blood products*****

Preparing for the OR

There are key differences between preparing for transfer to the OR with a DNC or DCC patient, further detailed below.

Donors that have met DNC criteria will remain on the ventilator with transfer to the OR. Potential DCC donors require significant team coordination for the transfer as the goal from the 2 physician declaration of death to cannulation in the OR is *5 minutes*.

PREPARATION	
Completed OR Checklist	BOTH DNC/ DCC
Consent to Donation and Declaration of Death (DNC or DCC) and front of chart	BOTH DNC/ DCC
NG insitu and set to LCS 4 hours prior to OR	BOTH DNC/ DCC
****Interdisciplinary team huddle 2 hours prior to the planned WLST**** The coordinator leading the case will go through the DCC Huddle Checklist to ensure all stakeholders are in agreement. Some key points we will be discussing:	** ONLY DCC**

○ Remove all unnecessary items from the patient's room ○ The donor coordinator will arrange a stretcher be brought up from the OR for the patient to be transferred onto. **Do NOT adjust height as it is pre-set for quick transfer to OR table.** ○ Monitoring: Only ECG, SpO_2, and arterial line for WLST. Cover with a single blanket. If applying a gown, **do NOT** button sleeves or tie onto the patient.	
All staff (CCAs, RTs, RNs) **must** wear OR approved attire in order to proceed into the OR core/theatre. A donor Coordinator can provide OR attire in advance. Failure to wear the approved attire will prevent those staff from entering beyond OR holding.	BOTH DNC/ DCC
Death Determination by Circulatory Criteria: Confirmed by 2 physicians ▪ If using a reliable arterial line, when pulse pressure ≤5mmHg (any ECG activity observed during this time should be treated as PEA) ▪ If no reliable arterial line insitu, asystole on ECG ▪ Any signs of return of spontaneous circulation, including a pulse pressure >5mmHg for any length of time, resets the 5 minute observation period	**ONLY DCC**
TRANSFER TO OR	
Staff must always **safely** transfer the potential donor to the OR, despite urgency with DCC transfer.	BOTH DNC/ DCC
At the end of the 5 minute observation period (legal time of death): ***When instructed by coordinator,*** quickly disconnect the arterial line closest to the patient (apply blue cap). Unplug the SpO_2 cable from probe if using a sticker and ECG cable from leads (leads/stickers are removed on the way to OR)	**ONLY DCC**
FAMILY SUPPORT	
Social work is an excellent family support and they often know potential donor families well, even before the donation process began. Whenever possible, we try arrange for a Social Worker to be present to support family as their loved one is transferred to the OR.	BOTH DNC/ DCC
The organ donation process is time-sensitive, but we are committed to treating every donor with the utmost respect and dignity during their final	**Special Attention with DCC but please look out

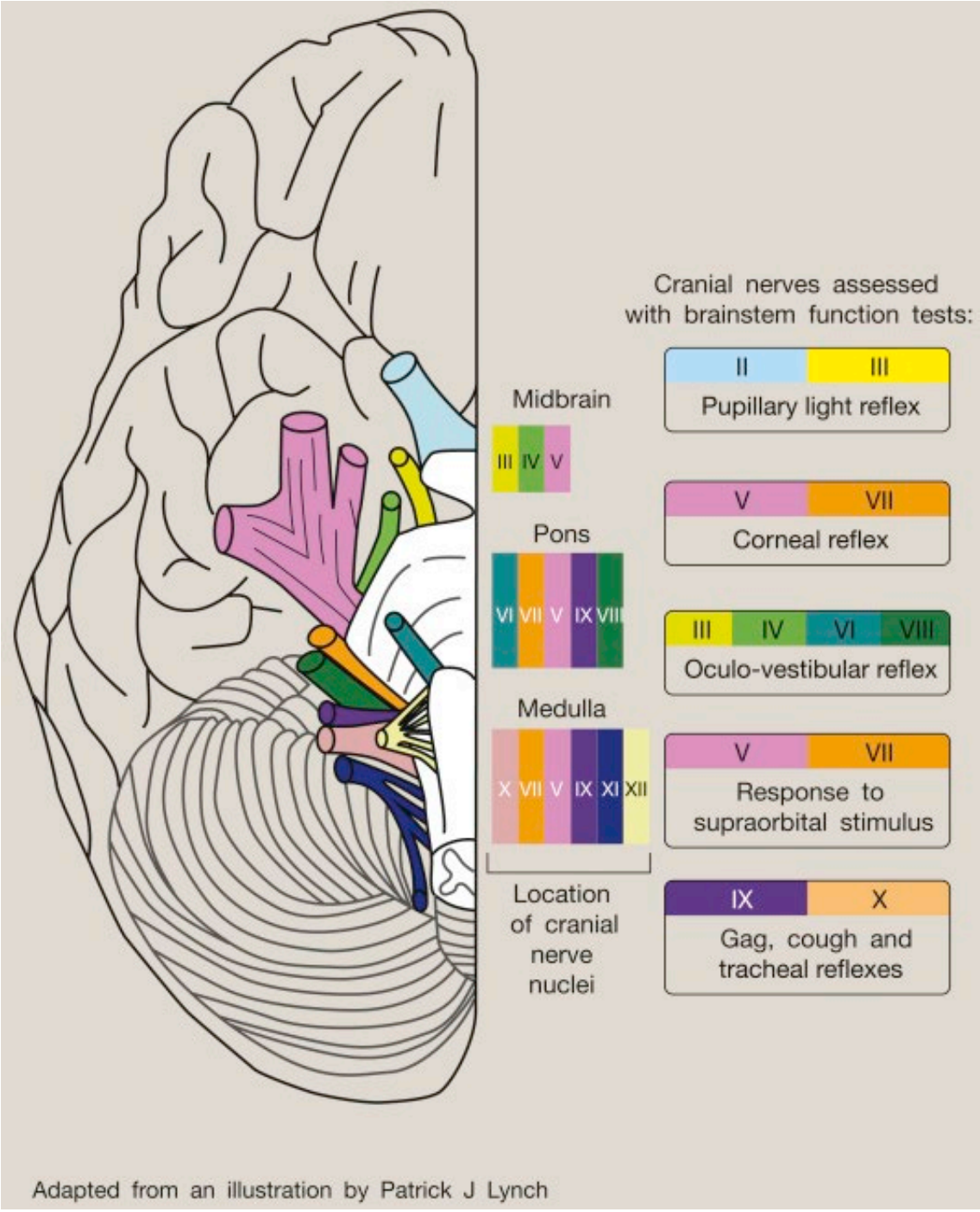
moments. The rapid transition to the operating room (OR) can be emotionally challenging for the donor's family and others in the ICU. To provide support, we assign at least one social worker or ICU team member to assist the family during this time. We also encourage all ICU staff to be attentive to signs of distress among colleagues, family members, or others present in the unit, fostering a compassionate and supportive environment for everyone involved.	for your colleagues and other family members in the ICU**

***The 5 minute observation period**: In order to determine irreversible death, once death is determined by circulatory criteria there is a 5 minute observation period to confirm no signs of ROSC (ABP pulse pressure >5mmHg, spontaneous breathing, movement)*

Family Support Throughout the Donation Process: ICU staff play a crucial role as they continue to provide support to family and are approached with questions during the donation process

- Donor Coordinators try to meet with families at least once a day to provide ongoing updates on the donation process.
- If there is ever a question asked regarding the donation process that you are uncertain of, please call the donor coordinator and ask them to come speak with the family
- If you feel the family may need more information/clarification about the donation process, please call the donor coordinator and ask them to come speak with the family
- The SHA Donation Program has a Social Worker who manages a family support services program which families have the option of enrolling in. This support program offers ongoing supports to families after their loved one has died, regardless of the outcome of the donation process (i.e. unable to proceed, withdrawn consent to donation, unable to procure or transplant)

Appendix A: DNC Clinical Assessment for the Absence of Brainstem Cranial Nerve Function



Appendix B: Death Determination by DNC Checklist

Saskatchewan Health Authority

Death Determination by Neurologic Criteria (DNC) Checklist

INITIAL APPLICABLE BOXES

Death is the permanent cessation of brain function.

Communicating with Substitute Decision Makers/Families			
Substitute decision makers/families have been offered a multidisciplinary support team to be included in end-of-life care discussions		❒ Yes	❒ No
Substitute decision makers/families have been informed about when and how death determination will occur		❒ Yes	❒ No
Prerequisites			
Specify the established cause of devastating brain injury severe enough to cause death and supported by neuroimaging evidence:			
Potential confounders (see Page 2) of an accurate clinical assessment have been considered and excluded. If confounders cannot be excluded, the clinical assessment must be completed to the fullest extent possible and ancillary investigation is required. If no, please explain:		❒ Yes	❒ No
Clinical Assessment			
Absent motor responses (excluding spinal reflexes)		❒ Yes	❒ No
Absent cough (tracheal) reflex		❒ Yes	❒ No
Absent gag (pharyngeal) reflex		❒ Yes	❒ No
Absent (bilateral) corneal reflexes		❒ Yes	❒ No
Absent (bilateral) vestibulo-ocular reflexes		❒ Yes	❒ No
Absent (bilateral) pupillary response to light		❒ Yes	❒ No
Absent rooting and sucking (newborns only)	❒ N/A	❒ Yes	❒ No
Apnea Testing Apnea testing should be the final element of the clinical assessment.			
Baseline	pH _____	$PaCO_2$ _____ mmHg	
At completion of apnea test	pH _____	$PaCO_2$ _____ mmHg	
$PaCO_2$ ≥ 20 mmHg above the baseline level and pH ≤ 7.28		❒ Yes	❒ No
Absent breathing/respiratory efforts		❒ Yes	❒ No
Date/time blood sample was taken when $PaCO_2$ reached targets:			
Ancillary Investigation If any portion of the clinical assessment cannot be completed and/or potential confounders of an accurate clinical assessment cannot be excluded, ancillary investigation is required for patients greater than 2 months of age. * For patients less than 18 years of age, Radionuclide Perfusion is the only ancillary test recommended. See indications for ancillary investigation on Page 2 and recommendation below.			
Date/time ancillary test performed:			
Ancillary Investigation Performed (circle):			
CT-Perfusion	Radionuclide Perfusion* (specify):	Other (specify):	
CT-Angiography	Transcranial Doppler		
Absent intracerebral blood flow/perfusion		❒ Yes	❒ No
Time of Death The legal time of death is recorded as the time of completion of the last test required to fulfill death determination criteria (typically, the time the blood sample was taken when the $PaCO_2$ reached the apnea test targets, or the time ancillary investigation was performed).			
This patient fulfills the criteria for death determination by neurologic criteria		❒ Yes	❒ No
Date/time of death:			
Clinician (print):	Signature:		
Second Clinician, if needed (print):	Signature:		

- For organ donation, two medical practitioners/physicians are required to determine death. Clinicians can perform the clinical assessment concurrently. If performed at different points in time, the second clinical assessment required for organ donation must be fully repeated.
- *We recommend that one complete clinical assessment is sufficient for patients one year of age or older who are undergoing DNC (Strong recommendation, moderate certainty in evidence).*
- *We suggest two complete clinical assessments separated in time are sufficient for patients less than one year corrected gestational age who are undergoing DNC (Weak recommendation, very low certainty in evidence).*
- *We suggest against performing an ancillary investigation in infants under 2 months corrected gestational age who require an ancillary investigation for DNC (Weak recommendation, very low certainty in evidence). If two complete clinical assessments are not possible, DNC cannot be determined. Alternative end of life care may be considered.*

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Saskatchewan Health Authority

Death Determination by Neurologic Criteria (DNC) Checklist Notes

Communicating with Substitute Decision Makers/Families

A multidisciplinary support team should be included in care discussions as early as possible when it is suspected that a patient may progress to death. Clinicians should provide substitute decision makers/families with information about when and how death determination will occur, as well as what typically follows (e.g., the removal of ventilation and other somatic support). Inviting substitute decision makers/families to witness the clinical assessment for death determination by neurologic criteria may help with understanding.

Prerequisites

The following prerequisites must be met before conducting a valid clinical assessment for death determination by neurologic criteria:

- There must be an established cause of devastating brain injury severe enough to cause death and supported by neuroimaging evidence
- Potential confounders of an accurate clinical assessment have been considered and excluded

Confounders

- Hypothermia (either as part of targeted temperature management treatment or after environmental exposure, example: cold-water drowning)
  - Patients should have a minimum core temperature of ≥ 36 °C.
- Unresuscitated shock
  - Adults should have a systolic blood pressure ≥ 100mm Hg, or a mean arterial pressure ≥ 60 mm Hg (with use of vascular volume, vasopressors, and/or inotropes as needed). Pediatric patients should have age- appropriate targets.
- Severe facial trauma, ocular trauma or skull fractures (including basal skull fracture with hemotympanum)
- Severe metabolic/endocrine/electrolyte imbalances/abnormalities including but not limited to:
  - Hyper/hyponatremia
  - Hypophosphatemia
  - Hypoglycemia
  - Hypermagnesemia
  - Hypokalemia
  - Hyper/hypothyroidism
  - Liver and/or renal dysfunction
- Anophthalmia, ocular trauma
- Pharmacologic neuromuscular blockade potentially accounting for motor unresponsiveness
- Neuromuscular disorders
- Pharmacologic confounders including:
  - Therapeutic or neuroprotective sedatives (example: benzodiazepines, propofol, barbiturates) and opioids administered to patients during resuscitative efforts
  - Drugs taken in an overdose setting, example: illicit substances, alcohol, muscle relaxants, antidepressants, anti-epileptics
- Infratentorial injury isolated to the brainstem without supratentorial involvement.
- Decompressive craniectomy
- Spinal cord injury
- Anoxic brain injury after resuscitated cardiac arrest

Clinical Assessment

Death determination by neurologic criteria is primarily a clinical determination:

- All components of the clinical assessment for death determination by neurologic criteria must be performed and require the following:
  - absence of consciousness shown by a lack of arousal and awareness in response to external stimuli, and
  - absence of brainstem function as shown by cranial nerve testing, and
  - absence of the capacity to breathe shown by formal apnea testing
- If a valid clinical assessment is fully performed, complete, and consistent with death, then this is sufficient for death determination by neurologic criteria.
- Ancillary investigation alone is not sufficient to determine death and will not override a clinical assessment that is inconsistent with death.

Ancillary Investigation

Indications for ancillary investigation include:

- Confounding conditions that cannot be resolved
- Inability to complete a valid clinical assessment, including apnea testing
- Uncertainty in interpretation of possible spinally mediated movements
- Isolated infratentorial brain injury without supratentorial involvement
- Substitute decision makers/family request, or to provide additional information to assist substitute decision makers/family understanding of, or resistance to, death determination by neurologic criteria

Time of Death

The legal time of death is recorded as the time of completion of last test required to fulfill death determination criteria. In consideration of families/substitute decision makers, any potential for delay between the completion of testing, the review and interpretation of the test results, and death declaration by the most responsible physician should be minimized.

- When death determination by neurologic criteria is established by clinical assessment and ancillary investigation is not required, the apnea test should be the final element of the clinical assessment. The time of death is the time the blood sample was taken when the $PaCO_2$ reached the apnea test targets.
- If ancillary investigation is required, the time of death is documented as the time that the ancillary investigation was completed.
- If steps occur out of the recommended sequence, (example: ancillary investigation is performed prior to the clinical assessment), the time of death is recorded as the time the last required test is performed (i.e., when all required elements/criteria are fulfilled).
- For organ donation, two clinicians are required to determine death. If their clinical assessments are completed at different points in time, the time of death is recorded as the time at which the *first* clinical assessment has been completed.

Qualifications for Determining Death

For death determination by neurologic criteria, clinicians must have full and current licensure for independent medical practice by the college of physicians and surgeons or licensing authority in the relevant Canadian jurisdiction, and the requisite skill and knowledge in the management of patients with devastating brain injury and in death determination by neurologic criteria; a particular level of specialty certification is not required. For organ donation, the second clinician may be a nurse practitioner, if in accordance with jurisdictional regulations, provided they have the requisite skill and knowledge in death determination by neurologic criteria. Both clinicians determining death must not have an association or active involvement in transplant procedures, organ allocation, or care of the intended transplant recipients.

Appendix C: DCC for Potential Organ Donors Checklist

COMPLETING THE DCC CHECKLIST

Physician 1 should be the MRP or a staff physician.

Physician 1 will need to initial all applicable boxes

Physician 2 can be another staff physician ***or*** a resident/fellow who has the knowledge and skill to determine death by circulatory criteria for potential organ donation

Physician 2 signature indicates agreement with all fields completed by physician 1

Both physicians must be present for the entirety of the 5-minute observation period

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Death Determination by Circulatory Criteria for Potential Organ Donors Checklist

INITIAL APPLICABLE BOXES

Death is the permanent cessation of brain function.

Communicating with Substitute Decision Makers/Families		
Substitute decision makers/families have been offered a multidisciplinary support team to be included in end-of- life care discussions.	❒ Yes	❒ No
Substitute decision makers/families have been informed about when and how death determination will occur.	❒ Yes	❒ No
Withdrawal of Life Sustaining Measures (WLSM)/Medical Assistance in Dying (MAID)/Termination of Cardiopulmonary Resuscitation (CPR)		
Date and Time of WLSM leading to circulatory arrest/MAID Provision/Termination of CPR:		
Observation Period • For arterial line monitoring, the observation period begins when there is an arterial pulse pressure of less than or equal to 5 mmHg and within the error of measurement for clinical monitoring equipment. • For electrocardiogram monitoring, the observation period begins when the electrocardiogram is isoelectric.		
Date/time of the start of the observation period:		
Time of Death The legal time of death is recorded as the time the observation period is complete. • 5-minute observation period for controlled donation after DCC (example: WLSM, MAID) • 10-minute observation period for uncontrolled donation after DCC (example: termination of CPR)		
This patient fulfills the criteria for death determination by circulatory criteria.	❒ Yes	❒ No
Date of Death:	Time of Death:	
First Clinician (Print):	Signature:	
Second Clinician (Print):	Signature:	

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Death Determination by Circulatory Criteria for Potential Organ Donors Checklist Guidance Notes

Instructions: Death determination by circulatory criteria is demonstrated by the absence of extracranial circulation that leads to the permanent absence of intracranial (brain) circulation.

Communicating with Substitute Decision Makers/Families

A multidisciplinary support team should be included in care discussions as early as possible when it is suspected that a patient may progress to death. Clinicians should provide substitute decision makers/families with information about when and how death determination will occur. Families should be prepared for the time sensitive process for determining death and the observation period that is focused on confirmation of sustained cessation of circulation.

Monitoring Devices

It is recommended that continuous arterial line monitoring be used to confirm permanent cessation of circulation for patients who are potential organ donors undergoing DCC (Strong recommendation, moderate certainty in evidence).

It is recommended that continuous electrocardiogram monitoring be used to confirm permanent cessation of circulation in situations where the use of an arterial line is not possible for patients who are potential organ donors undergoing DCC (Weak recommendation, moderate certainty in evidence).

Observation Period

It is recommended that an arterial pulse pressure of less than or equal to 5 mmHg and within the error of measurement of clinical monitoring equipment be used to confirm permanent cessation of circulation for patients with an arterial line who are potential organ donors undergoing DCC (Strong recommendation, very low certainty in evidence)

During the observation period, there must be continuous observation of the patient and the monitoring devices by the two clinicians determining death. The patient must not be moved until the end of this period.

The observation period must be restarted if any signs of persisting or return of circulation (e.g., an increase in arterial pulse pressure above 5 mmHg, breathing or movement) are observed. A return of ECG activity without a concomitant return of arterial pulse pressure above 5 mmHg should not trigger a restarting of the observation period. However, in the cases where ECG alone is used as a surrogate for monitoring for circulation and the arterial blood pressure cannot be confirmed, the observation period must be restarted in response to a return of ECG activity. Restarting of the observation period may be required more than once.

It is recommended that a minimum of 5 minutes of observation time be used to confirm permanent cessation of circulation for patients who are potential organ donors undergoing controlled donation after DCC (Strong recommendation, moderate certainty in evidence).

It is recommended that a minimum of 10 minutes of observation time be used to confirm permanent cessation of circulation for patients who are potential organ donors undergoing uncontrolled donation after DCC (Strong recommendation, low certainty in evidence).

Time of Death

Once the observation period has been completed, no further clinical assessment is required, death can be declared. The time of death is the time at which the observation period is completed.

Maintaining Permanence

Permanent cessation of intracranial (brain) circulation must be maintained should any post-mortem interventions (i.e., interventions carried out after death determination that are used for organ preservation as part of organ donation procedures) be used.

Qualifications for Determining Death

For organ donation after death determination by circulatory criteria the clinician present during the five-minute observation period who makes the first determination of death, must have full and current licensure for independent medical practice by the college of physicians and surgeons or licensing authority in the relevant Canadian jurisdiction, and the requisite skill and knowledge in death determination by circulatory criteria, including the ability to interpret monitoring devices being used; a particular level of specialty certification is not required. The second clinician may be a physician on an educational register (e.g., residents, fellows), or a nurse practitioner, in accordance with jurisdictional regulations, provided they have the requisite skill and knowledge in death determination by circulatory criteria, including the ability to interpret monitoring devices being used. Both clinicians determining death must not have an association or active involvement in transplant procedures, organ allocation, or care of the intended transplant recipient.

Appendix D: 8 Clinical Updates to Death Determination

8 Clinical Updates to Death Determination

Guidelines on the definition and determination of death were updated in 2023. Here are 8 key facts and changes for patients 18 years of age and older.

Complete Guidance

Death is defined as the permanent cessation of brain function.

New terms : DNC & DCC

Death Determination can be based on: Neurological Criteria (**DNC**) or Circulatory Criteria (**DCC**).

DNC: Wait 48 hours post arrest

DNC should be deferred at least 48 hours after a cardiac arrest - unless there is imaging evidence of a devastating brain injury compatible with death.

Core temp ≥36˚C for all ages

Core temperature should be 36˚Celsius prior to completing the clinical assessment for **DNC** in all patient populations (adult and pediatric).

Isolated brainstem injury = Ancillary

Patients with isolated brainstem or infratentorial brain injuries who appear to meet the clinical criteria for **DNC** require ancillary investigation.

New accepted ancillary investigations

Accepted ancillary–investigations include:

- CT angiogram
- Radionucleotide perfusion scan
- CT perfusion (new)
- Transcranial doppler (new)

More options for apnea testing

Apnea testing can be done using:

- Passive oxygenation
- Positive airway pressure using a ventilator or bag
- Exogenously Administered CO2 (Carbogen)

Time of Death

Time of death is recorded as:

- End of observation period in **DCC**
- End of apnea test (or the last
- required test performed) in **DNC** or
- Completion of ancillary investigation, where required, in **DNC**

Brain imaging should support injury

The cause of devastating brain injury leading to **DNC** should be supported by neuroimaging evidence consistent with the established cause.

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Adapted from the work of Dr. Jeff Singh
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