



The Canadian
DONATION and
TRANSPLANTATION
Research Program

FAST FACTS

DEATH DETERMINATION

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INTRODUCTION

A fundamental principle of organ donation is that donation cannot cause the death of the donor. Some organs and tissues may be donated without causing the death of a living donor (e.g. blood, bone marrow, one kidney, a section of liver). Apart from this, due to the rule that donation must occur only after the death of a donor, it is important to know specifically when death occurs. The legal framework for the determination of death in the context of organ donation is contained in provincial statutes. In most provinces, the statute indicates that death for the purposes of organ donation is to be determined "in accordance with accepted medical practice."

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THE DEAD DONOR RULE

The “dead donor rule” is the ethical and legal requirement that the removal of vital organs cannot be the cause of the donor’s death, and so can only take place after death has occurred.

The Criminal Code of Canada makes it clear that it is a criminal offence unlawfully to bring about a person’s death.

The Criminal Code also states that no person can consent to be killed, and so the dead donor rule cannot be waived by the donor. It is, however, permissible to withdraw life-sustaining therapies from a person where the legally required decision-making procedures are followed, as this is regarded as the removal of treatment that allows the underlying disease condition to bring about death naturally.[1]



HOW DO WE DETERMINE WHEN DEATH HAS OCCURRED?

Traditionally, a person was determined to be dead on the basis of a lack of respiration and heartbeat. People who had lost all brain function would stop breathing and their hearts would stop beating once they stopped breathing. Death in these cases was identified in the traditional way. However, when the mechanical ventilator was introduced in medicine, it became possible to maintain the respiration and heartbeat of a person whose brain had irreversibly stopped functioning. As a result, the idea of “brain death” or, the determination of death using neurological criteria, was developed in the late 1960s to describe situations of this type.[2]

Today two main techniques of determining when death has occurred are widely accepted.[3] They are:

- 1.determination of death according to circulatory or cardio-respiratory criteria (“cardiac death” or “circulatory death”)
- 2.determination of death according to neurological criteria (“brain death”). In both cases, specified clinical criteria and tests are applied to verify death.[4]

In the case of death determined according to neurological criteria, doctors perform a rigorous clinical examination to demonstrate the loss of consciousness, brainstem reflexes and the capacity to breathe. This test is considered reliable if performed accurately in cases where there is a known cause and there are no reversible or confounding conditions such as hypothermia or certain drug intoxications.

Recently, an international group of experts has warned that the terms “brain death” and “cardiac death” are misleading in that they imply the death of particular organs.[5] Instead, they propose: “Death occurs when there is permanent loss of capacity for consciousness and loss of all brainstem functions. This may result from permanent cessation of circulation or catastrophic brain injury. In the context of death determination, ‘permanent’ refers to loss of function that cannot resume spontaneously and will not be restored through intervention.”

TYPES OF DECEASED ORGAN DONATION

Organ donation may occur after death in three possible scenarios, although not all forms of donation occur in Canada at present.

Donation after neurologically-determined death

Donation occurs after a person has been declared dead on the basis of neurological criteria – neurological determination of death (NDD). This is also known as donation after brain death or DBD. When a brain dead person's body is maintained on a mechanical ventilator, blood circulation continues to bring oxygen to the organs and this enhances the chances of a successful transplant following removal of the organs from the donor. This form of deceased donation has been practiced in Canada for many years, and is currently the most common form of deceased donation in Canada.[6]



Controlled Donation after circulatory death (DCD)



Donation occurs after a person dies following the removal of life-sustaining treatment. In this case, a decision is made to withdraw mechanical ventilation for a seriously ill patient who is not brain dead, but who has no prognosis for recovery. Once the ventilator is removed, the patient's heart may stop beating. Donation will not take place until a pre-determined time period has elapsed after the heart stops beating. This form of deceased donation started in Canada in 2006.[7]

Uncontrolled donation after circulatory death

This form of deceased donation does not take place in Canada, although it is used in other jurisdictions such as Spain and France and is being explored in some parts of the United States. In these cases, resuscitation efforts are made to save a patient who suffers an unanticipated cardiac arrest. If the efforts to resuscitate the patient are unsuccessful, circulatory death is declared and deceased donation may occur. This is different from DCD (described above), where a prior decision has been taken to remove mechanical ventilation and so cardiac arrest is predicted.



ORGAN DONATION STATUTES

Many, but not all of the provinces and territories have enacted statutes that address death determination for the purposes of organ donation. Most of these statutes do not specifically define death or set criteria for how to determine when it has occurred. Instead, they indicate that death is to be determined according to "accepted medical practices." One exception is Manitoba, which states that death occurs when a person suffers the irreversible cessation of all brain function.

Other countries have included specific definitions in their legislation. For example, in the United States, many states have adopted laws along the lines of the 1981 Uniform Declaration of Death Act. This model law states that death refers to the "irreversible cessation of circulatory and respiratory functions," or the "irreversible cessation of all functions of the entire brain, including the brain stem." Whether either of these things has happened is to be determined according to "accepted medical standards." [8] In 1981, the Law Reform Commission of Canada recommended that Canada should also legislate a more specific definition of death, although this recommendation was not generally followed. [9]

SAMPLE LEGISLATION

Ontario

"For the purposes of a post-mortem transplant, the fact of death shall be determined by at least two physicians in accordance with accepted medical practice." [10]

Manitoba

"For all purposes within the legislative competence of the Legislature of Manitoba the death of a person takes place at the time at which irreversible cessation of all that person's brain function occurs." [12]

New Brunswick

For the purposes of post-mortem removal of a human body part or parts for implantation in a living human body, the fact of death must be determined in accordance with accepted medical practice by

- at least 2 medical practitioners, when the fact of death is determined in accordance with neurological criteria, or
- one medical practitioner, when the fact of death is determined by other criteria." [11]



CONTROVERSIES OVER "BRAIN DEATH"

The public is generally comfortable with the traditional way of determining death according to the absence of a heartbeat and respiration. The use of neurological criteria for determining death ("brain death") can be a bit more challenging for some people to understand or accept because the bodies of brain dead persons are attached to mechanical ventilators and so they will appear to breathe, their hearts will beat, and they will remain warm. In such cases, it may be challenging to understand the difference between the death of the person, the death of the body or the death of particular organs. While the major religions of the world now largely accept the neurological determination of death ("brain death") as valid, some sub-groups within these religions may not.[13] The recent highly publicized cases of Jahi McMath and Marlise Muñoz in the United States illustrate the sometimes-contentious nature of brain death for some today.[14]

In addition to public misgivings about the concept of "brain death," some experts have raised concerns about the accuracy of brain death testing, and one has suggested that a safety measure would be to perform an additional test (beyond what is the usual set of tests) to show the absence of blood flow to the brain.[15]



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REFERENCES

- [1] Nancy B. v. Hôtel-Dieu de Québec (1992), 86 D.L.R. (4th) 385 (Que. S.C.); Rodriguez v. British Columbia (Attorney General) [1993] 3 S.C.R. 519.
- [2] Machado, C. et al. 2007. The concept of brain death did not evolve to benefit organ transplants. *Journal of Medical Ethics*. 33(4):197-200.
- [3] Shemie, S. et al. 2014. International guideline development for the determination of death. *Intensive Care Medicine* DOI 10.1007/s00134-014-3242-7
- [4] Shemie, S. et al. 2014. International guideline development for the determination of death. *Intensive Care Medicine* DOI 10.1007/s00134-014-3242-7
- [5] Shemie, S. et al. 2014. International guideline development for the determination of death. *Intensive Care Medicine* DOI 10.1007/s00134-014-3242-7
- [6] Canadian Institute for Health Information, "e-Statistics Report on Transplant, Waiting List and Donor Statistics: 2012 Summary Statistics" http://www.cihi.ca/CIHI-ext-portal/internet/en/document/types+of+care/specialized+services/organ+replacements/report_stats2012
- [7] Ontario Trillium Gift of Life Network. Backgrounder. http://www.giftoflife.on.ca/resources/pdf/100th_DCD_Backgrounder-English_June_1-2010.pdf
- [8] National Conference of Commissioners on Uniform State Laws (NCCUSL). 1981. Uniform Determination of Death Act, s.1. <http://www.uniformlaws.org/Act.aspx?title=Determination%20of%20Death%20Act>
- [9] Downie, J., Kutcher, M., Rajotte, C., and Shea, Al. 2009. Eligibility for organ donation: a medico-legal perspective on defining and determining death. *Can. J. Anesth*. 56:851-863.
- [10] Trillium Gift of Life Network Act, R.S.O. 1990, c. H.20, s. 7(1).
- [11] Human Tissue Gift Act, S.N.B. 2004, c. H-12.5, s. 7(1).
- [12] Vital Statistics Act, R.S.M. 1987, c. V60, s.2.
- [13] Bernat, J.L. 2005. The concept and practice of brain death. *Progress in Brain Research* 150:369-379.
- [14] Magnus, D.C., Wilfond, B.S. and Caplan, A.L. 2014. Accepting brain death. *New England Journal of Medicine*. Mar 6;370(10):891-4
- [15] Bernat, J.L. 2005. The concept and practice of brain death. *Progress in Brain Research* 150:369-379.

