

THE THIN FLAT LINE: REDEFINING WHO IS LEGALLY DEAD IN ORGAN DONATION AFTER CARDIAC DEATH

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*Well, it just so happens that your friend here is only mostly dead. There's a big difference between mostly dead and all dead . . . Now, mostly dead is slightly alive.*¹

INTRODUCTION

By the end of 2008, a pilot program to recover organs from those dying on the streets of New York City could be in effect.² Under a federally-funded grant, the city is proposing to expand the donor pool by deploying a “rapid organ-recovery ambulance” to procure the organs of people who die of cardiac arrest outside hospitals.³ According to newspaper reports, a special transplant ambulance would trail an emergency ambulance responding to notification of a victim with cardiac arrest.⁴ After regular paramedics cease resuscitation efforts, the transplant ambulance team would wait five minutes and then attempt to maintain the viability of organs by administering drugs and by performing chest compressions to the victim until more extensive preservation efforts could be performed at the hospital and consent for donation from the next of kin could be obtained.⁵

Announcement of the program generated considerable controversy. One commentator referred to the organ-recovery ambulance as a “meat wagon.”⁶ An academic bioethicist pronounced the initiative “disgusting.”⁷ Another bioethicist voiced her concern that the victims of cardiac arrest might not be “irreversibly” dead when the organ transplant team took over minutes after resuscitation efforts ceased.⁸

Within a few months after the New York City initiative was announced, the New England Journal of Medicine reported that a team of

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1. THE PRINCESS BRIDE (Twentieth Century-Fox Film Corporation 1987).

2. Cara Buckley, *City Plans Ambulance for Donor Collections*, N.Y. TIMES, June 1, 2008, at A35.

3. *Id.*; see also Rob Stein, *N.Y. Planning Special Ambulance to Recover Organs*, WASH. POST, May 24, 2008, at A01.

4. Buckley, *supra* note 2.

5. Stein, *supra* note 3, at A08.

6. William Saletan, *Meat Wagons*, SLATE, May 27, 2008, <http://www.slate.com/blogs/blogs/humannature/archive/2008/05/27/meat-wagons.aspx>.

7. Stein, *supra* note 3 (quoting Michael A. Grodin, director of bioethics at Boston University).

8. *Id.* (quoting Leslie M. Whetsine, a bioethicist at Walsh University).

physicians at Denver Children's Hospital had been able to transplant hearts from three infant donors who were not brain-dead, but who had been removed from mechanical life support.⁹ Death was declared in one infant three minutes after cardiac and respiratory efforts ceased; in the other two infants, death was pronounced after seventy-five seconds of absent heart and lung functions.¹⁰ Once death was declared, organ recovery began.¹¹ Again, some medical bioethicists were alarmed. George Annas, who has been called the "father of patient rights,"¹² warned: "The donors are not dead. I understand they would like us to change the definition of death, but they can't do that by themselves."¹³ Robert M. Veatch, professor of medical ethics at Georgetown University, added:

The whole issue is whether the infants from whom the hearts were taken were dead. It seems very clear to me that they were not . . . I think it's illegal, and if it's illegal, what we're talking about is the physicians causing the death of the three patients, and that would be homicide. It's immoral. I think it should be stopped.¹⁴

Should we worry that organs are being removed from people who are just "mostly" dead? Law and medicine are grappling with a fundamental tension between, on the one hand, delaying the pronouncement of death until there is no chance of recovery and, on the other hand, increasing the quantity and quality of organs for transplant by pronouncing death as soon as possible. This article examines whether, in the relentless pursuit of organs, medicine has gone too far in tinkering with the definition of death.

Most cadaveric organs are recovered from donors who meet brain death criteria.¹⁵ There is, however, a growing imbalance between the number of brain-dead donors and the demand for organs. The New York City study and the Denver Children's Hospital protocol are recent exam-

9. Mark M. Boucek et al., *Pediatric Heart Transplantation After Declaration of Cardiocirculatory Death*, 359 NEW ENG. J. MED. 709, 711, 713 (2008). As an indication of the importance of this debate, The New England Journal of Medicine also featured three perspective reports, an editorial, and a videotaped roundtable discussion among bioethicists, all of which are available on the journal's website at <http://content.nejm.org/cgi/content/full/359/7/669/DC1> (last visited Dec. 19, 2008).

10. Boucek et al., *supra* note 9, at 711.

11. *Id.*

12. Boston University School of Public Health, George Annas, Biography, http://sph.bu.edu/index.php?option=com_sphdir&id=239&Itemid=340&INDEX=577 (last visited Dec. 19, 2008).

13. Rob Stein, *Infant Transplant Procedure Ignites Debate; Ethicists Question Strategy in Which Hearts are Removed Minutes After They Stop Beating*, WASH. POST, Aug. 14, 2008, at A01 (quoting George J. Annas).

14. *Id.* (quoting Robert M. Veatch); see also James L. Bernat, *The Boundaries of Organ Donation After Circulatory Death*, 359 NEW ENG. J. MED. 669, 671 (2008) (asserting that the protocol's shortened time period for determining death did not comply with prevailing medical standards).

15. See Eelco F.M. Wijdicks, *The Diagnosis of Brain Death*, 344 NEW ENG. J. MED. 1215, 1215-18 (2001) (describing the clinical criteria used to determine brain death, and noting that "brain death is the principle requisite for the donation of organs for transplantation").

ples of a movement in the transplant community to increase the supply of organs by using donors whose heart and lung functions have ceased, but who are not yet brain dead. This practice, known as donation after cardiac death (DCD), has proved controversial for a number of reasons.¹⁶ This article addresses the threshold controversy: whether DCD donors are legally dead at the time organ procurement begins.

The Uniform Determination of Death Act (UDDA) and its state counterparts require the “irreversible” cessation of the functions of either (1) the entire brain or (2) the heart and lungs before a person can be considered dead.¹⁷ There is a significant debate among scholars over whether the UDDA recognizes two kinds of death or only two different criteria, cardiac and neurological, under a unitary concept of death.¹⁸ The proponents of DCD have resolved this controversy by recognizing donation after “cardiac death,” where organs can be removed minutes after the heart stops, before brain death occurs.¹⁹ Locating a precise moment of death is not an issue in most victims of cardiac arrest. It is a primary issue in DCD, however, because once the heart stops, there is a need to protect transplantable organs from deteriorating due to a lack of blood flow.²⁰ The quality of organs is less of a concern with patients who are declared dead under brain death criteria because the donor is maintained on artificial support after death to keep the heart and lungs functioning throughout organ procurement.²¹ The DCD donor is not declared dead until life support is withdrawn or unsuccessful resuscitation is terminated.²² The need for viable organs creates a conflict between ensuring that the donor patient is dead and removing organs as soon as possible.²³

As DCD is generally practiced in the United States, death is declared two to five minutes after the cessation of cardiac and respiratory functions.²⁴ Once a diagnosis of cardiac death is made, transplant sur-

16. Concerns have also been raised about the pre-mortem administration of drugs and preservation of organs in the dying or newly dead donor; see Sarah D. Barber, *The Tell-Tale Heart: Ethical and Legal Implications of In Situ Organ Preservation in the Non-Heart-Beating Cadaver Donor*, 6 HEALTH MATRIX 471, 473, 487-89 (1996); see also *infra* note 111.

17. UNIF. DETERMINATION OF DEATH ACT § 1, 12 U.L.A. 589 (1980); see also discussion *infra* Part III.

18. Alexander M. Capron, *Brain Death—Well Settled Yet Still Unresolved*, 344 NEW ENG. J. MED. 1244, 1245 (2001).

19. Robert Steinbrook, *Organ Donation After Cardiac Death*, 357 NEW ENG. J. MED. 209, 209 (2007).

20. INST. OF MED., NON-HEARTING-BEATING ORGAN TRANSPLANTATION: PRACTICE AND PROTOCOLS 22 (2000), available at http://www.nap.edu/catalog.php?record_id=9700 [hereinafter 2000 IOM Report].

21. George J. Annas, *Brain Death and Organ Donation: You Can Have One Without the Other*, 18 HASTINGS CTR. REPORT 28, 28 (1988).

22. Robert D. Truog & Franklin Miller, *The Dead Donor Rule and Organ Transplantation*, 359 NEW ENG. J. MED. 674, 674 (2008).

23. 2000 IOM Report, *supra* note 20 (noting that the “need to maintain organ viability creates a strong incentive for an early determination of death”).

24. See James L. Bernat et al., *Report of a National Conference on Donation After Cardiac Death*, 6 AM. J. TRANSPLANTATION 281, 282 (2006) (stating that most organ procurement organiza-

geons begin the process of organ retrieval. It is unlikely that the DCD donor satisfies the criteria for brain death at the time of organ procurement as it takes longer than five minutes for the entire brain to be irreversibly damaged from lack of oxygen.²⁵ The speed with which a diagnosis of death is made in the DCD context is done solely to facilitate organ procurement.²⁶ The closer the donor is to life, the more useful the organs will be to the recipient.

The debate over whether DCD donors are truly dead is not new but has surfaced mostly in the academic community. Recently, however, DCD has become a focus of media and public attention, as demonstrated by the debate over the New York City and Denver Children's Hospital initiatives. In addition, the Washington Post featured an article in March 2007 about a "new trend in organ donation," airing the concerns of some physicians and bioethicists about the controversial practice of donation after cardiac death.²⁷ In 2008, widespread publicity was given to the indictment of a transplant surgeon in California in connection with the alleged administration of excessive and inappropriate medications to a potential donor awaiting cardiac death after removal from a ventilator.²⁸

These reports in the lay press mirror the expanding use of DCD to boost the supply of organs. Although the number of organs transplanted from cardiac death donors is still relatively small,²⁹ an increase is expected as hospitals and organ procurement organizations begin to develop DCD policies under mandate from oversight bodies.³⁰ Currently, most DCD donors are severely ill, hospitalized patients who do not meet the criteria for brain death but who have decided, either personally or through a surrogate, to refuse resuscitation and to withdraw life-sustaining medical care.³¹ The controversy over whether patients are

tions use a five minute interval, while three use an interval of two minutes and one uses four minutes). Pediatric DCD is relatively new, and with two donors, Denver Children's Hospital waited only seventy-five seconds after death to begin organ retrieval. See Boucek et al., *supra* note 9, at 711 and accompanying text.

25. See Barber, *supra* note 16, at 471-72 (defining brain death); see also *infra* notes 211-12 and accompanying text.

26. Rob Stein, *New Trend in Organ Donation Raises Questions*, WASH. POST, Mar. 18, 2007, at A03.

27. *Id.*

28. See Jesse McKinley, *Surgeon Is Accused of Hurrying Death of Patient to Get Organs*, N.Y. TIMES, Feb. 27, 2008, at A1 (reporting that transplant physician ordered excessive doses of morphine and Ativan and administered Betadine, a topical antiseptic, through a nasogastric tube). The physician was acquitted of all charges in December 2008, although the jury issued a note with its verdict stating that the case illustrated a need for clear standards in cardiac death donation. Jesse McKinley, *Surgeon Cleared of Harming Man to Rush Organ Removal*, N.Y. TIMES, Dec. 19, 2008, at A20.

29. In 2006, DCD organs comprised eight percent of the total cadaveric organs transplanted. HEALTH RESOURCES AND SERVS. ADMIN., 2007 ANNUAL REPORT OF THE U.S. ORGAN PROCUREMENT AND TRANSPLANTATION NETWORK AND THE SCIENTIFIC REGISTRY OF TRANSPLANT RECIPIENTS: TRANSPLANT DATA 1997-2006 Table 1.1 (2007), available at http://www.optn.org/AR2007/101_dh.pdf [hereinafter 2007 OPTN/SRTR ANNUAL REPORT].

30. See *infra* notes 145-147 and accompanying text.

31. Steinbrook, *supra* note 19, at 209-10.

“dead enough” for organ procurement has focused almost exclusively on this subset of potential donors, and little attention has been given to the distinct medical and legal concerns presented by the expansion of DCD to victims of sudden cardiac arrest outside the hospital. There is an obvious conflict between the right of these individuals to adequate emergency resuscitative efforts and the need to procure organs only minutes after cessation of the heartbeat. Removing organs a mere seventy-five seconds after the heart stops and transplanting hearts from donors who are not brain dead are two other recent developments in DCD that test the legal and ethical boundaries of organ transplantation. These controversial practices raise fundamental questions about the extent to which society is willing to tolerate the removal of vital organs from people we cannot be certain are dead in order to satisfy the escalating demand for organs. This article suggests that there is a need for a wider public debate on the permissible limits of DCD, but that a reasonable accommodation can be reached without compromising legal standards for determining death. There are ethically defensible reasons to allow this form of organ procurement in hospitalized patients voluntarily removed from life support, but absent broad social and political consensus, DCD, as currently practiced, should not be expanded to other potential donors.

Part I of this article begins with a brief background of solid organ transplantation and the statutory framework in which it operates. Part II explains the practice of donation after cardiac death and the history of its use in the United States. Part III examines whether DCD donors are legally dead under the UDDA. In Part IV, the article explores whether it is appropriate, given the speed with which death is determined, to apply DCD as it is currently practiced to those in sudden cardiac arrest or to children. Part V addresses the concern that DCD is causing the death of donors. Part VI suggests several approaches to resolve the controversy over the determination of death in DCD donors. This article concludes with a call for this debate to move beyond scholarly journals into the public arena.

I. A BRIEF HISTORY OF SOLID ORGAN TRANSPLANTATION AND THE LEGAL RESPONSE

The first successful human transplant was performed in 1954 when Dr. Joseph Murray transplanted a kidney from a live donor into his identical twin brother.³² Eight years later, Dr. Murray performed the first transplant from a cadaveric donor.³³ Early cadaveric transplants, primarily kidneys, were from patients who had suffered traditional circulatory death, where the lungs and heart ceased functioning.³⁴ Survival rates of

32. Peter I. Abt et al., *Donation After Cardiac Death in the US: History and Use*, 203 J. AM. COLL. SURGEONS 208, 209 (2006).

33. *Id.*

34. *Id.*

recipients were poor, however, primarily due to problems with rejection and poor organ quality caused by warm ischemia time,³⁵ the period in which the donor's organs begin to die from lack of an oxygenated blood supply.³⁶

In the 1960s and early 1970s, the use of neurological criteria to define death, which eventually came to be known as brain death, began to develop.³⁷ In 1959, French neurophysiologists coined the term, *le coma depasse*, or irreversible coma, to describe patients with irreparable brain damage.³⁸ By the mid-1960s, medical technology had progressed to the point where it was possible to keep patients with devastating neurological injuries alive.³⁹ In many of these cases, medical tests, including the electroencephalogram (EEG) demonstrated irreversible cessation of brain activity.⁴⁰ Some patients developed what is known as respirator brain, a condition where the heart and lungs can be kept functioning through mechanical ventilation, but where the brain tissue shows extensive signs of cell death.⁴¹

The burgeoning transplant community understood the implications of being able to recover organs that were still perfusing, or receiving a blood supply, through artificial support while the person was brain dead.⁴² Recovering organs from a "heart-beating donor" would avoid the problem of warm ischemia time associated with circulatory death, which diminishes the quality of organs available for transplantation.⁴³ In other words, the donor's brain would be dead, but the transplantable organs still very much alive.

There was a perceived legal impediment to the removal of organs from those who had suffered brain death, however. State laws were silent or unsettled on the new phenomenon of neurological death.⁴⁴ The

35. Warm ischemia time refers to the time in which the heart and lungs are not functioning adequately to ensure the flow of blood to the organs. Without blood, oxygen cannot be delivered and vital organs will die. 2000 IOM Report, *supra* note 20, at xv.

36. Abt et al., *supra* note 32, at 212.

37. *Id.*

38. *Id.*

39. *Id.*

40. *Id.* at 213.

41. PRESIDENT'S COMM. FOR THE STUDY OF ETHICAL PROBLEMS IN MED. AND BIOMEDICAL AND BEHAVIORAL RESEARCH, DEFINING DEATH: A REPORT ON THE MEDICAL, LEGAL AND ETHICAL ISSUES IN THE DETERMINATION OF DEATH 23 (1981), *available at* http://www.bioethics.gov/reports/past_commissions/defining_death.pdf [hereinafter DEFINING DEATH].

42. *Id.* (stating that there was a "new urgency" in the transplant community to recognize brain death).

43. See N.Y. City Health & Hosp. Corp. v. Sulsona, 367 N.Y.S.2d 686, 689 (Sup. Ct. 1975) (noting agreement of experts that kidneys obtained from donors who died from cardiopulmonary death resulted in an eighty-eight percent incidence of renal failure in the recipient, while kidneys from those who were brain dead were indistinguishable from those obtained from living donors).

44. See *id.* at 689-91 (addressing a petition for declaratory judgment that New York's definition of death included neurological death).

common law defined death as cardiac and respiratory failure.⁴⁵ Transplant surgeons who attempted to remove organs from persons who were brain dead but who still had heart and lung function, albeit mechanically, were concerned with possible criminal prosecution or civil suits.⁴⁶

In 1968, the landmark work of the Ad Hoc Committee of the Harvard Medical School was published, which proposed irreversible coma as a new criterion for determining death.⁴⁷ The committee stated that its purpose was two-fold: to decrease the burden on families of keeping a person on continued medical support who had irreversible brain damage, and to facilitate the recovery of organs from such people because they were dead, not under traditional circulatory criteria, but under the new definition of brain death.⁴⁸ According to the Ad Hoc Committee, “[o]bsolete criteria for the definition of death can lead to controversy in obtaining organs for transplantation.”⁴⁹ The Ad Hoc Committee’s findings were quickly and widely accepted by the medical community. In 1970, Kansas adopted the first statute to formulate a legal definition of death to include brain death, as well as circulatory death.⁵⁰ Other states quickly followed suit and, by 1980, twenty-four states had enacted statutory definitions of death that incorporated brain death.⁵¹

Due to the failure of some states to enact brain death legislation and the lack of uniformity in existing state laws, in 1980 Congress convened an interdisciplinary body under the auspices of the President’s Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research (President’s Commission) to explore the advisability of developing a uniform definition of death.⁵² In 1981, the President’s Commission recommended adoption of the Uniform Determination of Death Act (UDDA).⁵³ The UDDA provides:

45. *Id.* at 689; *Lovato v. Dist. Court Tenth Judicial Dist.*, 601 P.2d 1072, 1076 (Colo. 1979).

46. *See Sulsona*, 367 N.Y.S.2d at 688 (noting that one of the reasons the petitioner sought court approval of a new definition of death was the fear of potential criminal or civil liability); *see also* Alexander Morgan Capron & Leon R. Kass, *A Statutory Definition of the Standards for Determining Human Death: An Appraisal and a Proposal*, 121 U. PA. L. REV. 87, 97-100 (1972) (discussing the need for a statutory definition of neurological death to allay professionals’ fears of civil and criminal litigation).

47. AD HOC COMMITTEE OF THE HARVARD MEDICAL SCHOOL TO EXAMINE THE DEFINITION OF BRAIN DEATH, A DEFINITION OF IRREVERSIBLE COMA, 205 JAMA 85, 85 (1968) [hereinafter Ad Hoc Committee]. The report uses the terms irreversible coma and brain death coextensively. *Id.* at 88. Later, the medical community would recognize that these diagnoses are not interchangeable. *See* DEFINING DEATH, *supra* note 41, at 25.

48. Ad Hoc Committee, *supra* note 47, at 85.

49. *Id.*

50. Capron & Kass, *supra* note 46, at 108-09.

51. RICHARD M. ZANER, DEATH: BEYOND WHOLE-BRAIN CRITERIA 2 (Richard M. Zaner ed., Kluwer Academic Publishers 1988).

52. DEFINING DEATH, *supra* note 41, at 1, 7-8; *see also supra* at 24-25 (the Commission stated that it was also necessary to clarify the “misleading” term, irreversible coma, used by the Ad Hoc Committee in its 1968 report).

53. DEFINING DEATH, *supra* note 41.

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 brain stem, is dead. A determination of death must be made in accordance with accepted medical standards.⁵⁴

The President's Commission was aware of the impact its recommendations would have on the burgeoning field of organ transplantation. If the UDDA were widely adopted, neurologically devastated patients with functioning hearts and lungs could be declared dead in every jurisdiction.⁵⁵ The Commission's hopes were soon realized. The UDDA or similar legislation was approved in almost every state, although the statutes are not entirely "uniform" in their definitions of death.⁵⁶ Legal recognition of brain death led to the almost universal abandonment of organ procurement from persons suffering a traditional death following cardiac arrest.⁵⁷ Because mechanical ventilation sustained the vital functions of the heart and lungs, the quality of organs recovered from brain-dead, heart-beating donors was vastly superior to organs impaired by the warm ischemia time associated with circulatory death.⁵⁸

To promote organ donation, the Uniform Anatomical Gift Act (UAGA) was adopted in 1968, and subsequently revised in 1987 and 2006.⁵⁹ This act encourages cadaveric organ transplantation by authorizing the donation of an organ by an adult effective at death and by the next of kin after death.⁶⁰ The UAGA also immunizes physicians recovering organs in good faith from civil and criminal prosecution.⁶¹ Every state has adopted one of the versions of the UAGA.⁶²

As a mechanism for organizing organ donations and transplantation, the National Organ Transplant Act (NOTA) was passed in 1984.⁶³ NOTA established the Organ Procurement Transplantation Network (OPTN), which is charged with maintaining a waiting list of individuals

54. UNIF. DETERMINATION OF DEATH ACT § 1, 12A U.L.A. 781 (2008).

55. DEFINING DEATH, *supra* note 41, at 7-8 (asserting that state variations in the definition of death are not acceptable).

56. See generally Jason L. Goldsmith, *Wanted! Dead and/or Alive: Choosing Among the Not-So-Uniform Statutory Definitions of Death*, 61 U. MIAMI L. REV. 871, 889-90 (2007) (noting differences in the language of state law definitions of death).

57. See Abt et al., *supra* note 32, at 213-14 (noting that after the recognition of brain death, almost every transplant center stopped retrieving organs from DCD patients); Michael A. DeVita, et al., *Observations of Withdrawal of Life-Sustaining Treatment from Patients Who Became Non-Heart-Beating Organ Donors*, 28 CRITICAL CARE MED. 1709, 1709 (2000) (stating that non-heart-beating donation was largely abandoned when it was found that organs from brain-dead donors had better survival).

58. See Abt et al., *supra* note 32, at 214.

59. UNIF. ANATOMICAL GIFT ACT §§ 1-11 (amended 2006), 8A U.L.A. 27, 19 (Supp. 2008).

60. *Id.* §§ 4, 9.

61. *Id.* § 18.

62. Joseph B. Clamon, *Tax Policy as a Lifeline: Encouraging Blood and Organ Donation Through Tax Credits*, 17 ANNALS HEALTH L. 67, 76 (2008) (stating that the UAGA has been adopted in one of its forms by all fifty states).

63. National Organ Transplant Act, 42 U.S.C §§ 273-274g (2008).

who need organs, matching potential recipients with organs, operating a system for procuring and allocating organs, and increasing the supply of organs.⁶⁴ In 1986, the United Network for Organ Sharing (UNOS) received the first (and only) federal contract to operate the OPTN and to coordinate the placement of organs and the collection of data on donor and transplant recipients.⁶⁵ The OPTN also includes a system of regional Organ Procurement Organizations (OPOs) that are responsible for procuring, testing, and distributing organs within their respective geographic areas.⁶⁶

II. THE RENEWED INTEREST IN DONATION AFTER CARDIAC DEATH

The clinical field of transplantation was spurred not only by the shift in recovery of better quality organs from brain-dead, heart-beating donors, but also by improved techniques for preserving organs after their removal and by the use of immunosuppressants to prevent organ rejection in recipients.⁶⁷ In particular, the discovery of cyclosporine in 1978 is thought to have revolutionized the field of transplantation by markedly improving survival rates in organ recipients.⁶⁸

By the end of the twentieth century, solid organ transplantation had become the standard of care for treating organ failure, with recipients living longer with better quality of life than that offered by conventional treatments.⁶⁹ For example, numerous studies demonstrate that with end-stage renal failure, patients who receive kidney transplants have significantly higher long-term survival rates compared to those who remain on dialysis.⁷⁰

Yet transplantation is “a victim of its own success.”⁷¹ With improvement in the lives of recipients, the demand for transplants has far outstripped the supply. Even if all brain-dead patients were suitable donors, the number of organs recovered could not meet the needs of all the patients on the transplant waiting list.⁷² In 1997, there were a total of 9,539 donors; by 2006, that number had increased to 14,756, of which 8,024 were cadaveric donors and 6,732 were living donors.⁷³ During the

64. *Id.* § 274(b)(2).

65. United Network for Organ Sharing: Organ Donation and Transplantation, History of the UNOS Database, <http://www.unos.org/data/about/history.asp> (last visited Dec. 18, 2008).

66. 42 U.S.C. §273(b)(3).

67. Abt et al., *supra* note 32, at 214.

68. *Id.* at 208, 214.

69. *Id.* at 214.

70. See, e.g., J.E. Locke et al., *Outcomes of Kidneys from Donors After Cardiac Death: Implications for Allocation and Preservation*, 7 AM. J. TRANSPLANTATION 1797, 1803 (2007) (noting a sixty-eight percent reduction in the long-term mortality of transplanted patients over those on dialysis).

71. Mark D. Fox, *Stewards of a Public Trust: Responsible Transplantation*, 3 AM. J. BIOETHICS v, vi (2003).

72. Ellen Sheehy et al., *Estimating the Number of Potential Organ Donors in the United States*, 349 N. ENG. J. MED. 667, 673 (2003).

73. 2007 OPTN/SRTR ANNUAL REPORT, *supra* note 29, at Table 1.1.

same period, however, the waiting list⁷⁴ increased by more than 40,000: from 55,501 in 1997 to 98,263 in 2006.⁷⁵

In response to the growing imbalance between supply and demand, there has been a surge of new initiatives to increase the donor pool. The National Organ Donation Breakthrough Collaborative was established in 2003 to develop best practices for hospitals in order to achieve organ donation rates of seventy-five percent, up from an average of forty-three percent.⁷⁶ Medicare conditions of participation require each hospital to notify its OPO of all patient deaths and imminent deaths so that the OPO has the opportunity to determine the suitability of potential organ donors.⁷⁷ The deceased donor pool has been expanded through the use of “marginal” organs, so that older donors or those with an underlying disease are being increasingly used to fill the need for cadaveric organs.⁷⁸ The use of living donors, primarily for kidneys, increased by seventy percent from 1997 through 2004, but has fallen slightly in the last several years.⁷⁹ Despite current law prohibiting the sale of organs,⁸⁰ there have been proposals to financially incentivize donors, either through payments to the donor before death or the family after death, although none of these controversial recommendations has been implemented.⁸¹ Xenotransplantation, the transplantation of organs from non-humans to humans, is in the experimental stage but its use is severely limited by unknown health risks and ethical questions.⁸²

Finally, pressure to increase the supply of organs caused the transplant community to re-examine organ retrieval from patients who were not brain-dead but whose circulatory functions had stopped.⁸³ By the end of the twentieth century, the once seemingly insurmountable problems associated with warm ischemia time and the rapid deterioration of

74. 2007 OPTN/SRTR ANNUAL REPORT, *supra* note 29, at Chapter I (noting that some patients may be listed on multiple waiting lists, and the total number of registrations is higher than the number of unique patients); *id.* (stating that thirty percent of those on the waiting list are deemed “inactive” because they are not immediately eligible for an organ if one becomes available); *see also* Rob Stein, *A Third of Patients on Transplant List Are Not Eligible*, WASH. POST, Mar. 22, 2008, at A01 (questioning the reliability of the waiting list numbers).

75. 2007 OPTN/SRTR ANNUAL REPORT, *supra* note 29, at Table 1.3.

76. *See* U.S. DEP’T OF HEALTH AND HUMAN SERVS. HEALTH RESOURCES & SERVS. ADMIN. OFFICE OF SPECIAL PROGRAMS, DIV. OF TRANSPLANTATION No. 240-94-0037, THE ORGAN DONATION BREAKTHROUGH COLLABORATIVE: BEST PRACTICES FINAL REPORT (2003), *available at* <http://www.njha.com/onit/pdf/930200530512PM71.pdf>.

77. 42 C.F.R. § 482.45(a)(1) (2003).

78. Craig R. Smith & Jeffrey A. Lowell, *Ethical Considerations in Organ Donation and Transplantation*, 15 J. INTENSIVE CARE MED. 231, 235 (2000).

79. 2007 OPTN/SRTR Annual Report, *supra* note 29, at Table 1.1.

80. National Organ Transplant Act, 42 U.S.C. § 274e (2008).

81. *See generally* Steve P. Calandrillo, *Cash for Kidneys? Utilizing Incentives to End America’s Organ Shortage*, 13 GEO. MASON L. REV. 69, 108-118 (2004) (summarizing financial initiatives to increase organ donation).

82. *See generally* Margaret A. Clark, *This Little Piggy Went to Market: The Xenotransplantation and Xenozoonose Debate*, 27 J.L. MED. & ETHICS 137, 138-145 (1999) (discussing the medical, ethical, and legal issues raised by xenotransplantation).

83. Abt et al., *supra* note 32, at 214.

organs after cardiac arrest were being alleviated with improved donor preparation and organ preservation methods.⁸⁴ These donors were originally referred to as non-heart-beating donors (NHBDs), in contrast to the heart-beating donors who suffered brain death.⁸⁵ Donation from a non-heart-beating donor is now termed donation after cardiac death (DCD) and that term is used throughout this article to provide a consistent terminology.⁸⁶

Legal developments in end-of-life care also spurred renewed interest in DCD. In 1968, at the time of the Ad Hoc Committee's recognition of brain death, physicians were urged not to remove respirators before a declaration of death was made as this could subject them to legal jeopardy.⁸⁷ Beginning with the *Quinlan* case in 1976,⁸⁸ through *Cruzan* in 1990,⁸⁹ the "right to die" debate had evolved from a nascent movement to widespread acceptance of a patient's right to withdraw life-sustaining technology. Patients who were terminally ill but not brain-dead and who requested or had their surrogates request removal of extraordinary care were now a potential source of organs.⁹⁰

Organ donors who die from cardiac death rather than brain death are categorized as either controlled or uncontrolled donors.⁹¹ In the controlled group are those who are neurologically damaged or severely ill, usually on a ventilator, and who have a planned withdrawal from life-sustaining treatment because of the futility of further care.⁹² The uncon-

84. *Id.*

85. *Id.*

86. One critic has alleged that the terminology was changed from NHBD to DCD as a marketing ploy in the face of uncertainty in determining death. Mohammed Y. Rady et al., *Non-Heart Beating, or Cardiac Death, Organ Donation: Why We Should Care*, 2 J. HOSP. MED. 324, 328 (2007). The Institute of Medicine has suggested that the terminology be further refined to donation after circulatory determination of death (DCDD). COMMITTEE ON INCREASING RATES OF ORGAN DONATION, ORGAN DONATION: OPPORTUNITIES FOR ACTION 128 (James F. Childress & Catharyn T. Liverman, eds., 2006), available at <http://www.iom.edu/CMS/3740/24738/34249.aspx> [hereinafter 2006 IOM REPORT].

87. Ad Hoc Committee, *supra* note 47, at 339.

88. *In re Quinlan*, 355 A.2d 647, 663 (N.J. 1976), cert. denied sub nom. *Garger v. New Jersey*, 429 U.S. 922 (1976) (holding that a patient has a constitutional right of privacy to terminate life-sustaining treatment).

89. *Cruzan v. Dir. Mo. Dep't of Health*, 497 U.S. 261, 279 (1990) (assuming that a competent person has a constitutionally protected liberty interest in refusing life-sustaining medical treatment).

90. ROGER HERDMAN & JOHN T. POTTS, DIVISION OF HEALTH CARE SERVICES, INSTITUTE OF MEDICINE, NON-HEART-BEATING ORGAN TRANSPLANTATION MEDICAL AND ETHICAL ISSUES IN PROCUREMENT 24 (1997), available at http://www.nap.edu/catalog.php?record_id=6036 [hereinafter 1997 IOM REPORT].

91. *Id.* at 1. These categories are derived from the classification of non-heart-beating donors developed at the University Hospital Maastricht in the Netherlands. *Id.* at 25. The Maastricht categories include: 1. Dead on arrival; 2. Unsuccessful resuscitation; 3. Awaiting cardiac arrest; and 4. Cardiac arrest while brain dead. G. Koostra et al., *Categories of Non-Heart-Beating Donors*, 27 TRANSPLANTATION PROC. 2883, 2883 (1995). Category three is controlled; the other categories are uncontrolled. *Id.* at 2893-94. A fifth uncontrolled donor category, unexpected cardiac arrest in a critically ill patient, was recently added. Dale Gardiner et al., Editorial, *Non-Heart-Beating Donation—Solution or a Step Too Far?*, 62 ANESTHESIA 431, 431 (2007).

92. 1997 IOM REPORT, *supra* note 90, at 1.

trolled donor includes those who experience an out-of-hospital cardiac arrest or who are hospitalized and suffer an unexpected cardiac arrest and are not successfully resuscitated.⁹³

Most DCD donors are in the controlled group, where the timing of cardiac arrest and the retrieval of organs are carefully planned events and provide transplant surgeons with the shortest time for the retrieval of viable organs.⁹⁴ To approach the success rates of transplantation with organs from brain-dead, heart-beating donors requires a short interval to death and a prompt declaration of death followed by rapid organ retrieval and cold preservation of the organs.⁹⁵ With the consent of the patient or patient's family, physicians remove the ventilator and other life support in or near an operating room, waiting for the pulse and respirations to cease.⁹⁶ Once that occurs, death is declared quickly, usually within two to five minutes, and the organ procurement process immediately begins.⁹⁷ Occasionally, circulation does not promptly cease after life support has been withdrawn.⁹⁸ If cardiopulmonary arrest does not occur within a short period of time after removal of the ventilator, organ quality diminishes.⁹⁹ Most DCD protocols provide that if death does not occur within one hour, organ recovery will not be carried out.¹⁰⁰ In that event, the patient is returned to a patient care unit to await death.¹⁰¹

In the United States, the University of Pittsburgh Medical Center was one of the first to revisit the non-heart-beating donor as a possible source of organs. In 1992, the transplant center produced a protocol for recovering organs from persons who were not brain dead but who were expected to die from cardiac arrest following the voluntary withdrawal of life support.¹⁰² A central piece of this policy (commonly known as the "Pittsburgh protocol") was that procurement of organs could not begin until the donor suffered irreversible cessation of cardiopulmonary function, which required an observation time of two minutes following cardiac arrest before the declaration of death could be made and the retrieval process begun.¹⁰³

93. *Id.*

94. *Id.* at 24.

95. *Id.* at 26.

96. DeVita et al., *supra* note 57, at 1710 (describing the process of organ procurement at the University of Pittsburgh Medical Center).

97. *Id.*

98. 2000 IOM REPORT, *supra* note 20, at 21.

99. *Id.*

100. *Id.*

101. *Id.*

102. University of Pittsburgh Medical Center Policy and Procedure Manual, Subject: Management of Terminally Ill Patients Who May become Organ Donors After Death, *reprinted in* PROCURING ORGANS FOR TRANSPLANT, THE DEBATE OVER NON-HEART BEATING CADAVER PROTOCOLS, app. at 235 (Robert M. Arnold et al., eds., 1995) [hereinafter PROCURING ORGANS FOR TRANSPLANT].

103. *Id.* at 240. Clinical tests to confirm death included pulselessness, apnea, and electrocardiographic criteria. *Id.*

Concerns in the medical community about the two-minute length of time between cessation of circulatory functions and the declaration of death were promptly raised. An entire issue of the Kennedy Institute of Ethics Journal was devoted to the controversies surrounding the Pittsburgh protocol.¹⁰⁴ Renée Fox, who was a member of the President's Commission, called the plan macabre and an "ignoble form of cannibalism."¹⁰⁵ The primary concern, which persists to this day, is that the period of time between the cessation of circulation and the declaration of death is too short to be certain the patient is irreversibly dead before organs are harvested.

Following the lead of the Pittsburgh Medical Center, the Cleveland Clinic developed a similar proposal for recovering organs from DCD donors.¹⁰⁶ However, a professor of bioethics at Cleveland State University went to the local county prosecutor, alleging that under the draft protocol, the Clinic intended to hasten patients' deaths in order to procure their organs for transplant.¹⁰⁷ In March 1997, *Sixty Minutes*, a national television show, aired a segment in which it claimed that patients at the Cleveland Clinic were being killed for their organs.¹⁰⁸ Calling it a "matter of grave concern," the assistant district attorney commenced an investigation into the organ procurement policy.¹⁰⁹ The protocol was not implemented.¹¹⁰

In response to concerns about DCD, the Institute of Medicine (IOM) was asked by the U.S. Department of Health and Human Services in 1997 to review the medical and ethical issues associated with non-heart-beating donation.¹¹¹ In its report, the IOM acknowledged the "relentlessly increasing need for organs for patients with life-threatening organ failures"¹¹² The number of DCD donors was a very small component of the cadaveric donors: in 1996 there were only sixty-five DCD donors out of 5,416 dead donors.¹¹³ The majority of OPOs recov-

104. 3 KENNEDY INST. ETHICS J. 103 (1993). The articles in this issue were later published in PROCURING ORGANS FOR TRANSPLANT, *supra* note 102.

105. Renée Fox, "An Ignoble Form of Cannibalism": Reflections on the Pittsburgh Protocol for Procuring Organs from Non-Heart-Beating Cadavers, in PROCURING ORGANS FOR TRANSPLANT, *supra* note 102, at 155, 162.

106. George J. Agich, *From Pittsburgh to Cleveland: NHBD Controversies and Bioethics*, 8 CAMBRIDGE Q. HEALTHCARE ETHICS 269, 269 (1999).

107. *Id.*; see also Gina Kolata, *Controversy Erupts over Organ Removals*, N.Y. TIMES, Apr. 13, 1997, at A28.

108. Agich, *supra* note 106, at 269.

109. Kolata, *supra* note 107.

110. James M. DuBois & Michael DeVita, *Donation After Cardiac Death in the United States: How to Move Forward*, 34 CRITICAL CARE MED. 3045, 3045 (2006) (stating that the Cleveland Clinic DCD protocol was never implemented).

111. 1997 IOM REPORT, *supra* note 90, App. A. In addition to the criteria for determining death, the IOM discussed ethical issues involving DCD policies and oversight, pre-and post-mortem medical interventions, conflicts of interest, and interaction with families. *Id.* at 47-57, 61-63.

112. *Id.* at 8.

113. *Id.* at 10, 27, Table 4.1A.

ered no organs from DCD donors.¹¹⁴ Citing the more than 50,000 people on the waiting list, the IOM concluded it was unlikely that in the future, brain-dead donors or living donors would be able to satisfy the increasing demand.¹¹⁵ Returning to DCD donors as a source of organs was one way the transplant community could address the shortage of organs. A study cited by the IOM predicted that use of controlled donors could increase cadaver donors by at least twenty-five percent.¹¹⁶

In 1997, there were twenty-nine OPOs (out of sixty-three) that had a written DCD protocol.¹¹⁷ The standards for determining the irreversibility of cardiopulmonary death varied considerably: several protocols required very specific criteria such as confirmation of a zero pulse, apnea,¹¹⁸ unresponsiveness to verbal stimuli, and absence of electrical activity for two minutes on the electrocardiogram (ECG).¹¹⁹ Others were vague as to the criteria for determining death.¹²⁰ Although prominent European programs required a ten minute cessation of cardiopulmonary function before organ procurement,¹²¹ U.S. guidelines were either silent or varied significantly with respect to the period of time organ retrieval could begin after heart stoppage. Some allowed organ retrieval immediately after cardiac arrest, while others mandated a waiting period ranging from sixty seconds to five minutes.¹²²

While voicing its support for increasing the supply of organs from this patient population, the IOM suggested that DCD policies as to the timing and criteria for determining death be uniform among OPOs and hospitals.¹²³ The IOM noted the difficulties surrounding the timing of events and the requirement of “irreversible” cardiac death.¹²⁴ A lack of adequate safeguards in declaring death could leave transplant programs open to charges of orchestrating a premature death and retrieval of organs.¹²⁵ The IOM recommended a waiting period of at least five minutes after the cessation of heart and lung activity as demonstrated by ECG

114. *Id.* at 31.

115. *Id.* at 14. At the end of 1996, there were 50,047 people on the transplantation waiting list. *Id.* at 11. During the same year, there were 8,940 donors, of which 5,416 were dead donors and 3,524 were living donors. *Id.* at 10.

116. *Id.* at 30.

117. *Id.* at 34-35.

118. Apnea is the absence of breathing. *STEDMAN'S MED. DICTIONARY* 118 (28th ed. 2006).

119. 1997 IOM Report, *supra* note 90, at 40.

120. *Id.*

121. *Id.* at 58; see R. Schlumpf, et al., *Transplantation of Kidneys from Non-Heart-Beating Donors: Protocol, Cardiac Death Diagnosis, and Results*, 28 *TRANSPLANTATION PROC.* 107, 107 (1996) (stating that protocol of University of Zurich Hospital is to wait ten minutes after the diagnosis of cardiac death before further organ retrieval procedures are implemented); G. Kostra, *Statement on Non-Heart-Beating Donor Programs*, 27 *TRANSPLANTATION PROC.* 2965, 2965 (1995) (reporting that the first international workshop on non-heart-beating protocols reached consensus on a ten-minute interval after cardiac arrest to ensure the dead donor rule).

122. 1997 IOM Report, *supra* note 90, at 40-41.

123. *Id.* at 48.

124. *Id.* at 57.

125. *Id.*

changes consistent with absent heart function and zero pulse activity as monitored by an arterial catheter before a declaration of death is made and organ retrieval commences.¹²⁶ A two-minute or shorter interval from cardiopulmonary cessation to declaration of death was deemed by the IOM as too short to ensure irreversibility.¹²⁷ The IOM's recommendation for a five-minute interval applied solely to controlled donors who decline resuscitation after the withdrawal of life support; no suggestions were made as to the appropriate waiting period for uncontrolled donors, who, as the IOM noted, present a different set of ethical and legal challenges.¹²⁸

Despite the IOM's imprimatur and the growing demand for organs, over the next few years the process of harvesting organs from non-heart-beating donors failed to gain wide acceptance.¹²⁹ In an effort to promote DCD and to overcome obstacles to its implementation, the IOM issued a follow-up report in 2000, encouraging the development of DCD protocols.¹³⁰ No new ground was broken by this report. The IOM reiterated its original proposal for consistency among DCD protocols in the determination of death,¹³¹ although it appeared to retreat from its 1997 report recommending a five minute interval from cardiopulmonary function until a declaration of death. In its 2000 report, the IOM recognized that "well considered" opinions may differ on the proper interval and that a two-minute wait was acceptable.¹³²

Progress on DCD continued slowly. By 2003, out of sixty-nine OPOs, twenty-five performed no DCD retrieval, and only eight OPOs recovered organs from ten or more donors, which accounted for sixty-eight percent of all DCD donations in the United States.¹³³ In 2005, a national conference of experts ("consensus conference") was convened to assess the medical and ethical issues surrounding DCD.¹³⁴ The participants concluded that DCD was ethically acceptable and encouraged greater use of such protocols to increase the number of organs available for transplantation.¹³⁵ The consensus conference also found a short waiting period acceptable: a period of at least two minutes but not longer than five minutes should lapse between asystole,¹³⁶ or the lack of a heart-

126. *Id.* at 59, 61.

127. *Id.* at 59.

128. *Id.* at 5, 50; *see also infra* discussion Part IV.A.

129. 2000 IOM Report, *supra* note 20, at 9 (stating that less than three percent of donors were NHBDs and that there were only about a dozen active NHBD programs); *see also* DeVita, et al., *supra* note 57, at 1711 (noting the lack of support for non-heart-beating donation).

130. 2000 IOM Report, *supra* note 20, at 2.

131. *Id.* at 39.

132. *Id.*

133. Richard J. Howard, *A 10-Year Analysis of Organ Donation After Cardiac Death in the United States*, 80 *TRANSPLANTATION* 564, 565 (2005).

134. Bernat et al., *supra* note 24, at 281.

135. *Id.* at 287.

136. Asystole is defined as the absence of heart contractions. *STEDMAN'S MED. DICTIONARY*, *supra* note 118, at 172.

beat, and recovery of organs.¹³⁷ Interestingly, rejecting the IOM's recommendation, the conference decided that it was not necessary to confirm loss of circulatory functions by electronic monitoring.¹³⁸ Thus, a person could be declared dead while still demonstrating cardiac electrical activity on an ECG.

In spite of its efforts, the IOM recognized that in 2006, there was still "general inertia" in implementing DCD.¹³⁹ Noting that DCD remained controversial, the IOM stated: "this committee believes that it is worth examining why three IOM committees and at least two international consensus conferences have all concluded that both controlled and uncontrolled [DCD] can proceed in an ethical manner yet so little has changed in clinical practice."¹⁴⁰

One of the reasons for the lagging interest in DCD has been clinical resistance.¹⁴¹ A survey published in 2006 revealed that bedside caregivers had numerous concerns about DCD.¹⁴² Among the reservations listed by healthcare providers at all professional levels was a perceived similarity between DCD and "euthanasia."¹⁴³

The lack of support for DCD may soon change. Following the efforts of the IOM and transplant community to encourage greater use of DCD, the Joint Commission, which accredits ninety-one percent of the nation's hospitals,¹⁴⁴ implemented a new standard, effective January 2007, requiring hospitals to develop policies addressing the recovery of organs from asystolic donors.¹⁴⁵ The Joint Commission does not require hospitals to provide DCD, but if the hospital and its medical staff do not wish to implement a DCD protocol, the hospital must justify its reasons in writing.¹⁴⁶ Finally, UNOS developed model elements for a DCD pol-

137. Bernat et al., *supra* note 24, at 282.

138. *Id.*

139. 2006 IOM Report, *supra* note 86, at 136.

140. *Id.* at 144.

141. See M. Susan Mandell et al., *National Evaluation of Healthcare Provider Attitudes Toward Organ Donation After Cardiac Death*, 34 CRITICAL CARE MED. 2952, 2952 (2006).

142. *Id.* at 2955.

143. *Id.* The term euthanasia was not defined, and could mean either active or passive euthanasia.

144. JOINT COMM'N, JOINT COMMISSION FACT SHEETS, FACTS ABOUT JOINT COMMISSION ACCREDITATION AND CERTIFICATION, http://www.jointcommission.org/AboutUs/Fact_Sheets/facts_jc_acrr_cert.htm (last visited Dec. 19, 2008).

145. See JOINT COMM'N OF ACCREDITATION OF HEALTHCARE ORGS., THE JOINT COMMISSION. HOSPITAL ACCREDITATION PROGRAM: HOSPITAL TRANSPLANT SAFETY, STANDARD TS.01.01.01, 2 (2008), available at http://www.jointcommission.org/NR/rdonlyres/E9943504-BFF5-42B1-9467-79FEC1D9BD66/0/HAP_TS.pdf. The provision was previously designated as a part of Standard LD 3.110. See Joint Comm'n. on Accreditation of Healthcare Orgs., *Approved: Revisions to Standard LD.3.110*, 26 JOINT COMM'N PERSPS. 7 (2006), available at www.sharenj.org/hospital%20professionals/pdf/JCAHO%20Standard%20LD%203%20110.pdf.

146. JOINT COMMISSION HOSPITAL ACCREDITATION PROGRAM: HOSPITAL TRANSPLANT SAFETY, *supra* note 145, at 2. The Joint Commission requirement for a hospital to justify a decision to forego a DCD policy became effective January 1, 2008. See Joint Commission, *Approved: Revi-*

icy for all OPOs and transplant centers, which became effective July 1, 2007.¹⁴⁷ The mainstream medical community has seemingly put its seal of approval on DCD.¹⁴⁸

III. DEFINING DEATH UNDER THE UDDA

Despite the apparent consensus in the transplant community on the acceptability of DCD, a growing number of physicians and ethicists have raised concerns about this approach to recovering organs.¹⁴⁹ With a few notable exceptions, little attention has been given to this issue in the legal community.¹⁵⁰ In addressing the current practice of DCD, it makes sense to ask the question: does it matter whether we remove organs from those who may not be quite dead?

The “dead donor rule” has become entrenched in the transplant community: vital organs cannot be removed from a patient who is not dead and organ retrieval cannot be the cause of death.¹⁵¹ A number of states codify the dead donor rule. For example, Maryland’s version of the UDDA states: “A pronouncement of death under this section shall be made before any vital organ is removed for transplantation.”¹⁵² The UAGA also implicitly recognizes that donors must be dead before organ retrieval by providing that the gift of a vital organ is not effective until the death of the donor.¹⁵³ The UAGA does not define death and to de-

sions to Standard LD.3.110, Element of Performance 12, for Critical Access Hospitals and Hospitals, 27 JOINT COMM’N PERSPS. 6, 14 (2007).

147. UNITED NETWORK FOR ORGAN SHARING, MODEL ELEMENTS FOR CONTROLLED DCD RECOVERY PROTOCOLS, UNOS Bylaws, app. B, attachment III (2007), available at http://www.unos.org/policiesandBylaws2/bylaws/UNOSByLaws/pdfs/bylaw_145.pdf.

148. In 2006, a national initiative in Canada also recommended the adoption of DCD programs, using a five minute observation period before death could be declared. See Sam D. Shemie et al., *National Recommendations for Donation After Circulatory Death in Canada*, 175 CAN. MED. ASS’N J. S1, S6 (Supp. 2006).

149. Jerry Menikoff, *Less Bull, Better Bioethics*, 9 DEPAUL J. HEALTH CARE L. 1133, 1146-47 (2005) (reviewing ALBERT R. JONSEN, *BIOETHICS BEYOND THE HEADLINES: WHO LIVES? WHO DIES? WHO DECIDES?* (2005)).

150. See, e.g., Jerry Menikoff, *The Importance Of Being Dead: Non-Heart-Beating Organ Donation*, 18 ISSUES L. & MED. 3 (2002); James M. DuBois, *Is Organ Procurement Causing the Death of Patients?*, 18 ISSUES L. & MED. 21 (2002); Jerry Menikoff, *Doubts About Death: The Silence of the Institute of Medicine*, 26 J. L. MED & ETHICS 157 (1998).

151. Robert M. Arnold & Stuart J. Youngner, *The Dead Donor Rule: Should We Stretch It, Bend It, or Abandon It?*, in *PROCURING ORGANS FOR TRANSPLANT*, supra note 102, at 220-21. Although John Robertson is credited with coining the term, it is not altogether clear when the dead donor rule originated. *Id.* at 220. The idea that a donor has to be dead before vital organs are removed dates at least as far back as the late 1960s. *Id.*

152. MD. CODE ANN., HEALTH-GEN. § 5-202(b)(2) (West 2005); see also ALA. CODE § 22-31-3(a) (LexisNexis 2006) (“When a part of a donor is proposed to be used for transplantation . . . there shall be an independent confirmation of the death by another medical doctor licensed in Alabama.”); HAW. REV. STAT. ANN. § 327C-1(b) (LexisNexis 2008) (“Death shall be pronounced before . . . any vital organ is removed for purposes of transplantation.”); LA. REV. STAT. ANN. § 9:111(A) (2008) (“In any case when organs are to be used in a transplant, then an additional physician, . . . not a member of the transplant team, must make the pronouncement of death.”); N.M. STAT. ANN. § 12-2-4(C) (LexisNexis 2008) (“Death is to be pronounced . . . before any vital organ is removed for purposes of transplantation . . .”).

153. UNIF. ANATOMICAL GIFT ACT, supra note 59, § 2(3).

termine who is dead from the absence of either brain or cardiac activity requires looking at the state law defining death.¹⁵⁴

A. *The Meaning of "Irreversible"*

In accordance with the UDDA, most states define cardiopulmonary death as the "irreversible cessation of circulatory and respiratory functions" as determined by accepted medical standards.¹⁵⁵ Under the UDDA, death is not merely the lack of circulation and respiration; for death to occur, those functions must have irreversibly ceased. In recommending adoption of the UDDA, the President's Commission noted that a clinical assessment of irreversibility will change with new medical technology and capabilities. According to the Commission, "Many patients declared dead fifty years ago because of heart failure would have not experienced an 'irreversible cessation of circulatory and respiratory functions' in the hands of a modern hospital."¹⁵⁶

Neither the UDDA nor its state counterparts define the term irreversible. The President's Commission was concerned primarily with expanding the concept of brain death, and failed to address what is meant by irreversibility of cardiopulmonary functions.¹⁵⁷ Further, although death is to be determined under the UDDA according to accepted medical standards, no uniform standard for irreversibility exists in the DCD context.¹⁵⁸ In most areas of medicine, determining the precise moment of death is not critical.¹⁵⁹ In DCD, however, minutes can mean the difference between a viable and nonviable organ.¹⁶⁰ For practical reasons, therefore, the point at which death becomes irreversible must be a very short interval after heart stoppage; ergo, the basis for a two to five minute waiting period.

The meaning of irreversible in the determination of death has been the subject of much debate among physicians and medical ethicists.¹⁶¹

154. Comments to the 1968 version of the UAGA state:

Subsection (b) leaves the determination of the time of death to the attending or certifying physician. No attempt is made to define the uncertain point in time when life terminates. The point is not subject to clear cut definition and medical authorities are currently working toward a consensus on the matter The real question is when have irreversible changes taken place that preclude return to normal brain activity and self sustaining bodily functions.

UNIF. ANATOMICAL GIFT ACT (1968) § 7, 8A U.L.A. 147 (2003).

155. See Goldsmith, *supra* note 56, at 903.

156. DEFINING DEATH, *supra* note 41, at 76.

157. *Id.* at 76-77 (discussing the degree of brain damage necessary to meet irreversible cessation of functions).

158. 1997 IOM Report, *supra* note 90, at 61; see also Stuart J. Youngner et al., *When is "Dead"?*, 29 HASTINGS CTR. REPORT 14, 16 (1999) (noting that controversy about the meaning of irreversibility has made it difficult to achieve consensus about the timing of death in DCD).

159. 1997 IOM Report, *supra* note 90, at 57.

160. *Id.*

161. See, e.g., Youngner et al., *supra* note 158, at 16 (stating that although the term irreversible is used in both the law and clinical practice, its exact meaning is unclear); E.T. Bartlett, *Differences Between Death and Dying*, 21 J. MED. ETHICS 270, 274 (1995) (contending that the meaning of

The term irreversible implies that more than a mere cessation of heart-beat is necessary for one to be dead. Otherwise, people who suffer cardiac arrest and are resuscitated are being literally brought back from the dead. On the other hand, it is often difficult to determine the precise moment of physiological death.¹⁶² Physicians recognize that dying is a process that culminates in a diagnosis of clinical death, yet the law requires a demarcation between life and death—the irreversible loss of function of the organism.¹⁶³ James L. Bernat, lead author of the 2005 consensus conference report, argues that death is an event, not a process.¹⁶⁴ He believes that “[b]ecause all organisms must be either alive or dead, death is an inherently discontinuous and instantaneous event.”¹⁶⁵

In both its 1997 and 2000 Reports, the IOM noted the difficulties associated with the term irreversibility in DCD. “[E]xisting empirical data cannot confirm or disprove a specific interval at which the cessation of cardiopulmonary function becomes irreversible.”¹⁶⁶ The IOM reasoned that a five minute waiting period of time is an acceptable indication of irreversibility because a patient will not autoresuscitate after that period of time, i.e. the patient will not resume circulation on his own without medical assistance.¹⁶⁷ Although James M. DuBois asserts that “[t]he medical community has arrived at a moral certainty that circulatory and respiratory functions do not spontaneously resume . . . after they have been lost more than a couple of minutes,”¹⁶⁸ there is little scientific data to support this assumption.¹⁶⁹ The five studies on which the IOM relied were not direct studies of autoresuscitation and were conducted in the early to mid-twentieth century, with the last one performed in 1970.¹⁷⁰ In 1997, the IOM recommended further research to validate the

irreversibility is unambiguous and means “not capable of being reversed or reversing.”); Tom Tomlinson, *The Irreversibility of Death: Reply to Cole*, 3 KENNEDY INST. OF ETHICS J., 157, 161 (1993) (asserting that irreversibility is tied to the setting in which it is used); David J. Cole, *The Reversibility of Death*, 18 J. MED. ETHICS 26, 29 (1992) (arguing that the concept of irreversibility should be abandoned because it departs from conventional notions of death).

162. DEFINING DEATH, *supra* note 41, at 77 (recognizing that determining the time of death can be “troublesome”).

163. *Id.* (noting that “death should be ‘viewed not as process but as the event that separates the process of dying from the process of disintegration’”).

164. James L. Bernat, *A Defense of the Whole-Brain Concept of Death*, 28 HASTINGS CTR. REPORT 14, 15 (1998).

165. *Id.* at 16.

166. 2000 IOM Report *supra*, note 20, at 22; *see also* 1997 IOM Report, *supra* note 90, at 58 (citing a lack of scientific certainty in defining the interval for irreversibility).

167. 2000 IOM Report, *supra* note 20, at 22-23.

168. DuBois, *supra* note 150, at 32.

169. *See* DeVita, *supra* note 57, at 1710 (“The empirical data are sparse but suggest that 2 mins, rather than 5 mins, may be sufficient to ensure irreversible cessation of cardiopulmonary function.”); Youngner et al., *supra* note 158, at 15 (concluding that the data cited by the IOM on autoresuscitation are “seriously flawed” and “provided the weakest possible evidence for a recommendation”); Rady et al., *supra* note 86, at 325 (suggesting the true incidence of autoresuscitation is unknown because of underreporting).

170. 2000 IOM Report, *supra* note 20, at 22-23.

appropriate interval necessary to exclude the possibility of autoresuscitation.¹⁷¹ Those studies have not been undertaken.¹⁷²

Some critics of DCD do not dispute that the possibility of spontaneous recovery of circulation in controlled donors withdrawn from life support is exceedingly unlikely.¹⁷³ They do question, however, whether a body's inability to reverse circulation on its own carries the same meaning as irreversible cessation of function under the UDDA.¹⁷⁴ Irreversible cessation of cardiopulmonary function can be interpreted in different ways: (1) the patient's circulation will not spontaneously resume absent outside intervention (autoresuscitation); (2) the patient's circulation will not be reversed because the patient or family has chosen to withdraw life support and to refuse further resuscitative efforts; or (3) the patient's circulation can not be reversed, even with cardiopulmonary resuscitation (CPR) or other technical means.¹⁷⁵ The IOM and the transplant community have chosen a combination of the first and second constructs of irreversibility: after two to five minutes, the patient is unlikely to resume heart and lung functions on his own and circulation will not be artificially started at the request of the patient or family.¹⁷⁶ The reason the transplant community rejects the third meaning of irreversibility is obvious: the patient can not be irreversibly dead when organs are procured after just two to five minutes of asystole because many patients *can be* successfully resuscitated after this short an interval.¹⁷⁷

Although the UDDA does not define "irreversible" or address organ donation, a few states favor a strict construction of irreversible in their death statutes. For example, Oklahoma law provides: "A determination of death must be made in accordance with accepted medical standards; provided however all reasonable attempts to restore spontaneous circulatory or respiratory functions shall first be made, prior to such declaration."¹⁷⁸ The Virginia statute also mandates that before a person is de-

171. 1997 IOM Report, *supra* note 90, at 59 (stating there was a need to collect data to conduct the appropriate interval).

172. 2000 IOM Report, *supra* note 20, at 24 (noting that the studies it recommended had not been undertaken); *see also* Bernat et al., *supra* note 24, at 282 (stating in 2005 consensus conference report that studies on the minimum period of observation necessary to rule out resuscitation had not been conducted).

173. The possibility of spontaneous circulation is an issue with uncontrolled donors in whom resuscitation has been attempted, however. *See infra* note 264 and accompanying text.

174. *See* Joanne Lynn, *Are the Patients Who Become Organ Donors Under the Pittsburgh Protocol for "Non-Heart-Beating Donors" Really Dead?*, in *PROCURING ORGANS FOR TRANSPLANT*, *supra* note 102, at 98-99 (stating that the two-minute waiting period in the Pittsburgh protocol may not be wrong, but it is a departure from conventional notions of irreversibility).

175. 2000 IOM Report, *supra* note 20, at 24.

176. *Id.*

177. *See infra* notes 212, 213 and accompanying text.

178. OKLA. STAT. ANN. tit. 63, § 3122(2) (West 2004).

clared dead, a physician must confirm that all further attempts at resuscitation would be unsuccessful.¹⁷⁹

There is a paucity of case law on the meaning of irreversible cessation of circulatory functions under the UDDA, but the little that exists appears to support a definition of irreversible that is at odds with current DCD practice. In a 1995 Michigan case, the district attorney charged the defendant with negligent vehicular homicide of an infant born after an emergency caesarean section.¹⁸⁰ The baby had no discernible heartbeat or respiratory effort for at least ten minutes after delivery.¹⁸¹ Medical personnel were able to detect a heart rate fifteen minutes after birth and gasping respirations ten minutes later.¹⁸² Under Michigan law, negligent homicide has to cause the death of a person, which excludes viable fetuses not born alive.¹⁸³ The defendant contended he could not be charged with homicide because the infant was not alive at birth.¹⁸⁴ The court struggled with how to define “alive” and looked to Michigan’s version of the UDDA to determine if the child was born “dead.”¹⁸⁵ The court concluded that because heart and respiratory functions were restored, albeit many minutes after delivery, the child did not have irreversible cessation of circulatory and respiratory functions at birth.¹⁸⁶ The fact that the child required medical intervention to restore circulation did not preclude a finding that the child was born alive. “Otherwise,” the court reasoned, “the use of the word ‘irreversible’ becomes meaningless.”¹⁸⁷

A few other cases have reached a similar conclusion. In *Jefferson County v. Eastern Idaho Regional Medical Center (In re Johnson)*,¹⁸⁸ a hospital appealed from a finding by county commissioners that it was not entitled to payment for emergency resuscitation rendered to an indigent patient.¹⁸⁹ The commissioners found that due to an asthma attack, the patient had suffered cardiac arrest at 5:19 p.m. and had no pulse, blood

179. A person shall be medically and legally dead if . . . there is the absence of spontaneous respiratory and spontaneous cardiac functions and, because of the disease or condition which directly or indirectly caused these functions to cease, or because of the passage of time since these functions ceased, attempts at resuscitation would not, in the opinion of such physician, be successful in restoring spontaneous life-sustaining functions, and, in such event, death shall be deemed to have occurred at the time these functions ceased. VA. CODE ANN. § 54.1-2972(A)(1) (West 2005).

180. *People v. Selwa*, 543 N.W.2d 321, 322-23 (Mich. Ct. App. 1995).

181. *Id.* at 323 (citing expert testimony that the baby’s Apgar scores at one, five and ten minutes following birth were zero, which meant that the heart rate and respiratory effort were virtually nonexistent).

182. *Id.* The infant was removed from the respirator after a few hours and declared brain dead. *Id.*

183. *Id.* at 324. The intentional or willful killing of an “unborn quick child” is, however, punishable as manslaughter. MICH. COMP. LAWS ANN. § 750.322 (West 2004).

184. *Selwa*, 543 N.W.2d at 323.

185. *Id.* at 325.

186. *See id.* at 328.

187. *Id.* at 328.

188. 883 P.2d 1084 (Idaho Ct. App. 1994).

189. *Id.* at 1085-86.

pressure, and respirations at 5:45 p.m.¹⁹⁰ The patient remained unresponsive during transport and arrived at the hospital cyanotic¹⁹¹ and incontinent of urine and stool.¹⁹² Despite the patient's status, the emergency room physician began resuscitation efforts that did not cease until 6:28 p.m.¹⁹³ The commissioners decided that because the patient was dead on arrival at the hospital, the treatment rendered was neither reasonable nor necessary.¹⁹⁴ Reversing the commissioner's denial of payment, the court stated:

The only evidence which contrasted with the doctor's medical opinion was testimony from Johnson's husband who believed that his wife had died on their lawn while being attended by the paramedics. This lay testimony, however, was insufficient to supplant the expert opinion of the doctor as to whether there was a reasonable prospect that the cessation of Johnson's life functions *could be reversed* when she arrived at the hospital.¹⁹⁵

A recent (and rather peculiar) case nicely illustrates the ordinary understanding of irreversibility. Prior to his wife's filing of an action for divorce, Joseph Finnegan had suffered three heart attacks, but had been successfully resuscitated each time.¹⁹⁶ He moved to dismiss the action on the ground the court had no jurisdiction to dissolve the marriage because he had died on three occasions and the parties' marriage ended upon his death.¹⁹⁷ The court rebuffed defendant's claims, noting that he still existed and that his "alleged deaths were neither permanent nor irreversible."¹⁹⁸

The rapid declaration of death in DCD donors serves the broader goal of increasing the supply of organs. Yet, the price of this achievement is an acknowledgment among DCD proponents that death is contextual and irreversibility is defined by the intent of the patient.¹⁹⁹ To satisfy the dead donor rule, DCD proponents have to disregard the conventional understanding of irreversibility, i.e. whether it is possible to reverse a cardiac arrest. According to DCD supporters, because controlled donors choose to be withdrawn from life support and it would be unethical, if not legally wrong, to resuscitate these individuals, it is acceptable to construe irreversibility to mean that we *will not* reverse, not

190. *Id.* at 1086.

191. Cyanosis is a dark bluish color of the skin due to a lack of oxygen. STEDMAN'S MED. DICTIONARY, *supra* note 118, at 475.

192. *In re Johnson*, 883 P.2d at 1086.

193. *Id.*

194. *Id.*

195. *Id.* at 1087 (emphasis supplied).

196. *Finnegan v. Finnegan*, No. FA074031514, 2008 WL 642627, at *1 (Conn. Super. Ct. Feb. 19, 2008) (unpublished).

197. *Id.*

198. *Id.* at *2.

199. See DuBois, *supra* note 150, at 32-33 (recommending that irreversibility be determined contextually).

that we *cannot* reverse, circulatory functions.²⁰⁰ The irreversibility of heart function is thus a moral, not a physiological, reality that promotes the social objectives of organ transplantation.²⁰¹

Further evidence that irreversibility may have a different meaning in the DCD context is the frequent substitution of the word “permanent” for “irreversible” cessation of respiration and circulation.²⁰² In accepting the weak construal of irreversibility to mean that resuscitation will not be attempted, the report of the 2005 Consensus Conference notes: “This meaning of ‘irreversibility’ also has been called the ‘permanent’ cessation of respiration and circulation. If data show that autoresuscitation . . . cannot occur and if there is no attempt at artificial resuscitation, it can be concluded that respiration and circulation have ceased permanently.”²⁰³

Jerry Menikoff is highly critical of this pragmatic definition of irreversible circulatory death.²⁰⁴ He suggests that the intent of the patient plays no role in the determination of death under the UDDA and that cardiopulmonary function is not irreversibly lost as long as it could conceivably be restored by resuscitation efforts.²⁰⁵ Others agree. E.T. Bartlett is critical of the Pittsburgh protocol because it confuses being dead with dying.

Surely, no one would seriously argue that the condition of a patient, two minutes post-arrest, who is unable on his own to return to a normal rhythm is, *ipso facto*, dead. If that were true then we should now refuse CPR on similar patients because they are dead!²⁰⁶

Alexander Morgan Capron, executive director of the President’s Commission, also argues that the weak construal of irreversibility is inconsistent with the UDDA because there are not two kinds of death—circulatory and neurological—but only one phenomenon based on different criteria.²⁰⁷ “Thus,” he concludes, “replacing ‘irreversible cessation of

200. See John Robertson, *The Dead Donor Rule*, HASTINGS CTR. REPORT, Nov.-Dec. 1999, at 6, 12 (“[I]t is difficult to see why one should adopt a construal of irreversibility that ignores whether the patient could in fact legally or morally be resuscitated.”); see also Tomlinson, *supra* note 161, at 162 (concluding that, in a patient who has refused life-sustaining care, “medical means for reversing cardiopulmonary arrest are no longer ethically significant possibilities”).

201. See Tomlinson, *supra* note 161, at 162-63 (distinguishing between the physiological and functional criteria for death).

202. See 2006 IOM Report, *supra* note 86, at 146 (concluding that the term “permanent” loss of function is a reasonable interpretation of irreversibility under the UDDA).

203. Bernat et al., *supra* note 24, at 282.

204. See Jerry Menikoff, *Doubts About Death: The Silence of the Institute of Medicine*, 26 J.L. MED & ETHICS 157, 158-61 (1999).

205. *Id.* at 158.

206. Bartlett, *supra* note 161, at 274.

207. Alexander Morgan Capron, *The Bifurcated Legal Standard for Determining Death*, in THE DEFINITION OF DEATH CONTEMPORARY CONTROVERSIES 117, 133 (Stuart J. Youngner et al. eds., Johns Hopkins Univ. Press 1999).

circulatory of respiratory functions' with 'we choose not to reverse' flies in the face of the UDDA's underlying premise."²⁰⁸

In addition, lungs are increasingly being recovered from DCD donors with promising results,²⁰⁹ and, with the Denver Children's Hospital program, we know there have been at least three DCD heart transplantations.²¹⁰ Whatever definition of irreversibility is chosen, it seems inconsistent to say that a person's heart and lungs irreversibly ceased when they are later transplanted and revived in recipients. Simply put, "[I]f a heart is restarted, the person from whom it was taken cannot have been dead according to cardiac criteria."²¹¹

B. Are There Two Kinds of Death Under the UDDA?

Adding to the controversy is the fact that the brain may still be functioning in DCD donors at the time of organ procurement. Irreversible brain damage usually does not occur within two to five minutes of asystole.²¹² Many patients will survive and have normal neurological function if resuscitated at this point.²¹³ Even supporters of DCD admit that it may take ten to fifteen minutes of no circulation for the brain to suffer irreparable damage.²¹⁴ New resuscitative therapies demonstrate the possibilities that a patient may survive neurologically intact even after prolonged cardiac arrest²¹⁵ and that the poor survival rates and neurological outcomes associated with cardiac arrest may be due, at least in part, to outmoded clinical practices.²¹⁶

208. *Id.*

209. See, e.g., David Gómez de Antonio et al., *Results of Clinical Lung Transplant from Uncontrolled Non-Heart-Beating Donors*, 26 J. HEART & LUNG TRANSPLANTATION 529, 533 (2007).

210. See Boucek et al., *supra* note 9, at 710. It is more accurate to say Denver Children's Hospital performed three modern DCD heart transplants. The first heart transplants performed by Christian Barnard in the late 1960s took place before the concept of brain death arose and it is not clear whether the patients satisfied brain death criteria. See MARGARET LOCK, *TWICE DEAD: ORGAN TRANSPLANTS AND THE REINVENTION OF DEATH* 80, 87 (Univ. Cal. Press 2002).

211. Robert M. Veatch, *Donating Hearts After Cardiac Death—Reversing the Irreversible*, 359 NEW ENG. J. MED. 672, 673 (2008).

212. See DEFINING DEATH, *supra* note 41, at 17 (recognizing that a four to six minute loss of blood flow does not irreversibly damage the brainstem). See also Lynn, *supra* note 174, at 99 (stating that "no one" would argue that the brain would cease functioning after only two minutes without oxygen).

213. See Lynn, *supra* note 174, at 99 (noting there would be a "legion" of examples of people surviving with intact brain function after cessation of the heartbeat for two minutes). In fact, one bioethicist has suggested that patients may not even be unconscious after only two minutes of asystole. Robert M. Veatch, *Consent for Perfusion and Other Dilemmas with Organ Procurement from Non-Heart Beating Donors*, in *PROCURING ORGANS FOR TRANSPLANT*, *supra* note 102, at 198.

214. See DuBois, *supra* note 150, at 34 (noting that it would probably take ten to fifteen minutes after arrest for the brain to die); see also DEFINING DEATH, *supra* note 41, at 16-17 ("If deprived of blood flow for at least 10-15 minutes, the brain, including the brainstem, will completely cease functioning.").

215. See Rady et al., *supra* note 86, at 327-28 (stating that patients resuscitated with extracorporeal perfusion are able to recover after much longer periods than two to five minutes of cardiorespiratory arrest); see also *infra* notes 278-85 and accompanying text.

216. See Myron K. Weisfeldt & Lance B. Becker, *Resuscitation After Cardiac Arrest, A 3-Phase Time-Sensitive Mode*, 288 J. AM. MED. ASS'N 3035, 3036 (2002) (stating that although sur-

In response to concerns that the brain is not irreversibly damaged after two to five minutes, proponents of a short waiting period point to the UDDA, under which, they assert, death can be determined by either the cessation of brain or cardiopulmonary functions.²¹⁷ Thus, loss of circulation is an independent determination of death, unrelated to whether there is irreversible loss of brain function.²¹⁸ Nonsense, says Menikoff. Accusing the IOM of “shading the truth,”²¹⁹ Menikoff contends the history of the UDDA conclusively dispels the notion there are two different kinds of death.²²⁰ Death occurs when the organism ceases to function as a whole, and not when death comes to particular parts.²²¹ Citing an influential 1981 article by Capron and Leon R. Kass,²²² Menikoff states that “cardiopulmonary criteria were being retained [in the proposed statute] precisely because they gave clear results in the *easy* cases, where it was *quite evident* that brain function had ceased”²²³ The President’s Commission also looked upon death as a unitary phenomenon.²²⁴ Consideration was given by the Commission to a statute that would contain only a definition of brain death but circulatory death was included as alternative criteria because “the loss of spontaneous breathing and heartbeat are surrogates for the loss of brain functions.”²²⁵

Bernat, who today is an ardent supporter of DCD, previously criticized the Pittsburgh protocol because it was not clear the donors were brain dead after only two minutes.²²⁶ He stated:

Tests measuring circulation for the patient not receiving cardiopulmonary support assess the prolonged absence of heartbeat (asystole or ventricular fibrillation) and the prolonged absence of breathing (apnea). These are adequate tests for death in this context because they lead directly to the destruction of the brain and all other organs. The cessation of heartbeat and breathing must be prolonged because their absence must be of sufficient duration for the brain to become

vival rates are poor after ten minutes of cardiac arrest, it is unknown whether this is due to irreversible injury or the failure of current therapeutic approaches).

217. See 2000 IOM Report, *supra* note 20, at 24 (asserting that there is no basis for a requirement that death by cardiopulmonary criteria must be of sufficient duration to cause the loss of brain function).

218. *Id.*; see also Bernat et al., *supra* note 24, at 281 (stating that the cardiopulmonary standard may be used when the donor can not meet brain death criteria).

219. Menikoff, *supra* note 204, at 162.

220. *Id.* at 160.

221. See ALEXANDER MORGAN CAPRON, *The Report of the President’s Commission on the Uniform Determination of Death Act*, in DEATH: BEYOND WHOLE BRAIN CRITERIA, *supra* note 51, at 156.

222. See Capron & Kass, *supra* note 46, at 113-14.

223. Menikoff, *supra* note 204, at 159-60.

224. DEFINING DEATH, *supra* note 41, at 7.

225. *Id.* at 37.

226. Bernat, *supra* note 164, at 20.

diffusely infarcted and for the cessation of heartbeat and breathing conclusively to be irreversible.²²⁷

Similarly, one of the originators of DCD, the Maastrich University Hospital in The Netherlands, rejects the Pittsburgh protocol, preferring instead a ten-minute waiting time before organ procurement “to be sure that the patient’s brain is irreversibly damaged and an equivalent situation to brain death has been reached.”²²⁸

Intertwined with the problematic issue of whether controlled donors have irreversible brain functions is the increasing post-mortem use of artificial resuscitation to ensure viability of the organs. One technique used to preserve organs in the donor is extracorporeal membrane oxygenation (ECMO), where blood is circulated through an oxygenating system.²²⁹ ECMO, which is a modification of the heart-lung machine used during bypass surgery, is often employed as a resuscitative intervention in those who have experienced cardiac arrest.²³⁰ In DCD, however, ECMO is begun after the patient is declared dead to restore blood flow and to preserve the organs.²³¹ Once the heart is perfused with oxygen through ECMO, it may begin to beat again.²³² A recent editorial in *Anesthesia*, a British journal, described an “astonished audience” at an international conference in London in 2006 when it heard that a medical center in the United States was experimenting with ECMO after only two minutes of pulseless activity, resulting in reanimation of the heart.²³³ As critics have pointed out, claiming that the patient has died and then reversing the circulatory arrest seems to profoundly misapply the irreversibility requirement.²³⁴

Michael A. DeVita acknowledges that a problem in non-heart-beating donation is that brain function can return after cardiac arrest if resuscitative attempts restore circulation within five to ten minutes.²³⁵

227. *Id.*

228. Koostra et al., *supra* note 91, at 2893.

229. See Joseph F. Magliocca et al., *Extracorporeal Support for Organ Donation After Cardiac Death Effectively Expands the Donor Pool*, 58 J. TRAUMA 1095, 1096-97 (2005).

230. David Bracco et al., *The Thin Line Between Life and Death*, 33 INTENSIVE CARE MED. 751, 751 (2007).

231. Magliocca et al., *supra* note 229, at 1096.

232. Carla DeJohn & Joseph B. Zwischenberger, *Ethical Implications of Extracorporeal Interval Support for Organ Retrieval*, 52 AM. SOC’Y ARTIFICIAL INTERNAL ORGANS J. 119, 121 (2006); see also Magliocca et al., *supra* note 229, at 1097.

233. *Non-Heart-Beating Organ Donation*, *supra* note 91, at 432-33.

234. Joanne Lynn & Ronald Cranford, *The Persisting Perplexities in the Determination of Death*, in THE DEFINITION OF DEATH CONTEMPORARY CONTROVERSIES, *supra* note 207, at 106 (stating that restoring circulation after a determination of death is evidence of “confused thinking” and a misapplication of the criteria for irreversibility).

235. DeVita et al., *supra* note 57, at 1711. Michael DeVita is a professor at the University of Pittsburgh School of Medicine. *Id.* at 1709. See also Christopher James Doig & Graham Rocker, *Retrieving Organs from Non-Heart-Beating Organ Donors: A Review of Medical and Legal Issues*, 50 CAN. J. ANESTHESIA 1069, 1072 (2003) (suggesting that if circulatory functions and blood flow to the brain are restored, it is possible that patients could experience pain or even regain consciousness).

The practice of restoring circulation through ECMO or other techniques raises the possibility that the brain is also being resuscitated while the recovery of organs is ongoing.²³⁶ Some advocates of DCD nevertheless encourage resuscitation of victims of cardiac arrest for the sole purpose of preserving organ viability for procurement.²³⁷ The New York City organ recovery program envisions the transplant ambulance team continuing CPR and administering oxygen to the victim who had previously been declared dead in order to maintain blood flow during transport to the hospital.²³⁸ This raises the specter of limited brain resuscitation.²³⁹ Critics argue that if transplant surgeons are to use artificial means to restore circulation, it becomes imperative to wait in excess of ten minutes to confirm the total cessation of the entire brain before ECMO or other techniques are used.²⁴⁰ Otherwise, it may be possible for at least some patients to regain brain functions, including awareness or the perception of pain.²⁴¹

C. A Not So Uniform Determination of Death

In adopting the weaker construct of irreversibility, the transplant community has embraced a definition of death that is conducive to organ procurement but is at odds with the UDDA and the intentions of the President's Commission. For example, patients A and B are both in the intensive care unit.²⁴² A is a potential donor and refuses CPR. Patient B

236. Joseph L. Verheijde et al., *Recovery of Transplantable Organs After Cardiac or Circulatory Death: Transforming the Paradigm for the Ethics of Organ Donation*, 2 PHILOSOPHY, ETHICS & HUMANITIES IN MED. 1, 3 (2007) (asserting that post-mortem technology to preserve organs results in the resuscitation of the heart and brain), available at <http://www.peh-med.com/content/pdf/1747-5341-2-8.pdf>.

237. See, e.g., Mary Bennett & Niranjana Kissoon, *Is Cardiopulmonary Resuscitation Warranted in Children Who Suffer Cardiac Arrest Post Trauma?*, 23 PEDIATRIC EMERGENCY CARE 267, 271 (2007) (stating that the possibility of organ donation may be a reason to attempt a prolonged resuscitation); see also 2006 IOM Report, *supra* note 86, at 158 (“[P]remature removal of mechanical support can be a major barrier to organ donation.”).

238. Stein, *supra* note 3, at A01.

239. M.D.D. Bell, *Non-Heart Beating Organ Donation: Old Procurement Strategy—New Ethical Problems*, 29 J. MED. ETHICS 176, 179 (stating that the combination of cardiac massage and administration of oxygen after death “may be associated with some restoration of brain functions”).

240. Verheijde et al., *supra* note 236, at 3. To assuage the concerns of medical personnel about post-mortem beating of the heart, some transplant centers use a thoracic aortic balloon or lidocaine to prevent reanimation of the heart during ECMO. See DeJohn & Zwischenberger, *supra* note 232, at 121. Using a thoracic balloon will also prevent perfusion to the brain, thus avoiding the problem of brain resuscitation during ECMO. Bernat, *supra* note 14, at 671.

241. This is theoretical, of course, because once organs are removed and the patient dies, we cannot know whether the patient had any such experience. There is also a debate in the medical community about whether it is possible for patients to regain cognition or experience pain after only five minutes of absent blood flow. See Martha A. Q. Curley et al., Letters to the Editor, *Organ Donation After Cardiac Death: Are We Willing to Abandon the Dead Donor Rule? The Author's Reply*, 8 PEDIATRIC CRITICAL CARE MED. 507, 508 (2007) (stating that studies show patients' cognition and the ability to perceive pain are likely absent after five minutes of no cardiac output); Doig & Rocker, *supra* note 235, at 1072 (questioning whether patients in DCD protocols could experience pain or regain consciousness when brain perfusion is restored by mechanical means).

242. This scenario is adapted from a similar hypothetical described in Youngner et al., *supra* note 158, at 17.

has stated that he wants CPR if he arrests. According to current DCD practice, A can be declared dead after at least two minutes of cardiopulmonary arrest. B also suffers two minutes of asystole and apnea, but resuscitative efforts are started. Is B dead after two minutes? If B is successfully resuscitated, was he brought back from the dead, or was he not dead in the first place? The answer under the UDDA is that B is not dead because he did not suffer *irreversible* cessation of circulatory and respiratory functions. Using the weaker construal of irreversibility only for organ donors but not for other patients who suffer cardiac arrest contravenes the purpose of the UDDA, which was to set uniform criteria for the determination of death in all individuals. As the President's Commission commented:

[S]ince the proposed statute is intended to apply in all situations, it ought not to be incorporated into a state's Uniform Anatomical Gift Act (UAGA). Placing it there would create the mistaken impression that a special "definition" of death needs to be applied to organ transplantation, which is not the case.²⁴³

DCD advocates point out that under the UDDA, the determination of death is to be made in accordance with accepted medical standards. Since the medical community has found DCD ethical, they reason, it falls within the standard of care.²⁴⁴ But declaring a person dead after two to five minutes of absent circulation is not the medical standard of care for all patients.²⁴⁵ For those who experience sudden cardiac arrest, aggressive resuscitation is the rule.²⁴⁶ Under the UDDA, proof of death is both a medical and legal question.²⁴⁷ The question for medical experts is whether there is biological evidence of life (or death), not whether the patient has chosen to live or die.²⁴⁸ There is no separate test of death for organ transplant purposes.²⁴⁹

Further, to argue that the medical criteria for determining death have evolved since the 1980s in an effort to *shorten* the time in which

243. DEFINING DEATH, *supra* note 41, at 80. Neither does the UAGA purport to define death for purposes of organ transplantation. *Id.* at 145.

244. See DuBois, *supra* note 150, at 33.

245. Kimmo Sainio, *Are Non-Heart-Beating Donors Really Dead?*, 29 ANNALS MED. 473, 474 (1997) (noting that in an emergency room, a patient with unexpected asystole would not be declared dead after two minutes).

246. See *infra* note 263 and accompanying text.

247. *Randles v. Ind. Patient's Comp. Fund*, 860 N.E.2d 1212, 1226 (Ind. Ct. App. 2007).

248. See *id.* ("it is the role of the medical professional to decide whether brain death or other cessation of cardiopulmonary function is present in accordance with current medical standards") (quoting 22 AM. JUR. 2D Death § 424); see also UNIF. DETERMINATION OF DEATH ACT (1980), *supra* note 17, prefatory note ("Time of death is a fact to be determined with all others in each individual case, and may be resolved, when in doubt, upon expert testimony before the appropriate court.").

249. See *In re T.A.C.P.*, 609 So. 2d 588, 595 (Fla. 1992) (finding that anencephalic infant who lacked higher brain functions could not be declared legally dead for purposes of organ donation).

death is diagnosed is to stand medical progress on its head.²⁵⁰ If anything, recent resuscitative techniques have demonstrated that some individuals whom physicians would have declared dead even a few years ago can survive and lead productive lives.²⁵¹

The goal of increasing organs for transplantation is worthwhile, but whether there ought to be different definitions of death, depending on the context, is an issue that deserves greater scrutiny and public discussion before DCD attains widespread use. There is also some value in treating all individuals equally. “Otherwise,” commentators have noted, “patients would be dead or alive, depending on whether or not they were organ donors.”²⁵²

The lack of consistency among hospital protocols in the pronouncement of death is also troublesome.²⁵³ If Sue is withdrawn from life support in Pittsburg, she is dead after two minutes without evidence of cardiac activity. If Sue is in Shreveport, Louisiana, she will not be declared irreversibly dead until five minutes transpire after asystole.²⁵⁴ In other words, in Shreveport, Sue is just mostly dead after two minutes and her organs cannot be recovered while, in Pittsburg, Sue is really dead and her organs can be taken. In 1997, the IOM criticized as “uncomfortable” a situation where a donor could be considered dead in one OPO region while defined as alive in another.²⁵⁵ Nevertheless, just three years later, the IOM countenanced such inconsistencies when it concluded that there was “room for significant differences of opinion” on the interval required to assure the irreversibility of circulatory functions.²⁵⁶ This leaves patients or families who are considering donation in a disconcerting situation where they may not know or be able to choose which version of “death” will be applied to them.

Such variations in the timing of death do not engender confidence in the organ transplant system, which depends on the trust of potential donors and their families that a physician will not prematurely declare them dead to harvest organs. It also does not comport with the UDDA, which envisioned that there would be a uniform definition of death in every jurisdiction.

250. See 2006 IOM Report, *supra* note 86, at 146 (asserting that evolving medical standards support the weak construal of irreversibility).

251. See discussion *infra* Part IV.A.

252. Stuart J. Youngner & Robert M. Arnold, *Philosophical Debates About the Definition of Death: Who Cares?*, 26 J. MED. & PHIL. 527, 531 (2001).

253. See Youngner et al., *supra* note 158, at 20 (arguing for uniformity among protocols to avoid public criticism).

254. LA. STATE UNIV. HEALTH SCI. CTR.—SHREVEPORT, ORGAN DONATION AFTER CARDIAC DEATH (DCD) PROTOCOL LOUISIANA ORGAN PROCUREMENT AGENCY (LOPA) 4 (2008), http://www.sh.lsuhsu.edu/policies/policy_manuals_via_ms_word/hospital_policy/h_5.7.1.pdf.

255. 1997 IOM Report, *supra* note 90, at 59.

256. 2000 IOM Report, *supra* note 20, at 39.

IV. THE EXPANSION OF DCD IN UNCONTROLLED DONORS AND CHILDREN

Does this academic discussion about the time of death in DCD matter? Those prospective donors who are voluntarily withdrawn from life support in a hospital are not going to be resuscitated and their brain function will soon be irretrievably lost due to lack of cardiac function. In other words, in a few more minutes, they are going to be all dead, not just mostly dead. At least a persuasive utilitarian argument can be made that we should remove their organs to benefit those desperately in need of “the gift of life” while the organs are still useful. Yet, as the New York City proposal for organ recovery ambulances demonstrates, DCD practices are also being applied to victims who suffer cardiac arrest outside the hospital. Children are also viewed as potential DCD donors; indeed, doctors conducted the first DCD pediatric heart transplants quite recently. There are compelling reasons, however, why organ procurement from uncontrolled donors and children should proceed slowly.

A. *Uncontrolled Donors*

Most current DCD protocols in the United States focus on the controlled donor as the time of cardiopulmonary arrest is known and warm ischemia time can be minimized through careful planning of the organ procurement process.²⁵⁷ However, uncontrolled donors, i.e., those who suffer an unexpected or sudden cardiac arrest and who are not brain dead, may comprise the largest group of untapped donors.²⁵⁸ Approximately thirty-eight percent of all deaths occur outside a hospital.²⁵⁹ The IOM estimates that if persons undergoing unsuccessful resuscitation were considered as potential organ donors, there could be an additional 22,000 cadaveric donors each year.²⁶⁰

There is a “powerful potential conflict” between the interest of the prospective uncontrolled donor in a thorough and lengthy resuscitative effort and the interest of the future recipient in a viable organ procured soon after cardiac arrest.²⁶¹ If DCD is expanded to potential uncontrolled donors, will physicians wait only two to five minutes after cessation of cardiac and pulmonary functions before removing organs? The New York City proposal suggests that the same standard will apply: organ

257. Controlled donors were the primary focus of the 1997 and 2000 IOM reports and the 2005 consensus conference.

258. 2006 IOM report, *supra* note 86, at 154 (citing an estimate of 335,000 deaths a year due to sudden cardiac arrest).

259. Akinlolu O. Ojo et al., *Quantifying Organ Donation Rates by Donation Service Area*, 5 AM. J. TRANSPLANTATION 958, 961 (2005).

260. 2006 IOM Report, *supra* note 86, at 156.

261. 1997 IOM Report, *supra* note 90, at 60.

recovery ambulances will begin organ preservation methods five minutes after death is declared in the field.²⁶²

With the controlled donor, the patient or family has chosen to forego resuscitative measures and, in the absence of autoresuscitation, is dead (or at least soon will be dead). But with the uncontrolled donor, there is no presumption that resuscitation is not desired. The American Heart Association's current resuscitation guidelines state that "all patients in cardiac arrest should receive resuscitation," unless one of three criteria is met: the patient has a do not resuscitate order, the patient has signs of irreversible death such as rigor mortis, or no physiological benefit will be expected.²⁶³ In other words, "irreversibility" in the context of uncontrolled donors means that circulation *cannot* be restarted with current medical technology.

The claim that a DCD donor is irreversibly dead because there is no possibility of self-resuscitation after a two-minute period of asystole is also suspect when applied to victims of sudden cardiac arrest who undergo CPR. The medical literature speaks of the "Lazarus phenomenon," where patients who have been declared dead after unsuccessful resuscitation have a delayed, unexpected return of spontaneous circulation.²⁶⁴ The time from termination of CPR to return of spontaneous circulation in these patients ranges from a few minutes to as long as twenty minutes with functional recovery.²⁶⁵ Some of these cases of "resurrection" have received widespread public attention. For example, Richard Selzer, a surgeon, wrote about his recovery after being declared dead.²⁶⁶ While in the ICU, Selzer experienced a cardiac arrest.²⁶⁷ Despite vigorous resuscitation, he had no heartbeat and a flat tracing on an ECG for over four and a half minutes.²⁶⁸ The attending nurse entered the time of death and ten minutes later observed body characteristics compatible with death.²⁶⁹ Suddenly, Selzer began to breathe, tracing returned to the ECG, and the heartbeat became regular.²⁷⁰ On his discharge from the hospital, Selzer

262. See *supra* notes 4-5 and accompanying text.

263. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, Part 2: Ethical Issues, 112 CIRCULATION IV-6, IV-7 (2005), available at http://circ.ahajournals.org/cgi/reprint/112/24_suppl/IV-6.

264. See Vedamurthy Adhiyaman et al., *The Lazarus Phenomenon*, J. ROYAL. SOC. MED. 552, 552 (2007) (stating that there have been thirty-eight reported cases in the medical literature of delayed spontaneous return of circulation). The article also cited a number of media reports in which patients were declared dead, but were later found alive. *Id.* at 555.

265. *Id.* at 553, Table 1; see also Antti Kämäräinen et al., *Spontaneous Defibrillation After Cessation of Resuscitation in Out-Of-Hospital Cardiac Arrest: A Case of Lazarus Phenomenon*, 75 RESUSCITATION 543, 544 (2007) (describing the case of a man in a body bag who was observed breathing spontaneously fifteen minutes after resuscitation ended).

266. LOCK, *supra* note 210, at 54-55.

267. *Id.* at 55.

268. *Id.*

269. *Id.*

270. *Id.*

stated, "Next time hold a feather to my lips. It's more reliable."²⁷¹ These cases are uncommon,²⁷² but they raise serious questions about whether very brief intervals between the cessation of CPR and the process of organ recovery should be used in uncontrolled donation when resuscitation efforts have been previously attempted.²⁷³ To exclude the possibility of an errant diagnosis of death, several commentators have recommended that patients be observed for at least ten minutes after CPR has ended before confirming death to rule out the possibility of a delayed return of spontaneous circulation.²⁷⁴ Otherwise, it may be the removal of organs that makes the uncontrolled donor's cessation of circulatory functions "irreversible."

New resuscitative techniques also hold much promise for those who suffer prolonged cardiac arrest and have made it more difficult to determine when there is an irreversible cessation of circulatory functions that would justify termination of CPR. Survival rates in individuals who suffer sudden cardiac arrest have historically been dismal. With out-of-hospital CPR, survival ranges between five and twenty-one percent.²⁷⁵ In-hospital CPR results in an average fifteen percent survival rate.²⁷⁶ Many of those surviving have poor neurological outcomes.²⁷⁷ By using cardiopulmonary bypass as part of integrated resuscitative therapy, a recent study demonstrated a seventy-nine percent survival rate in thirty-four victims with prolonged cardiac arrest,²⁷⁸ with minimal neurological damage.²⁷⁹ Although this was a small patient population, the authors conclude that "[r]ecovery without adverse neurological outcomes is possible in a large number of cardiac arrest victims following prolonged manual CPR."²⁸⁰ Another report documents the usefulness of ECMO in

271. *Id.* (quoting RICHARD SELZER, *RAISING THE DEAD* 99 (Penguin Books 1994)).

272. The true incidence of Lazarus phenomenon may be unknown because of underreporting. Adhiyaman et al., *supra* note 264, at 552; see also Wolfgang H. Maleck et al., *Unexpected Return of Spontaneous Circulation After Cessation of Resuscitation (Lazarus Phenomenon)*, 39 RESUSCITATION 125, 127 (1998) (suggesting that the true incidence of the phenomenon may be fairly high and that its underreporting is due to legal concerns).

273. The Lazarus phenomenon is by definition applicable to those who have previously been subjected to resuscitation efforts and, therefore, would not apply to controlled donors who have chosen to forego CPR. See Sam D. Shemie, *Clarifying the Paradigm for the Ethics of Donation and Transplantation: Was "Dead" Really so Clear Before Organ Donation?*, 2 PHIL., ETHICS, & HUMAN. IN MED. 1, 4 (2007), available at <http://www.peh-med.com/content/pdf/1747-5341-2-18.pdf>.

274. Adhiyaman et al., *supra* note 264, at 555 (recommending that patients be passively monitored for at least ten minutes, if not longer, after the cessation of CPR); Kämäräinen et al., *supra* note 265, at 545 (advocating minimum of ten minutes of monitoring to rule out Lazarus phenomenon).

275. Constantine.L. Athanasuleas et al., *Sudden Cardiac Death: Directing the Scope of Resuscitation Towards the Heart and Brain*, 70 RESUSCITATION 44, 45 (2006).

276. *Id.*

277. *Id.* at 45, 47.

278. The patients in the study had experienced periods of refractory cardiac arrest ranging from twenty minutes to one and one-half hours. *Id.* at 46-47.

279. *Id.* at 49 (stating that only two of the thirty-four patients had an adverse neurological outcome).

280. *Id.* at 45.

refractory cardiac arrest, including the case of a four-year-old boy who had undergone three hours of CPR before ECMO was started.²⁸¹ He survived and had normal neurological function on discharge from the hospital.²⁸² Additional studies confirm the significant strides in survival rates made possible by resuscitation through ECMO, cardiopulmonary bypass, or hypothermia (cooling of the body temperature).²⁸³ One commentator suggests that with current technology, the limits of brain resuscitation after cardiac arrest can not be definitively established:

In reality, the duration of circulatory arrest that precludes recovery of any residual amount of brain function is unknown but is lengthening. Although arrest time is paramount, the conditions of the cardiac arrest (temperature) and the manner in which the circulation is re-established (e.g., hypertensive reperfusion, hypothermia, neuroprotective agents) will extend the time for potential recovery of various degrees of brain function well beyond 10 minutes.²⁸⁴

The success of these new interventions raises difficult questions about who decides whether a person arriving in the emergency room after cardiac arrest will be subjected to techniques like ECMO to reverse the cardiac arrest or will be declared dead and then have ECMO to preserve the organs for donation. In essence, “Where is the line between *refractory* cardiac arrest—making the patient a potential candidate for ECLS [extracorporeal life support] and *irreversible* cardiac arrest—making the patient a potential organ donor?”²⁸⁵

Even some supporters of DCD question whether the weak construal of irreversibility in controlled donors who choose not to be resuscitated should apply in other contexts. DuBois calls for a “stricter sense of irreversibility” in situations that do not involve the controlled donor.²⁸⁶ In 1997, the IOM similarly warned that where death is unexpected or sudden, longer periods of observation may be necessary to ensure that the cardiac arrest is truly irreversible.²⁸⁷ Yet seven years later, without explanation, the IOM suggested that with uncontrolled donors, a hands-off

281. Bracco et al., *supra* note 230, at 751.

282. *Id.*

283. See Massimo Massetti et al., *Back from Irreversibility: Extracorporeal Life Support for Prolonged Cardiac Arrest*, 79 ANN. THORACIC SURGERY 178, 181 (2005) (demonstrating increased survival rates in patients with refractory cardiac arrest who received extracorporeal support); Weisfeldt & Becker, *supra* note 216, at 3037 (citing several studies showing an advantage in survival rates when controlled reperfusion or hypothermia are used).

284. Shemie, *supra* note 273, at 3. See also Lynn & Cranford, *supra* note 234, at 109 (recommending a delay of at least ten minutes to avoid potential error in diagnosing death in individuals undergoing resuscitation).

285. Bracco et al., *supra* note 230, at 753.

286. DuBois, *supra* note 150, at 33; see also Veatch, *supra* note 213, at 197 (suggesting the question of whether a patient is dead after two minutes of asystole may not be important in uncontrolled donors, but would “raise serious problems” in patients who suffer sudden cardiac arrest).

287. 1997 IOM Report, *supra* note 90, at 58. See also Veatch, *supra* note 213, at 197-198 (recommending periods of pulselessness longer than two minutes to establish irreversibility).

period between the end of resuscitation and transfer to an organ transplant team may not even be necessary.²⁸⁸

Finally, it is questionable whether waiting ten minutes or slightly longer after an absent heartbeat for organ procurement is detrimental to viability of the organs. One of the oldest DCD programs is at the Hospital Clínico San Carlos in Madrid, Spain, where most of the non-heart-beating donors are adults who suffer cardiac arrest outside the hospital.²⁸⁹ The Madrid criteria include a requirement that the heartbeat must be absent for at least ten minutes after CPR is stopped.²⁹⁰ Despite this waiting period, transplantation of kidneys from uncontrolled DCD donors have long-term outcomes similar to those of organs from brain-dead donors.²⁹¹ The University of Zurich, another program that has been using kidney transplants from non-heart-beating donors since the mid-1980s, has also demonstrated that using a ten minute interval between cardiopulmonary arrest and organ procurement does not impair long-term graft survival rates.²⁹² Waiting slightly longer to recover organs may diminish their quality but that seems a price most people would be willing to pay to ensure that they are not prematurely declared dead.

B. Children

Although DCD has been primarily used in adult donors, there are calls for expanding its use in pediatric populations.²⁹³ The need for new sources of pediatric organs is particularly acute as the number of brain-dead donors in the pediatric population is decreasing due to improvements in resuscitation and rehabilitation.²⁹⁴ Concerns have been voiced, however, as to whether the same criteria used in adult DCD should apply to children.²⁹⁵

288. 2006 IOM Report, *supra* note 86, at 152-53.

289. Ana I. Sánchez-Fructuoso et al., *Victims of Cardiac Arrest Occurring Outside the Hospital: A Source of Transplantable Kidneys*, 145 ANNALS INTERNAL MED. 157, 157 (2006). The clinic began its DCD program in 1989. *Id.*

290. 2006 IOM Report, *supra* note 86, at 139.

291. Sánchez-Fructuoso et al., *supra* note 289, at 162. Organs other than kidneys may have poorer results. *Id.* at 162-63.

292. Markus Weber et al., *Kidney Transplantation from Donors Without a Heartbeat*, 347 NEW ENG. J. MED. 248, 248, 255 (2002). From 1985 until 1995, the hospital initiated organ retrieval five minutes after cardiac arrest. Beginning in 1995, it instituted a ten minute waiting period. *Id.* at 249; *see also* Menikoff, *supra* note 204, at 162 (citing to studies that indicated a longer waiting period would not impair the usefulness of organs).

293. *See* Boucek et al., *supra* note 9, at 713, 714 (encouraging pediatric heart transplantation from DCD donors); Amy L. Durall et al., *Potential for Donation After Cardiac Death in a Children's Hospital*, 119 PEDIATRICS 219, 221 (2007) (noting that the experience with DCD in pediatric hospitals is "quite small"); Nikoleta S. Kolovos et al., *Donation After Cardiac Death in Pediatric Critical Care*, 8 PEDIATRIC CRITICAL CARE MED. 47, 47 (2007) (stating that DCD may increase the number of pediatric organs for donation).

294. Margaret Ferguson & Jeannie Zuk, *Organ Donation After Cardiac Death: A New Trend in Pediatrics*, J. PEDIATRIC GASTROENTEROLOGY & NUTRITION 219, 219 (2003).

295. The transplantation of hearts from three DCD donors by a team at Denver Children's Hospital raises questions not only about applying DCD protocols to children, but also whether hearts

DeVita, one of the leading proponents of DCD, has questioned whether adult DCD protocols are appropriate for children because children may tolerate prolonged circulatory collapse.²⁹⁶ Current American Heart Association resuscitation guidelines make the same observation.²⁹⁷ Others have suggested that the risk of autoresuscitation may be variable in the pediatric population.²⁹⁸ There is also a heightened potential for conflicts of interest in pediatric DCD. Unlike the adult patient population in which the patient-donor is in a specialty critical care unit treated by one set of physicians and the potential recipient is at another location treated by another set of physicians, most potential pediatric donors are in multidisciplinary units, in which the same team may take care of both the potential donor and recipient.²⁹⁹ This arrangement leads to “[t]he prospect of having to advise one set of parents that they should consider withdrawal of [life] support because of devastating brain injury while other patients in the same unit might become recipients of the newly deceased child’s organs seems highly troubling to some intensivists.”³⁰⁰ This situation raises questions about conflicts inherent in terminating resuscitative efforts in the child donor.³⁰¹

In some children’s hospitals, the rush to expand pediatric DCD faces an unenthusiastic clinical staff.³⁰² This may be due to the lack of pediatric DCD programs and the unfamiliarity of staff with this type of organ donation.³⁰³ The reluctance of pediatric care providers to embrace DCD may also reflect wariness in forging ahead on a new form of organ donation where there are many unanswered questions, including the appropriate time interval between the cessation of cardiac function and organ recovery.³⁰⁴ With the mandates of The Joint Commission and UNOS for all hospitals and transplant centers to develop DCD policies, its use in pediatric institutions deserves more scrutiny.

can ethically and legally be removed from adult or child DCD donors. *See infra* note 315 and accompanying text.

296. DeVita et al., *supra* note 49, at 1712.

297. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular, Part 2: Ethical Issues, *supra* note 253, at IV-7 (noting that intact survival in children after prolonged resuscitation has been documented).

298. *See, e.g.*, Joel E. Frader, *Deconstructing Donation After Cardiac Death*, 8 PEDIATRIC CRITICAL CARE MED. 76, 77 (2007) (stating that the pediatric community needs to study whether the risk of autoresuscitation varies with age).

299. *Id.*

300. *Id.*

301. *See* Bernat, *supra* note 14, at 670 (noting that conflicts are more of a concern where the potential donor is a child).

302. *See, e.g.*, Martha A. Q. Curly, *Pediatric Staff Perspectives on Organ Donation After Cardiac Death in Children*, 8 PEDIATRIC CRITICAL CARE MED. 212, 216-18 (2007).

303. *Id.*

304. *Id.* at 217 (reporting that thirty-eight percent of survey participants favored basing the determination of death on the absence of brain activity, while sixty percent approved an average waiting period after cardiac cessation of five minutes and a range of two to ten minutes); *see also* Frader, *supra* note 298, at 77 (calling for further research on DCD in pediatric hospitals).

V. IS DCD CAUSING THE DEATH OF DONORS?

The most serious criticism of DCD is that the removal of organs after two to five minutes of asystole causes the death of donors and is tantamount to murder.³⁰⁵ This is a complex issue, particularly with controlled donors who have a constitutionally protected right to withdraw life-sustaining care.³⁰⁶ Modern law recognizes the difference between killing and being allowed to die.³⁰⁷ The removal of life support provides the condition for death; once the heart stops, the body can no longer supply the means of sustaining life and death through lack of oxygen to the brain follows. Hastening death by the removal of life support with the patient's consent is not unlawful.³⁰⁸ The question presented by DCD is whether the act of organ recovery in donors in the minutes before brain death alters that legal principle.

Menikoff argues that, at least with controlled donors, it is not organ retrieval that factually causes death; it is the loss of oxygen to the brain caused by removal of the ventilator.³⁰⁹ The intervening removal of organs during the process of dying does not affect the timing of brain death, which is occurring because of lack of blood flow.³¹⁰ Since controlled donors will not be resuscitated, it is only a matter of time before irreversible death occurs, a point that is not hastened by organ procurement.³¹¹

Even if organ procurement does not cause death in the controlled donor, a precept of the dead donor rule is that vital organs cannot be removed *before* a person is dead.³¹² DCD donors may very well be alive at the time organs are removed. In controlled donors, this may not be significant because they have chosen to forego life support and likely will not survive even if organ removal is not performed. For those who suffer unexpected cardiac arrest and who have not made their end-of-life wishes known, however, the rush to procure organs is worrisome. Re-

305. See Joan McGregor et al., *Do Donation After Cardiac Death Protocols Violate Criminal Homicide Statutes?*, 27 MED. & L. 241, 251 (2008) (contending that the removal of organs prior to brain death may be the proximate cause of death); Michael Potts, *Truthfulness in Transplantation: Non-Heart Beating Organ Donation*, 2 PHIL., ETHICS, & HUMAN IN MED. 1, 2 (2007), available at <http://www.peh-med.com/content/2/1/17> (calling for a ban on DCD because the donor is not dead until the organs are removed); Veatch, *supra* note 211, at 673 (asserting that removing a heart from a DCD donor after seventy-five seconds is "ending a life by organ removal").

306. See *Cruzan v. Dir., Mo. Dep't of Health*, 497 U.S. 261, 278 (1990) (stating that a competent person's liberty interest in refusing treatment could be inferred from the Court's prior decisions).

307. See *Vacco v. Quill*, 521 U.S. 793, 807 (1997) ("This Court has also recognized, at least implicitly, the distinction between letting a patient die and making that patient die.").

308. *Id.* at 802-03.

309. Menikoff, *supra* note 150, at 162.

310. *Id.*

311. *Id.*; see also James L. Bernat, *Are Organ Donors After Cardiac Death Really Dead?*, 17 J. CLINICAL ETHICS 122, 127 (2006) (agreeing with Menikoff that organ donation does not hasten death in controlled donors).

312. Menikoff, *supra* note 150, at 162.

cent studies indicate that there are many victims of sudden cardiac arrest who, provided with appropriate therapy, survive after prolonged periods of cardiac arrest and, therefore, should not be considered dead after only two to five minutes of absent circulation.³¹³ For at least some victims of sudden cardiac arrest, whether in or out of a hospital, a decision to begin organ procurement minutes after stopping CPR deprives them of an opportunity to reverse the arrest, which may be considered a hastening or direct cause of their demise. As the IOM recognized in 1997, prematurely abandoning resuscitation in the uncontrolled donor so that organ recovery can proceed “may forfeit the life of a patient who is otherwise a salvageable, competent person.”³¹⁴

Also troublesome are the removal of hearts from DCD donors and their reanimation in recipients. As Veatch has pointed out, how can irreversible cardiac death be diagnosed when the functions of the heart are later reversed?³¹⁵ The use of ECMO to restart circulation in a person declared dead because of irreversible cessation of circulation raises the same concern. Although it may be true that in most cases, withdrawal of life support and the accompanying cessation of breathing and circulation are the cause of death, this hypothesis does not account for cases in which circulation is restored after “death.” If blood flow is restored through artificial means shortly after the declaration of cardiac death, there is a possibility of brain resuscitation.³¹⁶ Thus, it would seem that surgeons need to postpone organ recovery until brain death occurs.³¹⁷ As one commentator explains, “If the state of death is reversed, then harvesting organs from the reanimated patient prior to death occurring a second time is failure to respect the dead donor rule: it constitutes restoring life and killing.”³¹⁸

Absent reanimation of the patient, however, it would be an onerous task for a prosecutor to bring homicide charges because of the difficulty, if not impossibility, of proving at what point in the organ procurement process the dying patient was alive or had reached the point of irreversibility. Patients’ clinical conditions vary and so does the speed at which they die after cardiac arrest. Potential controlled donors who are taken off life support and who are already severely neurologically compromised may die sooner than those who have not suffered a prior brain

313. See discussion *supra* Part III.A.

314. 1997 IOM Report, *supra* note 90, at 49.

315. Veatch, *supra* note 211, at 673.

316. McGregor et al., *supra* note 305, at 250.

317. See McGregor et al., *supra* note 305, at 251 (recommending a waiting time of fifteen to twenty minutes until brain death).

318. James M. DuBois, *Non-Heart-Beating Organ Donation: A Defense of the Required Determination of Death*, 27 J.L. MED. & ETHICS 126, 130 (1999).

insult.³¹⁹ Controlled and uncontrolled donors who have an intact brain prior to cardiac arrest may have a more prolonged process of dying.³²⁰ Although there may be clear-cut cases in which a patient's death is hastened by organ recovery, in most cases, there are probably too many unknowns in locating the precise moment of death that, with the high burden of proof, would negate criminal prosecution of physicians who practice DCD.³²¹

Further, there may not be the sense of public outrage over DCD that would spur a prosecutor to examine homicide charges.³²² Like many experts, the public may believe that it is acceptable to procure organs from patients voluntarily removed from life support who may not be quite dead—after all, they will be dead shortly. Norman Fost suggests that Americans have little interest in esoteric arguments about life and death in organ donation, noting that when concerns about DCD in controlled donors were raised by the media, the public was apathetic in its response.³²³ A recent study also indicates that many members of the public may be willing to violate the dead donor rule because they are confused about the definition of brain death and when organs can legally be procured from those who suffer devastating neurological injuries.³²⁴

It is debatable whether the public will be apathetic about the expansion of DCD to victims of sudden cardiac arrest. New York City's plan for organ recovery ambulances is the first of these initiatives to be aired by the mainstream media.³²⁵ While many individuals may be confused about the concept of brain death, they no doubt understand what it means when the heart stops beating. Many are also understandably concerned about the level of care they will receive in the event of an unexpected cardiac arrest at home or at work. It is one thing to argue that adults who consent to the withdrawal of life support be allowed to donate organs even if we are not quite sure at what point in the process they are potentially alive or irreversibly dead. It is quite another to hastily remove organs from victims of cardiac arrest who expect a thorough resuscitation.

319. See Rady et al., *supra* note 86, at 327 (recognizing that although donors who have preexisting neurological injuries may not have meaningful brain activity at the time of arrest, the same may not be true of potential donors who have intact brain function prior to arrest).

320. *Id.*

321. The California transplant surgeon who allegedly administered excessive and unnecessary medication is not being prosecuted for homicide, but for dependent adult abuse and prescribing a controlled substance without a medical purpose. McKinley, *supra* note 28, at A1.

322. See Norman Fost, *Reconsidering the Dead Donor Rule: Is It Important that Organ Donors be Dead?*, 14 KENNEDY INST. ETHICS J. 249, 255 (2004) (arguing that prosecutors have tolerated "clearly illegal behavior" by physicians in sympathetic cases).

323. *Id.* at 254-56.

324. Laura A. Siminoff et al., *Death and Organ Procurement: Public Belief and Attitudes*, 14 KENNEDY INST. ETHICS J. 217, 228 (2004) (reporting that ninety-eight percent of study participants had heard of brain death, but that only one-third believed that brain-dead persons were legally dead. Of those who considered a brain-dead person alive, over sixty-six percent said they would donate organs).

325. Cara Buckley, *City To Explore a Way To Add Organ Donors*, N.Y. TIMES, June 1, 2008.

Although most people support organ donation in theory, many are unwilling to become donors or to donate a family member's organs.³²⁶ One of the explanations for this reluctance is the fear of being declared prematurely dead or that emergency care will be compromised.³²⁷ The question that must be asked is, under what circumstances will the public be willing to accept a certain level of error in diagnosing death in order to promote organ procurement?

VI. HOW SHOULD DEATH BE DEFINED IN DCD DONORS?

Recognizing that defining death is not a simple matter, some in the medical community question whether this is even an important issue. Under the title, "Philosophical Debates About the Definition of Death: Who Cares?," Stuart J. Youngner and Robert M. Arnold argue that the concept of irreversibility is impossibly muddled and that the conversation should turn instead to whether it is permissible to take organs from patients who are "beyond harm," but who may not be dead.³²⁸ Robert D. Truog, a prominent bioethicist, has long argued that the dead donor rule should be abandoned and that people whom we consider alive, but who are terminally ill or permanently unconscious, should be allowed to donate organs while still alive, because the harm inflicted on these patients is minimal.³²⁹ For example, a person in a persistent vegetative state (PVS), who is not legally dead,³³⁰ should be allowed the pre-mortem opportunity to donate her organs. For these people, the quality of life is so unacceptable or death is so imminent that, with their consent, we ethically can take their organs before they die.³³¹ Similarly, other notable medical ethicists, including Fost, assert that the very premise on which we remove vital organs—death of the donor—is scientifically flawed, so that certain patients should have the right to donate organs even if it means a premature death.³³²

Others contend that we should not abandon the dead donor rule but rather allow individuals the choice of defining the conditions in which they could be considered dead so as to allow the removal of organs. Veatch has argued for over three decades that brain death should include not

326. See Laura A. Siminoff et al., *Factors Influencing Families' Consent for Donation of Solid Organs for Transplantation*, 286 J. AM. MED. ASS'N 71, 71 (2001) (citing studies showing that while more than seventy-five percent of people said they would donate their organs if asked, less than half of families actually agreed to donation after death).

327. See DuBois, *supra* note 318, at 132 (citing surveys showing that significant numbers of people fear their health care will be compromised if they agree to be organ donors).

328. Youngner & Arnold, *supra* note 252, at 533.

329. Robert D. Truog, *Brain Death—Too Flawed to Endure, Too Ingrained to Abandon*, 35 J.L. MED. & ETHICS 273, 278 (2007).

330. A person in a persistent vegetative state (PVS) is not brain dead under the UDDA because the person has not suffered whole brain death; PVS patients have brain stem functions. See *Cruzan v. Dir., Mo. Dep't of Health*, 497 U.S. 261, 266 n.1 (describing the physiological state of Nancy Cruzan, who was in a PVS).

331. Truog, *supra* note 329, at 278.

332. Fost, *supra* note 322, at 250-51.

only those who have complete loss of brain functions including the brain stem, but also those who have lost only higher brain or cerebral activity.³³³ According to Veatch, those who are no longer “members in full standing of the moral community” (such as those in PVS) should be able, at their option, to be defined as dead so that organs could be legally taken without violating the dead donor rule.³³⁴

The UDDA, UAGA, and most state laws defining death stand in the way of proposals to abandon the dead donor rule or except certain groups from its confines. Under the UAGA, one needs to be deceased to be a donor, and the UDDA defines brain death as death of the whole brain, including the brain stem.³³⁵ Homicide laws also prohibit intentionally causing death through the removal of vital organs.³³⁶ There have been no serious attempts to change the legal definition of death and it is to be expected that the public, courts, and legislators may balk at allowing physicians to remove organs from the living (as presently defined).³³⁷

Others who have expressed unreserved support for the dead donor rule in removing organs from brain-dead donors struggle with its application in the DCD context. Despite his early criticism of the Pittsburgh Protocol for allowing organ recovery in patients who were not dead,³³⁸ Bernat now concludes that it is irrelevant whether DCD violates the dead donor rule.³³⁹ He acknowledges that by using the true meaning of irreversible, i.e. that a patient can not be successfully resuscitated, some DCD donors may not be dead.³⁴⁰ To avoid the problem of removing organs from one who is not irreversibly dead, he advocates substituting the word “permanent” for “irreversible” in describing the loss of circulatory functions in DCD donors.³⁴¹ Permanent in this context means that functions will not be restored, either spontaneously by the patient or through artificial resuscitation.³⁴² Bernat does not advocate changing the UDDA to reflect this change in terminology, however, because he believes that most physicians are already using the permanence standard in practice.³⁴³ He candidly recognizes that using permanent loss of func-

333. Robert M. Veatch, *The Dead Donor Rule: True by Definition*, 3 AM. J. BIOETHICS 10, 10-11 (2003).

334. Robert M. Veatch, *Abandon the Dead Donor Rule or Change the Definition of Death*, 14 KENNEDY INST. ETHICS J. 261, 269 (2004).

335. A number of states also codify the dead donor rule. See *supra* note 152.

336. Truog recognizes the legal difficulty in abandoning the dead donor rule, as it would mean that organ recovery is the cause of a patient's death. He counters that the transplant physician's actions could be ethically regarded as not constituting a homicide. Truog, *supra* note 329, at 279.

337. See *In re T.A.C.P.*, 609 So. 2d 588, 592 (Fla. 1992) (refusing to declare an anencephalic infant dead for purposes of organ transplantation).

338. Bernat, *supra* note 164, at 20 (stating that at the time organs are procured under the Pittsburgh protocol, “death has not yet occurred”).

339. Bernat, *supra* note 311, at 128-29.

340. *Id.* at 125, 128.

341. *Id.* at 124-25.

342. *Id.* at 124.

343. *Id.* at 127.

tions as the test for death in DCD donors may transgress the dead donor rule, but argues that this exception is justified because the patient soon will be dead and the outcome is the same whether using a permanence or irreversibility standard.³⁴⁴

For Truog, Bernat's recommendation for a change in terminology confirms the obsolete nature of the dead donor rule.³⁴⁵ He views Bernat's proposal as an implicit acknowledgment that patients under a DCD protocol are not dead.³⁴⁶ By acknowledging the fact that DCD donors may be alive, Truog contends the transplant community has already crossed the boundary of the dead donor rule and should be honest and abolish it, both as to brain death and cardiac death.³⁴⁷ Similarly, Joseph L. Verheijde and colleagues, who have been vociferous critics of DCD because it violates the dead donor rule, support efforts to eliminate the dead donor rule as long as patients and their families give meaningful informed consent to the removal of organs before death.³⁴⁸

There may be legitimate reasons for reconstructing the definition of death as it applies to organ donation after cardiac death. From a purely utilitarian view, increasing the supply of organs is a social good. Particularly, in cases of planned withdrawal from life support—where the patient or surrogate has chosen not to resuscitate—it may be morally defensible to declare death within a short period of time in order to facilitate organ retrieval. Again, a comparison of patients in an ICU is illustrative of this principle.³⁴⁹ Patient A wishes to withdraw life support and to donate organs. B, also a patient in the ICU, declines CPR, but does not wish to be an organ donor. B has a cardiac arrest but is not resuscitated. At what point is B irreversibly dead? The answer is that, in most cases, the exact time of death does not matter because no surgical intervention, such as organ procurement, is to be immediately performed on the body.³⁵⁰ Patient B could be declared dead at the time of asystole. But it is also likely that a physician will not rush to declare B dead and that some delay will occur before B is transported to the morgue. Just like A, B will be “allowed to die,” but precisely when B becomes irreversibly

344. *Id.* at 128-29. Ten years ago, Bernat took a much different position: “Accepting a circulatory formulation for death immediately throws into jeopardy the entire multiorgan transplantation program unless the dead donor rule is sacrificed.” Bernat, *supra* note 164, at 22.

345. Robert D. Truog & Thomas I. Cochrane, *The Truth About “Donation After Cardiac Death,”* 17 *J. CLINICAL ETHICS* 133, 136 (2006).

346. *Id.* at 133, 136 (stating that DCD is a misnomer because donors are “dying but not yet dead”).

347. *Id.* at 136.

348. Verheijde et al., *supra* note 236, at 7.

349. This scenario is also adapted from a similar hypothetical described in Youngner et al., *supra* note 158, at 17.

350. The time of a non-donor's death could be of legal significance under some circumstances, however, such as whether a person survived another under the Uniform Simultaneous Death Act. UNIF. SIMULTANEOUS DEATH ACT §§ 2-4 (1993), 8B U.L.A. 147 (2001).

dead is generally of little moral or legal consequence.³⁵¹ Some have argued that if B can be considered dead when cardiopulmonary functions cease, why should we not consider A, the controlled donor, dead at the same moment?³⁵² Both A and B are patients in whom we cannot clearly define the line between life and death, and locating the moment of irreversible death is more of a moral decision than a legal one. Defining irreversibility to mean that the heart *will not* be started in controlled DCD at least fulfills the patient's wishes to end life-sustaining care and to become an organ donor. As John Robertson argued:

Not to regard her then as dead because she might have been resuscitated in a situation in which she never will be resuscitated is counter-intuitive to common understandings of death held by the general public, families, health care providers, and most ethicists, philosophers, and lawyers who study these issues.³⁵³

There may be limits, however, to how far the transplant community can legally or ethically venture in controlled DCD. Even some supporters of DCD draw the line at calling death in less than two minutes and do not support transplanting hearts from DCD donors, a practice which seems on its face to squarely contradict any notion of the irreversibility of circulatory functions.³⁵⁴ But accepting some restrictions, preferably set in place by legislators along with medical experts, DCD in adult controlled donors could proceed.

Nonetheless, this resolution of the debate also means that, with DCD, death will be defined not by an irreversible physiological state but by the context in which it occurs. If we redefine irreversibility in order to retrieve viable organs from controlled donors, where will our "gerrymandering"³⁵⁵ of death criteria end? Truog argues that if DCD is ethically acceptable even if donors are not quite dead, it should be permissible for other consenting terminally ill or neurologically devastated patients to donate their organs under general anesthesia before death.³⁵⁶ After all, it is certain that they, too, will soon be dead and their organs will be more useful if recovered before death.³⁵⁷ Ultimately, "For better

351. See Jerry Menikoff, *The Importance Of Being Dead: Non-Heart-Beating Organ*, 18 ISSUES L. & MED. 3, 6 (2002) (stating that until physicians wanted to remove organs from non-heart-beating donors, there was no rush to declare death and a person could be pronounced dead as long as an hour after the heart stopped beating).

352. See Bernat, *supra* note 311, at 127 (defending the timing of death in DCD donors because it is consistent with how death is usually determined in the non-donor).

353. Robertson, *supra* note 200, at 12.

354. See Bernat, *supra* note 14, at 671 (stating that recovering hearts from DCD donors and determining death seventy-five seconds after heart stoppage exceed the boundaries of DCD); Veatch, *supra* note 211, at 673 (contending that the removal of hearts from DCD donors is the cause of death).

355. Arnold & Youngner, *supra* note 151, at 222 (arguing that the concept of brain death was an effort to "gerrymander" the definition of death to increase the donor pool).

356. Truog, *supra* note 329, at 278.

357. Truog, *supra* note 345, at 134.

or for worse, the bright line [between life and death] is growing dimmer.”³⁵⁸

With controlled donors, we can say their intent is to have life support removed, to die, and to donate their organs. The public may not care whether these patients are declared dead a little early in the dying process.³⁵⁹ But this reasoning cannot seamlessly be applied to uncontrolled donors. We can not easily determine the wishes of those in sudden or unexpected cardiac arrest. In most cases, these patients want to be resuscitated and to live. To begin the organ procurement process only a few minutes (or seconds) after “unsuccessful” resuscitation in victims of sudden cardiac arrest seems to give insufficient respect to their personal autonomy and to jeopardize their small, but increasing, chance of survival.

Under the protocol being considered in New York City, emergency responders will call the time of death when further resuscitative efforts are deemed futile.³⁶⁰ With the organ recovery ambulance hovering nearby, there is a risk that some people will fear that they will be abandoned too soon. Such suspicions may not always be justified, but they are understandable and can undermine confidence in the transplantation system. We should proceed cautiously if DCD is to be expanded to this population so that organs will not be inadvertently removed from those few who may still be “slightly alive.”³⁶¹

There are several possible solutions to this debate. The first, and most preferable, option is to alter death statutes to define irreversibility in patients voluntarily withdrawing life support (who are not brain dead) as the time of cessation of circulatory functions plus a period that scientific studies demonstrate would exclude the possibility of self-resuscitation. This definition would affect not only organ donors; death would have the same meaning for all who electively withdraw life-sustaining measures. Part of the dilemma over the meaning of irreversibility is that the UDDA and many state death statutes were enacted before patients had a legal right to choose whether to be kept alive through extraordinary medical treatment. In promoting a standard of irreversibility that requires an inability to resuscitate, the UDDA fails to recognize that many deaths in hospitals today are from a planned withdrawal of life support in patients who refuse further resuscitation. Thus, defining death in this population to mean the cessation of cardiopulmonary functions plus a waiting period to exclude self-resuscitation acknowledges both legal approval and social acceptance of the “right to die.” Along with this statutory recognition,

358. Arnold & Youngner, *supra* note 151, at 224.

359. Bernat, *supra* note 311, at 129.

360. See Buckley, *supra* note 2.

361. See, e.g., William J. Burke, *More Donors Could be Survivors*, ST. LOUIS REV. ONLINE, June 13, 2003, <http://www.stlouisreview.com/article.php?id=4179> (asserting that DCD deprives some donors of a chance at survival and calling for a halt to the practice in Catholic hospitals).

the medical community must come to a common understanding and clear criteria about how long an interval is necessary to rule out the possibility of autoresuscitation. The idea that, after two minutes (or seventy-five seconds), one can be considered dead in one hospital but alive in another is inexcusable.

Although a delay of only a few minutes from arrest to declaration of death in patients for whom there will be no resuscitative efforts may be acceptable, that short an interval is not tolerable in individuals undergoing CPR. Irreversibility in its common sense notion—that functions *cannot* be reversed—should be retained for all other individuals, a standard that takes into account the great strides in resuscitation being made today and that provides a measure of safety from an erroneous diagnosis of death.

The second option is to wait at least ten minutes or longer to declare death in all DCD donors to make sure that any attempt at resuscitation would fail, i.e. we *can not* reverse because the brain is irreversibly damaged.³⁶² The transplant community has resisted this construal of irreversibility because of concerns about how longer waiting times can affect organ viability. Yet studies over the last two decades tend to demonstrate that a ten-minute waiting time does not impair long-term survival rates in recipients of kidneys, the organs most in demand. The primary drawback to this proposal is using a fixed period of time to determine irreversibility in the uncontrolled donor. With victims of sudden cardiac arrest, the prevailing view has been that after ten to fifteen minutes of pulselessness, irreversible brain damage inevitably follows. As discussed previously, recent studies have demonstrated that with innovative resuscitative therapies, some patients can survive prolonged periods of cardiac arrest, with little neurological sequelae. The period of time from arrest to organ procurement should, therefore, vary according to current medical knowledge and technology. Appointing a fixed hands-off waiting period to uncontrolled donors may deny future victims a possible chance of survival.

The third solution is to do nothing. DuBois argues that the meaning of irreversibility should remain vague and left to physicians to define depending on the context.³⁶³ The do-nothing solution may preserve the status quo in controlled donors, but in light of the apparent expansion of DCD to uncontrolled donors, to children, and to heart transplants, public engagement on this question is inevitable. There are cutting edge issues associated with DCD that have received little attention. Protocols acceptable in the adult population may not transfer in toto to child DCD donors. Recovering hearts and reanimating them in the recipient or using

362. Menikoff, *supra* note 204, at 162 (suggesting that a ten to fifteen minute wait might be appropriate).

363. DuBois, *supra* note 318, at 127.

ECMO or other techniques to restore circulation and possibly resuscitate the brain seem to transgress the “prudent boundaries” of DCD.³⁶⁴ These are practices that should not be pursued until such time as they have been fully examined and approved by both the medical community and policymakers.

CONCLUSION

The focus of organ transplantation has been almost exclusively on the welfare of the recipient of organs rather than the donor. Perhaps that is as it should be; medicine needs to concentrate on the living rather than on the dying. Denton Cooley, one of the pioneers of heart transplantation, stated: “We should not jeopardize the possible survival of the recipient while we are waiting around to make a decision whether the cadaver, as you call it, is dead or not.”³⁶⁵ Pragmatism, however, can only go so far before basic legal and ethical principles are compromised, and it is worthwhile to ask if we should redefine who is dead in order to salvage their organs.

Donation after cardiac death from controlled donors has been proceeding with little public or legislative discussion of whether these patients meet the legal criteria for death. In our incessant demand for organs, we have glossed over difficult questions: what does it mean to be dead, and is death, however defined, a necessary condition for organ donation? There is a need to air the debate over DCD in the public arena before it is extended to other situations that present new legal and ethical challenges. Otherwise, what seems controversial today, for example, removing hearts from infants seventy-five seconds after arrest and reanimating them in other children, may become routine and acceptable tomorrow.

Some argue this is an academic controversy that will not spark any public interest or concern among lawmakers.³⁶⁶ Others are worried that if the public is alerted to the debate about the uncertainty of death, its willingness to donate organs will diminish.³⁶⁷ Yet this is a public policy issue that should not be decided by the medical community alone.³⁶⁸ The organ transplant system depends on civic participation, and the dispute over whether organs should be taken from some patients before death deserves discussion beyond the pages of scholarly journals. As DCD moves from consenting patients in hospitals to unexpected victims in the

364. Bernat, *supra* note 14, at 671.

365. LOCK, *supra* note 210, at 87-88.

366. See, e.g., Fost, *supra* note 322, at 254-56.

367. See Robert A. Burt, *Where Do We Go From Here?*, in *THE DEFINITION OF DEATH: CONTEMPORARY CONTROVERSIES*, *supra* note 207, at 332, 333 (arguing that legislative changes may provoke public distrust of organ donation).

368. See Menikoff, *supra* note 351, at 20 (contending that the debate over the definition of death should not be sidestepped as it squarely addresses the kind of protections we are willing to give people in our society).

streets, the public needs to be reassured that the medical community will not further manipulate the blurred line between life and death.

The disquiet over DCD may be rendered moot by the inevitable progress of science. Through xenotransplantation or the growing of organs from stem cells, we may someday be able to look to alternative sources of transplantable organs. Until that happens, the only source of organs is from humans—wanted, dead or alive.³⁶⁹

369. “Wanted, dead or alive” is a common phrase from the Old West, but it was also used in the title of an article about the UDDA. Goldsmith, *supra* note 56, at 871.