

Defending a Functionalist View of Higher Brain Death¹

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Abstract

We provide a brief overview of the history of brain death showing how the cardiopulmonary model (CPM) of death became problematic due to the technological innovation of mechanical ventilation beginning with its use in the 1950s. We then examine difficulties that emerged with what was to become the received view of brain death known as Whole Brain Death (WBD). We argue that these challenges were never satisfactorily met by defenders of WBD. We also argue that a return to a CPM leads to even greater conceptual difficulties. Given that there are serious difficulties with both WBD and the CPM, we introduce a new version of higher brain death which we refer to as a *functionalist view*. We argue that a functionalist view of higher brain death can be defended more consistently than WBD and the CPM. Our defense introduces the notion of basing death on mental processing as opposed to traditional notions of higher brain death which used problematic and imprecise concepts such as consciousness and personhood.

Keywords: Functionalist; Whole brain death

Brief Overview on the History of Brain Death

There are three standards that have been considered for determining the death of a human being. The oldest is the CPM. Under the CPM human beings are considered dead when they permanently cease to breathe and circulate blood. Historically this view of death worked quite well, and it is relatively easy to document.² However, due to technological innovation of mechanical ventilation, the CPM, for the first time in human history, seemed inadequate. In the late 1950s some of the first few patients kept alive through mechanical ventilation fell into a deep coma. They seemed to be neither fully alive nor fully dead to their physicians.³ As a result the term “irreversible coma” was first coined.⁴ The term “Brain Death” was first used by Robert Schwab in 1963. Some doctors were disturbed by the semi-alive state they had created for their patients.⁵ The apparent fact that people still breathing could be, in reality, dead inspired the Harvard Criteria of 1968 [4] documenting death as associated with irreversible coma.

The Harvard criteria used the following four measures for determining death:

- Unreceptivity and unresponsivity
- No movements or breathing
- No reflexes
- Flat EEG

The criteria also demanded that all tests be repeated after 24 hours documenting that no change resulted. The second was to rule out that the test results could be from either hypothermia or a temporarily depressed nervous system induced by therapeutic drug interventions.

¹This paper is based on and summarizes our previous paper, LiPuma, Samuel H., and Joseph P. DeMarco. (2013) Reviving brain death: A functionalist view [1].

² There were instances of misdiagnosed deaths even using this standard, but it was not nearly as prevalent or problematic as brain death determinations were to become. For more information on the problem of misdiagnosed deaths using the CPM see Bondesen, J. (2001) [2].

³In 1959 two landmark cases occurred. The first was cited by Werheimer and Jovet who coined the term “death of the nervous system” [3] in 1959. The second, also in 1959, was cited by Mollaret and Goulon.

⁴Mollaret and Goulon first coined the term “coma dépassé” or “irreversible coma.”

⁵Goulon thought this was unsettling and wondered, “where the patient’s soul dwelled.”

This established irreversible coma as a form of death as reflected in the thesis statement of the Harvard members, “Our primary purpose is to define irreversible coma as a new criterion for death.”

For the first time in human history, it seemed legitimate to declare a human being dead based on the permanent cessation of brain activity even if a person had a beating heart and breathing lungs. What is also remarkable is the general acceptance of this notion of death by the general public. This is reflected in the fact that every state accepted the standard into law. Thus there is a general consensus among the public that death for the human being need not be tied only to a CPM. There was recognition that without a functioning brain, the functioning of the rest of the human body was irrelevant to distinguishing life from death.

The Harvard criteria operated, albeit somewhat imperfectly, throughout the 1970s^{6,7} until the Presidents Commission for the Study of Ethical Problems in Medicine and Biomedical Behavioral Research of 1981 sponsored the Uniform Determination of Death Act [6]. Here the Commission set a more specific standard for determining death which became fully enacted, more or less as in the model code, as law in all 50 states of the United States and in many other international countries [7]. This model became known as WBD. The WBD standard for determining death is, “Irreversible cessation of all functions of the entire brain, including the brain stem.”

An alternative view, promoted mostly by philosophers and bioethicists, emerged centering on the notion of consciousness. Since there is strong empirical evidence that the upper region of the

⁶For instance, see Tucker v Lower (1975) for one of the first court cases involving the use of brain death as a legal criteria for death.

⁷The landmark case of Karen Ann Quinlan also stirred debate regarding the determination of brain death. For more information on the Quinlan case see the Karen Ann Quinlan Memorial Foundation [5].

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human brain is responsible for conscious states, this became known as higher brain death (HBD).⁸ HBD never gained any traction among medical practitioners or policy makers. It has not been enacted into law. Problems regarding the exact nature of consciousness and a lack of any verification criteria with respect to establishing the presence of consciousness precluded it from being seriously considered as an alternative to WBD.

Little was questioned about the WBD model over the next 20 years until the neurologist D. Alan Shewmon wrote a seminal article questioning the legitimacy and consistency of determining WBD [11]. Shewmon bases his view on several functions brain dead patients have been able to carry out. Some of the more remarkable ones include wound healing, sexual maturation, maintenance of body temperature, and gestating a fetus. Due to the reaction of Shewmon's article, a second President Council was convened in 2008 which resulted in a White Paper on brain death [12]. In the White Paper the notion of WBD is defended as the best standard for determining the death of a human being.

Problems with WBD

Although WBD remains the received view for determining the death of a human being, closer scrutiny reveals serious inconsistencies with this standard. One such problem has been the insistence on what constitutes the permanent cessation of the functioning of the brain. It has been well documented that "nests of neurons" can continue to function after WBD has been verified. Robert Veatch has used this point to argue persuasively against WBD:

The idea that functions of "isolated nests of neurons" can remain when an individual is declared dead based on whole-brain-oriented criteria certainly stretches the plain words of the law that requires, without qualification, that all functions of the entire brain must be gone. ...By the time the whole-brain-oriented definition of death is so qualified, it can hardly be referring to the death of the whole brain any longer (emphasis original) [13].

As a further defense when these inconsistencies are raised, apologists for WBD like James Bernat [14] dismiss this type of brain activity as lacking any significance. They claim that such activity reflects isolated instances of the brain and is not reflective of "the organism as a whole." Bernat goes so far as to claim that after adding the expression, "organism as a whole" to the standard WBD definition regarding the permanent cessation of the entire brain, "... [WBD] provides a failsafe mechanism to eliminate false positive brain death determinations." Still, J McMahan argues that the organism as a whole concept leaves significant difficulties [15]. McMahan demonstrates that there is no empirical basis on which to justify what constitutes the organism as a whole. McMahan uses Shewmon's evidence that many functions occur with no real central brain integrator. McMahan also points out that the notion of an organism as a whole cannot be a conceptual claim. Brain functions could be mechanically replaced, as are other organ functions. The mechanical replacement of a function of the brain thought to be accountable for central integration would not, for McMahan, serve as a distinguishing mark between life and death. "It is very hard to believe that such a change could make the difference between life and death in an organism, either as a matter of fact, or, especially, as a matter of conceptual necessity."

There are additional problems for WBD advocates. Consider the case of dicephalus twins. Almost everyone agrees that in these

cases, two distinct persons share one body [16]. What Dicephalus twins demonstrate is that we identify life with mental processing (consciousness) more than anything that has to do with biological functioning.⁹ If one of the twins was to permanently lose the capacity for all mental processing, one would be hard pressed to consider that twin still alive in any meaningful sense. But that is just what a WBD advocate would have to admit.

This thought experiment could also be reversed with the same result. Let us suppose that we are able to transplant the heads of one of the twins onto a machine that took care of all other bodily functions. Then clearly, this twin would still be alive as a human being in every meaningful sense of the term, even though it only had a functioning head and brain while all of its other biological functions were managed mechanically. Shewmon concludes, "The point is simply that the orthodox, physiological rationale for WBD is precisely physiologically untenable" (emphasis original). The WBD standard does not properly account for the notion that our mental capacity can be distinguished from our other biological functioning. A person need not be an "organism as a whole" to be considered alive so long as she has the capacity for functional mental states.

Though WBD has significant difficulties with respect to achieving an objective, consistent standard, it received further support from the White Paper of the President's Council of 2008. Here the Council attempts to further defend the biologically based foundation of WBD as developed by Bernat and others. "All organisms have a needy mode of being... To preserve themselves organisms must-and can and do-engage in commerce with the surrounding world" (emphasis original).

The authors of the White Paper go on to cite three fundamental capacities that organisms must retain in order to realize this engagement with the world:

1. Openness to the world, that is, receptivity to stimuli and signals from the surrounding environment.
2. The ability to act upon the world to obtain selectively what the organism needs.
3. The basic felt need that drives the organism to act as it must, to obtain what it needs, and what its openness reveals to be available.

The authors then claim that the determination of WBD properly accounts for the failure of the organism to satisfy all three categories. They also claim that Shewmon does not account for the "drive" an organism must maintain to be considered alive. Isolated biological functions maintained after the declaration of WBD documented by Shewmon occur with no drive or engagement with the world. "But Shewmon misses the critical element: the *drive* exhibited by the whole organism to bring in air, a drive that is fundamental to the constant, vital working of the whole organism" (Emphasis original).

We find the argument of the White paper flawed. It does not account for the distinction between biological and mental functioning demonstrated by the case of dicephalus twins. It also plays on an equivocation concerning the term "openness" to the world. For instance, a human being that blinks when air is puffed in her face is "receptive to stimuli," but one would be hard pressed to consider that a sign of life if all mental processing was permanently lost. It would be little different from a mechanically built face that blinked from the same

⁹We use the term "mental processing" over "consciousness" and "personhood" due to the lack of clarity and consistency over the meaning of the terms "consciousness" and "personhood".

⁸For more information on HBD, see RM Veatch, RM [8] SJ Youngner and ET Bartlett [9] and Al Batavia, [10].

stimuli. Lastly, a fully conscious but highly disabled human being could have all biological functions maintained mechanically, could also have no felt need as a result, but is obviously still very much alive.

Problems with the CPM

At first glance, given the significant problems emerging with WBD, a return to the CPM can seem appealing. However, the CPM may have even greater conceptual difficulties. For instance, Shewmon must admit that a fully functioning human body with no brain activity must be considered alive. Shewmon considers such a person to be, "...very sick and disabled, but not dead." Carrying this thought further, we can imagine a human being with no head at all still being declared alive on this standard. Miller and Troug, in defense of CPM take just such a stand considering the decapitated living person as merely repugnant but not absurd [17]. John Lizza, in a critical commentary, argues that this scenario is clearly beyond repugnancy and is indeed absurd [18]. (Lizza 2009)

Defending HBD Based on Mental Processing

The earliest arguments developed in support of what would eventually come to be known as HBD centered on the notion of consciousness. Consciousness is a difficult term to conceptualize. Consciousness implies awareness, but there is evidence that much of our mental life occurs on a preconscious level.¹⁰ Because of this we use the term "mental processing" as best characterizing the distinguishing mark between life and death for the human being. We think this is supported by the general public as evidenced by the relatively quick acceptance of brain death. Had biological functioning of the body been solely important, brain death would have been rejected. Furthermore, a human being permanently and completely void of all mental functioning, from fully preconscious to fully self-conscious, is dead in every meaningful sense of the term qua human being regardless of how much biological functioning continues. Human biological functioning that occurs with absolutely no corresponding mental states would be no different than the functioning of a computer program that produces outputs based on inputs, or the swinging open of the grocery store door as it "senses" the presence of an oncoming customer.

What emerges from this debate regarding standards of death is that attempts to demarcate the difference between life and death qua human being cannot be based exclusively on empirical findings. It also includes cultural standards and influences. We argue that basing human death on the complete and permanent absence of all mental processing offers the least arbitrary standard possible and is consistent with the conception the general public holds as a distinguishing mark.

To further illustrate this point consider a comparison between two suicides. In the first, the person commits suicide at age 25 by ingesting poison and dies a full biological death soon after ingesting the poison. In the second, the person decides to no longer live, but does not want to be associated with the stigma of suicide. So the person creates a setting for herself where she is able to be completely void of all mental states permanently at the flip of a switch, and all of her other biological needs will be met by machines. She flips the switch at age 25 and remains in this state of a total mental blackout for 50 years until she dies of natural causes. We argue that in both cases, the person is dead at age 25, from the time that she permanently destroyed the capacity for mental life. It is just that in the former case she also destroyed all of her biological functioning by ingesting poison. In the latter case she

¹⁰See A Damasio [19] and J Haidt [20] for more evidence of how preconscious or subconscious mental activity can impact behavior.



Figure 1: Tombstone of Nancy Cruzan.

maintained biological functioning, but with the permanent cession of all mental functioning, became as dead qua human being as in the other case. That these cases are indistinguishable is supported by the fact that there would be no difference for all others attempting to interact with the two individuals. One would go to a grave and one would go to a bedside, but the result experientially would be the same. We would be visiting a completely unresponsive, non-conscious entity. Such a situation, perhaps, is best reflected in the landmark case of Nancy Cruzan who lost all mental functioning due to an automobile accident.¹¹ Her tombstone marks not only her birth and biological death dates, as is traditionally the case. It also included the time she "departed" which corresponded with the permanent cessation of her mental life at the time of her automobile accident.

Concluding Remarks

The movement to any brain death standard is of profound significance. It reflects the need to demarcate death beyond mere biological functioning of body parts. We argue here that the most consistent standard of brain death should be one based on the permanent cession of all mental processing. For this properly reflects that what is essential for human life is not a beating heart or a breathing lung, but rather the capacity for a mental life.

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¹¹For more details on the Cruzan case see W.H. Colby [21,22].

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