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5 The nature of human death

What is it for a human being to die? What, more generally, is it for any living thing to die? These questions, which are ontological or conceptual, seek a *definition* – a broad conceptualization – of death or human death in particular. Whatever human death is, how can we determine that it has occurred? A comprehensive answer to this epistemological question will include both a general *standard* of human death and *clinical tests* that indicate whether the standard has been met in particular cases. Because this chapter is primarily philosophical, it will focus on definitions and standards of human death, leaving it to clinicians to identify clinical tests.

Although the debate over the nature of human death typically refers to the locus of controversy as "the definition of death," most of this debate has focused on standards. Only the more philosophical contributions have engaged the issue of appropriate conceptualization. We will address both issues, but it will be convenient to organize the discussion around competing standards of human death.

The discussion begins with the currently mainstream *whole-brain standard*, according to which human death is the *irreversible cessation of functioning of the entire brain, including the brainstem*. The whole-brain standard emerged as an alternative to the traditional *cardiopulmonary standard* – human death as the *irreversible cessation of heart and lung function* – in the context of advancing medical technology and interest in organ transplantation. After contending that the whole-brain standard has considerable strengths but also difficulties, I take up the progressive *higher-brain standard*, according to which human death is the *irreversible loss of the capacity for consciousness*. I argue that this standard is no more

promising than its contentious philosophical basis. I next examine an updated cardiopulmonary standard – human death as the *irreversible cessation of circulatory and respiratory function* – which proves more holistic and plausible than its traditional forebear. Yet this standard, too, faces significant challenges. In concluding, I suggest that the circulatory-respiratory and whole-brain standards are both acceptable standards for determinations of human death, but also that such determinations are less morally important than we habitually assume. This last point leaves space for the higher-brain standard to make a contribution.

THE WHOLE-BRAIN STANDARD

The whole-brain (WB) standard can be clarified by contrasting it with the traditional cardiopulmonary standard. The WB standard regards the difference between assisted and unassisted respiration as crucial. A mechanical respirator can enable a "brain-dead" patient – a patient whose entire brain is irreversibly nonfunctional – to breathe and thereby continue cardiac function, but such a patient is incapable of *unassisted* respiration. On the cardiopulmonary (CP) standard, such a patient counts as living so long as respiration occurs, irrespective of how it occurs. But on the WB standard, such a patient is dead. Meanwhile, this standard judges that someone who is irreversibly unconscious yet retains some measure of brainstem function is alive.

Here it may help to review a few basic points about neurology. The human brain may be thought of as comprising two major parts: (1) the "higher brain," consisting of the *cerebrum*, the primary vehicle of consciousness, and the *cerebellum*, which is implicated in the control and coordination of voluntary muscle movements; and (2) the "lower brain" or *brainstem*. The latter includes, importantly for our purposes, the *medulla*, which controls spontaneous respiration, and the *reticular activating system*, something like an on/off switch that makes consciousness possible without affecting its contents (the latter job belonging to the cerebrum). "*Whole-brain death*" or "*total brain failure*" involves destruction of both the higher brain and the brainstem. In what is called a *persistent* (more accurately, *irreversible*) *vegetative state* or *PVS*, however, while extensive damage to the higher brain causes irreversible unconsciousness, a largely

functioning brainstem permits some or all of the following: spontaneous respiration and heartbeat; sleep and wake cycles (enabled by an intact reticular activating system though cerebral damage precludes consciousness); eye movements and pupillary reaction to light; and such reflexes as coughing, swallowing, and gagging. A patient in an *irreversible coma*, by contrast, never appears to be awake due to a damaged reticular activating system but is capable of unassisted breathing. The ability to breathe unassisted in either PVS or irreversible coma – as well as the sleep/wake cycles and reflexes that characterize PVS – presents the nearly irresistible impression that patients in these conditions are alive. Both the CP and WB standards confirm this common-sense judgment.

Why might one favor the WB standard over its traditional competitor? To my mind, the strongest case for the WB standard appeals to (1) an organismic definition of death, and (2) the thesis that the brain is the primary integrator of overall bodily functioning. If pragmatic considerations are permitted to serve as at least a tie-breaker, then one might also appeal to (3) certain practical advantages especially in connection with organ transplantation.

According to the organismic definition, human death is the *irreversible loss of functioning of the organism as a whole.*[1] Proponents of this definition emphasize that death is a biological phenomenon common to all organisms. Organisms are those things that are literally alive (in contrast to cultures and ideas, which live only figuratively) without being parts of larger biological entities (as cells and organs are parts of organisms). So an adequate definition must plausibly cover the deaths of nonhuman organisms – from paramecia to daisies to insects to coyotes – as well as human death. What is common to the deaths of all kinds of living creatures? In brief, the organism stops functioning as a more or less integrated unit. Where there once was a dynamic entity that extracted energy from the environment to maintain its own structure and functioning, there now is an inert piece (or pieces) of matter subject to disintegration and entropy. In the case of humans, no less than other organisms, death involves the irreversible loss of integrated bodily functioning.

The qualifier "irreversible" is important here and motivates a brief digression. If the body of an organism stops functioning, even for a long time, but the condition is later reversed so that function resumes, it is presumably incorrect to say that the organism died before returning to life. It seems to be part of the concept of death that an individual's death is irreversible.[2] Suppose someone falls into a freezing lake and loses cardiopulmonary and brain function for an hour before being resuscitated. Even though this person might have appeared dead to observers prior to resuscitation, he did not actually die. Similarly, if technology permits people or other organisms to exist in "suspended animation" through cryo-preservation, it seems most cogent to say that they are not dead while frozen only to return to life upon successful thawing and resumption of life functions. Rather, I suggest, these individuals would avoid death through cryo-preservation. Although death, on this understanding, is irreversible, it does not follow that life and death exhaust all possible states of organisms. After all, the semi-frozen person in the lake and Woody Allen's character in *Sleeper* are devoid of integrated bodily functioning for significant stretches of time. Rather than abandoning the traditional assumption that death is irreversible, I suggest, we should abandon just the assumption that life and death are exhaustive. Between life and death, a state of *frozen, nonfatal inertness* is possible.

Returning to the conceptualization of death as loss of integrated bodily functioning, how is this definition supposed to favor the WB standard? According to the mainstream defense of this standard, the human brain *integrates* major bodily functions so that only death of the entire brain is necessary and sufficient for human death.[3] Life involves the integrated functioning of the whole organism. Circulation and respiration are centrally important, but so are hormonal regulation, maintenance of body temperature, and various other functions – as well as, in humans and other higher animals, consciousness. The integration of all these vital functions is made possible by a central integrator: the brain.

From this perspective, when cardiopulmonary function persists due to a respirator and perhaps other life-support technologies despite total brain failure, mechanical assistance presents a false appearance of life, masking the lack of integrated functioning in the organism as a whole. Before such life-supports existed, lack of cardiopulmonary function guaranteed total brain failure and the collapse of organismic functioning. With present technology, according the argument, we should not confuse the traditional

marker of life – cardiopulmonary function – with the actual presence of life.

The WB approach – by which I mean the WB standard coupled with the organismic definition of death – has advantages. First, as suggested by its legal acceptance in recent decades, the standard is largely continuous with traditional practices and thinking about human death. Current law in the United States incorporates *both* the CP standard and the WB standard in disjunctive form, most states adopting the Uniform Determination of Death Act (UDDA), while others have embraced similar language. As UDDA states it, "an individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions, or (2) irreversible cessation of all functions of the entire brain, including the brainstem, is dead."[4] Relatedly, the WB standard is at least prima facie plausible as a specification of the organismic conception of human death.

The WB standard also offers practical advantages. Its acceptance facilitates organ transplantation by allowing a declaration of death and retrieval of viable organs while cardiopulmonary function continues, with mechanical assistance, following total brain failure. Another practical advantage is permitting discontinuation of costly life-support measures, even without an advance directive or proxy consent, for patients who have incurred total brain failure. Most proponents of the WB approach maintain that these advantages are fortunate consequences of an appreciation of the biological nature of death, but one might regard these advantages as an important component of the case for a standard whose justification cannot (as we will see) rest with appeals to biology alone.[5]

Let us now identify a few key challenges to the WB standard. First, there are at least some members of the human species for whom total brain failure cannot possibly be *necessary* for their deaths for the simple reason that they do not have brains. Embryos and early fetuses, after all, are as capable as living and dying as you and I are. While a proponent of the WB standard might say that it applies only to those human beings who have brains, and advance a different standard for those human beings who lack brains, the ad hoc feel of this maneuver hints that biological considerations alone might not uniquely support the WB approach.

Perhaps more threatening to the present approach is empirical evidence that total brain failure is not *sufficient* for human death – that is, assuming the latter is conceptualized as the collapse of integrated bodily functioning meditated by the brain. Many of the human body's integrative functions, according to the challenge, are not mediated by the brain and can persist in individuals who satisfy WB criteria for death by standard clinical tests. These somatically integrating functions include homeostasis, assimilation of nutrients, detoxification and recycling of cellular waste, wound healing, fighting infections, and hormonal stress responses to unanesthetized incisions (for organ procurement); in a small number of cases, brain-dead bodies have even grown, matured sexually, or gestated a fetus.[6] These phenomena suggest that the WB approach should be either rejected or construed in some way that does not appeal to the brain's (dubious) role as indispensable integrator of somatic functioning.

According to an alternative rationale for the WB standard that has recently come into play, a human being dies upon *irreversibly losing the capacity to perform the fundamental work of an organism*, a loss that occurs with total brain failure.[7] The fundamental work of an organism is characterized as involving (1) receptivity to stimuli from the surrounding environment, (2) the ability to act upon the world to obtain, selectively, what the organism needs, and (3) the basic felt need that drives the organism to act as it must to obtain what it needs and what its receptivity reveals to be available.[8] The most sympathetic reading of the somewhat unclear discussion in which this argument is advanced is that satisfaction of any of these three criteria is sufficient for being alive. A patient with total brain failure meets none of the criteria. By contrast, a PVS patient meets at least the second criterion through spontaneous respiration. So far, so good. But present-day robots are capable of meeting at least the first criterion and, if they cannot yet meet the second, it is easy to imagine more advanced robots that could meet that criterion as well – without being alive. If one tried to exclude robots by insisting, contrary to what I call the sympathetic reading, that something must satisfy all three criteria to be alive, then one would thereby also absurdly exclude presentient fetuses and patients who are thoroughly paralyzed yet conscious. No matter how we understand its criteria, then, the "fundamental work" variant of the WB approach does not seem to improve upon the mainstream version.

What I find the most adequate formulation of the WB approach emerged in response to a challenge directed against a literal reading of the legally established WB standard, which requires irreversible cessation of *all* brain functions for a human being's death. It is now commonly acknowledged that some patients who are declared dead by standard tests for the WB standard continue to exhibit very minor brain functions. The consensus is that the residual functions are too trivial to count against a judgment of death. Thus, a leading proponent of the WB approach has revised both (1) the organismic definition of death to "the permanent cessation of the *critical* functions of the organism as a whole," and (2) the corresponding standard to permanent cessation of the *critical* functions of the whole brain.[9] According to this revised approach, the critical functions of the organism are (1) the vital functions of spontaneous breathing and autonomic circulation control, (2) the integrating functions that maintain the organism's homeostasis, and (3) consciousness. A human being dies upon losing all three.

I find the "critical functions" formulation of the WB standard relatively promising. It addresses the problem of trivial brain functions persisting in individuals who are regarded as dead by clinicians who apply the WB standard. Moreover, sympathetically construed, it can address the challenge that the brain does not mediate *all* somatically integrating functions. The brain doesn't need to do so, we might allow, so long as it plays a *major role in mediating critical functions*. And this it does, for it is impossible to maintain spontaneous breathing and circulation control and impossible to maintain consciousness if the brain isn't doing its job; and while some aspects of homeostasis can be maintained independently of the brain, the brain greatly enhances these processes.

What about those prenatal human beings who lack brains? Their deaths can't be defined in terms of brain dysfunction; and their immaturity and radical dependence on maternal bodies entail that these human beings do not yet participate in *any* of the "critical functions of the organism as a whole." Yet they are clearly alive and can clearly die. It is a disadvantage of the WB approach that it must offer a different standard of death for embryos and early fetuses than for those human beings whose brains are up and running. But two points put this disadvantage in perspective. First, to the extent that the traditional CP standard focuses on heartbeat and lung function,

it faces the parallel observation that embryos and very early fetuses don't have hearts or lungs. Second, we might reasonably understand the role of the brain in this way: before the brain has developed and begins its major functions, the life of the human organism consists in integration of its bodily functions (enabled in significant measure by its mother's body); once the brain is up and running, the life of the human being consists in the performance of some or all of the critical functions. For this reason, we may plausibly regard the death of a pre-brain human being as the total collapse of organismic functioning and the death of a biologically complete human being as loss of all of the critical functions.

This construal may leave a residual sense of conceptual fudging. After all, the conception of death shifts from total functional collapse, which is unobjectionable, to the total loss of *critical* functions, which incorporates a value judgment about which functions are crucially important. Any sense of fudging may derive from an austere philosophical principle that prohibits value judgments from playing a role in how we define life and death. Yet biology alone may not be able to vindicate a unique standard of death for human beings. I am open to an approach, like the present one, that allows reasonable value judgments to play a role in specifying the general concept of death into a useful standard. Let us now consider a quite different approach, which abandons the organismic definition of death and zeroes in on one very important brain function.

THE HIGHER-BRAIN STANDARD

The higher-brain (HB) approach, which has yet to be enshrined in law in any jurisdiction, makes a clean break with biology and conceptualizes human death in terms of the loss of our psychological lives. Accordingly, the proposed standard of death is the irreversible loss of the capacity for consciousness. "Consciousness" here is meant very broadly, to include any subjective experience, so that both waking and dreaming states count as instances. Not only humans but all sentient creatures, by definition, have the capacity for consciousness in this broad sense. Reference to the *capacity* for consciousness indicates that individuals in whom the neurological machinery needed for consciousness remains intact, including individuals in a dreamless sleep or a reversible vegetative state or coma,

are alive. One dies, on this view, when one's brain becomes incapable of ever again returning to consciousness.

This implies, radically, that a patient in a PVS or irreversible coma is dead despite continuing brainstem function that permits spontaneous breathing and heartbeat. While many find this implication counterintuitive and jarring, proponents of the HB approach believe that the definition and standard of death that generate the implication enjoy the support of sound philosophical reflection. I maintain that in view of this counterintuitive implication and the availability of our ordinary (and widely accepted) biological conception of death, proponents of the HB approach bear a burden of justification and therefore need a very strong case to justify overturning the ordinary conception. I will argue that the strongest arguments for the HB standard are too questionable to make this case.

Proponents of the HB approach define death in different ways, but their definitions converge on the idea of the irreversible loss of some property for which the capacity for consciousness is necessary. The two strongest argumentative strategies for defending the higher-brain approach, I think, are (1) an appeal to the essence of human persons and (2) an appeal to prudential value.[10] Let's consider these in turn.

The appeal to the essence of human persons assumes that this essence requires the capacity for consciousness.[11] Employed in its strict ontological sense, "essence" here refers to the property or set of properties of an individual the loss of which would necessarily terminate the individual's existence. On this understanding, we human persons – more precisely, we individuals who are at any time human persons – are *essentially* beings with the capacity for consciousness so that we could not exist at any time without having this capacity at that time. We go out of existence, it is assumed, when we die, so death involves loss of what is essential to our continued existence.

Different authors who appeal to our essence advance different specific arguments and employ different terms to designate our essential kind. Nevertheless, we can boil down the collection of specific appeals to this argumentative core:

(1) For humans, irreversible loss of the capacity for consciousness entails (is sufficient for) loss of a property that is essential to their existence.

(2) For humans, loss of a property that is essential to their existence is (is necessary and sufficient for) death.

Therefore:

(3) For humans, irreversible loss of the capacity for consciousness entails (is sufficient for) death.

The conclusion of this argument follows validly from its premises, but premise (1) is highly debatable.

Some philosophers who advance this reasoning hold that we are essentially *persons* in a sense of the term that implies the capacity for relatively complex forms of consciousness such as those associated with self-awareness, reasoning, and linguistic thought. On this view, losing the capacity for consciousness would entail loss of personhood and therefore the end of a person's existence. But this view has incredible implications. It implies that people who undergo progressive dementia actually die – go out of existence – at some point *during* the gradual slide to irreversible coma. Even if practical concerns recommend drawing a safe line at irreversible loss of the capacity for consciousness (to prevent errors and abuse), the implication that, strictly speaking, we go out of existence *during* the course of progressive dementia strains credibility. A second implication of person essentialism along these lines is that because newborns lack the capacities that constitute personhood, you came into existence *after* what is ordinarily described as *your* birth. Although there is nothing incoherent about these implications, or the essentialist thesis that generates them, I find them too implausible to accept without a very compelling philosophical justification – of which, I think, there is none.[12]

A more promising view, which avoids these implications, is that we are essentially beings with the capacity for consciousness – any consciousness – who die upon losing this basic psychological capacity. Stated succinctly, we are essentially minded beings, or minds, and we die when we literally lose our minds.[13] (Note that this view need not be a version of substance dualism, because it leaves room for the claim that we are also essentially embodied.)

A central challenge facing mind essentialism is to account adequately for the human organism that is associated with one of us: the mind. Consider first the human fetus that gradually

developed prior to the emergence of sentience or the capacity for consciousness – that is, prior to the emergence of a mind. Surely the presentient fetus was alive. On the other end of life, a PVS patient who is spontaneously breathing, circulating blood, and exhibiting brainstem reflexes is alive. The proponent of mind essentialism must hold that the human organism is a living thing distinguishable from one of us: while we are essentially minds, the associated organisms are essentially members of some biological category such as *homo sapiens*, *animal*, or *organism* – a claim that accommodates the plausible thesis that the presentient fetus and PVS patient are living things.

So what is the precise relationship between one of us and the associated organism? The relationship cannot be *identity*, because the mind has different persistence conditions or criteria of identity from the organism, which is why the latter can precede you in time and outlast you in the case of PVS or irreversible coma. Thus, you are not identical to any animal.[14] Perhaps this is a tolerable implication, but it is at least prima facie odd. Also odd, at least to my mind, is the implication that death should be conceptualized in one way for persons, or perhaps for all minded (i.e. sentient) beings, and in another way for all organisms, including the human organism. Different standards of death for different kinds of beings (e.g. those with and without functioning brains) is one thing; different *definitions* are something else altogether, a bifurcation of what appears to be a unitary concept: death.

If I, the mind, am not identical to the human organism associated with me, perhaps I am *part* of this organism – namely, the brain (or, more precisely, the portions of it associated with consciousness).[15] But I supposedly go out of existence at death, yet my brain seems capable of surviving in the corpse. So maybe I am a *functioning* brain, which ends its existence at the irreversible loss of consciousness. But how could I be some organ only when it functions? Presumably, I am a *substance*, something with properties, not a substance *only when it has certain properties*. If one claims that the functioning brain is itself a substance, one distinct from the brain, this seems implausible. Nor can we seriously claim that I, the mind, am simply the *conscious properties* of the brain. For that would imply that I am not a substance at all but just a bunch of properties. While it might be plausible to assert that what we call "the mind" is really

just a set of properties, it is hardly plausible to claim that you and I are just properties.

Another possible thesis about the mind/organism relationship is that each of us is *constituted* by a human organism just as a statue might be constituted by a hunk of marble.[16] This subtle thesis encounters inter alia a challenge about counting conscious beings. On the constitution view, I am essentially a being with the capacity for consciousness. But the human animal that supposedly constitutes me has a functioning brain, so it too is a being with the capacity for consciousness. This suggests, strangely, that there are two conscious beings sitting in my chair as I write these words.

As we have seen, the higher-brain definition of death can be motivated by the claim that we are essentially minded beings and by any of several ways of understanding the mind/organism relationship. All of the theoretical options encounter challenges. An alternative view that does not support the higher-brain approach – namely, the view that we are essentially human animals, organisms, or members of some other biological category – has a simple and unproblematic view of our relationship to the human organisms associated with us. For on the biological approach, we *are* animals, as scientifically informed common sense generally assumes. This is not to say that the biological approach to our essence faces no significant challenges (it does); this is just to note one of its advantages over essentialist views that motivate the HB approach. Rather than claiming that mind essentialism is clearly indefensible, I claim that that it encounters too many reasonable doubts for it to shoulder the HB standard's burden of justification. Meanwhile, person essentialism, as discussed earlier, is highly implausible. Although appeals to the essence of human persons may not succeed in the ontological terms in which they are couched, they helpfully direct our attention to a thesis about *what matters in our existence.*

This brings us to the appeal to prudential value.[17] Conscious life, the argument begins, is a precondition for nearly everything that we value (prudentially) in our lives. We have an enormous stake in continuing our lives as persons, or at least as sentient beings, and little or no stake in continuing our lives as irreversibly unconscious biological blobs. The capacity for consciousness, therefore, is essential not in an ontological sense, but in an evaluative sense of *indispensable to us.* Although, for many people, consciousness is

insufficient for what's prudentially important – insofar as they find certain capacities of normal persons indispensable (e.g. self-awareness, the ability to relate meaningfully to others) – it is necessary; and the basic capacity for consciousness is the only safe place to demarcate death for legal and social purposes. So, even if the HB standard is at odds with the original biological concept of death, the argument concludes, we should embrace it on the strength of these value-based considerations.

Despite having some sympathy for this argument, I do not think it carries the day. In proposing to overturn a biological understanding of human death on the basis of shared prudential values, it rests heavily on the principal value claims. I maintain that the appeal to prudential value founders on reasonable pluralism about this sort of value. While supporters of the HB approach and many other people (including me) are likely to have prudential values in line with this appeal, plenty of others will not. Some people believe that human life is inherently valuable to its possessor, even if the individual cannot appreciate its value at a given time. They are likely to favor the continuation of life-supports for patients in a PVS or irreversible coma (unless perhaps there is a countervailing advance directive).

A proponent of the HB approach might reply that it's *irrational* to value the continuation of biological life in the absence of any possibility of returning to consciousness, so we should ignore the aforementioned assertion of value. But this reply assumes the *experience requirement*: that only states of affairs that affect one's experience can affect one's well-being.[18] The experience requirement is debatable. Some people believe that they are worse off for being slandered or cheated even if they never learn of the wrong and its repercussions never affect their experience. It is surely coherent to hold that states of affairs that don't affect one's experience but do connect significantly with one's values can affect one's interests *at least while one still exists*. Preference-based accounts of well-being standardly accept this principle, for what is preferred or desired may occur without affecting one's experience. These points illuminate the possibility of one's prudential values extending (reasonably) to a portion of one's life when one is irreversibly unconscious. I do not believe such a value system is open to refutation. Thus, I doubt that the appeal to prudential value is any more successful than the appeal to the essence of human persons in carrying the burden of proof for the HB standard.

RESUSCITATING TRADITION: AN UPDATED CARDIOPULMONARY APPROACH

Prior to societal and legal acceptance of the WB standard, death was understood as the irreversible cessation of cardiopulmonary function. Several conceptualizations of death hovered in the supportive background of the traditional standard. Some were religious or spiritual – for example, death as the departure of the vital principle or soul. Another was the same conception that champions of the WB standard invoke: death as the irreversible cessation of functioning of the organism as a whole.[19] However death was defined, before the development of modern life-support technologies a functioning heart and lungs indicated continuing brainstem function. The WB and traditional CP standards came into competition only after it became possible to sustain cardiopulmonary function, artificially, without any brain function. Although the WB standard became widely accepted and codified in law, some traditionalists never accepted total brain failure as sufficient for death. Growing awareness of challenges that face the WB standard has contributed to renewed interest in something along the lines of the CP approach.

Those who champion the CP standard *alone* – that is, not alongside the WB standard as in current American law – believe that a breathing, heart-beating human body is alive irrespective of whether these functions require external support (e.g. life-supports, the mother's body in the case of a fetus).[20] At the same time, the usual formulation of the traditional approach problematically focuses on the state of two organs: heart and lungs. This picture is overly reductionistic, leaving room for an improved variant of the traditional standard.

A more realistic picture features integrative unity as existing diffusely throughout the organism. On this view, what is crucial is not the performance of a small number of organs, but rather "the anti-entropic mutual interaction of all the cells and tissues of the body, mediated in mammals by circulating oxygenated blood."[21] The brain's capacity to augment other systems presupposes their pre-existing capacity to function. With maintenance of body temperature, for example, the "thermostat" may be in the brain but the "furnace" is

the energy metabolism diffused throughout the body. That is why brain-dead bodies may grow colder, but not as cold as corpses.[22]

According to this view, tradition's insight that respiration and circulation are especially important should be updated by de-emphasizing the organs and emphasizing a more holistic image: respiration and circulation as occurring throughout the body as oxygenated blood circulates to different organs and bodily systems. Unlike total brain failure, loss of respiration and circulation leads relentlessly to the break-down of cells, tissues, organs, bodily systems, and eventually the organism as a whole. This picture recommends an updated traditional standard, which we might call the *circulatory-respiratory (CR) standard*: death as the *irreversible cessation of circulatory-respiratory function*.[23]

This approach plausibly characterizes the difference between life and death – as understood in organismic terms – in a full range of cases, consistently with the clinical phenomena (discussed earlier) that challenge the WB standard. This is not to say that the CR standard is clearly superior to the WB standard – especially in its "critical functions" formulation. Rather, I claim, the CR standard is fairly plausible and is at least as consonant as the WB standard with an organismic understanding of death.

Not surprisingly, the traditional approach – under any formulation – faces challenges of its own. One challenge is the charge of overemphasizing our biological nature, as if we were merely organisms, while failing to appreciate our mental life and its control center, the brain.[24] As someone who has defended the updated traditional approach,[25] I cannot deny the intuitive power of this objection. In reply, I have urged that the ontological issues of our essence and the nature of death must be carefully distinguished from questions about what is most valuable in our existence. But as I now find the WB standard about as plausible as the CR standard – bearing in mind that both are motivated by an organismic conception of death – I am more open to values playing a role in arguments for particular standards of death. While this concession does not rescue the HB approach given its departure from the ordinary concept of death and its onus of justification, it keeps the competition open between the WB and CR standards.

Value considerations take us to another major challenge to any traditional approach: the specter of highly unpalatable practical

consequences. If we changed our laws and adopted the CR standard while no longer accepting the WB standard, then a patient who had suffered total brain failure but maintained respiration and circulation via life supports would count as alive. Consequently, unless we abandoned the "dead-donor rule" – the legal requirement that a body must be dead before vital organs can be harvested – it would be illegal to procure organs from the patients in question. Yet the viability of these organs requires maintaining respiration and circulation with life-supports. So having to wait until CR criteria are met to harvest vital organs would constitute a great setback to organ transplantation. Moreover, physicians might feel that they could no longer unilaterally discontinue treatment – when a family requests its continuation – upon a determination of total brain failure despite what many would consider the futility of continued treatment. And, of course, laws for determining death would need to be changed as the medical profession acknowledged (what would now be considered) the error of having accepted the WB standard for several decades.

Importantly, these challenges confront those who champion the CR standard alone rather than disjunctively alongside the WB standard.

CONCLUDING REFLECTIONS

Let me conclude this investigation of the nature of human death with a few reflections.

First, both the WB standard (especially in its "critical functions" formulation) and the CR standard are plausible specifications of the organismic conceptualization of human death. Human death proves to be a somewhat vague concept, which is why there can be more than one plausible way to specify it with a standard.

Second, the organismic definition of human death is more defensible than the conceptions invoked in support of the HB standard, conceptions that assume either person essentialism or mind essentialism. Person essentialism is implausible. Mind essentialism is more plausible, but no more so than a biological conception of our essence, so mind essentialism does not carry the burden of justification shouldered by any view that would overturn the presumption favoring the everyday biological conception of death. Here I assume a sort of realism about life and death as biological phenomena. This

realism does not preclude redefining death in the human case, but it imposes a burden of justification.

Third, the appeal to prudential value, like the appeal to our essence, fails to carry the burden of justification for the HB standard. This standard is not justified as a characterization of human death.

Fourth, the UDDA's disjunctive approach is optimal policy in view of the preceding conclusions. This approach accommodates reasonable pluralism about standards of death while neatly sidestepping the unpalatable practical consequences that would threaten the CR standard if it alone were implemented. It also permits taking advantage of the CR standard in what is called "donation after cardiac death" by permitting (with the patient's advance directive) the harvesting of organs just minutes after death is declared – and before total brain failure can be determined – on the basis of cardiac arrest.[26]

Finally, realism about death as a biological phenomenon does not entail acceptance of traditional assumptions about the moral significance of death. This is where the HB approach can make a significant contribution. Although unsuccessful in displacing the biological concept of death in the case of humans, this approach helpfully presses us to consider whether we must wait for death before engaging in "death behaviors." Along these lines, I make two suggestions. First, because the great majority of people do not value the prospects of surviving in an irreversible unconscious state, we should allow physicians and health-care institutions to terminate care unilaterally unless the patient had indicated in advance a preference to live in this condition and has the funds to pay for it. Second, we should seriously consider the possibility of vital organ transplantation, when authorized by a valid advance directive, in cases of PVS or irreversible coma even though such patients are clearly alive.

NOTES

1 See, e.g., Becker 1975 and Bernat *et al.* 1981.
2 This thesis does not conceptually preclude an "afterlife," because an individual in this state would remain biologically dead and would be "alive" only in some non-biological sense. Nor does it preclude a Frankenstein's monster: even though the monster is assembled from parts of corpses, after assembly *he* comes to life for the first time.
3 See Bernat *et al.* 1981.

4 President's Commission 1981: 119.
5 For reasons of space I will not discuss the closely related *brainstem standard*, according to which human death occurs at the irreversible cessation of brainstem function. This standard, which requires fewer clinical tests than the whole-brain standard while having largely equivalent implications for determining death, has been adopted in the United Kingdom and various other nations.
6 See Shewmon 2001.
7 President's Council on Bioethics 2008: chap. 4.
8 President's Council on Bioethics 2008: chap. 4.
9 Bernat 1998: 17.
10 Michael Green and Daniel Wikler influentially argued that appealing to our personal identity – more precisely, to the criteria for our numerical identity over time – represents a distinct argumentative strategy (Green and Wilder 1980). But this claim falsely assumes that we can know the criteria of our identity without assuming a particular account of our essence. See DeGrazia 1999.
11 See, e.g., Engelhardt 1975; Veatch 1975; Bartlett and Youngner 1988; and Baker 2000.
12 I develop this argument in DeGrazia 2005: chap. 2.
13 This view is developed in McMahan 2002: chap. 1.
14 This argument is developed in Olson 1997.
15 This is McMahan's view (2002: chap. 1).
16 See Baker 2000.
17 I present and evaluate this argument in DeGrazia 2005: 134–38.
18 For a discussion, see Griffin 1986: 16–19.
19 See, e.g., Becker 1975.
20 See Shewmon 2001 and Potts 2001.
21 Shewmon 2001: 473.
22 Shewmon 2001: 471.
23 Interestingly, the UDDA uses the more holistic language of "circulatory and respiratory" rather than "cardiopulmonary" even if tradition stressed heart and lung function.
24 Cf. Pallis 1999: 96.
25 DeGrazia 2005: chap. 4.
26 I believe that this practice involves a fudge, however, insofar as loss of CR functioning is only *permanent* – given a commitment not to resuscitate the patient – as opposed to *irreversible*. So I don't think these patients are dead (unless total brain failure has already occurred even if not yet confirmed by tests). At the same time, because I do not think we need to maintain the dead-donor rule, I approve of the practice. For a good discussion, see Truog and Miller 2008.