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The Law and Economics of Organ Procurement*  

KEITH N. HYLTON

This paper presents an economic analysis of the organ procurement system in the U.S. and examines proposals to alleviate the shortage of transplantable organs. The paper's principal conclusions are: (1) Although non-market solutions deserve the highest priority, demand increases fueled by improvements in transplant technology will probably make some market-based solution necessary in the future. (2) Quality deterioration and coercion will not necessarily be worrisome problems under a market-based procurement system.

I. INTRODUCTION

This paper examines proposals to alleviate the shortage of transplantable organs. Such proposals can be grouped into market and non-market categories, where market solutions aim to change incentives, primarily through allowing the sale of body parts, and non-market solutions attempt, through encouragement or fiat, to improve the existing altruistic procurement system.

As in any market, the primary benefit of the price mechanism in the organ procurement process would be its tendency to facilitate the transfer of resources to higher-valued uses. However, unlike markets in most other items, there are widespread doubts concerning the value of consumer sovereignty in a market for transplantable organs. Specifically, it is feared that people would be "coerced" into selling in an organ market, and that a large proportion of the organs provided would be diseased.

This paper attempts to assess some of these fears, and at the same time provide a rigorous discussion of incentives in the organ procurement process. The principal conclusions are as follows. Although non-market solutions deserve the highest priority, demand increases fueled by improvements in transplant technology will probably make market solutions necessary in the future. Second, the concern over quality deterioration may be misplaced. Compensating suppliers of body parts is likely to cause an increase in the proportion of diseased organs offered, but this need not imply an increase in the proportion of diseased organs transplanted if market pressures lead to more stringent quality control measures. Such

* This paper was originally written for a seminar at Harvard Law School. The author thanks Steven Shavell and Maria O'Brien Hylton for comments on an earlier draft of this paper.
market pressures are likely to develop in a regime in which parties are allowed to purchase organs. Third, although it is possible that in an unfettered organ market some individuals would be coerced, or be taken advantage of, or indeed fool themselves into signing on to bad deals, this risk can be made rather tolerable, if not altogether avoided, through regulation. Fourth, it must be remembered that the present altruistic procurement system imposes tremendous social costs through undersupply and wastage. Indeed, Section IV of this paper presents an estimate of the cost of undersupply and wastage in kidney procurement of roughly eleven billion dollars. While non-market solutions may help reduce wastage, they offer little in the way of increasing the supply of transplantable organs. The opening of a market would lead to improvements in both areas.

Section II of this paper briefly reviews organ procurement law. Section III discusses incentives in organ procurement. Section IV discusses sources of inefficiency in the existing procurement system, and the magnitude of the social cost of inefficient procurement. In light of the incentive structure described in III, Section V examines the costs and benefits of various proposals to increase organ procurement.

II. ORGAN PROCUREMENT LAW

The major sources of organ procurement law are the National Organ Transplant Act of 1984 (NOTA), state legislation regulating organ sales, the Uniform Anatomical Gift Act (UAGA), and common law property rights in cadavers.

NOTA regulates organ procurement for the purpose of transplantation. It authorizes federal support for the Organ Procurement and Transplantation Network, whose purpose is to assist organ procurement agencies in the distribution of organs (42 U.S.C. 274). In addition, NOTA prohibits the purchase and sale of organs.

Several states have passed legislation which, like NOTA, prohibits the purchase of organs. However, some of the state laws are broader than NOTA in that they cover uses other than transplantation.

The UAGA, which has been adopted in some form in every state, authorizes the giving of all or part of a human body after death for specified purposes. As long as the gift takes effect upon death, any individual of sound mind and at least eighteen years of age may donate (UAGA, Section 1). In the absence of actual notice by the decedent, certain family members and authorized persons may donate the decedent’s body. The UAGA is silent on the issue of organ sales.

Common law “quasi-property” rights grant to the next of kin the right to possession of a cadaver for purposes of burial, the right to recover damages for the mutilation of a cadaver, and the right to prescribe the manner and place of burial. The decedent is granted the right to make a contract for an
autopsy after death (e.g. Vanderbilt Law Review, 1968: 356; Sideman and Rosenfeld, 1970: 825, 834–837). The right to sell the body parts of a cadaver is not among the recognized quasi-property rights.11

III. THE ECONOMICS OF ORGAN PROCUREMENT

A. DEMAND FOR ORGANS

In many cases where a transplant would benefit a patient there are substitute medical treatments. For example, a heart transplant candidate can obtain an artificial heart, although the prospects for a permanent artificial heart now appear to be slight.12 Similarly, a leukemia patient can continue with chemotherapy rather than seek a bone marrow transplant,13 and kidney patients have the option of continuing with dialysis.14

The choice between different forms of medical therapy is an investment decision. The costs of both substitute and transplant therapy are realized early; the benefits, typically less certain, are enjoyed later. As a general rule, substitute therapy is more restrictive, often requiring patients, as in the case of kidney dialysis or chemotherapy, to make frequent hospital visits throughout the course of treatment. In most cases it is only through transplant therapy that the patient can hope to return to full participation in work and travel; thus, to a considerable degree, the gain from transplantation is the ability to earn and consume over a longer horizon as if illness had never occurred.

Although it might be asserted that a potential transplant recipient should be willing to spend his or her entire wealth for an organ, it should be clear from the foregoing that there is probably a lower limit on the amount many potential organ recipients would be willing to pay. For example, if, for a certain class of recipients, transplantation offers virtually nothing over substitute therapy, then the recipients belonging to such a class would not be willing to spend much more for transplantation than for substitute therapy. Similarly, patients who are old or who suffer from complicating illnesses should be less willing, other things being equal, to pay a substantial amount over the cost of substitute therapy for a transplant.

B. SUPPLY OF ORGANS

In most cases, organs are retrieved and distributed by organ procurement agencies.15 Retrieval requires a referral from the hospital in which the donee's body is held (e.g. Prottas, 1985: 99). Second, the local organ procurement agency must obtain the right to remove the organ from those with legal control over the body, usually relatives (Prottas, 1985: 99). Because the efforts of organ procurement agencies, physicians, and donors are needed in the procurement process, I consider the incentives of each below.
1. Supply of Donors

There are living ("live") and dead ("cadaveric") organ donors. The supply of organs from each donor type depends, as does the supply of any item, on the costs of donation for each group. However, a second influence is the benefit to the donor from taking part in an altruistic venture.

(a) Living Donors

Since a living donor would not give a vital organ, the supply of body parts from living donors is limited to nonvital organs and tissue. For such a donor, the costs of an organ donation arise from the following three sources: the work time lost in order to donate an organ is costly; second, in donating, one accepts the risk of developing complications during and after surgery to remove the organ or tissue; third, if the organ or tissue is one that does not regenerate, there is a risk that the donor may later suffer injury from having to live without the donated part.

As noted earlier, the second influence on the supply of organs is the private benefit to the donor from an altruistic gesture. If the recipient is a close relative, the private altruistic benefit is generally greater, although for obvious reasons it loses some of its sense of altruism. If the recipient is a stranger to the donor, the private benefit is smaller, and indeed may be negative if it is likely that the donated organ will go to someone who is a member of a group that the donor distrusts or dislikes.

(b) Dead Donors

Nonvital and vital organs may be retrieved from cadavers, in which case a relative of the deceased makes the decision to donate. The costs of donating the body parts of a deceased family member arise largely from the psychological discomfort of allowing the dismemberment of a deceased relative, and from violating religious, ethnic, or familial traditions which conflict with organ donation. Although the Catholic, Protestant, and Jewish religions support the donation of organs, there is religious doctrine, in each case, which may be interpreted as restricting the donation of body parts (U.S. Congress, Office of Technology Assessment, 1987: 138-141). For example, according to Jewish tradition, it is impermissible to mutilate the cadaver, or to delay its interment (U.S. Congress, Office of Technology Assessment, 1987: 139-140). There is similar traditional doctrine, though less rigidly stated, in the Catholic Church (U.S. Congress, Office of Technology Assessment, 1987: 141). Although far less than half of Catholic, Protestant, and Jewish Americans actually take the positions of their church into account in considering whether to donate an organ (New York Times, May 3, 1987: 28), only a small fraction need do so in order to lead a much larger group, their friends and relatives, to experience reluctance in donation. The possibility of offending relatives or friends presents a non-trivial cost to the potential cadaveric donor.
2. The Role of Physicians

It remains to explain the role of the physician in the procurement process. Physicians are needed to remove the organs of donors; however, they can also influence the number of donations. Since the provision of an organ to a procurement agency requires a referral from a hospital physician, effort on the part of physicians in generating such referrals affects the supply of transplantable organs.

In the case of live donors, who usually are asked to provide for a relative, there is little required of the physician in this regard, because the benefit of donating or the cost of not donating to a family member should be clear to the potential donor. In such cases the donor enjoys an advantage over the physician in valuing the altruistic benefit from a donation. The situation is different for cadaveric donors, who generally do not know the identity of the recipient, or whether there will be a recipient; in many cases, they know very little about the donation process itself. The benefit of an altruistic donation may seem to them to be very small. The mere fact that the organ is not going to a family member may lead them to ignore the altruistic benefit altogether. The perceived altruistic benefit is therefore likely to fall short of the social benefit of donation. Because of this divergence between private and social benefits of altruism, and the further tendency to ignore or to underestimate the social benefits from donation, the physician's most important role is arguably to provide information concerning the social benefit from donation. At a minimum, the physician can increase the supply of organs by requesting donations and notifying organ procurement agencies of the existence of a potential donor.19

3. Organ Procurement Agencies

The final segment of the supply pipeline is the organ procurement agency (OPA). The structure of the organ procurement industry has important implications for the number of organs procured.

The organ procurement network is decentralized, with roughly seventy agencies serving various regions (see Prottas, 1989: 42). There are two types of OPAs, hospital-based and independent, with independent agencies making up roughly thirty percent of the total in 1982 (Prottas, 1985: 104). All agencies are nonprofit and receive funding from the Federal End-Stage Renal Disease Program (Prottas, 1985: 104). Each procurement agency has its own defined service area (Prottas, 1985: 105). Although in retrieving organs from human suppliers the activity of each agency is local, distribution may exceed local boundaries.20 However, distribution and retrieval are limited by the shelf lives of organs. Kidneys must be transplanted within thirty to fifty hours, hearts within eight, and livers within four.21

From the foregoing, the determinants of the supply and demand conditions of a typical OPA can be described. Consider the market for vital
body parts, which is somewhat simpler since the only source of supply is cadaveric donations.

The most important determinant of supply is the agency's retrieval from a defined service area. This is important because the retrieval system grants procurement agencies the potential to behave as monopsonist purchasers in the organ retrieval market.

The reasons for retrieval from within defined, non-overlapping service areas are several. The most obvious is the shelf-life constraint: the shorter the shelf-life of an organ, the more likely it is that it will have to be given to the nearest regional procurement agency. However, even if the shelf-life is relatively long, as in the case of kidneys, there is still pressure to transfer the organ to the procurement agency as soon as possible, so that the search for a recipient can begin (e.g. Prottas, 1983b: 239). A final reason for the retrieval pattern is provided by NOTA: in order to be eligible for grants from the Secretary of Health and Human Services the procurement agency must have a defined service area, and must be the sole organization retrieving organs within its area (42 U.S.C. 273(a)-(c)).

A second determinant of supply is the degree of standardization among OPAs. Organs are obtained not only directly from human donors, but also through other OPAs. However, if tissue-typing, and related procedures, are not standardized across agencies, sharing will be relatively inefficient. Poor matches will result, and organs will have to be discarded (Prottas, 1985: 109). Such wastage can be minimized by establishing uniform procedures across agencies.

A third determinant of supply is effort on the part of the procurement agency in monitoring physicians to ensure that they request organ donations and inform the procurement agency of potential donors. The need for such monitoring follows from the role of the physician in this setting. As noted earlier, the physician can increase the supply of organs by requesting and informing patients of the social benefits from donation. However, the incentive to do this is weak. The cost of requesting is the risk of offending patients. The cost of not requesting is the reduction in transplantation benefits to the pool of potential organ recipients. While the latter cost is probably larger than the former, it is not borne immediately by the physician. Thus, in the absence of monitoring by the procurement agency, physicians will tend to put little effort into requesting donations and providing information.

On the demand side, the key determinant is the shelf-life constraint. If the organ has a very short shelf-life, it will more or less have to be obtained from a local agency, and this obviously confers monopoly power (i.e., the potential to behave as a monopolist) on the procurement agency. On the other hand, for organs with rather long shelf-lives, like kidneys, the procurement agency will not have monopoly power.

The number of organs supplied by a procurement agency obviously will not exceed the number of organs retrieved. However, this amount cannot be
determined without some notion of how the procurement agency behaves in the market. The two most common behavioral hypotheses considered in the literature on non-profit agencies are "profit maximization" and "output maximization subject to a break-even constraint" (e.g. Jacobs and Wilder, 1984). The assumption of output maximization is based on a supposed desire on the part of the agency to justify its charter and support from the government and other sources by producing a large quantity.

It is impossible to say whether OPAs behave as output or profit maximizers. However, in the case of organs with short shelf-lives, the typical procurement agency is likely to have a great deal of local monopoly and monopsony power. Indeed, the monopsony power problem is likely to persist even in markets, like that for transplantable kidneys, in which the shelf-life constraint is less important. The immediate implication of this is that if procurement agencies behave as profit-maximizing firms, they will tend to under-retrieve and under-produce organs. This suggests that it may be socially desirable to induce such agencies to increase their retrieval activity, perhaps through greater subsidization.

Lest anyone interpret this as accusing organ procurement agencies of monopolistic practices, it must be noted that the closest empirical evidence on this issue, a study of non-profit bloodbanks, supports the hypothesis of output-maximization (Jacobs and Wilder, 1984). Further, there is considerable anecdotal evidence suggesting a general altruistic motive on the part of the professionals who run the organ procurement agencies (Prottas, 1983b: 245, 248; Prottas and Batten, 1988: 644–645). However, that the structural characteristics of monopoly exist in the organ market is an observation that should be taken into consideration by anyone searching for ways, particularly market-orientated approaches, to restructure the procurement process in order to increase organ retrieval.

C. QUALITY AND INFORMATION DISCLOSURE

An organ donated by someone infected with hepatitis would infect its recipient. Clearly, guarding against the transferral of such organs to uninfected patients should be a major priority in any organ procurement scheme.

Although the quality of an organ can vary along a broad spectrum—indeed, the question is how well a match is made between the donated organ and its recipient—the clearest general distinction between organs is that between diseased and non-diseased. I will therefore assume, in order to simplify the discussion, that there are two types of organs: non-diseased or high quality, and diseased or low quality.

The implications of quality variation on the demand for and supply of organs depend on whether organ quality is observable, where by "observable" I mean that quality is obvious to the purchaser. If observable, then quality variation would have no adverse implications for the efficiency of
an organ procurement system. High and low quality organs would be purchased, at different prices, by different sets of consumers. For example, hepatitis-infected organs would be purchased, at a lower price, by those already infected with hepatitis.25

Quality variation that is not observable has adverse implications for the efficiency of organ procurement. If quality were not determined in advance and disclosed to purchasers, each would perceive some positive probability that an organ labeled "high quality" is, in fact, low quality. Given this risk, potential organ recipients will, other things being equal, tend to discount the value of transplantation relative to substitute therapy (e.g., dialysis). Moreover, some recipients will suffer from having received diseased organs which they would not have accepted had there been full disclosure of quality information. Such an outcome would be inefficient if it could be avoided, at sufficiently low cost, by disclosure of information concerning quality by organ providers.26

Of course, even if quality were determined and disclosed, there would still remain the risk that the testing procedure had failed or that the organ had been infected by some disease the presence of which could not be determined through testing.27 Thus, it is impossible to guarantee that a given organ is not diseased; the best that can be done is to disclose all information concerning organ quality to potential recipients.

The question is whether an organ procurement system in which there is essentially full disclosure could evolve. Note that in order for all of the relevant quality information to be disclosed, two sets of parties on the supply side of the market would have to reveal private information. The donor would have to reveal some "lifestyle" data having implications for organ quality—e.g., drug use history. In addition, the organ procurement agency would have to disclose relevant information to the purchaser—e.g., results of tests.

Although the argument has been put forth that a system of voluntary donation is superior in this regard to one in which organ providers are compensated,28 the underlying economics suggest that such a comparison should yield an ambiguous answer. It is certainly correct that organ donors would not have incentives to conceal adverse quality information under a system of voluntary donation, whereas such an incentive would exist under a market system in which compensation is directly related to quality. However, donors would not have incentives to disclose quality information under a voluntary system. Thus, full information disclosure would not necessarily result under such a procurement system.

Further, that there is an incentive to conceal adverse quality information is not enough to thwart a market system because the market provides incentives to disclose. Indeed, if all of the relevant quality information were verifiable, an organ market would produce something like full disclosure. The reason is that any party possessing verifiable information which would increase the perceived value of an organ if disclosed would disclose it, for
otherwise a potential recipient would rationally assume the worst. On the other hand, a market in which full disclosure is observed is unlikely to result if a substantial number of organ sellers possess quality information which is not verifiable. This is because sellers with negative, price-reducing information would have no incentive to disclose when by remaining silent they could "blend in" with other sellers who possess non-verifiable information (Shavell, 1987).

Given that there are parties on the supply side of an organ market who would find it very difficult to verify information regarding organ quality, it seems safe to conclude that, even though there are incentives to disclose quality information, a full-disclosure equilibrium would not result in a market-based procurement system. Thus, quality variation would be a potential source of inefficiency in a market-based system. However, it would be a potential source of inefficiency in a voluntary system as well; and it is impossible to say, without empirical evidence, whether the problem is more worrisome under either system of organ procurement.

IV. INEFFICIENCY IN THE EXISTING ORGAN PROCUREMENT SYSTEM

A. INEFFICIENCY IN THE U.S. PROCUREMENT SYSTEM

The U.S. organ "market" has been described as one in which there is a shortage of transplantable organs and a relatively high degree of wastage (Schwindt and Vining, 1986: 484-485). The wastage rate of kidneys in the U.S. was recently estimated to be at least double that of European transplant centers (Prottas, 1989: 49; Prottas, 1985: 115; U.S. Congress, Office of Technology Assessment, 1985: 184-185).

1. Shortage

The evidence of shortage is indisputable. For example, at present there are more than eleven thousand patients on kidney donor recipient registries. This estimate probably would be more than doubled if one were to add the number of dialysis patients who would benefit from a transplant. Research indicating that dialysis providers consider a transplant the preferred treatment for eighty-five percent of their patients under thirty-seven years of age (Prottas, 1983a: 281) suggests that the number of potential kidney recipients is at least thirty thousand.

The shortage of organs is, like every shortage, a result of price regulation. I mean this in the obvious sense that if a market in organs developed, every potential recipient who valued an organ more than a potential provider would purchase the organ; and thus an outcome in which demand, as measured by willingness to pay, exceeds supply, as measured by minimum asking price, could not exist for long.

In the existing market, the price at which an organ may be purchased is regulated by NOTA, which prohibits the purchase of organs, and provides
that the donor of an organ is entitled to compensation for the costs of travel, housing and lost wages, connected with the donation of an organ (42 U.S.C. 274e(c)(2)). On the surface, the "lost wages" criterion for compensation is vague, inviting several interpretations. Compensation for lost wages may cover only work time lost during the operation to remove the organ; alternatively, it may allow compensation for all wages lost as a result of the donation, a standard which would permit full compensation of donors. But the latter interpretation cannot be correct, as it would essentially allow unrestrained organ sales, contradicting the flat prohibition of commerce in organs. Thus, it may be assumed that the compensation which an organ donor may receive is no more than what is required to cover the costs of travel, housing, and wages lost during the period of surgery and recuperation.

It should be clear that this is not enough to compensate for all of the costs incurred in donation. The flat prohibition of purchases denies compensation to cadaveric donors for the costs of psychological discomfort or of violating religious, ethnic, or familial traditions. The ceiling on payments to live organ donors denies compensation for the same costs, as well as the health risk of living without the donated body part.34

2. Wastage

Wastage in organ procurement can occur in three stages: retrieval, "production", and "trading." Wastage can occur in retrieval if physicians do not make requests and inform procurement agencies of potential donors. Wastage in production is the result of technical errors in removal and storage. The minimum wastage rate in production has been put at roughly ten percent (Prottas, 1985: 115–116), though evidence from European transplant centers suggests that the minimum may be lower.35 The third source of wastage, trade, results from imperfect standardization of procedures across organ procurement agencies. Some of the organs traded among procurement agencies must be discarded because of inconsistencies in tissue-typing and other procedures.

The key sources of wastage in the U.S. market appear to be the retrieval and trading stages. A number of commentators have expressed disappointment with the rate at which transplant center physicians request donations (U.S. Congress, Office of Technology Assessment, 1985: 183; Merz, 1985: 3286), though there has been improvement in this area since the passage of NOTA (Prottas, 1989: 48–49). Wastage in trading has also been amply documented.36 There are no data indicating wastage in production.

The reasons for wastage in retrieval and in trading can be found in the existing structure of incentives. Schwindt and Vining have noted that wastage in retrieval exists in its present degree because few institutions have evolved which monitor the effort on the part of hospital staff members in requesting organ donations and informing their patients of the social benefit from organ donation (Schwindt and Vining, 1986: 486–487). They attribute
this to the allocation of property rights in transplantable organs: no potential recipient, or agent of a potential recipient, has a claim to a transplantable organ. Wastage in trading appears also to be a product of the existing structure of incentives. The incentives for decentralization provided by federal regulations (NOTA) discourage horizontal integration within the procurement industry. Further, because distribution does not proceed according to bids for organs, a by-product of the property right problem emphasized by Schwindt and Vining, the procurement agency does not benefit from joining a cartel with standardized procedures, even though the class of recipients would enjoy an enormous benefit.

B. SOCIAL COST OF SHORTAGE AND WASTAGE

Since the data that would be needed to estimate the supply and demand for a given type of organ are not available, it is impossible to arrive at an accurate approximation of the deadweight loss from shortage and wastage. However, some of the numbers from the kidney market might be used to suggest a rough guess. Consider the estimate, noted earlier, of thirty thousand dialysis patients that might benefit from transplantation. Consider also the following. In 1967, it was estimated that the typical dialysis patient paid, in present value terms, $104,000 for treatment; the average cost of a kidney transplant was $13,300; and that transplantation added an extra seventeen years to the life span of the average patient while dialysis added an extra nine years (Rettig, 1981: 10-11). Recent survey data suggest that fifty-four percent of transplant patients are able to work full-time or part-time, while roughly half that percentage (twenty-seven percent) of dialysis patients are able to do so (Stason and Barnes, 1985). These numbers provide enough raw data to make a very rough estimate of the deadweight loss. Using these figures, the deadweight loss from society's failure to provide kidneys to thirty thousand potential recipients can be shown to be roughly three billion in 1967 dollars. In 1982 dollars this translates to eleven billion dollars.

V. ANALYSIS OF PROPOSALS TO IMPROVE ORGAN PROCUREMENT

A. MARKET SOLUTIONS

The current organ market can be described as one in which donors cannot be paid for their organs, the procurement process is largely decentralized, and procurement agencies cannot service the same geographical market as another existing agency and still receive government funding under NOTA. This section considers the arguments for and against altering these features of the procurement process.
1. Commerce in Organs

(a) Benefits

The potential benefits of allowing the sale and purchase of body parts can be measured by the likely reductions in deadweight loss. Allowing the sale of body parts at prices greater than the ceiling set by NOTA will increase the number of organs supplied by bringing forth individuals who would experience little altruistic benefit in donating. Obviously this will reduce the shortage.

The potential benefit from allowing recipients, or agents of recipients (either insurance companies or organ procurement agencies) to purchase claims to organs can be measured by the reduction in the social cost resulting from wastage. The reason such benefits might be realized is that the ownership of claims would alter the incentives of organ procurement agencies. In a regime in which claims to organs were owned, by recipients or by procurement agencies, each agency would have an incentive to join a cartel in which procedures were standardized, in order to increase the likelihood that an organ will be supplied and that the organ supplied will actually match its recipient. The agency would be compensated for this by charging a higher price. This alteration in incentives would also work to reduce wastage from referrals. In order to meet recipients' claims, or, indeed, to make sure that their own claims are met, procurement agencies would have incentives to monitor the referral activity of local hospitals, as do the more successful independent procurement agencies at present.

There is an additional benefit from allowing the purchase and sale of organs, outside the market for transplantable organs. According to several commentators, research and development in the biotechnology industry currently is hindered by uncertainty as to the ownership of human organs and tissues. Since a prerequisite to allowing the sale of organs would be the recognition of property rights in body parts, permitting the sale of organs necessarily would resolve this issue. Although research companies obviously would prefer not to have to compensate human tissue sources, the benefit to such companies would lie in the resolution of the uncertainty itself.

(b) Costs

The potential costs of allowing sales and purchases of body parts are several. The sources of social cost most often brought up in the literature are quality deterioration, reduction in voluntary organ provision, coercion, and inequity.

(i) Quality Deterioration

Paying donors for organs would increase the supply of both diseased and nondiseased organs. If the supply of diseased organs is more elastic than that for nondiseased, then the effect would be an increase in the proportion of diseased organs in the market. Consequently, the likelihood that a given organ is diseased would be higher. If consumers were aware of this, as
might be expected in a market equilibrium, the demand for organs, at any given price, would be lower, the downward shift reflecting the expected loss from obtaining a diseased organ.

If organ purchasers were fully informed, an increase in the supply of diseased organs would not present a problem; recipients who wished to purchase a diseased organ would do so, presumably at a lower price. However, in light of the imperfect observability or verifiability of organ quality, it is unlikely that consumers would be fully informed, or that the market would approximate one in which there was essentially full disclosure of data concerning organ quality, and, in light of this, quality deterioration presents a potentially serious issue.

Although it seems probable that compensating organ providers would lead to an increase in the ratio of diseased to nondiseased tissue and organs offered for sale, this need not imply an increase in the proportion of diseased tissue and organs actually transplanted. Several reasons can be offered for this. First, if market pressures lead to more stringent quality control measures—as one would expect if parties were allowed to purchase enforceable claims to organs—the proportion of organs transplanted that happened to be diseased might fall. Quality deterioration could be controlled in an organ market through screening donor populations, testing, and developing stable registries for suppliers of renewable tissue.

Recent experience in the blood market suggests that this is more than speculation. Ross Eckert reports that in response to the AIDS crisis, the commercial blood sector more quickly strengthened screening standards than the non-commercial whole-blood sector (Eckert and Wallace, 1985: 57-70).

Second, the development of reputational differentiation might lead to a market in which the average quality of transplanted organs exceeds the current level. If parties are allowed to purchase organs, presumably some supplier would have an incentive to differentiate itself on the basis of quality.

Third, making organ procurement agencies strictly liable for the transmission of a diseased organ might further enhance incentives to take care. However, the wisdom of extending strict liability to organ procurement agencies is questionable.

It should be noted that in the absence of a rule extending strict liability to procurement agencies, the loss from diseased organ transferral would be shifted to some extent through various tort actions (e.g., various negligence claims such as malpractice or wrongful death) between the physicians who perform transplants, their hospitals, and their patients. Thus, the aim of strict liability would not be simply to shift the loss, as this might already be taking place, but to minimize the risk of diseased organ transferral.

If any party in the procurement chain were to be held strictly liable for the transferral of a diseased organ, it seems that the best choice, if the goal is to minimize the risk of diseased organ transferral, would be the procurement...
agency. Several reasons point to this. First, the familiar information and risk-sharing arguments for imposing strict liability do not seem to point in favor of subjecting individual sellers to liability. Relatively few would knowingly provide diseased organs, and there is little reason to believe that the cost of testing is lower for a seller than for a recipient, or that the typical seller can bear the risk any better than the typical recipient. Perhaps the most important reason that it is not clear that making the individual seller strictly liable would help is that it is very likely that most of the diseased organ sellers would be judgment-proof with respect to the damages that might be sought in a suit for diseased organ transferral, in which case there would be little deterrent value in letting recipients sue them for damages. However, nothing in this argument is intended to suggest that those who knowingly sell diseased organs or tissue should not be held criminally liable.

Given that it must already test for compatibility, the organ procurement agency can, it seems, more cheaply test the quality of an organ than any other institution or party in the procurement chain. Extending strict liability to the procurement agency probably would provide the agency with greater incentives to test the quality of the organs, and thereby reduce the risk of diseased organ transferral.

A persuasive argument against imposing strict liability on organ procurement agencies was put forth recently in *Wichita Falls General Hospital v. Adolph* (728 S.W.2d 604 (Mo. App. 1987)). The argument, put simply, is that the social benefit from organ provision is so great that it is better to deny transplant recipients the right to sue such agencies than to allow the threat of liability to deter organ provision efforts. Although this is ultimately an empirical issue, the argument is theoretically defensible. The organ procurement process probably provides an immense social benefit that is not captured in the pricing of its services to consumers. Shielding such agencies from liability is an indirect means of subsidizing them, and thereby allowing them to capture part of the social benefits that are not collected from fees or government subsidies.

(ii) Reduction in Voluntary Donations

In moving from an altruistic to a market regime, a second cost might arise from a reduction in voluntary donations (Brams, 1977: 190). If donors who would normally have given parts without compensation are offered money, some presumably would accept it. Moreover, it is impossible to distinguish the donors who would have given organs without compensation from those who would not. The costs of curtailment of altruistic donations could be significant: for example, if all current voluntary kidney donors were paid only $1000 for a kidney, the costs of organ retrieval would be three million, and this just to be at our current position (Prottas, 1983b: 248). This cost could be avoided if private altruistic benefits were truthfully revealed or could be verified, but this is unlikely.

Although the cost of reduced voluntary provision is probably unavoidable, it hardly seems to represent an important argument against the
compensation of organ providers. Organ suppliers who receive more than the minimum they would be willing to accept in exchange for providing an organ receive a rent, something which is realized by sellers in many other markets. For example, there are several university professors, government bureaucrats, professional athletes, and politicians who would be willing to continue in their occupations at a much lower salary. Far from implying market failure, that some organ suppliers would receive a rent implies that there are net benefits from the sale of organs, a healthy sign that such transfers increase society’s wealth.42 Further, although the cost would run into the millions, this would not represent more than a small fraction of the total dollar benefits flowing from an organ market.43

Finally, the problem of discouraging voluntary donations exists, at least in theory, in the blood market, and yet no one has suggested that this is an important obstacle to blood procurement. People continue to donate blood even though they are aware that it can be sold, and that there are others who sell theirs. A likely result of compensating organ providers is that the bifurcation observed in the blood market, between a market of donors and one of sellers, would eventually be observed in the organ market.

(iii) Coercion

A third source of cost arises from what many commentators put under the label “coercion”.44 Three different problems are discussed under this category. One is the fear that some living donors would hurt themselves by selling body parts because they need money very badly, or because the price offered seems very high. Although this may seem to be nothing more than a paternalistic concern,45 such activity imposes costs on society if individuals take steps which will in the long run leave them worse off.46 A second problem is the possibility that organs will be treated as assets that may be liquidated in order to meet debt payments. The third is that of vicarious organ sales, i.e., sales by third parties. Without prohibitions against this sort of activity, a class of profiteering organ merchants might develop.47 Also, steps would have to be taken to protect legally incompetent parties from guardians who would sell their organs.48

The costs of coercion could be controlled, if not altogether eliminated. By requiring living organ sellers to wait some period before agreeing to have an organ removed, and perhaps to sign a formal instrument with witnesses present, the societal costs of injury from sales made out of desperation could be held to a tolerably low level. A more effective alternative may be to avoid the costs altogether by not allowing “live” sellers for certain organs. Donors, within these categories, would be allowed to sell their organs subject to the proviso that transferral of ownership take place only after death, with the proceeds going to their estates. The social costs generated by “collateralization” and by vicarious organ sales could be avoided by allowing only the possessors of organs to claim them as property while alive.

(iv) Equity

A fourth source of social cost, falling under the general heading
“equity”, concerns the distribution of the costs and benefits of a market-based organ procurement system. It might be considered inequitable, in a system in which suppliers are compensated, that relatively poor people find themselves in the position where they must sell an organ in order to increase their consumption of other goods, while wealthy people need not ever consider such an option. Although the argument seems to contradict the principle that trade produces welfare gains for both seller and buyer, a more reasonable interpretation is that the risk of falling into or being born into poverty is not optimally spread in a regime in which some must sell their organs in order to consume more of other goods. It might also be argued that a system in which organs are distributed on the basis of willingness to pay would be inequitable. To the extent that these represent deviations from a system in which large-scale risks—of falling into poverty or of poor luck—were shared optimally, they represent real costs to society.

Although these concerns are important, they do not force the conclusion that a market in any type of organ or tissue is undesirable.

Distributing vital organs according to bids quite obviously runs against the principles of our social insurance system. However, the best solution to the inequitable distribution of organs that would result in a market in which organs are distributed according to price would be to subsidize organ purchases by the poor, not to prevent any use of the price system as an allocation mechanism. Establishing a system in which parties can purchase organs will create pressures to reduce wastage in the procurement process, and this would benefit all potential organ recipients.

Consider, as an analogous case, the allocation of food. Obviously, food is something that everyone needs. It should follow, then, that using price to allocate food will result in a system that is just as inequitable, given the importance of food, as one in which organs or tissue are distributed according to willingness to pay. However, anyone familiar with the supply problems in the Soviet Union, where as much as a fifth or more of the food supply is wasted in the distribution system (Economist, 1986: 38), should be reluctant to take seriously the argument that the price system should not be used to allocate food. It is obvious that, although the better food generally goes to the people who are willing to pay the most, everyone who has an interest in food benefits from the efficient distribution systems that have developed in market economies.

What about letting people sell organs? There seems to be nothing inequitable about letting a poor person sell the organs of a cadaver. The equity issue becomes acute and unavoidable when one envisions living people selling their organs, say, in order to buy food, or to pay for a child’s education.

Economics cannot be used, successfully at least, to theorize away the inconsistency of such a scenario with one’s simplest notions of fairness. However, the question is whether denying people the right to sell organs or tissue, renewable or not, will improve the risk-spreading properties of a
regime in which the social insurance system is inadequate. It is hard to see how one can give an answer to this other than no. Further, the complaint that is often expressed is that the poor would be selling to the rich in an organ market, a system which "smacks of slavery". But if the market that evolves resembles the current market in blood, this will not be the result. The market would be one in which some of the poor sell and the rich generally donate; and, assuming that the current racial composition of the kidney recipient registries can be used to make an extrapolation, a large share of the organ recipients probably would be poor.

2. Centralization
Schwindt and Vining argue that the problem of matching donors and recipients suggests that the organ procurement industry has the structural features of a natural monopoly (Schwindt and Vining, 1986: 62). The reason is that matching can be improved if standardized procedures are used, and the surest way of achieving this result is to have one agency, or as few agencies as possible, handle the matching. Coupling this argument with the claim that the state is better equipped or suited to enforce contracts in the organ market, they propose that the government run the procurement industry in a centralized fashion.

As Hansmann has pointed out (Hansmann, 1989: 63), this argument seems to be one in favor of greater standardization of procedures across procurement agencies, not centralization. The question which needs to be answered in order to decide whether centralization would help is whether, if procedures were standardized as fully as possible, the costs of providing organs would be substantially reduced by having it all done by one agency. This is an open question at this moment.

However, the more troublesome aspect of the Schwindt and Vining proposal is that it seems to ignore the benefits that might result from competition in the procurement industry. Note that one need not have a market in organs in order to inject competitive pressures into the procurement industry.

3. Competition
At present procurement agencies do not compete against one another. Each OPA serves a separate, geographically-defined market. As noted earlier, this system grants to each agency the power to act as a monopsonist, and in some cases as a monopolist. Moreover, a single procurement agency operating within a market without competitors faces no pressure from rivals to improve its services.

In light of the potential for monopolistic behavior, consideration should be given to measures which encourage competition in the procurement industry. The easiest change in this direction would be the adoption of a system of rewards for more efficient organ procurement agencies in the government subsidization programs. Perhaps the procurement agencies
should not be discouraged, as they currently are, from serving overlapping geographic markets. Each agency would then face the threat that a rival may enter its market. If, however, the industry were centralized, or developed into a natural monopoly, as Schwindt and Vining propose, there should remain some possibility for new entrants to displace the incumbent agency; or for management to be replaced, perhaps through renewal of a government franchise or, if the non-profit requirements of NOTA were relaxed, a corporate takeover.

B. NON-MARKET SOLUTIONS

I refer to a second broad category of proposals to improve organ procurement as non-market solutions because they do not rely on changing the incentives of actors in the procurement process. Within this category are three proposals: (1) presumed consent, (2) required request, which is now law, and (3) proposals to promote altruism.

1. Presumed Consent

Under presumed consent, currently the law in Austria, Czechoslovakia, Denmark, and France, the state would have the right to remove organs from a cadaver unless a family member objected. There is no requirement that the state find and contact family members. Presumed consent would increase organ retrieval, though there is evidence suggesting the gain would be small. One drawback, however, is that it would not reduce wastage in trading among procurement agencies, since it would do nothing to enhance standardization of procedures among the agencies.

Further, a presumed consent rule would generate new types of social cost. Routine retrieval under a presumed consent rule inevitably would lead to cases where the state had allowed the dismemberment of a cadaver, without having consulted relevant family members, when it would have been their preference not to donate. It is a safe bet that a disproportionately large share of the victims of such “expropriation”—i.e., dismemberments against the family’s wishes—would be poor or members of minority groups.

2. Required Request

Under required request, physicians are required to request organ donations from potential cadaveric sources and to report such donors to organ procurement agencies. A variant of required request, though probably more effective, is presumed consent subject to refusal by a family member (Matas et al., 1985). All required request proposals have as their essential aim the correction of the referral process.

Required request seems to have increased organ procurement (Merz, 1985: 3287). However, like presumed consent it is subject to the criticism that it cannot reduce the rate of organ wastage in trade. On the other hand,
it is clear that required request does not generate the fairness issues raised by expropriations that would occur under a presumed consent rule.

3. Promoting Altruism

The third type of non-market-based proposal, promoting altruism, aims to correct the referral process by investing more resources into publicizing the need for organ donations, particularly among groups with low donation rates, and encouraging the monitoring activities of organ procurement agencies (Prottas, 1983b: 244-247).

The promotion of altruism represents the weakest but also the least costly of the non-market proposals. Still, additional effort in this area might lead to significant increases in organ retrieval. Jeffrey Prottas, the most prominent advocate of this proposal, estimates that if the nation were covered by procurement agencies as effective as the most effective independent agencies, organ procurement would double (Prottas, 1983b: 242).

C. NON-MARKET VERSUS MARKET SOLUTIONS

Attempts to compare costs and benefits of market and non-market proposals only highlight the need for more and better data in this area. Still, some conclusions can be drawn from even this cursory examination.

Recent experience and common sense suggest that there are limits to how much organ retrieval rates can be increased through non-market solutions. Reducing wastage in retrieval by correcting the referral process, the aim of required request, probably could increase retrieval from the current rate of fifteen percent to a maximum of thirty percent, assuming that the effect of such legislation is to make all procurement agencies as efficient as the most effective ones in existence. Because some expropriation would occur, presumed consent would probably do better than this, but it is hard to believe that it would be a dramatic improvement over required request. In addition, proposals aimed at the referral process can only increase donations from cadaveric sources, the number of living donors cannot be increased through this route.

That non-market solutions are effective, albeit within sharp limits, and require less in the way of transition costs—e.g., requiring less effort to change the law—imply that they should receive the highest priority. Thus, efforts to promote altruism and compliance with required request statutes should be encouraged.

However, a second conclusion seems clear: if procurement is to increase substantially, to some level greater than a rate of thirty percent from cadaveric sources, the purchase of organs from live and cadaveric sources may eventually be necessary. Improvements in transplant technology will continue to increase the demand for transplantable organs. Consider, for example, that heart transplant technology may reach the point where as many as fifty thousand patients per year are deemed acceptable transplant
recipients (Russell and Cosimi, 1979: 477). At this level of demand, there will be enormous pressure to increase the rate of donation.

Further, although purchasing organs or tissue from living humans generally raises controversial issues, the purchase of renewable tissue should not be controversial at all, given that markets in blood and sperm already exist. One renewable tissue whose supply could be increased through allowing sale is bone marrow.\(^5\) At present, it is estimated that if 250,000 people were to join the recently-established National Bone Marrow Donor Registry, an additional five thousand potential marrow recipients could be matched with suitable donors (\textit{New York Times}, January 12, 1988: C6). Although the registry is growing, it now lists 66,000 potential donors (\textit{New York Times}, December 11, 1989: A1). This is an example of a shortage that could be alleviated by permitting compensation.

The need for a significantly greater rate of organ donation will in the long run require something more drastic than non-market measures to increase procurement.

\section*{VI. CONCLUSION}

That the sale of blood is legal, while the sale of bone marrow is not, is a distinction which anyone familiar with their extraction procedures should find hard to justify on ethical grounds.\(^6\) However, implicit in the approach of this paper is the belief that ethical arguments, alone, do not settle the issue. One must consider the feasibility and the efficiency properties of a market-based procurement system in assessing the social benefits of permitting the sale of certain types of organ or tissue.

There are reasons to expect that society would benefit. That the commercial blood market remains strong after the discovery of AIDS suggests that fear of quality deterioration need not stand in the way of a market-based organ and tissue procurement system.\(^7\) The quality issues arising in the blood market are virtually indistinguishable from those that would have to be considered by participants in an organ market. Through increased pressures to screen, test, and develop stable registries of suppliers of renewable tissue, the average quality of transplanted organs could improve under a market-based procurement system. The social costs of "market coercion" can be held to a tolerable level, and perhaps avoided altogether, through simple regulations. Finally, although there would be an unavoidable increase in expenditure from compensating suppliers who would have been willing to provide organs without compensation, it is unlikely that this would represent more than a small fraction of the benefits flowing to transplant recipients.

In no sense does this paper suggest that an unregulated market in body parts would be advisable. It may be appropriate to allow certain organs to be sold by their living possessors only under the condition that transfer take
place after death. In addition, given the structure of the procurement industry, measures that encourage competition with respect to quality should accompany legislation permitting the sale of certain types of organ or tissue.

Further, in spite of the potential benefits of a market, the non-market solutions of promoting altruism and encouraging compliance with required request statutes should receive the highest priority among proposed solutions to the organ shortage because they are the easiest to implement. However, as transplant technology improves, pressure will increase for a more effective method of procuring organs.

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NOTES

1. The term “coercion” has been used in the more traditional manner to describe sales made under duress, and also those that occur because the seller misperceives or undervalues risk. See infra text accompanying notes 44-48.


4. 8A U.L.A. 15 (1983). The Act was amended in 1987 (8A U.L.A. 2). Because the amended version has not been adopted in every state, this section will refer to the basic 1968 version.

5. There are more sources of law relevant to organ procurement than listed here, but the four listed in the text seem to be the most important for this discussion. However, one may find relevant law in the following areas: patent law, the law of blood and semen sales, copyright law, the law of trade secrets, the law of conversion and trespass to chattel, the law of accession, and finally constitutional protections of property and privacy. (See e.g. U.S. Congress, Office of Technology Assessment, 1987: 69-87; and Virginia Law Review, 1985: 1015).

6. The Act provides that any person who knowingly acquires or transfers “any human organ for valuable consideration for use in transplantation” will be subject to a fine of “not more than $50,000 or imprisoned not more than five years, or both” (42 U.S.C. 274e (a)-(c)).

Code Section 16-19-7a (1986) prohibit the sale of human organs (excluding blood and hair).

In addition to these states, Arkansas, Connecticut, Hawaii, Idaho, and North Dakota have prohibited the sale of organs at death by passing the 1987 version of the UAGA (Washington Law Review, 1990: 176). The 1987 UAGA prohibits the sale of organs to be transferred at death. Uniform Anatomical Gift Act (1987), Section 10. It should be noted that at the time of the passage of the 1967 UAGA, it was widely thought to have prohibited sales. (See Scott, 1981: 190.)


9. See, e.g., Chapman (1983: 397). Some states have incorporated minor variations in the gift act. For example, instead of using the age of eighteen as a threshold for voluntary consent, some states use the age of twenty-one, and some states use “competence to execute a will” as the standard. For a summary of important variations, see Cotton and Sandler (1986: 62–63).

10. The following classes of individuals may donate the decedent’s body: (1) the spouse, (2) an adult son or daughter, (3) either parent, (4) an adult brother or sister, (5) a guardian of the person of the decedent at the time of death, and (6) any other person authorized or under obligation to dispose of the body.


12. There seems to be a consensus forming that the artificial heart should be used as a temporary rather than a permanent replacement. (See e.g. Marwick, 1985: 3288). A more pessimistic view is that the artificial heart, even if used as a temporary device, does nothing to alleviate the shortage of transplantable human hearts (see Annas, 1985).


14. Corneal transplantation seems to be one of the exceptions: end-stage corneal disease can be cured only through transplantation (e.g. Sanfillipo et al., 1986: 29).

15. This is because most organs are retrieved from cadavers. For example, in 1986, seventy-nine percent of transplantable organs came from cadavers (see Prottas, 1989: 43). Outside of this class of transfers are those in which a person donates tissue or an organ to a relative, in which case the services of an organ procurement agency are not needed.

16. A 1974 study at the University of Minnesota Transplant Center reported a 28.2 percent complication rate for living donors (see Starzl, 1985: 5).

17. For example, a wife or husband who depends on the income of the spouse obviously gets more than just an altruistic benefit from donating an organ to the spouse; he or she also expects to continue benefiting from the spouse’s contribution to the family income.

18. This “negative altruistic benefit” (or altruistic loss) has been observed in surveys that compare donation rates of blacks and whites. Some black families apparently have expressed fears that such donations would only help whites. (See Prottas, 1983: 293).


20. The OPAs have established regional networks (see U.S. Congress, Office of Technology Assessment, 1985: 184). Almost all use UNOs, a computer system listing recipients waiting for a kidney transplant. As a result, roughly forty percent of the kidneys distributed in a given service area are retrieved from outside of the region (Prottas, 1985: 105).
21. See e.g., U.S. Congress, Office of Technology Assessment (1985: 184). New technology may enlarge these numbers. See e.g. Blakeslee (1988), reporting possible advance in organ preservation.

22. Referred to as "surveillance," this is the most controversial of the activities engaged in by organ procurement agencies. (Prottas, 1983b: 245–246).

23. Of course, since the procurement agency cannot penalize the physician for failing to request, there are limits to the effectiveness of monitoring. The procurement agency is limited to making appeals to hospital staffs for greater organ procurement effort. In spite of this, the available evidence seems to suggest that monitoring has a significant effect on the supply of organs to a procurement agency. The independent organ procurement agencies, which, unlike the hospital-based agencies, actually monitor organ procurement efforts, are much more effective at organ retrieval than their hospital-based counterparts (see Prottas, 1983b: 244–246).

24. Alternatively, there exists a costless test that determines quality.


26. The point can be made clearer with a numerical example. Suppose the value of a high quality organ is fifty dollars and the value of a low quality organ is negative twenty dollars. Also assume that the odds of getting either type are fifty-fifty. Then the value of a typical organ, in the absence of quality information, is (.5) ($50) + (.5) (-$20) = $15. Thus, patients would overconsume low quality organs and underconsume high quality organs. Suppose the loss in wealth attributable to underconsumption of high quality organs and overconsumption of low quality organs is X dollars. Then this outcome would be inefficient as long as the cost of supplying high quality information is less than X dollars.

It should be noted that this suggests that an outcome in which there is less than full disclosure of quality information is inefficient. The reason is that relevant quality information can usually be supplied at virtually no cost by the individual who proposes to donate or sell one of his organs; all that is required is that the organ supplier truthfully answer questions concerning medical history.

27. No test is one hundred percent reliable, and sometimes there are diseases for which there are no reliable tests. For example, until very recently, there were no reliable tests for Non-A and Non-B hepatitis. See, e.g., The Lancet (1984). The Food and Drug Administration recently approved a test to screen the nation's blood supply for hepatitis C, the major remaining source of hepatitis infections related to blood transfusions. (See New York Times, May 4, 1990: A11.)

28. This was argued, in the context of blood procurement, in Titmuss (1971). For criticism of Titmuss's empirical evidence, see Sapolski and Finkelstein (1977). Titmuss is criticized on a more general level in Arrow (1972).


30. For example, it would be very difficult for the typical organ procurement agency to verify its assertions regarding its screening procedures; similarly it would be difficult for a donor/seller to prove assertions concerning prior experience with drugs.

31. Although it is highly regulated, the procurement system can be described as a market.


33. Roughly thirty percent of patients in hospitals supported by the Veteran's Administration and the Public Health Service in 1967 were below thirty-seven years of age (Rettig, 1981). Assuming thirty-seven percent is a stable estimate, then thirty-seven percent of eighty-five percent of a dialysis population of
roughly one hundred thousand (New York Times, January 24, 1989: C9) provides an estimate of at least thirty thousand recipients. I should note that a figure of this magnitude (twenty-five thousand) is suggested in Prottas (1983b: 237).

34. In those cases where the donor experiences a sufficiently large altruistic benefit this will not deter donation, but such cases are apparently too infrequent to provide organs for all who need them.

35. Prottas (1989: 49), reporting European wastage of four to six percent.

36. Prottas (1983b: 109). New rules were issued, as part of the 1986 federal “required request” legislation, requiring that organs be distributed according to uniform recipient selection criteria (Pear, 1987). This will probably reduce some of the wastage in inter-agency sharing. For discussion of these rules, see Blumstein (1989: 18–32).

37. Since survey data indicates that fifty-four percent of transplant recipients and roughly twenty-seven percent of dialysis patients can work, the additional value of a transplant for those nine years over which both types of patient would live is 
\[ (.54 - .27)(9)($5300) = \$12,879, \]
where $5300 is the average annual salary of a worker in a private nonagricultural industry in 1967. For salary data see, e.g., The Economic Report of the President (1985). For the additional years in which the transplant patient could work, the additional value is 
\[ (.54)(8)($5300) = \$22,896. \]
The surplus from substituting transplantation for dialysis is the cost of dialysis less the cost of transplantation, which is $104,000 - $13,300 = $90,700. Adding these and multiplying by 30,000 yields roughly 3.8 billion in 1967 dollars. In 1982 dollars, this is eleven billion.

38. U.S. Congress, Office of Technology Assessment (1987). The concern over this issue has been made more pressing by the recent case of Moore v. Regents of the University of California, 249 Cal. Rptr. 494 (1988). The California Court of Appeals held that the plaintiff, John Moore, had a property right in his spleen sufficient to sustain a cause of action for conversion. The decision is on appeal to the California Supreme Court.


40. Ignoring the wisdom of such a decision, there are several legal obstacles in the way of applying the doctrine of strict liability in this area. For example, the fact that sales are not permitted under NOTA and other state regulations makes it unlikely that any plaintiff could successfully bring a claim based on a warranty or strict liability theory. Second, a majority of state statutes limit physicians' liability by providing that certain medical care and use of certain human products are deemed services rather than sale of a product. See Nolan and Schmidt (1987: 148–149).

41. See, e.g., Ravenis v. Detroit General Hospital, 234 N.W.2d 411 (1975), finding negligence in the transplantation of two corneas.

42. This is not to suggest that every government bureaucrat who receives a rent must be increasing society's wealth. By taxing, governments can always transfer sufficient resources to provide rents to some group, whether or not the group's activity increases society's wealth. However, in voluntary market transactions, the earning of a rent implies that the underlying transaction increases society's wealth.

43. Indeed, the proper comparison is between the several million dollar loss from compensating organ providers who would have donated under an altruistic system with the potential gain of eleven billion dollars, in the kidney market alone, from enhancing supply (see supra text accompanying note 37 for deadweight loss estimate of eleven billion dollars).

44. See, e.g., Andrews (1986: 33), criticizing coercion argument.

45. Indeed, as pointed out in Andrews (1986), there are several occupations which
put participants at greater risk than does kidney donation. Why is it that we allow people to work as professional boxers, or in the logging industry, and yet prohibit the selling of kidneys?

46. This may be due to time-inconsistent preferences. (See Strotz, 1956; Elster, 1979; and Tullock, 1971: 53–54.)

47. See e.g., Roughhead (1951: 68–104), detailing the story of Burke and Hare, the Edinburgh murderers who killed more than sixteen people in order to sell their bodies to medical institutions.

48. Cf. Strunk v. Strunk, 445 S.W.2d 145 (1969), the Kentucky Court allowed the transferral of a kidney from an incompetent ward of the state.

49. The notion that such risks should be spread seems to be the core of Rawls’ theory of justice (Rawls, 1971).

50. For example, a system in which insurance companies obtain claims, a portion of which are transferred to the government, would be consistent with this approach. (See Hansmann, 1989: 62–64.) I should note that the proposal of Schwindt and Vining (1986)—to have the government purchase claims to organs—is not obviously consistent with the notion of a market in which purchases by the poor are subsidized. An agent of the government generally would have less incentive to protect the interests of a potential recipient than would a private insurer.

51. This was part of Prichard’s critique of selling babies (Prichard, 1984).

52. For example, it is estimated that blacks make up roughly thirty percent of the lists of potential kidney recipients (Prottas, 1983b: 293).

53. For a general and rigorous economic analysis of the benefits of such a system, see Shliefer (1985).

54. See supra, note 19.


56. See Gerson (1987), describing the disappointing results of presumed consent system in France.

57. For example, because the family members found out about the death too late to prevent dismemberment of the body.

58. There have been several recent technological improvements which offer the hope of dramatically increasing survival rates from transplantation. One example is the discovery of FK-506, an anti-rejection drug that seems to be more effective than cyclosporin, by Dr. Thomas E. Starzl’s team at the University of Pittsburgh. (See, New York Times, October 18, 1989: Al.) See also Altman (1990), reporting recent discoveries of two methods of preventing rejection of kidney transplants; and New York Times (December 12, 1989: 21), reporting increase in multiple organ transplants.

59. It may be possible in the future to put liver cells within this category. A donor would be able to give a portion of his liver, which would form the basis of a new liver in the transplant recipient. (See Schmenck, 1989.)

60. Marrow donation is a relatively simple and safe procedure. Under anesthesia, about three to five percent of the donor’s marrow is removed from the hip through a hypodermic needle. The donor’s marrow replenishes itself within two weeks. The average donor misses two days of work (Brody, 1988a and 1988b).

61. Indeed, Cohen (1990: 29, n. 91) presents two reasons that the quality problem may be less worrisome in organ procurement than in blood procurement. First, sellers of cadaver organs would sell only once, which means that the risk of repeated infusions of infected tissue would be considerably smaller. Second, on the margin, the value of an organ is much greater than a pint of blood, and this provides a greater incentive to test for imperfections.
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