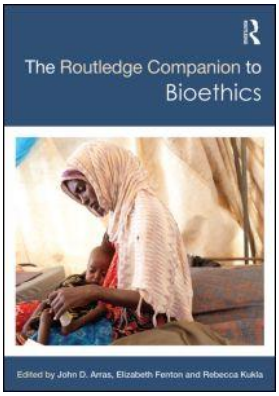

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Brain Death

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BRAIN DEATH

Winston Chiong

> "The boundaries which divide Life from Death are at best shadowy and vague. Who shall say where the one ends, and where the other begins?"
>
> (Edgar Allan Poe, "The Premature Burial")

Introduction

In the history of medicine, debates and demands for greater precision regarding the determination of death have reflected technological advances in medical care as well as broader social concerns. Prior to the mid-1700s, physicians did not play a central role in pronouncing death; as Hippocratic tradition advised physicians to withdraw when death could not be delayed, this role was left largely to family, undertakers, and lay practitioners. The development of resuscitative techniques such as ventilation (advocated by the Amsterdam Society for the Recovery of Drowned Persons in 1767) and electrical resuscitation (first documented in 1774) raised public awareness that some people who had been presumed dead could be revived. Sensational press reports of people buried alive stoked widespread fears of premature burial, vividly represented by Poe and other Gothic writers, and uncertainty over the timing of death prompted laws requiring longer and longer observation periods prior to burial. Physicians of the period responded to demands for greater certainty in the determination of death by critically evaluating a variety of physical signs of death (often used in combination), such as rigor mortis, mottling of skin, pulseless arteries, absence of blood flow from transected blood vessels, hypothermia, pupillary dilation, and putrefaction (Powner et al. 1996). Laennec's invention of the stethoscope in 1819 eventually led to greater confidence in physicians' ability to discern even minimal heart and lung function, and thereby to consensus on the application of circulatory and respiratory tests for death.

In the twentieth century, two further advances disrupted this consensus: Intensive care (including mechanical ventilation) and organ transplantation. While spontaneous breathing depends on the brainstem, mechanical ventilation could maintain oxygen exchange and thereby continue heart function and blood flow for extended periods following the destruction of the brain, a condition originally characterized as *coma dépassé*, or "beyond coma" (Mollaret and Goulon 1959). Such artificially supported circulation despite permanent brain injuries incompatible with natural life raised the question of whether these patients were still truly alive.

The development of organ transplantation added further pressure to resolve this question, since procurement of vital organs for transplantation presented a practical dilemma. On one hand, removing vital organs from a potential donor prior to death would effectively

sacrifice a living donor in order to save recipients' lives; on the other hand, delaying organ procurement until after the cessation of circulation would risk permanent injury to organs from prolonged lack of blood flow, limiting their usefulness in transplantation. An Ad Hoc Committee of the Harvard Medical School (1968) proposed new criteria for pronouncing death based on irreversible coma due to loss of all brain function; this would allow mechanical ventilation to be discontinued from brain-dead bodies without the threat of legal sanctions against physicians, and would also allow vital organs to be removed for transplantation from brain-dead bodies while circulation continued. In 1970, Kansas adopted a statute allowing for the declaration of death following either the loss of circulatory and respiratory function, or the loss of brain function. Following the recommendation of the President's Commission (1981), a uniform statute with a similarly bifurcated standard for determining death was adopted by most U.S. states, and similar laws have been adopted throughout the world (Wijdicks 2002).

While neurological criteria for the determination of death were rapidly adopted, there is continuing controversy and unease regarding the conceptual foundations and justification for this change. First, brain-dead bodies maintained with modern intensive care can *look* very much alive: They have a continued pulse and heartbeat, they are warm to the touch, and their chests rise and fall as air is mechanically forced into their lungs at set intervals. Furthermore, Alan Shewmon (1998b) documented remarkable cases in which the bodies of people reliably diagnosed as brain dead have exhibited other characteristic signs of biological life, including cardiovascular stress responses to incision for organ retrieval, successful gestation of fetuses in women who were pregnant at the time of brain death, and proportional growth and sexual maturation (in brain-dead children). Some critics of brain death have argued that the preservation of these functions demonstrates that these people are not truly dead, suggesting that brain death may be merely a useful fiction allowing for withdrawal of mechanical ventilation and procurement of organs from people who are permanently unconscious, but not dead. Finally, further advances in organ transplantation, including protocols for procuring organs from donors after the cessation of circulation, have raised questions about legal standards that accommodate both circulatory–respiratory and brain-based criteria for death.

In this chapter, I will consider the standard arguments offered for neurological criteria for death, and for the prevailing alternative views. I will also present a more recent challenge to a widely accepted argumentative framework accepted by proponents of these different criteria, and will conclude by considering a controversy over whether death should matter for organ procurement.

Criteria and Definitions

According to proponents of the whole-brain criterion of death, we die when our whole brains irreversibly cease to function. Coma, absence of respiratory effort, and absence of brainstem reflexes are the standard clinical tests for the loss of whole-brain function. The two main alternatives to the whole-brain criterion are the traditional circulatory–respiratory criterion and the higher-brain criterion of death. Proponents of the circulatory–respiratory criterion for death claim that death occurs when circulatory and respiratory function together are irreversibly lost; as this criterion is usually interpreted, it does not matter whether these functions are carried out spontaneously or via external measures (such as mechanical ventilation or chest compressions). Meanwhile, proponents of the higher-brain criterion claim that death does not require the irreversible loss

of the entire brain's function, but only of the cerebrum—the "higher" part of the brain responsible for consciousness, memory, personality, and perception. This criterion would only require permanent unconsciousness to determine that death has occurred, dismissing the functions of the "lower" brainstem, such as respiratory drive and brainstem reflexes, as irrelevant. Finally, a view that is closely related to the whole-brain criterion of death is the brainstem criterion of death, which has been adopted in the United Kingdom—this criterion only requires the permanent loss of brainstem function, supported by the rationale that while cerebral function is necessary for consciousness, consciousness also requires brainstem activation of cerebral structures. For this reason, the clinical tests for the whole-brain criterion and the brainstem criterion of death are the same, and both will be grouped together in this chapter as accounts of "brain death."

These criteria can be illustrated by considering cases that they would classify differently. Prior to the advent of mechanical ventilation, destruction of the entire brain (including the brainstem) would lead to loss of respiratory function, and the resulting loss of oxygenation and buildup of carbon dioxide would quickly lead to cardiac arrest and the loss of circulatory function; however, in modern intensive care settings, respiration and circulation can be artificially maintained in the absence of brain function. Patients maintained in this way would be classified as still living according to the circulatory–respiratory criterion, but as dead according to the whole-brain and higher brain criteria. Meanwhile, other people have suffered the destruction of the cerebrum, while the brainstem remains intact; this condition leads to a persistent vegetative state, in which the patient is permanently unconscious but may retain brainstem-mediated functions such as spontaneous breathing, sleep/wake cycles (when "awake" they are not conscious, but generally more active), swallowing food placed in their mouths, and blinking when their corneas are touched. (For simplicity in this example I exclude cases in which patients diagnosed as persistently vegetative on clinical grounds might have undetected cerebral function—this example is limited to patients known to have suffered the destruction of the cerebrum.) These patients would be classified as still living according to both the circulatory–respiratory and whole-brain criteria, but as dead according to the higher-brain criterion.

How should we decide among these different accounts of death? In a series of influential articles, proponents of the whole-brain criterion have advanced a theoretical framework for these debates that has become widely accepted, even by proponents of the other criteria. This *definitions–criteria–tests* framework has three stages:

> This analysis of brain death should be conducted in three sequential phases: (1) the philosophical task of making explicit the *definition* of death that is implicit in our traditional conception of death; (2) the combined philosophical and medical task of identifying the *criterion* of death—that generally determinable standard that shows that the definition is satisfied by being both necessary and sufficient conditions for death; and (3) the medical task of devising a set of bedside *tests* to show that the criterion of death has been fulfilled. Thus, the optimal sequence of argument must proceed from the intangible and conceptual to the tangible and measurable.
>
> (Bernat 1992: 21–2)

This framework begins with the linguistic and conceptual project of explicating the shared meaning of words like "death," and then looks out into the world to see what actual phenomena satisfy the conditions implicit in that shared meaning. As such, this

framework reflects the influence of the philosophical tradition of *conceptual analysis*, developed by Gottlob Frege, Bertrand Russell, and G. E. Moore in the early twentieth century. Within this structure, we may observe that arguments in favor of one criterion over others may occur at either phase 1 or phase 2. At phase 1, proponents of different criteria might disagree about what definition or analysis of "death" best captures the shared meaning of death; alternatively, proponents of different criteria might agree about the proper definition or analysis of "death," but might still disagree about which criterion is both necessary and sufficient for satisfying this definition. In fact, the disagreement between proponents of the whole-brain and higher-brain criteria typically is at phase 1, while the disagreement between proponents of the whole-brain and circulatory–respiratory criteria typically is at phase 2.

Higher-Brain and Whole-Brain Criteria: Disputes over Definitions

On this widely accepted *definitions–criteria–tests* framework, we must begin by analyzing our shared concept of death, so as to understand what findings indicate death. As a first step, we may note that our ordinary thinking about death incorporates both physical and psychological aspects. On the physical side of death, we associate death with bodily changes such as pulselessness, cessation of breathing, loss of warmth, and eventually decay and putrefaction. On the psychological side of death, we associate death with the end of conscious experience; thus, traditional philosophical discussions of the badness of death (as in Nagel 1970) focus on the deprivation of experience rather than the loss of biological function. Indeed, in some dualistic religious traditions the promise of "life after death" is understood as the persistence of our conscious experiences, memory, personality, and other psychological features in immaterial souls that survive the death and decay of our physical bodies.

Philosophers often mark this dichotomy by distinguishing the life and death of *organisms* from the life and death of *persons*—where "person" is used in a technical sense to refer to an entity possessing psychological continuity, or reflexive self-awareness, or some other mental property. These categories are not coextensive: Many organisms lack the psychological capacities constitutive of personhood (such as members of many if not all non-human species, and also some human organisms following severe brain injury or abnormal brain development), while there could be persons that are not organisms (such as disembodied souls or sophisticated robots).

In ordinary usage, we often do not distinguish between these two different senses of death—that is, between the death of the human organism and the death of the person. However, when trying to characterize death precisely for the purposes of death determination, this distinction is of great importance. Typically, proponents of the whole-brain and circulatory–respiratory criteria maintain that the sense of death relevant in this context is the death of the organism; thus, they propose definitions of death such as *the irreversible cessation of the functioning of the organism as a whole* (Bernat et al. 1981). Meanwhile, proponents of the higher-brain criterion argue that the relevant sense of death is the death of the person, and have proposed definitions of death such as *the irreversible loss of consciousness and cognition* (Youngner and Bartlett 1983). This difference explains why proponents of the whole-brain and circulatory–respiratory criteria classify patients in persistent vegetative states as still living, while proponents of the higher-brain criterion would classify them as dead.

While proponents of the higher-brain criterion might still acknowledge that heartbeat or continued spontaneous breathing and brainstem reflexes indicate the persistence of an organism, the loss of cerebral function in these patients means that their personhood has been irrevocably lost.

Some proponents of the higher-brain criterion, in supporting their preferred account of the definition of death, have appealed to philosophical work on the metaphysics of personal identity. One way of motivating this appeal is to note that, when we distinguish between organisms and persons as two different types of entity, it becomes natural to ask whether *we* are essentially organisms, or are essentially persons. As an example, consider persistent vegetative states in which patients are left permanently unconscious after the destruction of the cerebrum. We might describe this situation as one in which the person has ceased to exist, but the organism survives. If you were to suffer this sort of injury, would *you* then be alive or dead? Some people believe that after losing the capacity for conscious experience, *you* would be dead regardless of whether there was a remaining living organism; this view suggests that even now in the healthy state, *you* are essentially a person and not an organism. Other people believe that the surviving unconscious organism would still be *you*, though in a permanently unconscious state. This view suggests that even now in the healthy state, *you* are essentially an organism rather than a person.

Several philosophers have argued that we are essentially persons (Shoemaker 1984; Parfit 1984). This account of our identity has been taken to support the higher-brain criterion as an account of death that addresses what we essentially are, and some proponents of the higher-brain criterion have proposed other, related accounts of personal identity. Green and Wikler (1980) have proposed that our identity over time depends not on psychological continuity itself, but instead on the persistence of the causal processes (in the case of persons like us, neural mechanisms) that underlie our psychological continuity. (This account is closely related to what Parfit calls the Narrow psychological criterion of identity.) Similarly, Jeff McMahan (1995) has argued that we are neither persons nor organisms, but instead are essentially embodied minds; that is, brains with the capacity to support consciousness (regardless of psychological continuity, reflexive awareness or other persisting psychological traits). According to both accounts, conditions like persistent vegetative states, in which the brain structures responsible for consciousness and cognition are destroyed, are conditions in which *we* have died.

Some proponents of the whole-brain criterion have responded by arguing that death is a purely biological phenomenon that should be kept separate from questions of personal identity. For instance, Bernat has claimed that only organisms can die in the strict sense, while persons cannot die except in a metaphorical sense. However, it seems unclear how this very strong claim can be justified merely by appealing to an analysis of our shared understanding of death; after all, as previously mentioned, much of the long philosophical literature about death has been principally concerned with the cessation of conscious experience rather than with the cessation of any biological process.

There are other reasons, however, why the higher-brain criterion of death has not been widely adopted. First, philosophical debates over the nature of personal identity, or what we essentially are, have proven controversial and complex. While many philosophers accept psychological or embodied mind accounts of our identity over time, philosophers like Eric Olson (1997) have presented strong arguments for the claim that we are essentially organisms. (See DeGrazia (2005) for the implications of these and similar arguments for debates over brain death.) Second (perhaps especially given these

unresolved philosophical questions), it is not obvious why medical practice and the law concerning the determination of death must reflect metaphysical claims about what we essentially are. Given that medical practice is principally concerned with the biology and health of the human body, proponents of the whole-brain and circulatory–respiratory criteria could grant that *we* are essentially persons while insisting that the appropriate sense of death in this context is the biological death of the human organism. Third, as we lack direct access to the conscious experiences of other people (the *other minds problem*), physicians and neuroscientists have faced serious difficulties in developing reliable *tests* to distinguish unconsciousness in persistent vegetative states from, e.g., conscious unresponsiveness in a paralyzed brain-damaged patient (Owen et al. 2006; see Chapter 36 in this volume).

Finally, some of the intuitive support for the higher-brain criterion reflects normative intuitions, such as the idea that being permanently unconscious would be just as bad as dying, or that we should not expend scarce medical resources to prolong the life of the permanently unconscious, or that we should use the organs of the irreversibly unconscious for transplants to save the lives of conscious people. While some early proponents of the higher-brain criterion explicitly introduced such normative considerations as part of their definition of death (Veatch 1993), other scholars who had previously advocated the higher-brain criterion now argue that the medical question of whether someone has died should be distinguished from the ethical questions of whether permanently unconscious people should be kept alive artificially, or whether their organs should be used for transplantation (e.g., Youngner and Arnold 2001). If so, then it may not have been necessary to adopt neurological criteria for death in order to remove permanently comatose patients from mechanical ventilation, or to use their organs for transplantation. Thus, many of these former proponents of the higher-brain criteria have returned to the circulatory–respiratory criterion as an account of how to determine death, but maintain that these practices can still be justified (as will be discussed in the final section).

Whole-Brain and Circulatory–Respiratory Criteria: Disputes on Criteria Meeting a Shared Definition

As we have seen, traditional proponents of the whole-brain criterion of death have adopted definitions of death that appeal to the loss of integrated functioning of the organism as a whole. The next step in the argument, applying the *definitions–criteria–tests* framework, is to argue that the destruction of the whole brain is necessary and sufficient for satisfying this definition in human beings. Meanwhile, this same definition could plausibly be adopted by defenders of the circulatory–respiratory criterion of death, who would then bear the same argumentative burden. Which criterion best fits with this definition?

Consider a paradigmatic case of disagreement between these criteria: A patient on mechanical ventilation, whose entire brain has been irreversibly injured and can no longer function. This patient, like those in persistent vegetative states, is permanently unconscious. In addition, due to the loss of respiratory control centers in the brainstem, the brain-dead body does not breathe on its own, depending on a mechanical ventilator that forces air into its lungs at set intervals for gas exchange. Protective reflexes such as the corneal blink reflex, the gag reflex, and the cough reflex are also lost; as are the regulation of body temperature and numerous hormonal systems by the hypothalamus, and autonomic regulation of the heart, blood pressure, gastrointestinal system, urination,

and skin by the brainstem. Proponents of the whole-brain criterion have adduced these myriad regulatory functions of the brain to argue that the brain is the "master organ" or "critical system" that integrates the disparate activities of the other organs into a cohesive whole. In the brain-dead patient, it is argued, while individual organs may continue to carry out their respective functions for a while (so the heart continues to beat, the kidneys continue to filter blood, the pancreas continues to secrete insulin and digestive enzymes) they are no longer able to work together as a unified organism.

Until recently, most physicians believed that the organs in a brain-dead body could continue to function in this way for only one or two weeks. But as mentioned in the introduction, the neurologist Alan Shewmon has since documented 175 cases in which the bodies of patients reliably diagnosed as fulfilling the whole-brain criterion were maintained for at least one week (and in rare cases years), often with few aggressive interventions beyond mechanical ventilation. These cases exhibit a "litany of non-brain-mediated somatically integrative functions," including:

- homeostasis of a limitless variety of physiological parameters and chemical substances;
- assimilation of nutrients;
- elimination, detoxification, and recycling of cellular wastes;
- energy balance;
- maintenance of body temperature (albeit subnormal);
- wound healing;
- fighting of infections and foreign bodies;
- development of a febrile response to infection (albeit rarely);
- cardiovascular and hormonal stress responses to incision for organ retrieval;
- successful gestation of a fetus (as in thirteen pregnant women of the prolonged survivors);
- sexual maturation (in two prolonged-surviving children);
- proportional growth (in three children).

(Shewmon 1998a)

An important observation from this series is that patients do pass through a period of severe physiological instability after brain death requiring highly aggressive care to support blood pressure and maintain other basic physiological functions; physicians' experiences in managing this unstable period may have led them to believe that brain-dead patients have irreversibly lost the ability to regulate these physiological functions. However, in patients who have been successfully maintained through this period, this instability eventually subsides, allowing for persistent maintenance of circulation and other functions with less invasive care (other than mechanical ventilation). Shewmon argues that these cases suggest a more modest role for the brain in enhancing and fine-tuning an integrative unity that is distributed throughout the body rather than centralized in any critical organ, and which in these cases persists even in the absence of the brain.

These cases, then, seriously undermine the standard rationale offered for the whole-brain criterion, and have been taken by many scholars to support a return to the circulatory–respiratory criterion of death. In response, the U.S. President's Council on Bioethics (2008) offered an entirely new conceptual justification for the whole-brain criterion. This new justification rejected an analysis of death in terms of the loss of integrated functioning, instead analyzing death as the loss of an organism's ability to

perform its "fundamental vital work." According to the President's Council, the work of the organism is self-preservation, and the mark of organisms is that they are driven by their needs to interact with the outside world. In human organisms, one form that this interaction takes is conscious awareness and action selection; while another form is spontaneous breathing to satisfy the need for oxygen.

This account has struck many commentators as an *ad hoc* attempt to preserve the whole-brain criterion in the face of counterexamples, rather than as a compelling account of death in its own right. The central notion of an organism's *work* is underspecified, and the President's Council makes no attempt to show that our shared, implicit understanding of life and death encompasses this idea (as would be required in the *definitions–criteria–tests* framework). It would also allay suspicions if this notion had an explanatory or conceptual role outside of this defense of the whole-brain criterion; however, it seems to play no explanatory role in physiology or evolutionary theory, and also seems to have no counterpart in the philosophy of biology (although it appears to be informed by an Aristotelian account of vital function). Finally, some defenders of the circulatory–respiratory criterion have been puzzled by the fact that this account of an organism's survival is disjunctive. According to this view, conscious human organisms that have lost the ability to breathe (for instance, due to paralysis) remain alive in virtue of their continued consciousness, while permanently unconscious human organisms that retain the ability to breathe (as in the vegetative state) are also alive in virtue of spontaneous breathing. How can it be that both of these count as cases in which the organism continues to perform its vital work, when the vital work performed by one organism is completely different from the work performed by the other (Shewmon 2009; Miller and Truog 2009)?

Criticisms of the *Definitions–Criteria–Tests* Framework

One irony of this controversy is that the *definitions–criteria–tests* framework initially proposed by proponents of the whole-brain criterion, along with their preferred definition of death in terms of the loss of integrated functioning, appears instead to support the circulatory–respiratory criterion that brain death was initially formulated to replace. Meanwhile, some authors have criticized this framework itself; for instance, by challenging the claim that there is any determinate standard that gives necessary and sufficient conditions for the death of the organism. In a famous exchange with Leon Kass, Robert Morrison (1971) argued for a view of death as a process rather than an event, alluding to the fact that some characteristically vital functions such as circulation and respiration can continue for long periods after the loss of others (such as the capacity for consciousness). Halevy and Brody (1993) have similarly proposed that there is no sharp line demarcating the boundary of life and death for all practical purposes; instead, given that some key functions can be present or absent in different combinations, some patients may exist upon a continuum across which different behaviors and ethical protocols may be appropriate at different stages. And Linda Emanuel (1995) has argued for a "bounded zone" account of death between clear cases of life and death, in which it may be appropriate to treat a patient either as still living or as dead depending upon his or her values and previously expressed preferences.

These challenges to the determinacy of the boundary between life and death are grounded in the physiological diversity observed in patients in different stages of dying. These observations may make us skeptical of the claim that we should identify any

unified criterion that can clearly distinguish the dead from the living. In previous work (Chiong 2005, 2014) I have challenged the methodological assumptions underlying the *definitions–criteria–tests* framework. Within the framework advanced by Bernat and his colleagues, disputes about death should be resolved by explicating an implicit definition of the term "death" that yields necessary and sufficient conditions for its application. Some terms in the English language may admit of such definitions—for instance, we can define the term "bachelor" as "an unmarried adult male person," which would provide us with necessary and sufficient conditions for the term's application. However, there are many other important terms and concepts that do not fit this framework as neatly.

As an important and influential example, we may consider the case of biological species. First, it is unclear whether species terms such as "bottlenose dolphin" admit this sort of informative definition (Kripke 1972; Putnam 1973). Here a particular worry is that people who correctly use such a term could still be mistaken about the appropriate conditions for the term's application; for instance, the shared implicit conception of bottlenose dolphins in pre-Linnean times might have included that they are a type of fish. More problematically, there are evolutionary grounds for denying the claim that there are any necessary and sufficient features of bottlenose-dolphinhood shared by all bottlenose dolphins that all non-members of the species lack (Hull 1978). Species comprise myriad individuals with tremendous genetic and phenotypic diversity, including individuals with novel mutations and damaged individuals unable to carry out many of the characteristic functions of the species that nonetheless belong to the relevant species. Consider also speciation—bottlenose dolphins evolved from some ancestral species of dolphin via a gradual process over hundreds of generations, and it would be implausible to claim that there is any set of necessary and sufficient conditions that clearly demarcate bottlenose dolphins from members of the ancestral species.

Similarly, I have argued against the requirement for a definition that explicates the shared meanings that we associate with death, and have argued that we should not expect to find any unique set of features that is both necessary and sufficient for death. Following Richard Boyd's (1999) work on scientific categories, I have proposed a *cluster account* of life and death that does not attempt to identify some physiological functions (such as circulation or consciousness or spontaneous breathing) as essential to death while dismissing others as irrelevant. Instead, life and death involve a variety of functions including (in some species) the capacity for consciousness and behavior, circulation, spontaneous breathing, integration, reproduction, and nutrition. In typical cases these features reinforce and sustain one another, and thus tend to be present together (in living organisms) or absent together (in dead organisms). In some cases, one or two features might be missing (as with postmenopausal women and reproduction), but the presence of other features makes it obvious that something still is a living organism. (Just as some individual bottlenose dolphins may lack some features that are typically characteristic of bottlenose dolphins, without ceasing to belong to the species.)

However, there will also be cases of true indeterminacy, in which some but not all of the relevant features are present. On my view, persistent vegetative states are not cases of true indeterminacy; instead, as implied by the term, the mode of life of these unfortunate patients is comparable to many other indisputably living organisms such as plants. Meanwhile, on my view, a brain-dead pregnant woman that gestates a fetus while on mechanical ventilation is a borderline case between life and death. In such borderline cases, I believe that a number of policy approaches may be reasonable. One approach would be to adopt a standard, such as the whole-brain criterion, as an artificial cutoff,

analogous to adopting an artificially determinate threshold for adulthood at age 18 or 21 years. Another approach might be to adopt a more pluralistic view such as Emanuel's, allowing for variation in patients' and families' preferences; although as a practical matter heterogeneity in our practices of determining death may also introduce new difficulties.

Is Death Important?

Finally, some authors (particularly those who accept the circulatory–respiratory criterion of death) have questioned an assumption at the root of the Ad Hoc Committee's original proposal of the whole-brain criterion as an account of death: Namely, that the determination whether or not someone has died is relevant to the ethical permissibility of discontinuing mechanical ventilation or removing their organs for transplantation. In the first case, while many at the time believed that physicians are obligated to do everything in their power to prolong the life of the patient, there is now widespread consensus that life-sustaining treatment can and in some cases should be withdrawn from still-living but moribund patients. Therefore, even if we were to adopt the circulatory–respiratory criterion, classifying brain-dead individuals as still biologically alive, we would remain well within prevailing ethical standards to withdraw mechanical ventilation from such patients (particularly in cases where the patient himself or herself, when still conscious, would not have valued continued existence in a permanently unconscious state).

Several authors have gone a step further, and proposed that we should in some cases procure vital organs for transplantation from permanently unconscious but still-living individuals (for instance, cases in which the individual, while still conscious, expressed the desire to become an organ donor and not to have his or her life prolonged in a vegetative state). In other words, these authors propose that we reject the "dead donor rule" that vital organ donors must die before their organs can be removed for transplantation. Such a transition would be a radical one, with legal and public policy ramifications. First, rejecting the dead donor rule would require changes in existing law, as a surgeon who removes a vital organ from a still-living patient would (given the present legal understanding) commit a homicide, even if done with the full prospective consent of the organ donor when he or she was conscious. Second, strong protections would be necessary to protect persistently vegetative patients (or more precisely, their families) from undue pressure to undergo a fatal organ procurement. This is made more critical by the recent finding that some patients who are reliably diagnosed as persistently vegetative may continue to have conscious experiences while being unable (due to paralysis or other limitations) to signal their consciousness to their physicians (Owen et al. 2006; see Chapter 36 in this volume). Finally, there is a concern that rejecting the dead donor rule might undermine public trust in organ transplantation, as it would allow procedures in which a living but permanently unconscious individual is killed in order to provide organs for others. If fear or misunderstanding about this prospect reduces healthy people's willingness to become organ donors, this might restrict rather than increase the supply of organs available for transplantation. Considering these difficulties, some authors who reject the dead donor rule have expressed pessimism that these legal and policy changes can be effected in the current political environment (Miller et al. 2010).

Of course, the urgency of rejecting the dead donor rule depends in part on one's view of the justifiability of current practices. If the circulatory–respiratory criterion instead of

the whole-brain criterion is the only *true* standard for determining death in human organisms, then we are *already* violating the dead donor rule (because brain-dead organ donors are still living), but only doing so dishonestly. However, the strongest arguments against the whole-brain criterion presuppose a *definitions–criteria–tests* framework that itself lacks philosophical justification. A more modest defense of the whole-brain criterion, as an admissible though artificial cutoff for determining death in borderline cases, could be combined with a more modest version of the dead donor rule. Such a rule would still prohibit vital organ procurement from people who are determinately alive, but would allow vital organ procurement in borderline cases as long as these cases met the generally agreed-upon standard for determining death.

Appropriate criteria for the determination of death have been a rich topic for debate in bioethics, as they may depend on otherwise abstract issues of ontology and philosophical method, but have direct implications for life-and-death practices such as the discontinuation of intensive care or vital organ donation. One focus for future work on this topic may be its connections with other central philosophical questions, such as the question of whether we are essentially persons or organisms, or the question of what constitutes biological life.

Related Topics

Chapter 36, "From the Persistent Vegetative State to the Minimally Conscious State: Ethical Implications of Disorders of Consciousness," Joseph J. Fins

Chapter 43, "Organ Transplantation Ethics from the Perspective of Embodied Personhood," Fredrik Svenaeus

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