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Unequal Racial Access to Kidney Transplantation

*Ian Ayres**
*Laura G. Dooley***
and
*Robert S. Gaston****

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* Professor of Law, Stanford University.
** Assistant Professor of Law, Valparaiso University.
*** Assistant Professor of Medicine and Surgery, University of Alabama at Birmingham.
Lori Andrews, Jennifer Brown, Guido Calabresi, J. Michael Dennis, E. Don Elliot, Alan Friedman, John Langbein, Mitch Polinsky, Eric Rasmussen, Carol Rose, Peter Schuck, Peter Siegelman, Daryl Warder, and seminar participants at the American Bar Association, the Law & Society Association, the Public Choice Society, and Denver, Valparaiso, and Yale Law Schools provided helpful comments.

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I. INTRODUCTION

Access to medical care is an issue of acute and increasing importance in the United States, a country in which the most promising of ground-breaking technologies may be available to only the privileged few. Although debate about the problem of unequal access to medical care typically centers on financial obstacles to advanced therapies and the obvious inequity of allowing patients' ability to pay to drive treatment decisions, issues of equitable access for patients of both genders and all racial and ethnic backgrounds increasingly have come into focus.

These concerns about equitable access animate the ongoing debate about how government should regulate the transplantation of kidneys. More than 100,000 people in the United States suffer from kidney failure—what doctors call "end-stage renal disease" (ESRD).[1] While kidney failure may be treated with dialysis,[2] kidney transplantation is the preferred treatment: studies show that transplant recipients are more likely to return to work, avoid hospitalization, and enjoy a greater sense

1. U.S. Renal Data System (USRDS), 1990 Annual Data Report.

2. Dialysis mechanically purifies a patient's blood. The patient must remain attached to a dialysis machine three times a week for treatments that might take three to four hours each.

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of well-being than patients on dialysis.[3] Kidney transplants constitute more than three-fourths of the solid organ transplants performed in this country and have success rates routinely as high as eighty percent.[4] A severe shortage of transplantable kidneys, however, limits the availability of this preferred treatment.[5] For example, in 1990, while more than 18,000 Americans were registered on waiting lists, fewer than 8200 received renal transplants.[6]

Federal regulations control the allocation of scarce donated kidneys among prospective recipients. Since 1972, Medicare has covered the costs of virtually all kidney transplants.[7] To qualify for Medicare reimbursement, transplanting hospitals must abide by rules promulgated by the federal Organ Procurement and Transplantation Network (OPTN).[8] Current OPTN policies for cadaveric kidney allocation give strong preference to potential recipients who are genetically similar to

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3. See Roger W. Evans, et al., *The Quality of Life of Patients With End-Stage Renal Disease*, 312 New Eng. J. Med. 553 (1985); R. J. Fischel, et al., *Long-term Outlook for Renal Transplant Recipients with One-year Function*, 51 Transplantation 118 (1991); Roger W. Evans, *The Demand for Transplantation in the United States*, in Paul I. Terasaki, ed., *Clinical Transplants 1990* 319 (U.C.L.A. Tissue Typing Laboratory, 1991).

4. Paul W. Eggers, *Effect of Transplantation on the Medicare End-Stage Renal Disease Program*, 318 New Eng. J. Med. 223 (1988); James F. Blumstein, *Federal Organ Transplantation Policy: A Time for Reassessment?*, 22 U.C. Davis L. Rev. 451, 460 (1989).

5. Transplantable kidneys come from either "living related" or "cadaveric" donors. In 1990, 1714 transplants were performed using kidneys from living related donors and 6443 from cadaveric donors. Potentially many more cadaveric kidneys could be harvested. Up to 20,000 Americans die annually in circumstances—such as car accidents—that would make their organs suitable for transplantation. Organ Transplants, H.R. Rep. No. 769, 98th Cong., 2d Sess. 4 (1984); U.S. Department of Health and Human Services, Report of the Task Force on Organ Transplantation: Issues and Recommendations (1986); Henry Hansmann, *The Economics and Ethics of Markets for Human Organs*, 14 J. Health, Pol., Pol'y & L. 57 (1989); Lloyd R. Cohen, *Increasing the Supply of Transplant Organs: The Virtues of a Futures Market*, 58 Geo. Wash. L. Rev. 1 (1989).

6. UNOS Update (March 1991); USRDS 1990 Report (cited in note 1); S. Takemoto, E. Carnahan and P. I. Terasaki, *A Report of 504 Six Antigen-Matched Transplants*, 23 Transplantation Proc. 1318 (1991). The selection process through which ESRD patients are placed on a waiting list is left largely to the discretion of the local transplant team. *Developments in the Law: Medical Technology and the Law*, 103 Harv. L. Rev. 1519, 1630 (1990). A recent study has shown that black dialysis patients have a significantly lower chance of being placed on a transplant waiting list, even after controlling for a number of health factors that would affect the likelihood of transplant success. J. Michael Soucie, John F. Neylan, and William McClellan, *Race and Sex Differences in the Identification of Candidates for Renal Transplantation*, 19 Am. J. Kidney Dis. 414 (1992). Compared to white males, the relative likelihoods that black males and females would be placed on a waiting list were .78 and .67 respectively (both statistically significant at .05). The process by which dialysis patients are selected for waiting lists is not the focus of this Article, yet it also may be a key factor in the disparate access of black patients to kidney transplants. See 103 Harv. L. Rev. at 1632.

7. See 42 U.S.C. § 426 (1988). For example, in 1988 Medicare paid for more than 92% of the transplants performed. USRDS 1990 Report (cited in note 1). See also Blumstein, 22 U.C. Davis L. Rev. at 454 (cited in note 4); Peter H. Shuck, *Government Funding for Organ Transplants*, 14 J. Health, Pol., Pol'y & L. 169 (1989).

8. See Blumstein, 22 U.C. Davis L. Rev. at 463-64.

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the donor as determined by the identification of antigens located on the surface of cells.[9] For example, if a harvested kidney has all the same antigens as a potential recipient on the waiting list, then that patient will receive the kidney—even if other dialysis patients have waited longer for a transplant.[10]

The rationale for basing kidney allocation on "antigen matching" is that a recipient who receives a kidney from a donor with similar antigens may be less likely to have her immunologic system reject it. The federal guidelines reflect a belief that better antigen matching will lead to a higher rate of kidney graft survival and that this interest in maximizing transplant outcomes should outweigh the equitable claims of patients who must wait longer for a renal allograft.

Mandated antigen matching, however, also makes it difficult for black dialysis patients to qualify for the pool of scarce cadaveric kidneys. Blacks wait almost twice as long as whites for their first transplant—13.9 and 7.6 months respectively.[11] While whites comprise sixty-one percent of the dialysis population, they receive seventy-four percent of the kidney transplants.[12] In a given year white dialysis patients have approximately a seventy-eight percent higher chance of receiving a cadaveric transplant than black dialysis patients.[13]

The antigen matching rules are a "but for" cause of this racial disparity. Because antigens are distributed differently among racial groups,[14] a white patient is more likely than a black patient to have

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9. Antigens are proteins that stimulate an immune response. HLA antigens (human leukocyte antigens) are found on the surface of nearly all human cells and are the product of genes located in the Major Histocompatibility Complex (MHC) of human DNA at chromosome six. Michael Owen, *Major Histocompatibility Complex*, in Ivan M. Roitt, Jonathan Brostoff and David K. Male, eds., *Immunology* 4.1 (Gower Medical, 2d ed. 1989). These antigens are the key determinants that enable immunologically active cells to recognize "self" from "foreign" tissues, sparing the former and destroying the latter. While the term "MHC antigens" may be more scientifically correct, "HLA" remains in common usage within the transplant community. Efforts to improve tissue compatibility by defining these antigens and allocating donated kidneys among recipients in a manner that minimizes antigenic differences are known as "HLA matching." In this Article the term "antigen matching" refers to this process.

10. These guidelines are discussed in greater detail in notes 52-58 and accompanying text.

11. Office of Inspector General, The Distribution of Organs for Transplantation: Expectations and Practices 8 (1991).

12. Health Care Financing Administration, End Stage Renal Disease Patient Profile Tables (1988). In 1988, 33.5% of dialysis patients were black, but only 22.3% of cadaveric kidney transplants went to black patients.

13. In 1988, 4865 cadaveric transplants were distributed among 67,778 white dialysis patients (4865 / 67,778 = 7.17%), and 1486 cadaveric transplants were distributed among 36,951 black dialysis patients (1486 / 36,951 = 4.02%). USRDS 1990 Report (cited in note 1). Thus, the likelihood that a white dialysis patient will receive a kidney in a given year is 78% higher than the likelihood that a black patient will receive a kidney ((7.17-4.02)/4.02 = 78.4%). More detailed estimates are discussed in note 67 and accompanying text.

14. See note 79 and accompanying text.

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antigens that match those on a kidney from a white donor. Whites donate almost ninety percent of kidneys in the United States. Because the proportion of blacks on the waiting list is significantly higher than the proportion of kidneys donated by blacks, white patients are more likely to have antigens that match those on donated kidneys. Thus, a disproportionately black waiting list chases a disproportionately white donor pool.

Alternative allocation rules could eliminate the racial disparity in access to donated kidneys.[15] A first-come-first-served rule, for example, would give all patients equal access to the pool of cadaveric kidneys. Several scholars have argued that the best solution to racial disparity in transplantation is to increase black donation of both cadaveric and living related kidneys.[16] They point out that blacks are less likely than whites to donate both cadaveric and living related kidneys.[17] From this they suggest that increasing black donation rates could improve the pool of well-matched kidneys for blacks on the waiting list and thus mitigate the disparate effects of antigen matching rules.[18]

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15. To be sure, other factors—including unequal access to waiting lists and a relative inability of blacks to respond when an organ becomes available—contribute to this racial disparity. Fred P. Sanfilippo, et al., *Factors Affecting the Waiting Time of Cadaveric Kidney Transplant Candidates in the United States,* 267 J. Am. Med. Ass'n 247 (1992).

16. C. O. Callender, *Organ Donation in the Black Population: Where Do We Go From Here?,* 19 Transplantation Proc. 36 (Supp. 2 1987); Luis M. Perez, et al., *Organ Donation in Three Major American Cities with Large Latino and Black Populations,* 46 Transplantation 553 (1988).

17. In 1988 blacks donated only 12% of living related transplants and only 8% of cadaveric kidneys. Office of Inspector General, Distribution of Organs for Transplantation at 11 (cited in note 11). Studies from New York, Los Angeles, Miami, and Washington D.C. document that blacks were markedly underrepresented in donor statistics. Callender, 19 Transplantation Proc. 36 (cited in note 16); Perez, et al., 46 Transplantation at 553 (cited in note 16) (saying that black families were two to three times less likely to consent to organ donation than white families).

While the reasons for the lower rate of black organ donation are not fully understood, several recent studies have addressed the problem. One found that the most common reasons for donor reluctance were lack of information, religion, distrust of medical professionals, fear of premature death, and a preference to donate only to members of the same race. Clive O. Callender, et al., *Attitudes Among Blacks Toward Donating Kidneys for Transplantation: A Pilot Project,* 74 Nat'l Med. Ass'n J. 807 (1982); Gallup Organization, Attitudes and Opinions of the American Public Towards Kidney Donations (1983), cited in Callender, 19 Transplantation Proc. at 36.

The lower rate of consent by black families to cadaveric donation may be caused by the failure of healtb care professionals to ask for consent in an effective way. The requests for consent come disproportionately from whites. Current studies are investigating whether higher levels of consent can be obtained if the persons making the request are of the same race as the potential donor family. See The Partnership for Organ Donation and The Annenberg Washington Program, *Solving the Donor Shortage By Meeting Family Needs: A Communications Model* (Oct. 30-31, 1990).

18. The relatively low black donation rate does not justify the unequal access that results from the present system. An individual white patient does not have a greater equitable claim to a given cadaveric kidney than a black patient simply because blacks as a class donate fewer cadaveric kidneys than whites, especially given that the lower rates may be an artifact of disparate procurement procedures. See note 17 (discussing the possibility that black families may encounter substandard requests from medical professionals). Nonetheless, a class-based linking of an alloca-

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Intensified efforts to increase the donation rates of black Americans, however, have virtually no chance of eliminating the disparate rates of transplantation for blacks and whites. Because the waiting list for kidney transplants is so disproportionately black, increasing the rate of black donation cannot plausibly equalize the proportions of blacks seeking and receiving kidneys. The incidence of ESRD in the United States is nearly four times greater for blacks than whites: while blacks comprise nearly twelve percent of the general population, thirty-four percent of ESRD patients are black.[19] To eliminate the disparate impact of antigen matching, blacks would need to donate enough additional kidneys so that the proportion of black donors would approximate the proportion of blacks on the waiting list—thirty-four percent.[20] To accomplish such an increase, the donation rate for blacks—for both cadaveric and living related organs—would have to increase to five times its current rate and more than four times the current rate for whites. Increases of this magnitude are unlikely.[21] Efforts

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tion scheme to procurement might induce higher donation rates. The possible dependence of procurement success on the system of allocation is discussed more fully in the text accompanying note 194. While we favor measures to increase the donation of cadaveric kidneys by blacks, increased donation is unlikely to abrogate unequal racial access to transplantation.

19. USRDS 1990 Report (cited in note 1). The incidence rate of ESRD in the United States is 376 per million for blacks and 99 per million for whites. Dan Gordon, *Racial Differences in ESRD*, 19 Dialysis & Transplantation 114 (1990).

This disproportionate representation defies easy analysis and may be due to several factors. Socioeconomic issues such as diet, accessibility of health care, education, and substance abuse surely contribute. A. O. Hosten, *Kidney Disease in Blacks in North America—An Overview*, 19 Transplantation Proc. at 5 (Supp. 2 1987). However, the key element in black ESRD appears to be high blood pressure, or hypertension.

High blood pressure is more common in blacks for poorly defined reasons. Richard F. Gillum, *Pathophysiology of Hypertension in Blacks and Whites*, 1 Hypertension 468 (1979). Blacks have an incidence of hypertension-related ESRD 6.5 times that of whites. In several large series, hypertensive kidney disease is the most common cause of ESRD in blacks. See, for example, Hosten, 19 Transplantation Proc. 5; Rafael Oriol, Jacques Le Pendu, and Calvin Chun, *Influence of the Original Disease, Race, and Center on the Outcome of Kidney Transplantation*, 33 Transplantation 22 (1982). Thus, hypertension in the black population seems either to cause or exacerbate renal disease of all etiologies, hastening the progression to ESRD.

20. It is possible that even a proportionate representation of donated black kidneys would not equalize the rates of antigen matching. Because blacks have more heterogeneous distributions of antigen types, it may be less likely that a black patient will match the antigens on a donated black kidney than that a white patient will match the antigens on a donated white kidney.

21. Current efforts to spur black donations, including educational funding and the use of blacks to solicit cadaveric donations, have not generated increases of the magnitude required to eliminate the disparity. Paul Delaney, *Fighting Myths in a Bid to Get Blacks to Consider Transplants*, N.Y. Times C17 (Nov. 6, 1991). Substantial increases in the supply of kidneys might be achieved by governmental purchase of the right to transplant cadaveric organs. Compare Cohen, 58 Geo. Wash. L. Rev. 1 (cited in note 5); Hansmann, 14 J. Health, Pol., Pol'y & L. at 57 (cited in note 5); Lori B. Andrews, *My Body, My Property*, 16 Hastings Center Report 28 (Oct. 1986); Chris Hedges, *Egypt's Desperate Trade: Body Parts for Sale*, N.Y. Times A1 (Sept. 23, 1991). While a market-oriented approach deserves careful consideration, we predict that our government is un-

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to increase black donation are laudable and important, but it is misleading to argue that increasing black donation rates could significantly reduce disparate racial access to transplantation.[22]

This Article explores whether the disparate racial impact of mandated antigen matching is justified by higher overall survival rates of kidney transplants.[23] Recent advances in the use of drugs that effectively suppress immune responses have dramatically altered the impact of antigen matching—the likelihood of graft survival may now be relatively independent of the degree of antigen matching. Our tentative conclusion is that technological advances have made antigen-based allocation less critical to transplant success.

Normatively, we argue that the equitable claims of black dialysis patients for cadaveric kidneys outweigh the marginal improvement in transplant outcomes currently associated with matching. Guido Calabresi and Philip Bobbitt have reasoned:

> [C]orrected egalitarianism . . . plays an unusually influential role in the American concept of equality. It accepts the general premise of formal egalitarianism that discrimination is proper so long as likes are treated alike, but corrects the operation of this premise by rejecting it whenever methods applying it happen to produce results which correlate the permissible category of discrimination—health, for example—with an impermissible one, such as wealth or race.[24]

The federally mandated system for allocating kidneys has produced just this impermissible effect based on an increasingly weak correlation with health or transplant survival. Recent proposals to expand the influence of antigen matching on organ allocation would further increase racial disparity in transplantation.[25] While the disparate racial impact of anti-

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likely to adopt such an approach in the near future. Given the types of puhlic and private initiatives that might plausibly be undertaken, the proportion of blacks on waiting lists almost certainly will continue to be higher than the proportion of cadaveric kidneys donated by blacks.

22. For example, a recent article implicitly ascribes the racial disparity in transplantation solely to rates of donation saying that "the lack of organs donated by blacks makes transplants to blacks more difficult." Delaney, N.Y. Times at C17 (cited in note 21).

23. At the outset, it is important to note that for most potential recipients allocation of kidneys for transplantation is not a matter of life or death due to the alternative treatment offered by dialysis. However, as noted previously, most authorities consider transplantation to be an optimal therapy. See Eggers, 318 New Eng. J. Med. at 223 (cited in note 4); USRDS 1990 Report (cited in note 1). Inexplicably, blacks have lower mortality rates on dialysis than whites. In 1986, for example, blacks on dialysis had a 23% lower mortality rate than whites. Gordon, 19 Dialysis & Transplantation at 114 (cited in note 19). Thus, one might justify the disparate racial impact of antigen matching as a way of decreasing ESRD mortality by taking disproportionate numbers of whites off dialysis, which is relatively more risky for them.

24. Guido Calabresi and Philip Bobbitt, *Tragic Choices* 25 (Norton, 1978).

25. See David W. Gjertson, et al., *National Allocation of Cadaveric Kidneys by HLA Matching*, 324 New Eng. J. Med. 1032 (1991) (proposing to create a single national waiting list and to allocate every kidney procured within the United States to the potential recipient with best antigen mateh). See also Steve Takemoto, et al., *Survival of Nationally Shared, HLA-Matched Kidney Transplants from Cadaveric Donors*, 327 New Eng. J. Med. 834 (1992).

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gen matching has been intensely analyzed within the transplant community in the last two years,[26] it has been largely ignored in the legal literature.[27]

The Article also serves as a case study of the difficulty of administering regulations in the face of conflicting and evolving empirical data. The increased demand for donor organs has intensified debate over allocation, but the issues are not new. While some within the transplant community argue that allocation based on antigen matching is the most scientifically sound method, others contend that factors such as newer drug therapies, evolving technology, and equitable access are of greater importance.[28] In the absence of firm empirical results, one of the most important normative choices will be allocating burdens of proof—because without certain knowledge about the benefits of antigen matching or new drug therapies, much will turn on presumptions.

The time is now ripe to consider these issues. While the allocation system was originally developed without the procedural protections of the Administrative Procedure Act, the Department of Health and Human Service (HHS) has decided to develop and submit for comment a notice of proposed rulemaking to replace the mandatory allocation system devised by UNOS.[29] HHS expects to publish proposed allocation rules in the Federal Register in the near future.[30] This procedural change may give those concerned with inequitable racial allocation an opportunity to overcome regulatory inertia.

Part II of this Article provides the factual background. There, we describe in more detail the federal rules governing antigen matching and the reasons why these rules cause disparate racial access to cadav-

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26. See, for example, S. M. Greenstein, et al., *Does Kidney Distribution Based Upon HLA Matching Discriminate Against Blacks?*, 21 Transplantation Proc. 3874 (1989); Bertram L. Kasiske, et al., *The Effect of Race on Access and Outcome in Transplantation*, 324 New Eng. J. Med. 302 (1991); V. A. Lazda and M. E. Blaesing, *Is Allocation of Kidneys on Basis of HLA Match Equitable in Multiracial Populations?*, 21 Transplantation Proc. 1415 (1989). The disparate access to cadaveric kidneys by blacks has also been a central concern of public officials. See Office of Inspector General, *Distribution of Organs for Transplantation* (cited in note 1); Remarks of Louis W. Sullivan, Secretary of Health and Human Services at the Partnership for Organ Donation's Consensus Conference (1991).

27. For example, a 1989 issue of a prominent health law journal that was devoted entirely to organ transplantation failed to even refer to this concern. See James F. Blumstein and Frank A. Sloan, eds., 14 J. Health Pol., Pol'y & L. 1 (1989).

28. Both groups can produce scientific evidence supportive of their respective positions. Compare L. G. Hunsicker and Philip J. Held, *The Role of HLA Matching for Cadaveric Renal Transplants in the Cyclosporine Era*, 12 Seminars in Nephrology 293 (1992) with Gjertson, et al., 324 New Eng. J. Med. 1032 (cited in note 25).

29. Letter of James O. Mason, Asst. Secretary for Health, to Robert J. Corry, President of UNOS (Sept. 22, 1989) [hereinafter "*Mason Letter*"].

30. Conversation with Reny Aronoss, HRSA project officer who oversees contract with UNOS (Sept. 4, 1992) [hereinafter "*Aronoss Conversation*"].

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eric kidney transplants. We also explore the degree to which antigen matching improves the likelihood of successful transplantation—focusing on newer immunological therapies that increasingly may divorce graft survival from antigenic similarity.

Part III explores difficult normative issues of kidney allocation. In our effort to justify a system that devalues antigen matching, we consider the ethical choices that must be made—implicitly or explicitly—in choosing one system of allocation over another. In particular, we pose in concrete terms the tradeoff between enhanced graft survival and equitable allocation of available kidneys. We propose specific allocation rules that seek to strike a more appropriate ethical and clinical balance.

Finally, Part IV examines the potential viability of a suit challenging the current regulations on a disparate impact theory. It should be emphasized that here, as in other contexts,[31] the presence of disparate racial outcomes should not be taken to imply racial animus or bigotry on the part of any of the relevant advocates or decisionmakers. To the contrary, it is our firm belief that there is a surfeit of good faith among the various actors in the transplant community. The differences of opinion are inevitable and, indeed, a healthy byproduct of thoughtful responses to these complex and important issues.

II. ANTIGEN MATCHING

A. *The UNOS Policies for Mandated Sharing of Well-Matched Kidneys*

The National Organ Transplant Act of 1984 (NOTA)[32] provided funds for HHS to establish the Organ Procurement and Transplantation Network (OPTN).[33] The OPTN was to be a nonprofit organization devoted to establishing (i) a national list of people who need organs,[34] (ii) a national system to match organs and individuals on the list,[35] and (iii) criteria for allocating organs.[36] In 1986 HHS awarded the OPTN contract to a pre-existing entity, the United Network for Organ Sharing

31. See, for example, Ian Ayres, *Fair Driving: Gender and Race Discrimination in Retail Car Negotiations*, 104 Harv. L. Rev. 817 (1991).

32. Pub. L. No. 98-507, 98 Stat. 2339 (1984), codified at 42 U.S.C. §§ 273, 274(a)-(e) (1988 and Supp. II 1990).

33. Id. at § 274. An excellent summary of federal regulation of organ transplantation is provided by Blumstein, 22 U.C. Davis L. Rev. at 461-76 (cited in note 4).

34. 42 U.S.C. § 274(b) (1988).

35. Id.

36. Id.

(UNOS), which had already established a central computer registry of potential kidney recipients.[37]

The 1984 act also provided grants for qualified Organ Procurement Organizations (OPOs).[38] NOTA required OPOs to have effective agreements "with a substantial majority" of the transplanting hospitals within a service area to acquire and allocate all usable organs "equitably among transplant patients according to established medical criteria."[39] To qualify for grants, OPOs also had to be members of the OPTN, but OPTN membership was not a legal prerequisite for either procuring or transplanting kidneys. As Professor James Blumstein summarized:

> To the extent that the Network was useful and provided a service, transplant centers and their patients could benefit from the system of coordination. To the extent that other avenues of donation and procurement were available and more attractive, transplant centers and their patients were free to utilize those other sources and resources as well.[40]

The voluntary participation in the OPTN changed, however, in 1986 with the passage of the Sixth Omnibus Budget Reconciliation Act (SOBRA)[41] and its addition of Section 1138 to the Social Security Act.[42] Section 1138 requires that to qualify for Medicare or Medicaid reimbursements, hospitals with transplant programs must be members of the OPTN (i.e., UNOS) and abide by its rules. Compliance with the policies of UNOS is a prerequisite not only for Medicare and Medicaid reimbursement relating to transplantation, but for all Medicare and Medicaid payments. Section 1138 thus effectively mandates compliance with UNOS's policies[43] because noncompliance means that the hospital

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37. See Blumstein, 22 U.C. Davis L. Rev. at 463 (cited in note 4); Frank A. Sloan, May W. Shayne and Marilyn D. Doyle, *Is There a Rationale for Regionalizing Organ Transplantation Services?*, 14 J. Health Pol., Pol'y & L. 115, 127 (1989). As an overview for understanding HHS's supervision of UNOS, it is useful to introduce the relevant administrative actors that directly or indirectly control transplantation policy. The Division of Organ Transplantation is part of the Bureau of Health Resources Department which is part of the Health Resources and Services Administration (HRSA, pronounced her'-sa) which is part of HHS. In addition, the Health Care Financing Administration (HCFA, pronounced hick'-fa) is responsihle for the administration of Medicare and Medicaid coverage for kidney transplants. HCFA is also a part of HHS.

38. 42 U.S.C. § 273(a)(1),(2) (1988).

39. Id. at § 273(b)(3).

40. Blumstein, 22 U.C. Davis L. Rev. at 464 (cited in note 4).

41. Pub. L. No. 99-509, 100 Stat. 1874 (1986).

42. Id. § 9318(a), 100 Stat. at 2009-10. Section 1138 of the Social Security Act is codified at 42 U.S.C. § 1320b-8 (1988 and Supp. II 1990). See Blumstein, 22 U.C. Davis L. Rev. at 467 (cited in note 4).

43. UNOS Policy 1.0 establishes: "By acceptance of membership in UNOS, each member agrees to be bound by all provisions of the UNOS Articles of Incorporation, By-Laws and Policies." *UNOS Policy* 1.0 (1991).

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must "forgo Medicare and Medicaid payment for *all* services, not just transplant services."[44]

1. An Introduction to Antigen Compatibility

Current UNOS policies explicitly mandate allocation of cadaveric kidneys to potential recipients with antigens similar to those of the donor. Before examining the specifics of these policies, it is useful to provide a brief introduction to antigen matching. An antigen is a protein on the surface of tissues that can stimulate an immune response. HLA antigens enable white blood cells—the primary immunologically-active cells of the body—to distinguish between "self" and "foreign" tissue.[45] Unless suppressed by drug therapy, the immune system will attack tissue that it recognizes as foreign, but ignore "self" tissue. If kidney tissue bearing specific antigens is transplanted into a person whose tissue does not bear those antigens, then the immune system of the recipient will attack the transplanted tissue in a process known as rejection. As will be stressed below,[46] however, the immune system can be suppressed by drugs, enabling transplanted kidneys to survive, even in the presence of foreign antigens.

Antigens are the expression, or phenotype, of Major Histocompatibility Complex (MHC) genes. Current techniques cannot detect MHC differences at the genomic level in humans; however, phenotypic differences—differing antigens on the surface of cells—are readily detected by a process known as tissue typing.[47] Sets of antigens at three loca-

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44. 53 Fed. Reg. 6525, 6529-30 (1988) (emphasis in original) (to be codified in scattered sections of 42 C.F.R.). Section 1138 gave the OPTN contracting party (UNOS) potentially coercive power that was criticized because it was unchecked by traditional due process protections. See, for example, *Mason Letter* (cited in note 29); Blumstein, 22 U.C. Davis L. Rev. at 496 (cited in note 4). The Organ Transplant Amendments Act of 1988, Pub. L. No. 100-607, 102 Stat. 3114, responds in part to these concerns by mandating publication of its policies and providing "members of the public an opportunity to comment." Id. at 3115. HHS has determined that the UNOS policies must be submitted to the HHS Secretary for approval and must follow Administrative Procedure Act guidelines for proposed rulemaking and ultimate publication in the Code of Federal Regulations. Health Care Financing Administration, Medicare and Medicaid Programs; Organ Procurement and Transplantation Network Rules and Actions, 54 Fed. Reg. 51802, 51803 (1989).

45. The principal white blood cells involved in immune response are called lymphocytes. In the human body there are approximately 10^{12} (one trillion) lymphocytes, each of which recognizes a single antigen from among the universe of all possible antigens. As the immune system develops, those lymphocytes that recognize and destroy "self" tissues are deleted. When, however, transplanted tissues with foreign antigens are recognized by lymphocytes, the process of immunologic destruction, or "rejection," is initiated. Rejection is the bane of transplantation: if untreated, it results in the loss of the transplanted organ. Ken Welsh and David Male, *Transplantation and Rejection*, in Ivan M. Roitt, Jonathan Brostoff, and David K. Male, eds., *Immunology* 24.1 (Gower Medical, 2d ed. 1989).

46. See Part II.C.4.

47. The basic tissue typing technique involves placing the tissue cells to be typed into numerous "wells," each with a different type of serum known to contain antibodies to a specific

tions, or loci, on the cell surface have been found to be particularly relevant in transplantation. These three antigen loci are denoted A, B, and DR, and different specificities are commonly labelled by number. For example, at the A locus common antigens include A1, A11, and A25. Each person has two antigens at each locus[48]—one inherited from each parent—totalling six antigens altogether. In the absence of immunosuppressive drugs, these antigens strongly affect whether a recipient's immune system will attack a transplanted kidney.[49]

Only identical twins possess identical MHC genes and HLA antigens at all loci; their tissues are thus immunologically interchangeable. Indeed, the earliest successful kidney transplants were between twins. As antigens were identified in the early and mid 1960s, doctors hoped that by matching antigens between donor and recipient as closely as possible the results achievable in twins could be approximated with minimal immunosuppression. In transplants from living relatives of the recipient this has proven true because genetic inheritance of all antigens makes phenotypic status (antigen matching) a good proxy for the underlying genotypic status. However, with transplantation of cadaveric organs, which are obtained from persons of diverse genetic backgrounds, the use of antigen matching is a poorer proxy for the underlying MHC genes that more directly control the immune response. In order to successfully transplant organs between any nontwin donor-recipient pairs, immune responses must be suppressed in some way, usually by drugs. Thus, while antigen matching has from its inception accurately predicted outcomes in living-related transplantation, its role when cadaveric donors are used has been controversial.

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antigen (e.g., A2). If the antibodies of a particular serum result in the death of the tissue cells that are to be typed, one can infer that the cells must have that particular antigen expressed on their surface. Michael Steward and David Male, *Immunological Techniques*, in Ivan M. Roitt, Jonathan Brostoff and David K. Male, eds., *Immunology* 25.1 (Gower Medical, 2d ed. 1989).

48. An A locus might, for example, have both the A1 and A11 antigens.

49. In some patients tissue typing is unable to identify six different antigens. For example, tissue typing might identify only the A1 antigen at the A locus. Current tecbniques would thus define a total of five (1A, 2B, and 2DR) rather than six antigens in such a person, who would be said to have a "blank" at the A locus. Blanks may represent either as yet unidentified antigen specificities or "homozygosity." A person would be homozygous on the A locus if both A antigens were, for instance, A11. Such a kidney would be "pbenotypically" matehed to be transplanted into a recipient who had the donor's five antigens and any additional antigen at the donor's homozygotic locus. Again, as long as the donor kidney does not have antigens present that are absent in the recipient, the recipient's immune response may be weaker.

Blanks in blacks may be more likely to represent as yet unidentified antigens than homozygosity. See note 47 (discussing tissue typing with serum). It is well documented that HLA antigen expression is less well-defined in blacks than wbites. A. H. Johnson, S. Rosen-Bronson and C. K. Hurley, *Heterogeneity of the HLA-D Region in American Blacks*, 21 Transplantation Proc. 3872 (1989).

Another type of antigen matching relevant to transplantation concerns blood group (ABO) compatibility. Antigens that distinguish blood types A, B, and O are also present on the surface of kidney tissue.[50] Blood types A and B, for example, refer to blood cells that have either A or B antigens, respectively. Just as type A blood cannot be transfused into a patient with type B blood, neither will a type B recipient accept a kidney from a type A donor. Donor and recipient must have compatible blood type antigens—regardless of the type of immunosuppressant drug therapy. Blood type O, however, refers to the absence of either the A or B antigens. Hence, type O kidneys can be transplanted into either type A or type B recipients. Persons who are type O are said to be "universal" donors, but can receive kidneys (or blood) only from others of the same blood type. Conversely, a small fraction of persons possess both the A and B antigens—blood type AB—and are universal recipients.[51]

2. Mandatory National Sharing of Six-Antigen-Matched Kidneys

The current UNOS policies privilege antigen matching in two separate ways. First, the policies mandate that all "six antigen matched" kidneys be shared on a national basis.[52] The policy is implemented in the following manner. When an ESRD patient is placed into the UNOS computer registry, his or her blood type and HLA antigens are also recorded. As a cadaveric kidney becomes available, blood and tissue typing are immediately performed on the donor, and the results are entered into the computer registry. If a donated kidney is a six-antigen match with an ABO compatible dialysis patient on the UNOS waiting list, then "it is mandatory that the kidney shall be offered for the six antigen match patient."[53]

The six-antigen match is, however, a term of art that includes a growing number of harvested kidneys.[54] If tissue typing identifies only one antigen on each of the three loci of the donor—that is, three blanks

50. The Rh+ or Rh- blood-type antigen that distinguishes, for example, blood type O-positive from O-negative is not present in kidney tissue and is not relevant to transplantation.

51. David Male, *Reactions Against Blood Cells and Platelets*, in Ivan M. Roitt, Jonathan Brostoff and David K. Male, eds., *Immunology* 20.4 (Gower Medical, 2d ed. 1989).

52. The UNOS policies on their face govern the allocation of kidneys from living related donors as well as from cadavers. This means that a kidney donated by the sibling of a dialysis patient could potentially qualify as a six-antigen match with nonrelated recipients. The guidelines mandate that this kidney be offered first to the unrelated six-antigen match. See Blumstein, 22 U.C. Davis L. Rev. at 486-88 (cited in note 4). In practice, however, kidneys from family members are considered to be "donated" for a specific recipient and are not subject to allocation guidelines.

53. *UNOS Policy* 3.3.3 (1992). If there is more than one six-antigen-matched patient, the kidney shall be offered to the patient with the highest number of UNOS points. Id. The UNOS point system is discussed in note 61 and accompanying text.

54. UNOS defines a "six antigen match" to be

are present[55]—a donated kidney may still qualify as a six-antigen match.[56] This effective redefinition of a six-antigen match to mean a "zero antigen mismatch" has important implications for the number of transplants governed by UNOS's mandatory sharing policy. HLA antigens are distributed so that fewer than ten percent of cadaveric donations go to true six-antigen-matched recipients.[57] This number may be as high as twenty-five percent, however, if a zero antigen mismatch standard is used instead.[58]

3. The Mandatory Local Point System

If a cadaveric kidney does not qualify as a six-antigen match for national sharing, then UNOS policies mandate that the cadaveric kidneys be allocated locally[59] according to the point system set out in Table 1.[60]

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a match between a donor and recipient where the recipient is ABO compatible and matched on all 6 HLA-A, B, and DR antigens with the donor or there is phenotypic identity between the donor and recipient where at least one antigen is identified at the A, B, loci and DR loci. *UNOS Policy* 3.3.1 (1992).

55. The identification of a single antigen on an individual locus can signify two very different things. First, as discussed in note 49, the presence of a blank might mean that the locus is homozygotic in that both antigens on that locus are the same. Conversely, a blank could signify the presence of an as yet undefined antigen specificity. Current tests cannot distinguish between the two. The rationale for this aspect of the gnidelines is that as tissue typing has become more reliable, blanks are more likely to define homozygosity, which would pose less of a barrier to successful transplantation than unidentified antigens.

There are, however, a large number of antigens that still cannot be typed by laboratory serum. In a recent national study, laboratories were unable to identify antigens on the DR locus for more than 30% of the white population and for more than 40% of the black population. E. L. Milford, L. Ratner, and E. Yunis, *Will Transplant Immunogenetics Lead to Better Graft Survival in Blacks?—Racial Variability in the Accuracy of Tissue Typing for Organ Donation: The Fourth American Workshop*, 19 Transplantation Proc. 30, 31 (Supp. 2 1987).

56. On January 21, 1991 UNOS extended this definition further to cover blanks discovered on the DR locus as well so that kidneys with only three identified antigens may qualify for six-antigen-matched treatment. UNOS Policy Proposal Statement (Jan. 21, 1991).

57. M. Ray Mickey, Daniel J. Cook, and Paul I. Terasaki, *Recipient Pool Sizes for Prioritized HLA Matching*, 47 Transplantation 401 (1989).

58. Id. See also Paul I. Terasaki, Steve Takemoto and M. Ray Mickey, *A Report on 123 Six-Antigen Matched Cadaver Kidney Transplants*, 3 Clinical Transplantation 301 (1989); note 25 and accompanying text.

59. The cadaveric kidney shall be allocated among the list of local recipients defined to be "either the individual transplant center recipient list or a shared list of recipients within a defined procurement area and shall be no larger than the OPO." *UNOS Policy* 3.5.1 (1992).

60. *UNOS Policy* 3.5 (1992). Prior to 1987 each local transplant program could set its own allocation policy. In 1987 UNOS adopted the "Starzl" system, which awarded up to 10 points for waiting time, 12 for quality of antigen match, 10 for presensitization (discussed in note 61), 10 for "medical urgency," and 6 for logistical factors such as proximity to the hospital. Thomas E. Starzl, et al., *A Multifactorial System for Equitable Selection of Cadaver Kidney Recipients*, 257 J. Am. Med. Ass'n 3073 (1987). See generally J. Michael Dennis, *A Review of Centralized Rule-Making in American Transplantation*, 6 Transplantation Rev. 130, 132 (1992) (recounting the history of the

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TABLE 1. UNOS POINT SYSTEM FOR SELECTING KIDNEY TRANSPLANT RECIPIENTS

	Points
HLA matching	
0 - A, B, DR mismatch	10
0 - B, DR mismatch	7
0 - A, B mismatch	6
1 - B, DR mismatch	3
2 - B, DR mismatch	2
3 - B, DR mismatch	1
Waiting Time	
Patient with longest waiting period (proportionate points for shorter periods)	1
Each year on waiting list	.5
Children	
Age 0-5	2
Age 6-10	1
Presensitization[61]	4

The point system places heavy weight on the quality of the antigen match, making ten out of approximately seventeen possible points contingent on the number of antigens matched. In contrast, the system gives only one point to the patient who has waited for the longest pe-

development of the point system). In 1989 the current point system, known as the "Terasaki modification," was adopted.

61. *UNOS Policy* 3.5.3 (1992). Four points are awarded if the recipient shows a high likelihood of reacting immunologically to more than 80% of the potential donors, but displays a negative crossmatch with a particular donor. A positive crossmatch indicates that the recipient already has produced antibodies against the donor's HLA antigens and thus precludes placing a kidney from that donor into that recipient. All persons on a waiting list have their blood tested periodically (usually monthly) for antibodies against HLA antigens in a laboratory test. This is done using a "panel" of cells from approximately 40 random donors. If a person's blood reacts with 10 of 40 donors, he or she is said to have 25% panel reactive antibodies (PRA), implying approximately a 25% chance of reacting positively with any single donor from the larger population of potential donors. Thus, for patients with high ($\geq$ 80%) PRA levels, it is difficult to find a donor with a negative crossmatch.

The rationale for this rule is that because the recipient has demonstrated poor compatibility with the larger population of potential donors, but has shown a preliminary compatibility witb a particular donor, he or she should receive the kidney. Put simply, extra points are awarded because a better match is not likely to come along. Transplantation to these recipients is privileged in order to provide equitable access, not to maximize success rates. Indeed, patients with high PRA levels may comprise a group at "high risk" for graft loss. Prasad Koka and J. M. Cecka, *Sensitization and Crossmatching in Renal Transplantation*, in Paul I. Terasaki, ed., *Clinical Transplants 1989* 379 (U.C.L.A. Tissue Typing Laboratory, 1989).

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riod; those who have not waited as long get fractions of a point.[62] The point system also awards an additional one-half point for each additional year on the waiting list after one year.[63] The net result is almost complete emphasis on antigen matching in determining allocation, with time on the waiting list serving largely as a tie-breaker. Thus, in vying for a particular kidney, a patient with only one antigen matched could conceivably be awarded a kidney over someone who had waited up to two years longer.[64]

B. *The Costs of Matching: Disparate Access to Cadaveric Kidneys*

This Part argues that blacks have disproportionately limited access to cadaveric kidneys and that the mandatory allocation system based on antigen matching contributes to this racial disparity.[65] The first task is relatively straightforward. As discussed above,[66] 33.5% of dialysis patients in 1988 were black, but blacks received only 22.3% of cadaveric kidney transplants. Detailed studies of national and regional data underscore the fact that white dialysis patients may have more than a fifty percent greater chance of receiving a transplant.[67] A multivariate analysis conducted by the Urban Institute indicates that even after controlling for a host of other socioeconomic variables, the likelihood of cadaveric transplants for blacks relative to whites is only fifty-five percent.[68] This disparity in access to cadaveric kidneys means blacks have to wait almost twice as long as whites for their first transplant (13.9 months for blacks as compared to 7.6 months for whites).[69]

At least a portion of this disparity is attributable to matching ABO blood groups, as required by UNOS policy.[70] ABO compatibility is re-

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62. *UNOS Policy* 3.5.2 (1992).

63. Id.

64. For example, a patient with no A locus matches and one out of four B and DR matches and who had just been placed on the waiting list would receive one point for the antigen match (3 - B, DR mismatch). A patient with no antigen matches could wait almost two years and receive only one point for his or her relative seniority on the waiting list (additional half points accrue only if the additional year is completed).

65. This is not to say that other factors do not impede equal opportunities for blacks who need transplants. A host of socioeconomic factors may also play a role. See notes 15 and 17.

66. See note 12.

67. See, for example, Carl. M. Kjellstrand, *Age, Sex, and Race Inequality in Renal Transplantation*, 148 Arch. Intern. Med. 1305 (1988). In the United States in 1983, white patients had a 30% transplant rate and nonwhite patients had a 20% rate: "[N]onwhite patients aged 21 to 45 years had only half the chance of receiving a transplant compared with white patients of the same age and sex." Id. at 1305.

68. Philip J. Held, et al., *Access to Kidney Transplantation: Has the United States Eliminated Income and Racial Differences?*, 148 Arch. Intern. Med. 2594, 2596 (1988).

69. See note 11 and accompanying text .

70. See *UNOS Policy* 3.3.1 (1992). The antigenic basis of blood typing is discussed at notes 50-51 and accompanying text.

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quired for successful transplantation. As Table 2 demonstrates, the medical requirement of ABO compatibility causes white dialysis patients to receive a disproportionate share of cadaveric kidneys because these antigens are distributed differently in whites and blacks.[71]

TABLE 2. DISTRIBUTION OF ABO BLOOD GROUPS IN THE UNITED STATES

ABO Group	White	Black	Av. Waiting List Time
O	45%	49%	14.3 mos.
A	40	27	6.9
B	11	20	15.7
AB	4	4	4.6.

In particular, the large pool of blood type A donations will go disproportionately to white recipients.[72]

The UNOS rules, however, go beyond the medical requirement of ABO compatibility by mandating that blood type O kidneys, which are universal donors, be transplanted only into patients with blood type O.[73] This "O rule" prohibits types A and B from competing for donated O kidneys. The UNOS O rule was promulgated to provide equal access for O recipients for whom only an O kidney is suitable and who in the past were thought to have waited inordinately long for a transplant.[74] On balance, however, the O rule reduces blacks's ability to qualify for kidney transplants. Blacks are almost twice as likely as whites to have blood type B (twenty percent versus eleven percent).[75] Under the O rule black dialysis patients who have blood type B must wait for a relatively small supply of type B kidneys.[76] If the rule were repealed, these patients could look to the much larger pool of O donors because forty-five

71. Frances K. Widmann, ed., *Technical Manual of the American Association of Blood Banks* (American Ass'n of Blood Banks, 9th ed. 1985); Kasiske, et al., 324 New Eng. J. Med. 302 (cited in note 26).

72. "The fact that whites (40 percent of whom have blood group A) make up the majority of organ donors suggests that cadaver kidneys will more often go to whites than to blacks (27 percent of whom have blood group A)." Kasiske, et al., 324 New Eng. J. Med. at 302-03.

73. *UNOS Policy* 3.4 (1992). An exception to this rule is allowed for "six antigen matched patients who have a blood group other than O." Id. This exception to the O kidney rule is likely to favor whites disproportionately. It is much more likely that white recipients with, for example, blood type A, will meet the six-antigen qualification for a type O cadaveric kidney. As discussed in detail at text accompanying notes 87-90, this results from the higher propensity of white donors to have six antigen matches with white recipients.

74. F. K. Port, et al., *Discrepancies in the Distribution of Renal Allografts Cause Prolonged Waiting Times for Blood Type O Patients*, 35 Kidney Int'l 522 (1989). See also F. K. Port, et al., *The Impact of Nonidentical ABO Cadaveric Renal Transplantation on Waiting Times and Graft Survival*, 17 Am. J. Kidney Dis. 519 (1991).

75. See text accompanying note 71.

76. Again, this is because most cadaveric kidneys come from a white population that has only 11% type B kidneys.

percent of white donors have blood type O. Although the O rule helps black recipients with blood type O, an analysis of these competing effects using differential equations suggests that the blood type B effect dominates.[77] The likely effect of the O rule is to increase the percentage of blacks on the waiting list and the amount of time the average black has to wait.[78]

Of greater importance, however, are the UNOS policies that mandate organ allocation based on HLA antigen matching. These regulations restrict the availability of cadaveric kidneys for black patients for the simple reason that most donors are white, and white kidneys tend to have different antigens than black kidneys. The American Society of Histocompatibility and Immunogenetics recently reported a study of HLA antigen frequency. With the participation of eighty-three tissue-typing laboratories, the study showed that twenty-two antigens on the A, B, and DR loci have statistically significant differences in the frequency of appearance in blacks and whites. These disparate frequencies are shown in Table 3.

77. See Appendix. An analysis of differential equations suggests that blood type B patients will need to wait much longer for kidneys than blood type A patients—even though under the O rule neither blood type A nor B patients can qualify for donated O kidneys. The reason that the O rule hurts blood type B patients more than blood type A patients is that the donated kidneys are disproportionately white and therefore disproportionately blood type A relative to ESRD patients. ESRD patients with blood type A accordingly have a relatively large pool of cadaveric kidneys even without receiving O type transplants. Blood type B recipients, however, face a very small pool of donated type B kidneys and, accordingly, are dramatically affected by the inability to qualify for type O cadaveric transplants.

78. The average waiting list times reported above support this analysis. Under the O rule the average waiting time for the predominantly black B recipients is higher than for O recipients (15.7 months $>$ 14.3 months), while the average waiting time for the predominantly white A recipients is lower than for O recipients (6.9 months $<$ 14.3 months). The O rule reduces the waiting time for type O recipients and increases the waiting times for blood type A and particularly for type B recipients.

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TABLE 3. ANTIGEN FREQUENCY BY RACE

	Antigen	White (%)	Black (%)
"A" Locus Antigens:	Disproportionately White		
	A1	23.4	9.8
	A11	11.8	3.7
	A24	16.4	6.1
	A25	6.8	0.9
	Disproportionately Black		
	A23	5.6	22.3
	A30	7.0	22.0
	Aw33	4.6	16.2
	Aw34	0.8	13.1
	Aw36	0.2	9.1
"B" Locus Antigens:	Disproportionately White		
	B8	12.4	5.8
	B13	5.1	1.2
	B27	7.5	1.2
	B38	6.9	0.6
	B44	16.4	8.8
	Bw60	7.8	0.9
	Bw62	9.0	2.1
	Disproportionately Black		
	Bw42	1.4	14.6
	B45	2.0	8.8
	Bw53	1.4	17.4
	Bw58	1.6	11.9
"DR" Locus Antigens:	Disproportionately White		
	DR4	20.0	6.1
	Disproportionately Black		
	DR9	2.4	4.9.[79]

These differences in frequency of antigen expression are exacerbated by what doctors call "linkage disequilibrium."[80] The expression of certain antigens on one locus is often positively correlated (or "linked") with

79. Milford, Ratner and Yunis, 19 Transplantation Proc. at 31 (cited in note 55)

80. Owen, *Major Histocompatibility Complex*, in *Immunology* 4.1-.11 (cited in note 9). See also M.R. Mickey and Paul I. Terasaki, *The Serological Data of the 8th Workshop and Summary Analyses*, in Paul I. Terasaki, ed., *Histocompatibility Testing* 21 (U.C.L.A. Tissue Typing Laboratory, 1980); G. Opelz and A. Engelman, *Effect of HLA Matching in Cyclosporine-Treated Black Kidney Transplant Recipients*, 21 Transplantation Proc. 3881 (1989).

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particular antigens at another locus. This linkage exacerbates these racial differences because a black recipient failing to match a white donor on one locus may be less likely to match at other loci as well.

Not surprisingly, these disparate antigen pools cause blacks to have fewer potential antigen matches with a predominantly white cadaveric donor pool. A recent study in Illinois calculated how well 352 cadaveric kidneys matched 604 patients on the local UNOS waiting list.[81] The study revealed that while only 52% of the overall waiting list was white, whites dominated the class of recipients having four or more antigens matching—with 71.8% of these well-matched kidneys.[82] Since the majority of donors is white, such disparity in antigen distribution, coupled with an allocation system based heavily on HLA matching, places potential black recipients at a significant disadvantage. Several studies reveal that white patients receive the vast majority of kidney transplants with excellent donor-recipient histocompatibility—more than four antigen matches.[83]

Another recent study shows directly that UNOS's emphasis of antigen matching reduces the number of blacks that qualify for transplantation. Lazda analyzed an alternative point system approved by UNOS—termed a "variance"—for the Regional Organ Bank of Illinois (ROBI).[84] Operating under the UNOS variance, ROBI allocates cadaveric kidneys under a point system that emphasizes time on the waiting list more strongly relative to the quality of the antigen match than does the UNOS system.[85] Larger numbers of black candidates received transplants under the ROBI variance.[86]

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81. Lazda and Blaesing, 21 Transplantation Proc. 1415 (cited in note 26).

82. Id. at 1415. Potential black recipients, who made up 39.9% of the overall waiting list, comprised only 16.2% of the four or more antigen matches. These discrepancies are further exacerbated if the analysis is restricted to matching the cadaveric kidneys from white donors. In that case white patients would receive 75.2% of the four or more antigen matches, and black patients would receive only 14%. These latter figures may be more relevant on a nationwide level because the Illinois study contained a relatively elevated proportion of cadaveric kidneys from black donors (13.9%).

83. Id. See also Velta A. Lazda, *The Impact of HLA Frequency Differences in Races on the Access to Optimally HLA-Matched Cadaver Renal Transplants*, 53 Transplantation 352 (1992); Robert S. Gaston, et al., *Improved Survival of Primary Cadaveric Renal Allografts in Blacks with Quadruple Immunosuppression*, 53 Transplantation 103 (1992).

84. V. A. Lazda, *An Evaluation of a Local Variance of the United Network for Organ Sharing (UNOS) Point System on the Distribution of Cadaver Kidneys to Waiting Minority Recipients*, 23 Transplantation Proc. 901 (1991).

85. As summarized by J. Michael Dennis: "The main difference [between the UNOS and ROBI point systems] is that ROBI gives no points to two of the less match grades (2 and 3 BDR mismatches) and offers slightly more points for length of wait." J. Michael Dennis, *American Blacks, Kidney Transplantation & The Politics of Local Inequality* (1991) (unpublished manuscript, on file with author).

86. Id.

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The disparate racial impact is even more extreme with regard to the mandatory sharing of six-antigen matches. The initial study of mandatory sharing of six-antigen-matched kidneys revealed that of 123 transplants, blacks received only two.[87] Subsequent studies have confirmed this virtual exclusion of blacks from the pool of six-antigen-matched transplants at the national level, although when six-antigen match is redefined as "zero-antigen mismatch" the proportion of kidneys going to blacks rises to seven percent.[88] A recent study from the University of Alabama at Birmingham, where the waiting list is sixty-five percent black, revealed that of thirty-three mandatorily shared kidneys only one was transplanted into a black recipient.[89] Hunsicker and Held have estimated that mandatory national sharing of all kidneys with no HLA mismatches would result in a maximum of eight percent going to black recipients and would reduce the total number of kidneys available to black patients by three percent.[90]

C. *The Disappearing Benefits of Matching*

Given the inherent disparate racial impact of the UNOS antigen matching policies, the desirability of antigen matching turns crucially on the degree to which matching enhances the probability of transplant survival.[91] This section takes up this question and makes four stylized conclusions:

(1) Independent of any effect of antigen matching, black kidney recipients have lower survival rates than white recipients;

Against a waiting list with blacks making up 42 percent, the UNOS point system ranked candidates so that 37 percent of the highest ranked potential recipients was black, the ROBI system 41 percent. When the donor was a non-black, 33 and 39 percent of the highest ranked recipients were black for the UNOS and ROBI protocols respectively.

Id.

Dennis notes, however, that it is difficult to assess the national effect of antigen matching on black recipients because several OPOs have variances that deemphasize antigen matching.

87. Terasaki, Takemoto, and Mickey, 3 Clinical Transplantation at 303 (cited in note 58).

88. See Takemoto, et al., 327 New Eng. J. Med. 834 (cited in note 25). This percentage still is lower than the proportion of cadaveric kidneys donated by blacks—approximately eight percent—perhaps because the distribution of antigens among blacks is more heterogenous than among whites.

89. Bruce Barger, et al., *The Impact of the UNOS Mandatory Sharing Policy on Recipients of the Black and White Races—Experience at a Single Renal Transplant Center*, 53 Transplantation 770 (1992).

90. Hunsicker and Held, 12 Seminars in Nephrology 293 (cited in note 28).

91. Antigen matching might also enhance patient survival. However, numerous studies have found no statistically significant correlation between either race or antigen matching on the mortality rate of transplant recipients. See, for example, Jane Galton, *Racial Effect on Kidney Transplantation*, in Paul I. Terasaki, ed., *Clinical Kidney Transplants 1985* 153 (U.C.L.A. Tissue Typing Laboratory, 1985); H. Krakauer, et al., *The Recent U.S. Experience in the Treatment of End-Stage Renal Disease By Dialysis and Transplantation*, 308 New Eng. J. Med. 1558 (1983). Our analysis of the benefits of antigen matching accordingly focuses on its effects on graft survival.

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(2) Six antigen matches may improve transplant survival significantly—by approximately ten percent;

(3) Matching fewer than six antigens has a much less pronounced effect on allograft survival for white recipients and no reliable effect on survival rates for black recipients;[92] and

(4) The use of new immunosuppressant drug therapies is likely to reduce further the positive correlation between quality of antigen matching and graft survival.

An ancillary goal of the section is to convey the degree to which these empirical conclusions are contested and contingent upon rapidly changing statistical samples. The advent of new drug technologies and new allocation point systems in particular necessitates reevaluating new cohorts of transplantation recipients.

1. Racial Differences in Transplant Survival

Early analysis of survival rates for kidney transplantation did not mention race as a determinant of graft outcome.[93] In 1977, however, investigators from the U.C.L.A. Kidney Transplant Registry first noted that cadaveric graft survival at both one and three years was ten percent lower for black transplant recipients than for whites.[94] Although some single center studies in those early years showed no racial differences in graft survival,[95] other single center studies[96] and larger multicenter data[97] consistently documented an eight percent to twelve percent advantage in graft survival for white recipients.[98]

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92. In fact, the recent article by Takemoto and colleagues implicitly supports this hy comparing the success of six-antigen matches to all lesser matches as a group. See Takemoto, et al., 327 New Eng. J. Med. 834 (cited in note 25).

93. See, for example, Advisory Committee to the Renal Transplant Registry, *The Thirteenth Report of the Human Renal Transplant Registry*, 9 Transplantation Proc. 9 (1977).

94. G. Opelz, M. K. Mickey and P. I. Terasaki, *Influence of Race on Kidney Transplant Survival*, 9 Transplantation Proc. 137 (1977).

95. See, for example, Paul J. Garvin, et al., *Recipient Race as a Risk Factor in Renal Transplantation*, 118 Arch. Surg. 1441 (1983); Arthur J. Matas, et al., *Does Race Affect Renal Transplant Results?: A Single Institution Study*, 1 Clinical Transplantation 261 (1987); Vijay K. Mittal, et al., *Influence of Race on Cadaveric Kidney Transplantation*, 11 Dialysis & Transplantation 960 (1982).

96. See Bruce O. Barger, et al., *Influence of Race on Renal Allograft Survival in the Pre- and Postcyclosporine Era*, in Paul I. Terasaki, ed., *Clinical Transplants 1987* 217 (U.C.L.A. Tissue Typing Laboratory, 1987); Frank P. Stuart, et al., *Race as a Risk Factor in Cadaver Kidney Transplantation*, 114 Arch. Surg. 416 (1979).

97. See, for example, J. Michael Cecka, *The Roles of Sex, Race, and ABO Groups*, in Paul I. Terasaki, ed., *Clinical Transplants 1986* 199 (U.C.L.A. Tissue Typing Laboratory, 1986); Galton, *Racial Effect on Kidney Transplantation*, in *Clinical Kidney Transplants 1985* 153 (cited in note 91); Rafael Oriol, Jacques Le Pendu, and Calvin Chun, *Influence of the Original Disease, Race, and Center on the Outcome of Kidney Transplantation*, 33 Transplantation 22 (1982).

98. These results can be summarized:

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The introduction of the drug cyclosporine as an immunosuppressant therapy in 1983-1984 dramatically increased the one-year survival rate of kidney transplants and raised hopes of diminishing racial differences in graft survival. Again, small single-center reports suggested no racial difference at one year in survival of first cadaveric transplants and showed vastly superior overall results using cyclosporine-based protocols.[99] Multicenter data, however, while confirming improved graft survival, have continued to show a racial effect of eight to eleven percent. See Table 4.

TABLE 4. ONE YEAR GRAFT SURVIVAL IN PRIMARY CADAVERIC TRANSPLANTS BY RACE IN CYCLOSPORINE-TREATED PATIENTS

			Graft Survival	
Study	YRS of Study	No. Transplants	White (N)	Black (N)
Cecka[100]	83-85	2190	77% (1944)	66% (246)
Kondo[101]	84-87	6655	77% (5126)	68% (1529)
Barger[102]	83-86	437	76% (256)	60% (181)

Long term graft survival also varies with race: the half-life of kidney transplants in black recipients has been found to be as much as fifty percent shorter than for white recipients—four and eight years respec-

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ONE YEAR GRAFT SURVIVAL IN PRIMARY CADAVERIC TRANSPLANTS BY RACE IN PATIENTS TREATED WITH AZATHIOPRINE-PREDNISONE

			Graft Survival	
Study	Years of Study	No. of Transplants	White (N)	Black (N)
Opelz	1970-75	4559	47% (3581)	37% (978)
Oriol	1970-79	10,802	48% (7984)	36% (2129)
Krakauer	1977-80	7202	58% (5558)	50% (1624).

Opelz, Mickey, and Terasaki, 9 Transplantation Proc. 137 (cited in note 94); Oriol, Le Pendu, and Chun, 33 Transplantation 22 (cited in note 97); Krakauer, et al., 308 New Eng. J. Med. 1558 (cited in note 91).

99. See Matas, et al., 1 Clinical Transplantation 261 (cited in note 95); H. J. Ward, et al., *Outcome of Renal Transplantation in Blacks*, 19 Transplantation Proc. 1546 (1987). A recent study indicates, however, that cyclosporine may not enhance long-term survival of kidney transplants. The half-life of transplants in the cyclosporine and the precyclosporine eras were not statistically different—7.2 and 6.9 years respectively. Gjertson, et al., 324 New Eng. J. Med. 1032 (cited in note 25).

100. Cecka, *The Roles of Sex, Race, and ABO Groups*, in *Clinical Transplants 1986* 199 (cited in note 97).

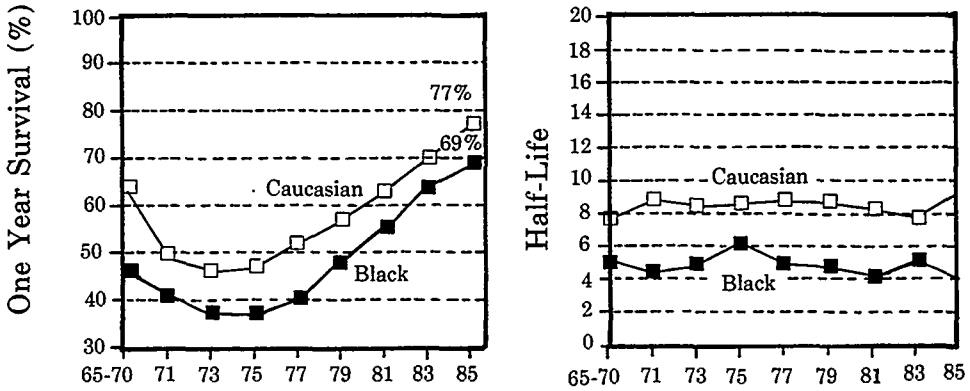
101. Kazunori Kondo, et al., *Racial Effect on Kidney Transplants*, in Paul I. Terasaki, ed., *Clinical Transplants 1987* 339 (U.C.L.A. Tissue Typing Laboratory, 1987).

102. Barger, et al., 53 Transplantation 770 (cited in note 89). See also G. Opelz, et al., *Kidney Graft Survival Rates in Black Cyclosporine-Treated Recipients*, 21 Transplantation Proc. 3918 (1989) (finding that the three-year survival rates for black and white cadaveric kidney recipients were 50% and 70%, respectively).

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tively.[103] These differences in both one-year graft survival and half-life are depicted in Figure 1.[104]

RACE



Yearly Cohort

Several explanations have been proposed for this racial disparity in graft survival, including racial differences in (1) original kidney disease and recurrence rate,[105] (2) the quality of antigen matching,[106] (3) the quality of the transplanting center,[107] (4) patient

103. S. Takemoto and P. I. Terasaki, *A Comparison of Kidney Transplant Survival in White and Black Recipients*, 21 Transplantation Proc. 3865 (1989); Joyce Yuge and J. M. Cecka, *The Race Effect*, in Paul I. Terasaki, ed., *Clinical Transplants 1989* 407 (U.C.L.A. Tissue Typing Laboratory, 1989).

104. Reproduced by permission from Paul Terasaki, et al., *Long Term Survival of Kidney Grafts*, 21 Transplantation Proc. 615, 616 (1989).

105. It has been suggested that high blood pressure as a cause of kidney failure might also be associated with poorer transplant outcomes. Oriol, Le Pendu, and Chun, 33 Transplantation 22 (cited in note 97). Under this theory blacks might have lower transplant survival rates because they are six times as likely as whites to have hypertension as the cause of ESRD. Subsequent series have failed to offer support for this original disease hypothesis as a major factor. See Galton, *Racial Effect on Kidney Transplants*, in *Clinical Kidney Transplants 1985* 153 (cited in note 97).

106. As discussed in the text accompanying notes 79-83, blacks are less likely to receive kidneys with equally well-matched antigens. A poorer average antigen match might contribute to poorer survival rates. See Kondo, et al., *Racial Effect on Kidney Transplants*, in *Clinical Transplants 1987* 339 (cited in note 101); Opelz, et al., 21 Transplantation Proc. 3918 (cited in note 102).

107. Some authors have argued that black survival rates are lower because black recipients tend to have their operations performed at "poor" transplant centers. Sondra T. Perdue and Paul I. Terasaki, *Analysis of Interracial Variation in Kidney Transplant and Patient Survival*, 34 Transplantation 75, 75 (1982) (saying that "Negro recipients appear to bave essentially the same graft and patient survival rates as Caucasian recipients after analyzing for the center effect"). The cause of widely divergent results across centers is the subject of ongoing investigation. R. W. Ev-

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noncompliance,[108] and (5) immunologic responsiveness.[109] No consensus exists, however, regarding the validity and relative importance of these factors.

Even though black patients receive kidneys with poorer antigen matching than white recipients,[110] the racial disparity in survival rates persists even among patients receiving kidneys with equally well-matched antigens. A recent multivariate regression analysis indicates that after controlling for ten other factors—including the degree of antigen matching—black recipients of white kidneys have a twenty-five percent greater risk of graft failure than white recipients of white kidneys.[111] With this historical baseline of a significant racial disparity in

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ans, D. L. Manninen, and F. Dong, *The Center Effect in Kidney Transplantation*, 23 Transplantation Proc. 1315 (1991).

As a statistical matter, however, the direction of causality has proven extremely difficult to determine: do blacks have poorer survival rates because they receive transplants at poor centers, or do certain centers have poorer survival rates because they perform more transplants on blacks? A recent report from the U.C.L.A. registry attributes 4.6% of the 11% racial disparity in one year survival to the center effect. Kondo, et al., *Racial Effect on Kidney Transplants*, in *Clinical Transplants 1987* 339 (cited in note 101).

108. Two recent studies have indicated that black allograft recipients are less likely than white recipients to comply with prescribed drug therapies. R. H. Didlake, et al., *Patient Non-Compliance: A Major Cause of Late Graft Failure in Cyclosporine-Treated Renal Transplants*, 20 Transplantation Proc. 63 (Supp. 3 1988) (saying that blacks, comprising 20.7% of the transplant population, accounted for 70% of noncompliant graft failures); Mary Rovelli, et al., *Noncompliance in Organ Transplant Recipients*, 21 Transplantation Proc. 833 (1989) (finding a noncompliance rate of 30% in blacks and 12% in whites). See also Donald E. Butkus, Edward F. Meydrich, and Seshadri S. Raju, *Racial Differences in the Survival of Cadaveric Renal Allografts—Overriding Effects of HLA Matching and Socioeconomic Factors*, 327 New Eng. J. Med. 840 (1992). When these data were reanalyzed, however, there appeared to be no racial differences within socioeconomic strata (blacks were overrepresented in the lower income category). M. Rovelli, et al., *Noncompliance in Renal Transplant Recipients: Evaluation by Socioeconomic Groups*, 21 Transplantation Proc. 3979 (1989). A higher rate of noncompliance among black recipients may be caused by a host of socioeconomic factors—poverty, inadequate education, and the like—but might also be an artifact of the centor effect, discussed in note 107, if inferior resources are devoted to their convalescent therapy.

109. Recent studies have indicated that lower kidney survival rates for blacks might be attributable to a tendency for blacks to have a stronger immune response to grafts than whites. R. H. Kerman, et al., *Stronger Immune Responsiveness of Blacks vs. Whites May Account for Renal Allograft Survival Differences*, 23 Transplantation Proc. 380 (1991); R. H. Kerman, et al., *Possible Contribution of Pretransplant Immune Responder Status to Renal Allograft Survival Differences of Black Versus White Recipients*, 21 Transplantation 338 (1991); R. H. Kerman, et al., *Influence of Race on Crossmatch Outcome and Recipient Eligibility for Transplantation*, 53 Transplantation 64 (1992).

110. See notes 81-83 and accompanying text.

111. John M. Weller, et al., *Influence of Race of Cadaveric Kidney Donor and Recipient on Graft Survival: A Multifactorial Analysis*, 9 Am. J. Kidney Diseases 191 (1987). See also G. Opelz and A. Engelmann, *Effect of HLA Matching in Cyclosporine-Treated Black Kidney Transplant Recipients*, 21 Transplantation Proc. 3881 (1989); Barger, et al., 53 Transplantation 770 (cited in note 89).

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graft survival, we now consider the incremental effects of antigen matching.

2. The Benefits of Six-Antigen Matching

Empirical evidence indicates that recipients of six-antigen-matched kidneys experience significantly improved graft survival. An analysis of more than 500 kidneys transplanted since 1987 under the UNOS mandatory sharing policy of six-antigen-matched kidneys indicates one-year survival rates of eighty-seven percent—a ten percent improvement over nonmatched survival.[112] These results are particularly striking because transplants occurred at more than sixty centers, with varying degrees of quality, and some of the donor kidneys were preserved for longer periods of time as required to transport them across the nation.[113]

There is more tentative evidence that transplants with zero mismatches have enhanced survival. As discussed,[114] antigen typing might not reveal two different antigens on each of the A, B, and DR loci. A typing blank can result either because the existing sera fail to detect existing antigens, or because the tissue is homozygotic, meaning that its locus expresses two antigens of the same type.[115] If a blank results because the donor is homozygotic, then zero-mismatched transplants might have the enhanced survival characteristics of six-antigen-matched transplants. An initial analysis of forty-two zero-mismatched transplants tentatively found one- and two-year survival rates to be no different from those for six-antigen-matched recipients.[116] These data are particularly relevant to the recent UNOS amendment that extended

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112. S. Takemoto, E. Carnahan and P. I. Terasaki, *A Report of 504 Six Antigen-Matched Transplants*, 23 Transplantation Proc. 1318 (1991). To control for the possibility of enhanced kidney quality, this U.C.L.A. registry study also reported the survival rates of the other donated (contralateral) kidney if one was harvested. The enhanced rate of survival from six-antigen matching is reflected in second year statistics as well:

	Survival Rate	
Type of Transplant	1 Year	2 Year
6 Antigen	87.2	79.8
Contralateral	75.8	69.6

The effects of six-antigen matching were statistically insignificant ($P = < .05$). See also Takemoto, et al., 327 New Eng. J. Med. 834 (cited in note 25).

113. Terasaki, Takemoto and Mickey, 3 Clinical Transplantation at 304 (cited in note 58) (saying that "[a]pparently harvest techniques and storage methods have now been worked out sufficiently well to yield uniform high survival rates that are almost independent of harvesting center").

114. See note 49.

115. A child's locus will be homozygotic if each parent contributed the same antigen to the locus.

116. Takemoto, Carnahan, and Terasaki, 23 Transplantation Proc. 1318 (cited in note 112).

national mandatory sharing to this wider class of zero-mismatched transplants.[117]

Six-antigen matching—and possibly zero-antigen mismatching—thus significantly enhances kidney transplant survival. Yet as the foregoing analysis indicated,[118] these well-matched kidneys go almost exclusively to white recipients. Fewer than four percent of these mandatorily shared kidneys now go to black recipients,[119] and at least one major center has never received a six-antigen-matched kidney for a black recipient.[120] Thus, although the mandatory sharing policy has been successful for the predominantly white recipients lucky enough to receive six-antigen-matched kidneys, black candidates have not shared in its benefits.

3. The Attenuated Benefits of Partial Antigen Matching

When one or more antigens are mismatched, there is a much weaker correlation between the quality of matching and transplant survival. In a single center report,[121] while whites and blacks had different survival rates, matching for one or more antigens did not make a statistically significant difference in patient or graft survival at one, two, or three years for either white or black recipients when compared to transplants with no matched antigens.[122] In multivariate analysis of data from Michigan,[123] the presence of three or four antigen mismatches on the A and B loci did not increase risk of graft loss.[124] A recent analysis of national data indicates that the marginal impact on graft survival of an additional antigen mismatch is greater at the zero end of the scale compared to six mismatches.[125] Graft survival increases more significantly when comparing a change from one to zero mismatches than when comparing six to five mismatches.[126]

A recent article by Hunsicker and Held concludes that recipients of zero-antigen-mismatched kidneys receive most of the benefit from

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117. See text accompanying notes 54-58.

118. See text accompanying notes 87-90.

119. Hunsicker and Held, 12 Seminars in Nephrology 293 (cited in note 28).

120. Barger, et al., 53 Transplantation 770 (cited in note 89).

121. S. M. Greenstein, et al., *Does Kidney Distribution Based Upon HLA Matching Discriminate Against Blacks*, 21 Transplantation Proc. 3874 (1989).

122. Id.

123. Weller, et al., 9 Am. J. Kidney Diseases 191 (cited in note 111).

124. Id. at 193. The results of this Michigan study are partially contradicted by an Alabama study indicating that matching at least one antigen on both the A and B loci can enhance one- and two-year graft survival by 10%. Barger, et al., *Influence of Race on Renal Allograft Survival*, in *Clinical Transplants 1987* 217 (cited in note 96).

125. Hunsicker and Held, 12 Seminars in Nephrology 293 (cited in note 28).

126. Thus, the study concludes that the aggregate impact on graft survival of a change in the average mismatches depends crucially upon where on the mismatch scale the change occurs. Id.

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matching, though recipients of single-antigen-mismatched kidneys may also realize some benefit.[127] They found that cadaveric renal transplantation with lesser degrees of matching offered very little gain at all.[128] Indeed, USRDS data demonstrate no statistical relationship of HLA matching to survival of first allografts at five years in the presence of even one or more mismatches.[129]

The data on the effects of partial matching are, however, not monolithic. Multicenter data from the U.C.L.A. Transplant Registry and the Collaborative Transplant Study continue to describe marginal improvements in graft survival with improved matching.[130] A recent analysis conducted by the U.C.L.A. Tissue Typing Laboratory finds that the half-life of kidney transplants tends to increase with better antigen matching, but says that this improvement—from 7.2 to 9.4 years—occurs only if there are no mismatches on either the A or the B locus,[131] again suggesting that the most dramatic benefit occurs only with extremely well-matched transplants.

A clearer picture emerges, however, when analyzing the effects of partial matching on graft survival for black transplant recipients: there is virtually no correlation between partial matching and graft survival in black recipients. Two studies from the University of Alabama, which performs a large number of transplants for black recipients, concluded that partial antigen matching did not improve black patients' chances of graft survival.[132] Three recent reviews from the U.C.L.A. registry failed to note any relationship between cadaveric allograft survival in blacks and antigen matching.[133] Although an article from the Collaborative Transplant Study reported a marginal positive effect of antigen matching, the authors concluded: "[T]he lack of a matching effect in

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127. Hunsicker and Held, 12 Seminars in Nephrology 293 (cited in note 28).

128. Id. The authors also conclude: "The most recent UNOS/UCLA data also show a substantial decrease in the long-term benefits of matching with as few as one mismatched antigen." Id. at 298.

129. Hunsicker and Held, 12 Seminars in Nephrology 293 (cited in note 28).

130. David W. Gjertson, *Short- and Long-Term Effects of HLA Matching*, in Paul I. Terasaki, ed., *Clinical Transplants 1989* 353 (U.C.L.A. Tissue Typing Laboratory, 1989); Gerhard Opelz, *In Response to 'The Role of HLA Matching in Renal Transplant Patients with Sequential Immunosuppression'*, 3 Clinical Transplantation 233 (1989).

131. Gjertson, et al., 324 New Eng. J. Med. at 1033-34 (cited in note 25). See also Takemoto, et al., 327 New Eng. J. Med. 834 (cited in note 25).

132. Barger, *Influence of Race on Renal Allograft Survival in the Pre- and Postcyclosporine Era*, in *Clinical Transplants 1987* at 229 (cited in note 96) (saying that, for example, one year allograft survivals for DR matched and nonmatched black recipients were 59% and 62% respectively). See also Gaston, et al., 53 Transplantation 103 (cited in note 83) (finding no beneficial effect of antigen matching on graft survival for black recipients).

133. Yuge and Cecka, *The Race Effect*, in *Clinical Transplants 1989* 407 (cited in note 103); Kondo, et al., *Racial Effect on Kidney Transplants*, in *Clinical Transplants 1987* 339 (cited in note 101); Takemoto, Carnahan and Terasaki, 23 Transplantation Proc. 1318 (cited in note 112).

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blacks reflects both poorer understanding of HLA antigens in blacks and disparate distribution between races."[134]

The absence of an antigen matching effect for black recipients of white kidneys is likely an artifact of the imprecise nature of antigen typing. The immunologic response of the recipient is actually controlled at the genetic level—that is, by the particular sequencing of DNA—and is only crudely captured by the current antigen typing method.[135] Antigen matching serves as a proxy for the underlying genetic compatibility that directly controls the recipient's immune response. Antigen matching may be a better proxy for the underlying genetic compatibility when white donors are giving to white recipients. The reduced value of antigen matching for black recipients of a largely white donor population is consequently less surprising because the underlying genetic material does not correlate as well across race.

In sum, the evidence supporting a positive correlation between graft survival and partial antigen matching is dramatically weaker than for six-antigen matching. Moreover, the preponderance of evidence seems to suggest that partial antigen matching does not enhance transplant success for black recipients. The latter result is particularly important because black recipients, as a practical matter, have access to less than fully matched kidneys.[136]

4. The Impact of New Immunosuppressant Drug Therapies

The empirical analyses of the preceding sections—concerning both the racial disparity in graft survival and the impact of antigen matching on graft survival—were based on data accumulated during the "cyclosporine era." This potent immunosuppressive agent, introduced in the United States in 1983, revolutionized transplantation with marked improvements in outcomes compared to previous therapies. Further advances in immunosuppression are occurring at a dizzying rate. These improved therapies are likely to have a significant impact on both antigen matching and racial differences in graft survival. For

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134. Opelz, et al., 21 Transplantation Proc. 3918 (cited in note 102) (finding enhanced one-year graft survival for zero mismatches on the DR locus on the order of five percent).

135. See notes 47-49 and accompanying text.

136. The implications of these results have not been lost on the transplant community:

> To realize the greatest benefit from scarce cadaver kidneys, it may be appropriate to encourage transplants that have a distinctly superior success rate, such as 6-Ag [antigen] match transplants. However, it is difficult to justify giving a kidney to a patient who has heen on the waiting list for a short time while denying it to another who may have waited for years, merely because of a supposedly better match, the value of which has not heen demonstrated and continues to be disputed.

S. M. Greenstein, et al., *Does Kidney Distribution Based Upon HLA Matching Discriminate Against Blacks?*, 21 Transplantation Proc. 3874, 3875 (1989).

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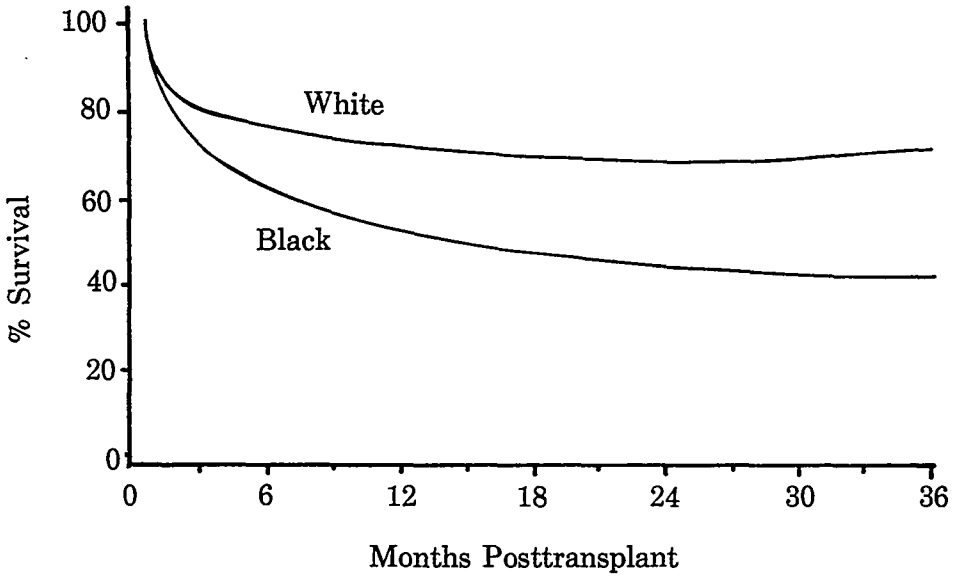
example, at the University of Alabama, which for twenty years had experienced eight percent to nineteen percent poorer graft survival in black recipients, the use of a modified drug regimen known as "quadruple therapy" has completely abrogated racial disparity in graft survival since its introduction in 1987.[137] In this series of 642 patients, there also was no impact of HLA matching on graft survival in blacks and only minimal effects of improved matching in whites.

TABLE 5. GRAFT SURVIVAL AT ONE YEAR[138]

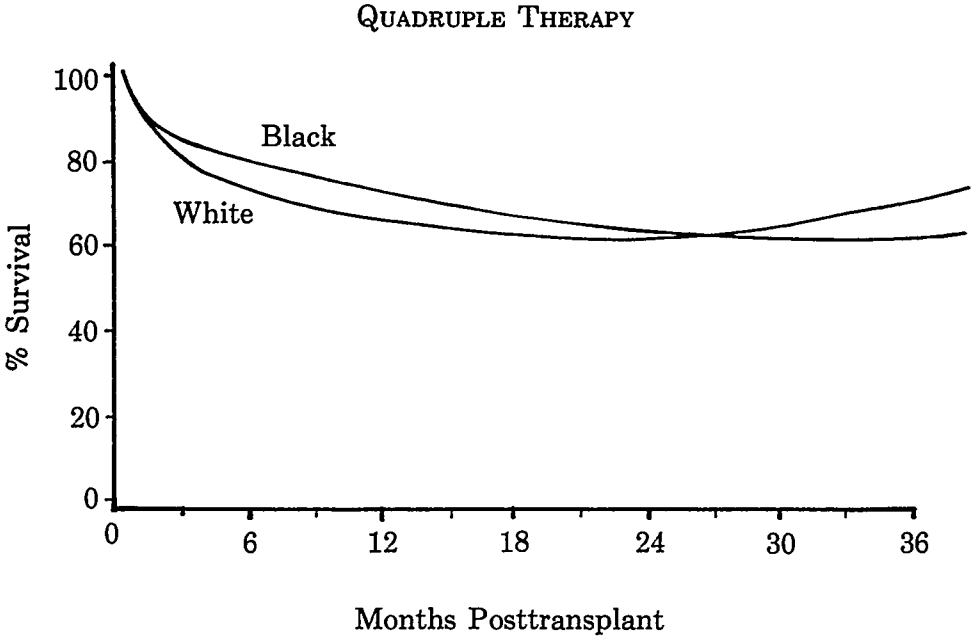
Recipient Race	Standard (N=276)	Quad (N=366)
Black	54% (112)	76% (180)
White	74% (164)	73% (186).

The parity in survival rates induced by quadruple therapy was evident for periods of at least three years.

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137. Gaston, et al., 53 Transplantation 103 (cited in note 83).
138. Id. (reproduced with permission).



With quadruple immunosuppression, a potent anti-rejection agent known as Minnesota anti-lymphoblast globulin (MALG) is added prophylactically to standard cyclosporine-based therapy.[139] Improvement in graft survival for black recipients with this regimen has also been documented in a recent review of data from several centers.[140] The experience of several transplant centers has shown that with quadruple therapy, all recipients—white and black—achieve success rates rivalling those usually associated with six-antigen matches regardless of antigen matching.[141] Available evidence thus suggests that with quadruple therapy neither race nor quality of antigen matching predicts graft survival.

Of potentially greater significance are new drugs on the horizon, which appear to offer more potent immunosuppression, fewer rejec-

139. Standard therapy is known as "triple drug" therapy, using cyclosporine along with azathioprine and prednisone in what is thought to be a beneficial combination. Hence, the addition of MALG becomes "quadruple therapy." Quadruple therapy is synonymous with "sequential therapy." MALG is itself an antibody, extracted from horses, that is used to attack the lymphocytes of the recipient that initiate a response to a nonmatching antigen of the transplanted kidney. By attacking the cells that initiate the recipient's immune response, MALG may enhance graft survival.

140. Donald E. Butkus, *Primary Renal Cadaveric Allograft Survival in Blacks—Is There Still a Significant Difference?*, 5 Transplant Rev. 91 (1991).

141. Ronald M. Ferguson, *A Multicenter Experience with Sequential ALG/Cyclosporine Therapy in Renal Transplantation*, 2 Clinical Transplantation 285 (1988).

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tions, and less toxicity.[142] These drugs include FK-506, which is extremely effective in liver transplantation and is currently undergoing trials in kidney recipients;[143] RS-61443, a new agent of high efficacy with few side effects in preliminary clinical trials at the Universities of Wisconsin and Alabama;[144] and rapamycin, which is still in animal trials.[145] It seems likely that the continued development and use of these new immunosuppressant therapies has the potential to further enhance graft survival in patients of all races.[146] In short, the new therapies hold the promise of reducing the importance of both race and antigen matching as determinants of transplant outcomes.

III. TRAGIC CHOICES

With these stylized facts as a backdrop, we now discuss the difficult policy choices concerning the procurement and allocation of cadaveric kidneys. The choices that society makes concerning the disparate racial impact of antigen matching in the end are of the same nature that Guido Calabresi and Philip Bobbitt labeled "tragic."[147] The optimal rules for procuring and allocating cadaveric kidneys depend not only on social norms, but on judgments about the empirical issues raised above. Ultimately, the absence of clear empirical results may make the allocation of burdens of proof the most important normative decision of all.

This Part begins by analyzing two of the "cleanest" normative objectives of allocation: maximizing transplant survival and minimizing medical cost. We argue that both objectives ultimately lead to alloca-

142. Like MALG, many of these agents are antibodies designed to attack the recipient's lymphocytes and thus suppress the recipient's immune response. MALG is a nonspecific "polyclonal" antibody that attacks a broad range of lymphocytes. Unlike MALG, however, many of the new immunosuppressants are "monoclonal": more specifically targeted to suppress only those lymphocytes that would reject transplanted tissues. OKT3, for example, is a monoclonal antibody that targets only "T cells" for attack. Newer monoclonal antibodies may be even more selective, attacking only T cells that are actively participating in the rejection response. Gideon Goldstein, *Monoclonal Antibody Specificity: Orthoclone OKT3 T-Cell Blocker*, 46 Nephron 5 (Supp. 1 1987). See also N. Tolkoff-Rubin, et al., *Immunosuppression With Anti-ICAM-1 (CD54) Monoclonal Antibody in Renal Allograft Recipients*, 2 J. Am. Soc. Nephrology 820 (1991).

143. See A. M. Macleod and A. W. Thomson, *FK506: An Immunosuppressant for the 1990s?*, 337 Lancet 25 (1991); R. Shapiro, et al., *Kidney Transplantation Under FK 506 Immunosuppression*, 23 Transplantation Proc. 920 (1991).

144. Hans W. Sollinger, et al., *RS-61443: Phase I Clinical Trial and Pilot Rescue Study*, 53 Transplantation 428 (1992).

145. J. Wang, et al., *Initial Use of Rapamycin Immunosuppression in Nonhuman Primate Graft Recipients*, Am. Soc. of Transplant Surgeons, 17th Annual Scientific Meeting 49 (May 1991). See also Kozo Tamura, et al., *15-Deoxyspergualin (DSP) 'Rescue Therapy' Against Methylprednisolone (MPSI)-Resistant Rejection of Renal Transplants as Compared with Anti-T Cell Monoclonal Antibody (OKT3)*, 2 J. Am. Soc. Nephrololgy 819 (1991).

146. Whether the new therapies will negate the 10% improvement in survival associated with six-antigen matching remains to be determined.

147. Calabresi and Bobbitt, *Tragic Choices* at 19 (cited in note 24).

tion schema that would be subjectively unpalatable in our society. This leads us to consider more complicated accommodations between equity and efficiency. We propose a range of allocation alternatives that further these more amorphous goals under both current and future immunosuppressant technologies. Finally, we analyze the political history of kidney allocation in the United States and situate our proposal within the current debate.

A. The Limits of Two Simple Objectives

A straightforward objective in allocating the increasingly scarce supply of cadaveric kidneys would be to maximize transplant survival. Survival maximization furthers one notion of egalitarianism: "[T]reating differently patients in whom the kidney would work from those in whom it would not amounted to treating people equally who were relevantly equal, and discriminating between those groups which were relevantly unequal."[148] This objective would lead to the mandatory sharing of six-antigen-matched kidneys. As discussed,[149] the survival rates of these kidneys are approximately ten percent better than those of less well-matched kidneys. In addition, maximizing survival rates might also require awarding some preference—at least for whites—to partial antigen matching when the evidence also indicates improved outcomes.

We argue, however, that maximum survival is normatively an incomplete objective because it would lead to the nearly complete exclusion of blacks from kidney transplantation. The evidence from multiple studies is that black kidney recipients have uniformly lower survival rates than similarly situated whites.[150] Our belief that the wholesale exclusion of blacks would be rejected by society depends on the relatively small size of racial disparity in graft survival.[151] If graft survival in

148. Id. at 24-25.

149. See text accompanying note 112.

150. See text accompanying note 94. While some of this statistical correlation may result from a tendency for blacks to receive kidneys from inferior transplantation centers, the "center effect" has not been able to explain all of the racial disparity. See note 107.

151. A pure survival maximization objective would not necessarily exclude all blacks from transplantation, but more precisely would call for a lexicographic system of allocation in which blacks received kidneys only if white recipients were unavailable. Empirically, however, the number of potential white recipients would effectively preclude transplantation to blacks under this system.

Pure survival maximization might even preclude blacks from receiving the cadaveric kidneys of black donors given the perverse empirical finding that black recipients of black kidneys do not have enhanced survival rates. See Opelz, Mickey, and Terasaki, 9 Transplantation Proc. 137 (cited in note 94); Kondo, et al., *Racial Effect on Kidney Transplants*, in *Clinical Transplants 1987* 339 (cited in note 101); Harry J. Ward and Martin A. Koyle, *The Beneficial Effect of Blood Transfusion and the DR 1 Gene Dose on Renal Transplant Outcome in Blacks*, 51 Transplantation 359

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black recipients approached zero percent in the first year, the racial basis for exclusion might be tolerable.[152] Yet, the historical disparity of eight percent to eleven percent in first year survival rates does not seem sufficiently high to warrant complete exclusion of blacks from the recipient pool.[153]

Indeed, the generic normative question is how large must the discount be? If according to the cyclosporine era statistics white recipients have a seventy-seven percent first year survival rate, how much lower must the rate for black recipients be before they are disfavored in the allocation process? Survival maximization yields the straightforward answer that any reliable discount is sufficient for racial exclusion, but this simplicity comes at the sacrifice of other normative values. Our point here is a small one. The social unacceptability of wholesale exclusion of blacks from the transplantation process is strong evidence that our objectives must go beyond simple survival maximization.

A similar analysis applies to arguments that society should minimize the costs of transplantation.[154] A recent article, for example, argues for a mandatory national system of partial antigen matching, in part because the authors claim that national matching would save the government $6.5 million a year.[155] Their basic argument is that the additional costs of a national matching system—estimated to be $1000 per transplant—are outweighed by savings that result from higher survival rates.[156] This type of cost savings, however, clearly is not the sole determinant of our allocation system. The authors' own analysis indicates that the use of cyclosporine increases the cost of transplantation. Even though kidney failure necessitates a costly operation to remove the graft and return to dialysis, the cost savings induced by higher survival rates with cyclosporine are more than offset by the costs of the drug

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(1991). Wholesale exclusion of blacks from transplantation is even supported by an analysis of patient survival because, again perversely, blacks tend to have a slightly lower mortality rate on dialysis than whites. See Barger, et al., 53 Transplantation 770 (cited in note 89).

152. After all, the exclusion of blood type B recipients from the pool of blood type A cadaveric donations is not problematic given the zero success rates for such transplantation.

153. This analysis could of course proceed upon other measures of survival, each of which itself involves an implicit normative choice. For example, the racial disparity in transplant half-life may be on the order of 50%. See text accompanying note 103.

154. Cost-benefit analysis often is determined by the initial assumptions of what costs and what benefits count. See John J. Donohue III and Ian Ayres, *Posner's Symphony No. 3*, 39 Stan. L. Rev. 791 (1987).

155. Gjertson, et al., 324 New Eng. J. Med. 1032 (cited in note 25).

156. Transplant failure necessitates the removal of the graft, which the authors estimated to cost approximately $10,000, and the return to dialysis, estimated to cost $17,000 per year. Elevated survival rates can reduce the government's expenditures because the government spends only $8000 per year on cyclosporine therapy for successful transplants after the first-year of treatment. Id. at 1035.

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itself. Yet, it is hard to imagine that we would eliminate the use of this "wonderdrug" that enhances survival rates by ten percent to twenty percent.

The normatively unacceptable nature of this type of cost calculation is even more striking, however, when extended to issues of race. The exclusion of blacks from the pool of cadaveric transplants would save the government even more money than a mandatory national program of partial antigen matching. Extending the analysis of this article, we estimate that the expected present value of government expenditures for a transplant are $98,300 for a black recipient and $90,700 for a white recipient.[157] Reallocating to whites the approximately 1400 cadaveric kidneys that currently go to black recipients would consequently save the government more than $10.6 million per year.[158]

Again our normative conclusion is a limited one. Both pure cost minimization and survival maximization objectives would lead to normatively unacceptable results such as explicit racial exclusions. Consequently, one cannot defend or justify other allocative choices by analyzing these objectives alone. In short, we believe that our society holds these objectives to be morally incomplete. Our argument is not that these objectives are unimportant, but only that our society tempers them with equitable concerns, among them, that government actions should not burden traditionally disadvantaged races.[159]

Two aspects of the current UNOS point system—the O kidney rule and the presensitization points—provide especially powerful examples of how the current allocation system rejects a single-minded emphasis on survival. As analyzed above,[160] the O rule prohibits the transplantation of kidneys from O blood type donors into recipients of other blood types unless there is a six-antigen match.[161] Even though the O blood type organs could be transplanted into recipients with A or B blood types, the guidelines reflect a concern that without this prohibition the O blood type recipients would inequitably have to share the pool of O kidneys with too many other recipients. The O rule is an example of

157. For assumptions underlying this calculation, see note 156. In addition, the authors estimated that the transplantation costs $35,000 and that first year treatment (including cyclosporine) costs $20,000. Id. To capture the racial difference in survival rates, we have assumed hazard rates for whites of 20% in the first year and 6% per year thereafter, and for blacks of 28% in the first year and 11% per year thereafter. See G. Opelz, et al., *Kidney Graft Survival Rates in Black Cyclosporine-Treated Recipients*, 21 Transplantation Proc. 3918 (1989).

158. 1400 x (98.3 - 90.7) = 10,640.

159. This is what Calabresi and Bobbitt referred to as "corrected egalitarianism." See text accompanying note 24. J. Michael Dennis refers to this value as "sociological justice." J. Michael Dennis, 6 Transplantation Rev. 130 (cited in note 60). See also W. B. Arnason, *Directed Donation: The Relevance of Race*, 21 Hastings Center Report 13 (Nov.-Dec. 1991).

160. See text accompanying note 73.

161. *UNOS Policy* § 3.4 (1992).

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equity trumping efficiency because it potentially favors an O blood type recipient with a zero-antigen match over a B blood type recipient with a five-antigen match. This interplay between equity and efficiency has, however, a perverse racial dimension. The O rule favors O blood type recipients over the predominantly black B blood type recipients and thus exacerbates the unequal access of blacks to transplantation.[162]

Society's willingness to privilege equitable concerns over a simple interest in graft survival is also exemplified by presensitization points. The UNOS system currently awards points to candidates whose blood contains antibodies against more than eighty percent of potential cadaveric donations.[163] Presensitization lowers a candidate's chance of successful transplantation because the recipient's immune system has already produced antibodies to attack a wide array of foreign tissue.[164] The limited goal of graft survival would cause presensitized candidates to receive negative points in an allocation system. However, because presensitized candidates "can wait three or more years for transplant, they have attracted a near-universal sympathy for their plight."[165]

J. Michael Dennis characterizes the treatment of presensitized candidates as consistent with the goal of medical justice: " 'Medical justice' is a principle based on compassion for patients with 'medical bad luck.' Because of their medical condition, these patients have a less-than-average chance to receive treatment. Medical justice dictates that they be given allocative preference."[166] This does not account for the major cause of presensitization: the failure of an initial transplant. When initial transplantations fail, the recipient's body often produces massive numbers of antibodies that presensitize the recipient against further transplantation. The allocative preference for presensitized candidates thus has the perverse effect of rewarding candidates who often already had the opportunity for transplantation. In economic terms, the "medical bad luck" is not completely exogenous.

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162. As analyzed above in notes 73-76 and accompanying text, the O rule disadvantages predominantly white A recipients and predominantly black B recipients. A recipients may draw from a disproportionately large pool of donated A kidneys in comparison with the pool of donated B kidneys available to B recipients and therefore are not affected as much as B recipients by the removal of O type transplants. A differential equation model of donation and ESRD rates suggests that the advantage to black O candidates is outweighed by the disadvantage to black B candidates. Given the current donation rates, the O rule probably decreases the percentage of kidneys transplanted into black Americans. See Appendix.

163. See note 61.

164. See M. Aprile, J. Rochon and C. Cardella, *Effect of Peak PRA's on the Outcome of Cadaver Kidney Transplants*, 21 Transplantation Proc. 735 (1989). There is a greater likelihood that immunosuppressant drugs can prevent an unmatched recipient from producing antibodies.

165. Dennis, 6 Transplantation Rev. at 134 (cited in note 60).

166. Id. at 133.

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The "near-universal sympathy for the plight" of presensitized and blood type O recipients, which gave rise to these equitable exceptions to the UNOS allocation system, also might be seen as an instance of effective interest group lobbying. Both these equitable exceptions respond to the preferences of candidates who are represented on the waiting list long enough to form a powerful political constituency. Indeed, the National Organ Transplant Act explicitly mandates that allocative preference be given to presensitized patients.[167] The strength of the presensitization lobby is such that UNOS turned down an application for a variance to deemphasize sensitization at a single transplant center. The OPO in question argued that because presensitized patients have worse medical outcomes, giving them priority wastes resources.[168] Yet UNOS, in compliance with its federal contract, affirmatively rejected the survival goal to promote the equitable interests of presensitized candidates. As in other contexts, one person's equity is another person's private interest.

B. The Relevance of Race

The above analysis may demonstrate that our allocation systems are not determined solely by the goals of transplant survival or cost minimization, but it has not directly addressed why society should respond to allocation strategies that have a disparate impact on blacks. This section attempts to provide such a rationale. One of the strongest rationales for disparate impact liability in the law is to prohibit actions that might be motivated by racial animus.[169] Such suspicions are, however, virtually absent in the transplantation context. All participants in the area believe that the original point system and its subsequent modifications were developed in good faith to accommodate the goals of graft survival and other equitable concerns.[170]

We believe, however, that race is relevant for two reasons. First, ignoring the disparate impact of blacks represents selective indifference.[171] The UNOS guidelines privilege equity over efficiency when presensitized or blood-type O patients received smaller numbers of transplants, but are indifferent to the equitable claim of blacks. If the roles were reversed and white patients had lower chances of matching antigens, we believe that the point system might give less weight to

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167. NOTA § 372, 98 Stat. at 2344. See also Dennis, 6 Transplantation Rev. at 133; R. Mendez, *A National Allocation System*, 20 Transplantation Proc. 1014 (Supp. 1 1988).

168. Dennis, *American Blacks* at 11 (cited in note 85).

169. Paul Gewirtz, *Remedies and Resistance*, 92 Yale L. J. 585 (1983).

170. See note 61.

171. Paul Brest, *The Supreme Court, 1975 Term—Foreward: In Defense of the Anti Discrimination Principle*, 90 Harv. L. Rev. 1, 6 (1976).

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matching. Even those who believe that the best allocation should simply try to maximize survival rates, the willingness of the system to respond selectively to other equitable claims might argue for considering the claims of blacks as well. In a world where the equitable claims of other discrete groups are heard, UNOS's failure to respond to the equitable claims of black patients becomes suspect.

Second, responding to this disparate racial access can be justified as an attempt to eliminate the effects of past discrimination.[172] Kidney failure is associated with a number of other factors that may be exacerbated in black communities because of past discrimination—including poverty, stress, alcohol use, and poor medical care. To the extent that past discrimination[173] has left blacks disproportionately poor and that poverty induces higher rates of kidney failure,[174] these lingering effects of discrimination also support society's corrective concern. At a minimum, we believe it is incumbent on society not to ignore the equitable claims of blacks in favor of other possibly less pressing equitable claims such as those of presensitized or blood type O recipients.

In making this case for privileging race, difficult issues of framing need to be addressed. For example, one might persuasively argue that federal funding of virtually all renal transplants represents tremendous governmental largess to the disproportionately black ESRD population and that when considered as a whole the program disproportionately

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172. Paul Gewirtz, *Choice in the Transition: School Desegregation and the Corrective Ideal*, 86 Colum. L. Rev. 728 (1986).

173. Recent research by Clarence E. Grim suggests that blacks may have higher rates of hypertension and kidney failure because of the quintessential expression of discrimination—slavery. "[B]lacks living in the United States today may owe their higher hypertension rate to a genetic trait that helped their ancestors survive the grueling conditions of slavery. That trait is an inherited tendency to conserve salt within the body . . . ." Kathy A. Fackelmann, *The African Gene?*, 140 Science News 254 (1991).

Grim's provocative hypothesis is that Africans with a salt-conserving gene or genes were less likely to die of dehydration during transport across the Atlantic by slavetraders. Id. at 254. The ability to hold onto salt—and thus water—also helped them to survive the harsh conditions they encountered in the New World. Seventy percent of African slaves died within the first four years of their capture. This devastating fatality rate might have radically accelerated the process of genetic selection. The same genetic ability to retain salt that may have conferred a temporary survival advantage on slaves may now be responsible for a higher level of hypertension and kidney failure.

It should be stressed that while this causal hypothesis is supported by some indirect evidence, id., it is quite controversial. For example, even though West Africans consume a high salt diet, they have much lower rates of high blood pressure among American blacks. Id. at 255. Yet the possibility that the elevated renal failure among blacks is a vestige of the slave trade makes concrete the causal link between past discrimination and the current demand for renal transplantation. Even if we conclude that the theory has only a 50% chance of being true—or only explains 50% of the elevated black demand—the mere possibility that slavery increased the kidney failure rate among blacks provides a conceivable rationale for restructuring allocation systems that disfavor blacks.

174. Id. at 254 (saying that "the stress of poverty or racism may evoke a hormonal 'fight or flight' response that boosts heart rate and blood pressure").

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favors blacks—even though the antigen matching aspect of the allograft allocation disproportionately excludes blacks.[175] Moreover, even if the disparate racial impact of antigen matching is a concern, blacks—and society—might benefit more from corrective efforts that address other health issues such as high blood pressure, smoking, or even prenatal care.

Calabresi and Bobbitt argue that no single perspective can capture all of society's concerns. They speak of "the motion that is composed of the succession of decision, rationalization, and violence as quiet replaces anxiety and is replaced by it when society evades, confronts, and remakes the tragic choice."[176] In making tragic choices, societies inevitably oscillate between different perspectives. In this Article we have framed the issue around the ongoing debate about how to allocate cadaveric kidneys and have implicitly left aside the thorny issues of whether government should continue subsidy of kidney transplantation and whether attempts to remedy past discrimination are better done by other compensating programs. To the extent that the proper allocation of cadaveric kidneys remains a discrete public concern, the medically unjustified disparate impact on blacks is a relevant concern of policymakers.

C. Proposal to Revise the UNOS Point System

1. Accommodating Equity and Efficiency[177]

This tension between equity and efficiency concerns is reflected implicitly in the language of the NOTA, which requires organ procurement organizations to "allocate donated organs equitably among transplant patients according to established medical criteria."[178] We do not claim that a consensus exists concerning the appropriate balance between equity and efficiency objectives. Instead, we suggest that there is a spectrum of allocative systems that represent different accommodations of these conflicting objectives.

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175. This framing argument parallels the issue in *Connecticut v. Teal*, 457 U.S. 440 (1982). In that case the Supreme Court considered whether an employment test which disparately excluded blacks violated Title VII even though the employer had hired proportionate numbers of protected workers. The Court rejected the employer's "bottom line" defense and held that Title VII plaintiffs had discretion on how to frame their disparate impact claim.

176. Calabresi and Bobbitt, *Tragic Choices* at 19 (cited in note 24).

177. A classic discussion of these concerns can be found in Arthur M. Okun, *Equality and Efficiency, The Big Tradeoff* (Brookings Inst., 1975).

178. 42 U.S.C. § 273(b)(3)(E) (1988 and Supp. II 1990). Originally the act mandated that kidneys be allocated equitably "between patients and centers." But in 1988 Congress amended the Act deleting the reference to transplant centers, thus further focusing the allocation issues on patient equity.

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At one extreme is the current system, which places almost exclusive emphasis on antigen matching. At the other extreme would be allocation by pure waiting list. Giving cadaveric kidneys to the dialysis patients who had waited longest would ensure that persons of each race would receive a share of transplants proportional to that race's representation on the waiting list. A pure waiting list achieves this equity, however, at the cost of reduced graft survival. By giving no weight to recipients who have even six antigen matches, first-come-first served allocation systems sacrifice increased probability of graft survival for at least a portion of the transplanted kidneys.[179] At least in the current cyclosporine era of drug therapy, we ultimately reject this type of queueing allocation for reasons analogous to those that led us to reject the extreme efficiency-based allocation schemes.[180] We conjecture that our society cares about equity, but equitable goals, like efficiency goals, are themselves incomplete.

Our preferred accommodation of these competing goals of equitable access and graft survival is (1) to give allocative preference to antigen matching in proportion to its effectiveness in enhancing graft survival, and also (2) to give patients with rare antigens and who are therefore harder to match a preference in receiving those unmatched kidneys when enhanced graft survival is not at issue. This modified allocation system would continue the mandatory sharing of six-antigen-matched kidneys and might possibly give some preference to recipients with only one antigen mismatch as this degree of partial matching may enhance graft survival.[181] Unlike the current UNOS system, however, recipients who mismatched two or more antigens of a donated kidney would receive no points. Our proposed system also would give patients with relatively rare antigens at least the same number of points that are given for other equitable concerns such as presensitization. Although the exact values are open to debate, Table 6 provides a redacted version showing how our proposal would change the current UNOS point system.

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179. There is an argument that pure waiting lists sacrifice equitable concerns because dissimilar people are treated similarly. Thus, among the class of white recipients, a waiting list would be inequitable because recipients with lower expected graft survival might be given priority in transplantation. We conjecture, however, that pure waiting lists would not be as immediately objectionable to society as allocations that include racial exclusions. Other countries, for example, have used pure waiting lists to allocate kidney transplants in the past. See Calabresi and Bobbitt, *Tragic Choices* (cited in note 24).

180. See Part III.A. See also 103 Harv. L. Rev. at 1642 (cited in note 6) (saying that first-come, first-served allocations "are ethically bankrupt: society would be choosing not to choose").

181. See text accompanying note 130.

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TABLE 6. MODIFIED POINT SYSTEM FOR SELECTING KIDNEY TRANSPLANT RECIPIENTS

(Additions are in brackets; deletions are lined out)

	Points	
HLA matching		
0 - A, B, DR mismatch	~~10~~	[Mandatory Sharing]
[1 - A, B, DR mismatch	7]	
~~0 - B, DR mismatch~~	~~7~~	
~~0 - A, B mismatch~~	~~6~~	
~~1 - B, DR mismatch~~	~~3~~	
~~0 - B, DR mismatch~~	~~2~~	
~~3 - B, DR mismatch~~	~~1~~	
Waiting Time		
Patient with longest waiting period (proportionate points for shorter periods)	~~1~~	[2]
Each year on waiting list	~~.5~~	[1]
Children		
Age 0-5	2	
Age 6-10	1	
Presensitization	4	
[Rare Antigens	4]	

Patients whose combination of antigens would give them less than a ten percent chance of qualifying for one of the antigen matching preferences could receive "rare antigen" points. Awarding rare antigen points would be consonant with the equitable exceptions already in place. Just as the presensitization points promote medical justice by elevating the chances of those with medical bad luck,[182] recipients with the poor fortune of having rare antigens would receive a preference.[183] Awarding points for rare antigens thus would increase the ex ante equality of opportunity.[184] While the criterion of having less than a ten percent

182. Dennis, 6 Transplantation Rev. at 133 (cited in note 60).

183. The preference for patients with rare antigens is even more defensible than the preference for presensitized patients because a patient's antigens are an immutable characteristic while presensitization often is the result of a previous transplant opportunity that failed.

184. Before being antigen typed (ex ante), each ESRD patient theoretically could have the same probability of transplantation. Typing would then reveal which recipients had non-rare antigens—and hence an elevated chance of qualifying for antigen matching preference—and which recipients had rare antigens—and hence an elevated chance of qualifying because of the rare antigen preference.

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chance of matching five or six antigens is an arbitrary cutoff, it is no more arbitrary than the current criteria for presensitization—PRA greater than eighty percent—or childhood—less than ten years old.

Most importantly, rare antigen points—combined with a deemphasis on partial matching—could substantially reduce the disparate racial impact of the current point system without resorting to race conscious points. Because black ESRD patients only rarely qualify for six-antigen match transplants,[185] disproportionate numbers of rare antigen points would go to blacks. Awarding points on the basis of rare antigen type would also avoid problems that might accompany a race conscious preference. If blacks received race conscious points to remedy this disparate impact and possible past discrimination, the rate of white cadaveric donations might decrease. In addition, race conscious points awarded on the basis of a patient's declaration might induce whites to misrepresent their race in order to qualify for these additional points.[186]

At a minimum, the current UNOS point system should be amended to award more points for time on the waiting list relative to partial antigen matching. As discussed above,[187] the current point system uses time on the waiting list largely as a tie-breaker. The current practice of awarding points for as few as one or two antigen matches cannot be supported absent reliable evidence that recipients with two or three matching antigens have higher success rates than patients with

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Equalizing ex ante opportunity is not universally reflected in our discrimination law. Imagine, for example, that an employer needs to hire 100 people. Ninety-five of the jobs can be performed by any worker, but five jobs require sufficient strength so that hiring only men constitutes a bona fide occupation qualification (BFOQ) under Title VII. In economic parlance ex ante equal employment opportunity would mean that an applicant would have an equal opportunity of being hired regardless of gender. A commitment to ex ante equality of opportunity would therefore require employers to give women preference in competing for the remaining jobs; 50 of 95 would need to go to women to counterbalance the five BFOQ jobs for which women could not compete. Title VII imposes no such requirement upon employers to employ preferences to counterbalance BFOQ hiring.

We suggest, however, that the government regulations concerning kidney transplantation should reflect a concern for ex ante racial equality. Employers under Title VII are not required to consider equity when hiring employees, and individual employers are not required to eliminate the vestiges of past societal discrimination. In the kidney context the government does mandate other forms of equitable allocations, and the possible connection between kidney failure and slavery heightens society's responsibility for disparate racial access to this scarce commodity.

185. See text accompanying notes 87-90.

186. A race-conscious allocation system, however, does have some merits. The current point system gives black recipients an arbitrary preference for partial antigen matching even though partial matching has no empirical relation to survival rates in black recipients. See text accompanying notes 132-34. Moreover, giving black ESRD patients a fixed number of points could directly counterbalance the disparate racial impact of mandatory six antigen sharing and partial antigen points so that cadaveric kidneys would be allocated to blacks in proportion to black representation in the ESRD population.

187. See note 64 and accompanying text.

zero or one matching antigen. The current system, therefore, needlessly sacrifices equity with minimal increase in graft survival. Eliminating the current points for two or more mismatches and increasing the points for time on the waiting list can mitigate both the disparate racial impact and the caprice of the current allocation rules.[188]

Moreover, our proposal is consonant with the variances in place at several OPOs throughout the country. The Regional Organ Bank of Illinois (ROBI) allocates cadaveric kidneys under a UNOS-approved variance that already employs two of our proposed changes. The ROBI point system gives more weight to time on the waiting list relative to antigen matching and gives no points for two or three B, DR mismatches.[189] Indeed, virtually all of the alternative allocation rules put less emphasis on antigen matching relative to time on the waiting list.[190] Thus, when individual transplant centers seek to vary UNOS rules they almost invariably move away from antigen matching toward the kind of allocation rules that we propose.

2. Defining the Geographic Scope of the Point System

Up to now, we have focused on modifying kidney allocation by changing the relative weight given to different factors under the UNOS point system. The choices involved in constructing a scheme for allocating cadaveric kidneys, however, also include the appropriate geographic scope of the point system. Defining the geographic scope establishes the pool in which the point system operates. A kidney harvested in an Alabama hospital, for example, could go to the recipient who had the most points on that hospital's waiting list, on that OPO's waiting list, or on a national waiting list. The choice of the appropriate pool size is analytically distinct from the question of the appropriate bases for awarding points.

Recently, advocates of increased antigen matching have proposed extending the geographic scope of the partial antigen matching pool.[191] Instead of the current system, which applies the point system to those on local waiting lists, these authors would pool recipients nationally and transport each kidney to the recipient who had accumulated the most points for that kidney based on HLA matching. A national point system

188. Granting more points for time on the waiting list would enhance equity while retaining some of the benefits of antigen matching. Due to relatively poor matching, however, black ESRD patients would be able to overcome the racial impact of antigen matching only by waiting for longer periods. Thus, enhancing the relative importance of waiting list points would mitigate but not extinguish the disparate racial impact.

189. See Lazda, 23 Transplantation Proc. 901 (cited in note 84).

190. See Dennis, *American Blacks* (cited in note 85).

191. Gjertson, et al., 324 New Eng. J. Med. 1032 (cited in note 25).

is consistent with an emphasis on enhanced survival through better antigen matching because the larger the pool of recipients, the greater the probability of finding a good match. The choice of a national system might also be consistent with an emphasis on equity. If a pure waiting list were used to allocate kidneys, it would be inequitable to apply the points on a local basis because under this normative view the dialysis patients who had waited the longest should have a prior claim to kidneys harvested in any part of the country. Thus, a national scope for the point system is supportable on both equity and efficiency rationales.

The strongest arguments in favor of a local scope for point systems concern issues of procurement.[192] The mode of allocating cadaveric kidneys may alter the number of kidneys that are harvested. The incentives of the harvesting doctor may be particularly important.[193] Beyond the often arduous task of removing organs at the time of death, which may often be at night, the harvesting OPO must first gain the consent of the donor family. Making more than perfunctory efforts to accomplish these tasks requires a large amount of altruism. Much of the incentive to procure kidneys aggressively derives from the knowledge that local patients will benefit. Local allocation may increase procurement rates by enabling centers to transplant patients on their own waiting list[194] and aggressive OPOs to reap rewards for their efforts.

Conversely, mandatory sharing of all kidneys may discourage procurement in an era when the donor shortage is clearly the limiting factor in renal transplantation. Expanding the scope of the UNOS point system to the national level would decrease the likelihood of transplanting kidneys that were harvested locally. While there are no direct empirical data on the magnitude of this procurement effect, it is widely acknowledged in the literature[195] and implicit in the current UNOS guidelines, which require OPOs that receive a six-antigen-matched kidney from another center to return the next suitable kidney with the

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192. A local allocation system provides the added benefits of lower cost and quicker transplantation. National allocation, however, has been estimated to entail an increased expenditure of only $1000 per transplant. Id. While national allocation causes longer delays between harvesting and transplantation, better techniques and new drug therapies have reduced the importance of preservation time as a determinant of graft survival.

193. See Blumstein, 22 U.C. Davis L. Rev. at 490 (cited in note 4).

> In light of the . . . strong condemnation of commercializing organs and its advocacy that property rights of donors be eliminated, it is ironic that the ideology of "national resource" for organs confronts and must respond to the territoriality or property rights perspective—not of donors or patients, but of transplant centers and their surgical teams.

Id.

194. See Thomas E. Starzl, et al., *A Multifactorial System for Equitable Selection of Cadaver Kidney Recipients*, 257 J. Am. Med. Ass'n 3073 (1987).

195. See id.

same ABO type.[196] In sum, because of this possible procurement effect,[197] we tentatively propose retention of local geographic allocation, but suggest that more empirical work is necessary.

D. *Adapting Allocation to New Drug Therapies*

The previous sections have been concerned primarily with discussing how we should allocate kidneys in the current cyclosporine era. But as we advance these tentative proposals, the postcyclosporine era is rapidly taking shape as new therapies become available. These new therapies not only may increase survival rates, but also may simplify the normative dilemmas outlined above. If the new drugs successfully eliminate recipient race and antigen matching as determinants of graft survival, allocation schemes can begin to treat time on the waiting list as the determinative factor.[198] Under this scenario, the tradeoff between equity and efficiency would largely disappear.

At the very least, the current empiricism is sufficient to suggest that immunosuppressant therapies should be sensitive to racial differences. There is growing evidence that black patients have heightened immunologic responsiveness[199] and may require more intense drug therapies.[200] Indeed, quadruple immunosuppression, which has proven to abrogate racial disparity in graft survival over three years, originated not because of a special concern for race, but rather to alleviate cyclosporine toxicity. The improvement in black allograft survival was noted only as an ancillary benefit. Therefore, with the evidence of immunologic differences between races mounting, the medical community now must define parameters of immune responsiveness that may differ between races. Failing to account for potential racial differences would be another form of selective indifference, paralleling the unfortunate

196. *UNOS Policy* § 3.5.11 (1992) ("Payback for Six Antigen Match Kidneys"). See also id. § 3.5.12 ("Payback of Voluntarily Shared Kidneys with Extra-Renal Organs"); id. § 3.5.13 (1992) ("Payback of Kidneys Shared for Highly Sensitized Recipients").

197. In reaching this conclusion, we should note that one of the authors is a nephrologist at the University of Alabama. Because of the high procurement rates of the Alabama Regional Organ and Tissue Center, a national point system—whether based on pure antigen matching or a pure waiting list—would inevitably reduce the number of transplants performed at the center and increase the waiting time for those on the local waiting list. Consequently, readers may want to probe our analysis because of a possible conflict of interest. For a more detailed discussion of various interests of participants in the current allocation debate, see note 205 and accompanying text.

198. It may be that six-antigen-matched transplants would retain significance and therefore should be included in the revised point system.

199. See, for example, R. H. Kerman, et al., *Stronger Immune Responsiveness of Blacks vs. Whites May Account for Renal Allograft Survival Differences*, 23 Transplantation Proc. 380 (1991).

200. See Gaston, et al., 53 Transplantation 103 (cited in note 83).

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practice of extrapolating the results of white or male cohorts in other areas of science.[201]

The more difficult normative question may concern the degree of empiricism that is required to justify a change in allocation policies. At a minimum, we argue that such policies should not be static, but should continue to evolve. The emergence of new drug therapies only underscores this conclusion. In the absence of authoritative empiricism, administrative agencies should consider whether it is advantageous to wait for more information.[202] While deemphasizing partial antigen matching *may* reduce survivability, retaining or expanding the current point system will almost certainly perpetuate or worsen the racial disparity in transplantation. Weighing these speculative costs against certain equitable benefits might militate for changing the allocation rules without waiting for further confirming data.

The current UNOS point system developed outside of the formal administrative rulemaking process and does not adequately address the impact of current immunotherapy. Both administrative and therapeutic changes militate for a revised allocation system. HHS has decided to formally develop and submit for comment a formal notice of proposed rulemaking to replace the mandatory allocation system devised by UNOS.[203] In the postcyclosporine era the heavy preference for partial matching relative to time on the waiting list is normatively untenable. Even if our prior understanding justified privileging partial antigen matching, newer empiricism indicates that those benefits are small and potentially decreasing, with a decidedly adverse impact on blacks. The current UNOS allocation system is outmoded and should be revised.

E. A Political History of Antigen Matching and Immunosuppression

These pressing allocative decisions are not being made in an esoteric or ahistorical setting. Indeed, we argue that the history of kidney transplantation has powerfully framed the normative issues that policymakers now confront. The transplantation community is itself sharply divided between those who would extend antigen matching even further and those who would deemphasize antigen matching in the face of superior therapeutic regimens. In this section we sketch the history of re-

201. See, for example, Carol Gilligan, *In a Different Voice* (Harvard, 1982).

202. See, for example, *International Harvester v. Ruckelhaus*, 478 F.2d 615 (D.C. Cir. 1973).

203. *Mason Letter* (cited in note 29).

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nal transplantation and outline the current positions of the major players in the policy debate.[204]

The first successful kidney transplant in the United States was performed in 1953 by Dr. Joseph Murray at Boston's Peter Bent Brigham Hospital with a kidney donated by an identical twin of the recipient.[205] The early history of transplantation was shaped by the use of living related donors, particularly twins, whose kidneys could be transplanted in the absence of immunosuppressant drugs. Until the late 1960s chronic dialysis treatments were not widely available, and kidney failure was a fatal disease. In those years surgeons were willing to attempt transplants without firm evidence of the likelihood of success because the alternative for the patient was almost certain death. Thus, transplants from a variety of living related donors—including fraternal twins, siblings, and parents—were attempted. At that time the only immunosuppressant drugs were cortisone derivatives, which were highly toxic and poorly tolerated. In the absence of effective immunosuppressive therapies, research focused on genetic determinants of graft survival. Initially, it was observed that some transplants from siblings were quickly rejected while others survived for long periods of time. In the early 1960s Jean Dausset and others discovered HLA antigens and developed the techniques of tissue typing. The discovery of the antigen loci and the ability to identify different antigen types furthered the genetic emphasis in kidney transplantation. Tissue typing for antigens among potential living donors became the accepted method for choosing donors, and results of tissue typing studies predicted transplant outcomes with a fair degree of reliability.

This emphasis on genetics and antigen matching, which continues to this day, is in some ways an historical artifact of the early days of kidney transplantation. In contrast, liver and heart transplantation developed a radically different therapeutic ethos. Transplantation from living related donors obviously is infeasible for hearts and livers. In addition, short preservation times for these organs when obtained from cadaveric donors did not allow doctors to use tissue typing results in the selection of recipients.[206] Thus, transplantation of these organs did not evolve along the same genetics-oriented route, and thus far tissue typing plays a very minor role.

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204. For a more detailed history of the politics of transplantation, see Dennis, 6 Transplantation Rev. 130 (cited in note 60).

205. See James B. Nelson, *Human Medicine Developments in the Law* (Augsburg, 1984); 103 Harv. L. Rev. at 1614 (cited in note 6).

206. Hearts and livers, until quite recently, required transplantation within six to eight hours of harvest. Kidneys, by comparison, may be preserved for 36 to 48 hours.

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The introduction of cyclosporine in 1984 revolutionized transplantation, markedly improving results in renal transplantation, and for the first time making heart and liver transplants practical. [207] Since the beginning of the cyclosporine era, however, the kidney transplant community has been divided about whether survival of cadaveric grafts is determined more by antigen matching or by immunosuppressant therapies.

Dr. Paul Terasaki of the U.C.L.A. Tissue Typing Laboratory, a pioneer in the development of tissue typing, has been particularly effective in championing allocation based on antigen matching.[208] As noted earlier, he and his associates have called for expanded emphasis on matching—most recently advocating mandatory national allocation of cadaveric kidneys on the basis of hierarchical antigen matching in order to maximize transplant survival rates.[209] Others, with supportive data, have opposed such a system. Philip Held and co-authors, using data from the United States Renal Data System, concluded that even with a seven-fold increase in the number of six-antigen matches, there would be only a two to three percent increase in the overall graft survival of all transplants.[210] These data have been disputed by Terasaki and associates, who, using data voluntarily submitted to the U.C.L.A. Transplant Registry, contend that a national allocation program that included partial antigen matches could increase overall five-year survival rates by five percent.[211] Such proponents of mandatory antigen matching programs usually downplay any relationship between antigen matching and racial access to transplantation.[212] They argue that the point system provides more transplants for patients with longer waits than would a center-driven system, under which individuals have discretion to exclude blacks from waiting lists. This in no way supports the

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207. See *Organ Transplantation: Hearing Before the Senate Committee on Labor and Human Resources*, 98th Cong., 1st Sess. 177, 179 (1983) (statement of Nancy L. Ascher, transplant surgeon); Barry D. Kahan, *The Impact of Cyclosporine on the Practice of Renal Transplantation*, 21 Transplantation Proc. 63 (1989).

208. See Terasaki, Takemoto, and Mickey, 3 Clinical Transplantation 301 (cited in note 58).

209. Gjertson, et al., 324 New Eng. J. Med. 1032 (cited in note 25).

210. See Hunsicker and Held, 12 Seminars in Nephrology 293 (cited in note 28).

211. Gjertson, et al., 324 New Eng. J. Med. 1032 (cited in note 25).

212. For example, as one article states

> Some contend that HLA matching would discriminate against blacks. . . . [Currently] [p]atients forced to wait for long periods, presumably because they are difficult to match, receive an allowance in the form of points allocated for waiting time. When kidneys were allocated according to a point system rather than a center-driven system in a local two-year trial, transplantation in patients with longer waiting times and those with high levels of HLA antibodies were performed more frequently. . . . Therefore, a change to a national system will not suddenly decrease the number of black recipients undergoing transplantation; rather, it may increase it.

Id. at 1035.

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conclusion that a national point system would not decrease the number of black recipients.[213] Clearly, the impact of such policies on the black ESRD community remains indeterminate.

Unfortunately, while the time may be ripe administratively for a reconsideration of the kidney allocation program, the division between the two camps is, if anything, widening. Tissue typers continue to demand broader application of antigen matching and are involved in research to define more precisely the genetic origins of HLA antigens.[214] Many clinicians remain committed to retaining local control of harvested kidneys and are involved in the development of technologies that have the potential to minimize the impact of antigen matching. Neither side appears to be listening to the other.[215]

IV. THE PLAUSIBILITY OF A DISPARATE IMPACT CHALLENGE

Title VI of the Civil Rights Act of 1964 prohibits discrimination in any program or activity that receives federal funds.[216] In *Guardians Association v. Civil Service Commission*,[217] the Supreme Court clarified the availability of relief under Title VI for persons injured by federally funded programs administered in a way that adversely impacts particular racial groups. The Court held, in a divided opinion,[218] that although Title VI is directed at intentional discrimination, suits seeking to recover for racially disparate impacts may be pursued under implementing agency regulations, at least against governmental defendants.[219] Thus, blacks who suffer disproportionately in terms of access to cadaveric kidneys under the present UNOS allocation system[220] would have

213. Moreover, the authors admit forthrightly: "Whether or not survival of the graft in every patient improves with hierarchical matching remains in question." Id. at 1035.

214. Aida A. Barbetti, et al., *HLA Serologic Epitopes*, in Paul I. Terasaki, ed., *Clinical Transplants 1989* 477 (U.C.L.A. Tissue Typing Laboratory, 1989).

215. A. R. Hull, *Editorial*, 5 Nephrology News and Issues 42 (1991).

216. The pertinent statutory language is as follows: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, he denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." 42 U.S.C. § 2000d (1988).

217. 463 U.S. 582 (1983).

218. Two justices concluded that Title VI prohibits behavior that has a racially discriminatory effect; three others joined with them to form the majority holding that the implementing regulations, which explicitly mention discriminatory impact, authorize suits based on racially disparate impacts.

219. *Guardians*, 463 U.S. at 591. See also *Alexander v. Choate*, 469 U.S. 287, 293 (1985) (saying that *Guardians* held that "actions having an unjustifiable disparate impact on minorities could be redressed through agency regulations").

220. Persons in this category, as the intended beneficiaries of the government's ESRD program, clearly would have standing to challenge policies with racially discriminatory impacts. In *Guardians* the Supreme Court definitively recognized that an implied private cause of action exists under Title VI and its regulations. 463 U.S. at 607.

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to surmount two legal barriers to obtain relief under the civil rights laws. First, they must show that the system adversely affects black kidney patients in violation of applicable regulations and without adequate justification. Second, they must show either that the entity responsible for the policies that produce this disparate impact is subject to suit under the civil rights enforcement regime or that the agency responsible for the funding of the organ sharing program, HHS, has not fulfilled its duty to enforce Title VI.

A. Disparate Impact of Kidney Allocation and Title VI Relief

After the *Guardians* decision authorized recovery in disparate impact cases under regulations issued pursuant to Title VI, the lower federal courts set about the task of deciding what a plaintiff must establish to recover.[221] These courts found an obvious model in the Title VII employment discrimination cases,[222] which long had recognized that a plaintiff may recover by demonstrating that a facially neutral policy adversely affects a protected group.[223] As in the Title VII context, a plaintiff alleging violation of Title VI regulations makes a prima facie case by showing a preponderance of evidence that the challenged policy, though neutral on its face, has a racially disproportionate effect.[224] If the plaintiff successfully makes that showing, the burden shifts to the defendant to justify its policy.[225] Even in the face of a legitimate justifi-

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221. See, for example, *Larry P. v. Riles*, 793 F.2d 969, 981 (9th Cir. 1984) (holding that a California school's policy that placed students in remedial programs on the basis of IQ test results violated Title VI regulations because it had the effect of discriminating on the basis of race). The *Larry P.* court used the regulations promulgated by the Department of Education implementing Title VI as the source of the right to recover. See 34 C.F.R. § 100.3(b)(2) (1992). In programs receiving federal assistance through the Department of Education, this section explicitly prohibits use of:

> criteria or methods of administration which have the effect of subjecting individuals to discrimination because of their race, color, or national origin, or have the effect of defeating or substantially impairing accomplishment of the objectives of the program as respect individuals of a particular race, color, or national origin.

Id. This nondiscrimination policy is repeated verbatim in 45 C.F.R. § 80.3(b)(2) (1991) as to programs receiving federal assistance through HHS.

222. See *Georgia State Conference of Branches of NAACP v. Georgia*, 775 F.2d 1403, 1417 (11th Cir. 1985) (stating that the "elements of a disparate impact claim may be gleaned by reference to cases decided under Title VII").

223. See *Griggs v. Duke Power Co.*, 401 U.S. 424 (1971) (holding that plaintiffs may recover under Title VII by showing that facially neutral practices disproportionately disadvantage members of protected groups).

224. *Georgia State Conference*, 775 F.2d at 1417.

225. The defendant must prove "a substantial legitimate justification for its practice." Id. See also *Larry P.*, 793 F.2d at 982. In two pre-*Guardians* cases, the Second and Third Circuits departed from the Title VII disparate impact model as to defendants' burden, holding that defendants need only articulate, rather than prove, a legitimate nondiscriminatory reason for the policy that has a racially disproportionate impact. See *NAACP v. Medical Center*, 657 F.2d 1322,

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cation, a plaintiff may prevail by demonstrating the existence of an alternative policy that would be equally effective yet would avoid the disproportionately adverse impact on the racial minority.[226]

Applying this model to the UNOS kidney allocation guidelines described above indicates that a Title VI regulatory violation may exist. First, HHS has promulgated regulations implementing Title VI that explicitly forbid recipients of federal funds to use "criteria or methods of administration which have the effect of subjecting individuals to discrimination because of their race."[227] This language is identical to regulations issued by the Department of Education, which federal courts have found to give rise to disparate impact claims under *Guardians*.[228] Since HHS's own regulations prohibit policies that produce a racially disparate impact, black ESRD patients can make a prima facie case by demonstrating that the UNOS point system, with its emphasis on tissue typing, results in more cadaveric kidneys being matched with white re-

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1333 (3d Cir. 1981); *Bryan v. Koch*, 627 F.2d 612, 618-19 (2d Cir. 1980). This model corresponds to the traditional Title VII disparate treatment model, which then requires plaintiffs to demonstrate that the proffered reason is a pretext for discrimination. See *Larry P.*, 793 F.2d at 982 n.10; *Johnson v. Uncle Ben's Inc.*, 657 F.2d 750, 752 (5th Cir. 1981). For a description of the burden of proof scheme for disparate treatment cases, see *Texas Dep't of Community Affairs v. Burdine*, 450 U.S. 248, 252-56 (1981). See generally Ivan E. Bodensteiner and Rosalie Berger Levinson, *State and Local Government Civil Rights Liability* § 8:25 (Callaghan, 1987).

The courts adhering to the position that the defendant carries the burden of proof on rebuttal were in sync with the disparate impact cases brought under Title VII prior to 1989. In that year, however, the Supreme Court modified the Title VII disparate impact proof model in *Wards Cove Packing Co., Inc. v. Atonio*, 490 U.S. 642 (1989). *Wards Cove* held that statistics which simply compare the racial compositions of skilled and unskilled labor forces in a company do not constitute a prima facie disparate impact case. The Court went on to discuss the defendant's duty when rebutting a properly supported prima facie case:

> In this phase, the employer carries the burden of producing evidence of a business justification for his employment practice. The burden of persuasion, however, remains with the disparate-impact plaintiff. . . . "[T]he ultimate burden of proving that discrimination against a protected group has been caused by a specific employment practice remains with the plaintiff *at all times*." This rule conforms . . . to the rule in disparate-treatment cases that the plaintiff bears the burden of disproving an employer's assertion that the adverse employment action or practice was based solely on a legitimate neutral consideration.

Id. at 659-60, quoting *Watson v. Fort Worth Bank & Trust*, 487 U.S. 977, 997 (1988). In November 1991 President Bush signed into law a new Civil Rights bill that, among other things, overruled the *Wards Cove* decision and restored the defendant's higher burden on rebuttal in Title VII cases. The impact of these developments on Title VI cases is unclear, although they signal generally that the Supreme Court's view of civil rights claims is more restrictive than that of Congress. In any event, because defenders of the UNOS point system can both articulate and substantiate perceived benefits of antigen-based matching, it will be necessary to move to the next phase and consider whether our proposal provides an equally effective alternative with less discriminatory impact.

226. *Wards Cove*, 490 U.S. at 660. See also *Larry P.*, 793 F.2d at 982.

227. 45 C.F.R. § 80.3(b)(2) (1991).

228. See, for example, *Georgia State Conference*, 775 F.2d at 1417; *Larry P.*, 793 F.2d at 981-82.

cipients and thus has a substantial adverse effect on them because of their race.[229]

In the Title VII context, the Supreme Court has noted that statistics can establish that discrimination is the "standard operating procedure—the regular rather than the unusual practice."[230] Thus, statistics showing that an adverse impact is not explainable by chance are substantial enough to establish a prima facie case.[231] The data we present here undoubtedly would satisfy the requirement to show a substantial disproportionate impact on black kidney patients. The statistics indicate that black patients receive cadaveric kidneys at a much lower rate than whites, a problem especially severe in light of the disproportionately high number of black ESRD patients.[232] In the context of employment discrimination some courts have required that a prima facie case show that a challenged hiring criterion results in a selection rate for the protected group that is less than four-fifths that of the group most often hired.[233] As we explained above, the UNOS system of privileging antigen matching in allocating cadaveric kidneys has an effect that is far more statistically significant. First, the statistics showing the relative rates of distribution indicate that black dialysis patients have only a fifty-five percent likelihood of receiving a cadaveric kidney as compared to whites, a number well below the eighty percent benchmark used in Title VII cases.[234] Second, the current allocation system has resulted in waiting periods almost twice as long for black recipients.[235]

To say that black potential kidney recipients would easily establish a prima facie case under Title VI disparate impact regulations, however, is simply to come to the most difficult issue: whether the perceived benefits of tissue typing justify this disparate impact on blacks. Defenders of the UNOS point system undoubtedly would counter the statisti-

229. See *Hazelwood Sch. Dist. v. United States*, 433 U.S. 299, 309 (1977).

230. See *Teamsters v. United States*, 431 U.S. 324, 336 (1977).

231. See *Castaneda v. Partida*, 430 U.S. 482, 496-97 n.17 (1977) (saying that if the observed selection rate is greater than two or three standard deviations from the expected selection rate, then a statistically significant disparity is present). See also *Hazelwood*, 433 U.S. at 309 n.14.

232. See note 13 and accompanying text.

233. See, for example, *Fudge v. City of Providence Fire Dep't*, 766 F.2d 650, 658-59 n.10 (1st Cir. 1985); *Firefighters Inst. for Racial Equality v. City of St. Louis*, 616 F.2d 350, 356-57 (8th Cir. 1980). This standard was taken from the Uniform Guidelines on Employee Selection Procedures. See 29 C.F.R. § 1607.4(D) (1991).

234. Held, et al., 148 Arch. Intern. Med. at 2596 (cited in note 68). Statistics compiled in other studies are even more striking. See Kjellstrand, 148 Arch. Intern Med. 1305 (cited in note 67). See also note 13 (analyzing national distribution rates among black and white kidney recipients in 1988 and finding that whites were 78% more likely to receive a kidney that year).

235. As previously noted, the 1990 figures indicate that blacks wait an average of 13.9 months for their first cadaveric kidney transplant as compared to an average wait of 7.6 months for white kidney patients. Office of Inspector General, Distribution of Organs for Transplantation at 8 (cited in note 11).

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cal prima facie case by pointing to evidence[236] that allocating kidneys by antigen matching produces better results.[237] As noted above, this argument in favor of tissue typing may be correct with respect to six-antigen matches.[238] Improvements in immunosuppression, however, seem to have eliminated whatever tenuous survival benefits partial antigen matching may have had in the past.[239] Accordingly, the traditional justification for antigen matching may be obsolete as to kidneys distributed with fewer than six antigen matches.[240]

Even assuming that defenders of the UNOS point system might justify the statistical disparity by pointing to success with six-antigen matches and the marginal increase in survival rates for white patients with partial matching, the Title VI recovery scheme still contemplates that plaintiffs can win by demonstrating the existence of nondiscriminatory alternatives that effectively and efficiently serve the goals that the challenged policy was designed to achieve.[241] The allocation scheme proposed in Part III would do just that. The allocation scheme promotes equity by awarding rare antigen points and by deemphasizing partial antigen matching, for which there is scant documented benefit, while preserving the benefits of six-antigen matching. Awarding pa-

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236. The Court in *Wards Cove* described the defendant's rebuttal phase in the Title VII context as one in which:

> the dispositive issue is whether a challenged practice serves, in a significant way, the legitimate employment goals of the employer. . . . The touchstone of this inquiry is a reasoned review of tbe employer's justification for his use of the challenged practice. A mere insubstantial justification in this regard will not suffice, because such a low standard of review would permit discrimination to be practiced through the use of spurious, seemingly neutral employment practices. At the same time, though, there is no requirement that the challenged practice be "essential" or "indispensable" to the employer's business for it to pass muster . . . .

490 U.S. at 659. The new Civil Rights Act requires defendants to "demonstrate that the challenged practice is job related for the position in question and consistent with business necessity." Civil Rights Act of 1991, Pub. L. No. 102-166, 105 Stat. 1071, 1074.

237. As we describe in Part III above, "better results" might be measured in a number of ways, including length of graft survival, length of half-life of transplanted kidneys, or even overall cost-effectiveness.

238. See Terasaki, Takemoto and Mickey, 3 Clinical Transplantation 301 (cited in note 58).

239. Gaston, 53 Transplantation 103 (cited in note 83).

240. Of course, if ongoing research lends support to the notion that partial antigen matching increases graft survival rates for whites, an argument might be made that the point system is justified because overall transplants will enjoy higher success rates. But as we demonstrate above, "success" of the ESRD transplant program is not measured solely in terms of graft survival; indeed, if it were, then wbites would be entitled to be first in line for all partially matcbed kidneys, a result unpalatable to most members of the transplant community.

241. See, for example, *Georgia State Conference*, 775 F.2d at 1417 (saying that the "plaintiff tben may ultimately prevail by profering [sic] an equally effective alternative practice which results in less racial disproportionality or proof that the legitimate practices are a pretext for discrimination"). See also Civil Rights Act of 1991 § 105(a), 98 Stat. at 1074 (saying that plaintiff may demonstrate the existence of an alternative employment practice in accordance with pre-*Wards Cove* standards).

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tients with rare antigens enough points to compensate for the six-antigen matching preference also promotes ex ante equal opportunity without reducing the expected success.

Defenders of the UNOS point system might argue that even this deemphasis of partial antigen matching could result in an overall, albeit slight, decrease in graft survival. Yet as discussed above, graft survival is not the only goal of the ESRD transplant program, even under current policies.[242] Because Congress has mandated that any point system will involve an accommodation between the competing norms of equity and efficiency, a court might find that this modified point system serves the statutory goals as well as, if not better than, the present system.[243]

B. Enforcement

The drafters of Title VI charged the federal agencies that control expenditures with enforcing the nondiscrimination policy envisaged by the statute.[244] The statute explicitly authorizes rescission of federal funding as the primary sanction to induce compliance.[245] Private indi-

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242. See notes 160-65 and accompanying text. The dual nature of the program goals is evident even in the text of the statute, which requires that the OPTN develop an allocation system that is "equitable" in accordance with "established medical criteria." 42 U.S.C. § 274 (1988 and Supp. II 1990).

243. An alternative allocation scheme might compensate for the disparate racial impact of matching or the lingering effect of past disparate treatment by awarding blacks race-conscious points. Such a scheme might itself be vulnerable to statutory or constitutional challenge for discriminating on the basis of race. Since the Supreme Court held in *Regents of the Univ. of Cal. v. Bakke*, 438 U.S. 265 (1978), that an affirmative action program must be struck down under Title VI if it violates the Equal Protection Clause, lower courts have upheld voluntary programs against Equal Protection and Title VI challenges. *Detroit Police Officers Ass'n v. Young*, 608 F.2d 671 (6th Cir. 1979). In *Metro Broadcasting, Inc. v. FCC*, 497 U.S. 547 (1990), the Supreme Court established that benign race conscious remedial schemes established by Congress will be upheld as long as "they serve important governmental objectives within the power of Congress and are substantially related to achievement of those objectives." Id. at 565. Given that Congress directed UNOS to develop a point system that allocates cadaveric kidneys equitably according to established medical criteria, use of race-conscious points arguably serves the important, articulated goal of equitable distribution and would survive constitutional scrutiny.

244. See 42 U.S.C. § 2000d-1 (1988).

245. The relevant statutory language reads:

> Compliance with any requirement adopted pursuant to this section may be effected (1) by the termination of or refusal to grant or to continue assistance under such program or activity to any recipient as to whom there has been an express finding on the record, after opportunity for hearing, of a failure to comply with such requirement, but such termination or refusal shall be limited to the particular political entity, or part thereof, or other recipient as to whom such a finding has been made and, shall be limited in its effect to the particular program, or part thereof, in which such noncompliance has been so found, or (2) by any other means authorized by law . . . .

Id. In 1988 Congress overrode a presidential veto and passed the Civil Rights Restoration Act, Pub. L. No. 100-259, 102 Stat. 28 (1988), which makes clear that the provisions of Title VI are enforceable against funded entities as a whole if any part of the entity receives federal assistance.

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viduals who wish to challenge the Title VI compliance of private entities receiving federal funds thus have two potential targets: the private entity itself[246] and the federal agency responsible for its funding.[247]

Black potential kidney recipients who are denied access to kidneys under the UNOS point system[248] could sue HHS, which controls the funding of the organ transplantation network program run by UNOS.[249] A second option would be to sue UNOS directly, as the recipient of federal funding.[250] In response to concerns about the unchecked administrative power granted UNOS under the OPTN contract, Congress passed legislation requiring UNOS policies to be developed as federal regulations in accordance with the Administrative Procedure Act.[251] In response to this mandate, the Health Resources and Services Administration ("HRSA"), the federal agency charged with overseeing the UNOS contract, is now in the process of codifying UNOS policies.[252] Because this administrative structure now allows for public comment

246. See *Guardians*, 463 U.S. 582.

247. See *United States Dep't of Transp. v. Paralyzed Veterans of Am.*, 477 U.S. 597 (1986) (impliedly recognizing a private right of action against Civil Aeronautics Board regarding its failure to enforce the Handicapped Act).

248. To sue a federal agency, of course, the plaintiffs must comply with constitutional standing norms—that is, they must show that they have heen injured in fact by the agency nonaction and that the harm to them would be redressed by the remedy sought in the case. See, for example, *Allen v. Wright*, 468 U.S. 737 (1984).

249. In *Cannon v. University of Chicago*, 441 U.S. 677 (1979), the Supreme Court confirmed the existence of private rights of action under the civil rights statutes (there, Title IX). Recent decisions of lower courts have purported to cut back on the permissible scope of private enforcement actions in suits against federal agencies. In *Women's Equity Action League v. Cavazos*, 906 F.2d 742 (D.C. Cir. 1990), the circuit court for the District of Columbia held that private plaintiffs could not maintain a Title VI suit against the federal government in which they sought "across-the-board continuing federal court supervision of the process by which the agencies ensure compliance with the antidiscrimination mandates" with regard to school desegregation efforts. Id. at 748. The *Cavazos* court was careful to distinguish that case from "situation-specific suits against the federal agency based on federal funding of a particular project or district." Id. at 749. A lawsuit against HHS challenging the UNOS point system under Title VI categories would fall under the latter category and presumably would be permissible even in the District of Columbia Circuit after *Cavazos*. But see *Washington Legal Foundation v. Alexander*, 778 F. Supp. 67 (D.D.C. 1991) (saying that white students may not sue the Department of Education for failing to implement policies forbidding race-based scholarships under Title VI).

250. Indeed, UNOS has a statutorily created monopoly on the organ distribution market; it is the only entity that controls cadaveric kidney distribution, and it uses federal funds to do so. Some language in the *Guardians* opinion may prove problematic in pursuing this course, however. Justice Stevens expressed the view that an action to enforce Title VI regulations would have to be brought under Section 1983, which of course has a state action requirement. Because UNOS cannot be characterized as a "state actor," Section 1983 relief would not be available. Justice Stevens's statement, however, was at best dicta, given that the *Guardians* defendant was a state actor; moreover, lower courts have not required that Section 1983 be used as the enforcement vehicle in Title VI regulatory disparate impact cases. See *Larry P.*, 793 F.2d at 983.

251. See 42 U.S.C. § 274(c) (1988 and Supp. II 1990).

252. *Aronoss Conversation* (cited in note 30)

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about how kidneys are allocated, aggrieved parties may influence allocation policies by participating in the administrative process. Given the nature of ongoing research, it is important that allocation policies be systematically and routinely reevaluated in light of emerging therapeutic technologies. The Administrative Procedure Act's procedural model might be the best vehicle for assessing the adequacy of these evolving systems in achieving the proper accommodation of equity and efficiency.

V. CONCLUSION

The severe and growing shortage of transplantable kidneys necessitates "tragic" allocative choices regarding the competing social objectives of graft survival, graft procurement, and equity. This Article has presented a series of stylized facts related to the disparate racial impact of antigen matching. Because blacks and whites have different distributions of antigens and because blacks have almost four times the rate of kidney failure, allocation schemes based on antigen matching make it more difficult for black patients to qualify for transplantation. Under the current UNOS point system, blacks receive a disproportionately small percentage of cadaveric transplants and have to wait almost twice as long as whites for transplantation. In short, a white dialysis patient may have a fifty percent higher chance of receiving a transplant in any given year. Some contend that this problem could be solved merely by increasing organ donations by blacks. While efforts in this regard are desirable, it is implausible to believe that black donation rates for both cadaveric and living-related kidneys can be increased five fold in order to eliminate the disparate impact of antigen matching rules. Antigen matching is a "but for" cause of blacks' unequal access to renal transplantation.

The disparate racial impact of the current antigen matching rules is not justified by offsetting medical benefits. The benefits of partial antigen matching are small and declining. Although in the current cyclosporine era white recipients do have enhanced survival rates of up to ten percent in the first year for six-antigen-matched kidneys, no persuasive evidence exists that partial antigen matching enhances transplant survival—especially for recipients who match fewer than four HLA antigens. Moreover, the use of new immunosuppressant therapies further reduces the impact of antigen matching on graft survival. The current emphasis on partial antigen matching relative to time on the waiting list sacrifices equitable access to transplantation without any corresponding medical benefit.

These stylized facts suggest that the current federal system of allocating cadaveric kidneys has become capricious and outmoded. We have

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proposed allocation rules that (1) eliminate points for patients with two or more mismatched antigens, (2) increase the points for time on the waiting list, and (3) award points for patients with rare antigens.[253] While the exact point values might be debated, our proposal gives preference to antigen matching that demonstrably increases graft survival while promoting ex ante equal opportunity for transplantation. At a minimum, new HHS guidelines should award more points for time on the waiting list relative to partial antigen matching. The extreme preference for partial antigen matching is not justified by current empiricism. The time has come to reevaluate the system's responsiveness to evolving medical technologies to promote more equitable access to transplantation.

253. See notes 181-88 and accompanying text.

APPENDIX: ESTIMATING THE DISPARATE IMPACT OF THE O RULE

As described above,[254] the UNOS O rule mandates that blood type O kidneys may be transplanted only into blood type O recipients. This rule favors blood type O recipients over blood type A and B recipients. Because the blood type A population is disproportionately white and the blood type B population is disproportionately black, it is initially unclear whether the reallocation of cadaveric kidneys toward blood type O patients decreases the total number of kidneys going to black patients.

Using stylized facts about the different racial distribution of blood types[255] and the disparate racial rates of donation and kidney failure, it is possible to analyze a differential equation model to predict the likely effect of the O rule on the composition and size of the waiting list. Let R = a constant rate at which ESRD patients sign on to the waiting list. Combining the facts that thirty-four percent of the recipient group is black, forty-nine percent of blacks are blood type O, and forty-five percent of whites are blood type O, we can derive the rates at which blood type O patients join the waiting list:

R_O = rate of new blood type O recipients
= [.45(1-.34) + (.49)(.34)]R = .46R.

Similarly, we can derive:

R_A = [.40(1-.34) + (.27)(.34)]R = .36R
R_B = [.11(1-.34) + (.2)(.34)]R = .14R
R_{AB} = .04R.

Let N = the constant rate at which kidneys are being donated. Because eight percent of donors are black, the rates at which specific blood types are being donated can be calculated in an analogous fashion:
N_O = .45 N; N_A = .39N; N_B = .12N; and N_{AB} = .04N.

Finally, let G = the rate at which the waiting list is growing [R = N+G], then a differential equation describing the rate at which the number of O-type people on the waiting list changes equals:

$$\frac{dO}{dt} = R_o\text{-}N_o = .46\ R\text{-}.45N = (.01 + .46G)N$$

254. See note 73 and accompanying text.

255. See text and Table 2 accompanying note 71.

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which can be solved in terms of an initial position O_o:

$$O(t)=O_o+(.01+.46G)Nt$$

Analogous solutions for the other blood types yield:

$$A(t)=A_o+(-.03+.36G)Nt$$

$$B(t)=B_o+(.02+.14G)Nt$$

$$AB(t)=AB_o+(.04G)Nt$$

For the special case in which the donation rate matches the ESRD rate (G=0), these solutions clearly reveal that blacks are disadvantaged by the O rule. Over time, more than forty-four percent of the waiting list would be black even though only thirty-four percent of ESRD patients are black. This result is because two-thirds of the waiting list would be comprised of blood type B patients, who are disproportionately black. The disproportionately white blood type A recipients are disadvantaged by the rule, but the donor pool is predominantly white and therefore provides a rich source for blood type A kidneys.

The model predicts that the O rule also has a disparate effect against blacks when the waiting list is growing through time ($G > 0$)—but that the disparate effect diminishes as the waiting list growth rate increases. For the past several years, the waiting list has grown at an annual rate of about 1200. In Setting $G = 1.2$, the model predicts that under the O rule thirty-eight percent of the waiting list would be black even though only thirty-four percent of ESRD patients are black.

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