

NORMATIVE AND PRESCRIPTIVE CRITERIA:
THE EFFICACY OF ORGAN TRANSPLANTATION
ALLOCATION PROTOCOLS

TOM KOCH

*Forum Associate at the David See-Chai Lam Centre for International Communications,
Simon Fraser University (Harbour Centre), Vancouver, Canada*

ABSTRACT. Normative criteria adopted to assure just, equitable, and efficient allocation of donor organs to potential recipients has been widely praised as a model for the allocation of scarce medical resources. Because the organ transplantation program relies upon voluntary participation by potential donors, all such programs necessarily rely upon public confidence in allocation decision making protocols. Several well publicized cases have raised questions in North America about the efficacy of allocation procedures. An analysis of those cases, and the relevant technical literature, suggest consistent structural deficits exist in the organ allocation process as it is applied by many individual transplantation centres. These irregularities are based upon both the failure of rank waiting as a method to guarantee just treatment and a general failure to recognize the extent to which prescriptive criteria – social values – are commonly used to screen potential organ transplant candidates. Resulting idiosyncratic determinations, and a devaluation of rank waiting as a criterion, raise fundamental questions regarding justice, fairness, and equability in the application procedure at large. To correct these structural problems in organ allocation procedures, a multicriterion model defining prescriptive criteria through the Analytic Hierarchy Process (AHP) is proposed.

Key words: Analytic Hierarchy Process, bioethics, ethics committees, multicriterion decision making, organ transplant, resource allocation, transplantation procedures

1. INTRODUCTION

Generally accepted procedures for the matching of medically eligible patients with newly available donor organs are widely promoted and generally perceived as a model for the equitable and just distribution of scarce resources.¹ A series of recent cases in Canada and the United States, however, raise questions about the efficacy, justice, and certainly the fairness of the organ transplant allocation process. An analysis of these cases, coupled with a review of the literature, suggests that the boast of its supporters – “No part of the health care system has done more to resolve questions of justice than transplantation”² – is overstated. At least in North America, donor organ allocation procedures are not particularly just, uniform, or fair. Nor are they accurately presented to the participating public.

“General confidence that the criteria for allocation are applied evenhandedly”³ is a necessity if voluntary organ donation by the public is to be supported. As at least one recent case has demonstrated, public dissatisfaction with transplant allocation decision making may result in individuals withdrawing from voluntary donation programs.⁴ This is especially true in those countries where public funds are used to support transplantation procedures.⁵ Thus the perception of inequity or bias has the potential of exacerbating the already chronic scarcity of donor organs. And because donor organs are defined in both North America⁶ and Europe⁷ as public resources, their inequitable assignment raises serious questions about broader standards of public distribution and health service equity.

2. ETHICAL CONTEXT

Some believe the current method of organ allocation to be so fair and impartial as to offer a general model for the allocation of other scarce health system resources.⁸ But the context of transplant allocation decision making is unlike that affecting other areas of bioethical and ethical debate, and therefore an unlikely model for general decision making in health care. Organ transplantation allocation occurs in a context of absolute scarcity, one in which demand absolutely outstrips supply. This is unusual, and perhaps unique. In the more typical condition of relative (sometimes called “comparative”) scarcity – where resources are at least potentially available – the question is whether society *should* provide care or support to a petition or class of petitioners.⁹ In debates on the appropriateness of ventilator support for severely anencephalic infants, for example, the question has never been the availability of stabilizing treatment but whether such procedures should be supported.¹⁰ In the 1970s, the U.S. debate on federal support for renal dialysis turned on the moral obligations of a rich society in a context of relative scarcity, on what *should* be done because it *could* be done.¹¹

In the case of transplantation, however, the absolute scarcity of available organs means that some candidates will die no matter what policy is followed. All petitioners can not be saved. Decisions must be made. As of July 5, 1995, there were 40,989 patients registered on the UNOS organ transplant waiting list, more than double the number of patients who received organ transplants in the whole of 1994.¹² Transplant records suggest that, depending on the organ required, between one in ten and one in three patients would die before a liver, heart, lung, or kidney was made available for their use. Attempts to solve the problem by increased finan-

cial support, official mandate, or ever greater participation in donor programs historically have been unsuccessful. The dilemma of necessary allocation is real. Unpopular or undemocratic decisions will only exacerbate the problem of donor organ scarcity if potential donors withdraw from the program in protest.

In the context of absolute scarcity there is no inherent and unequivocal “right” to treatment because a supply of organs necessary for all claimants is unavailable. The Hippocratic Oath’s injunction to “do no harm” must be bent because harm necessarily will be done to those potential organ recipients who do not receive a transplant. A person who might be saved will be allowed to perish. Principles of the “sanctity of life” must be violated because some but not other people who might be saved will be left to die, and decisions on shortening one or another human life will be made based on considerations of relative merit.¹³ The only question, then, is on what basis will one person’s life be saved over another’s?

The dilemma of organ allocation thus presents the classic lifeboat problem which has troubled moralists and ethicists ever since an American sailing ship, the *William Brown*, sank in 1841 off the coast of Newfoundland.¹⁴ Crew members rescued many passengers in a leaking lifeboat captained by the first mate, too many to allow the small boat to survive in stormy seas. To assure the continuation of at least some survivors, the mate ordered fourteen of those rescued out of the overloaded lifeboat and into the still stormy sea. While the decision was his, it was one agreed to and complied with by others in the boat, who threw those deemed least fit out of the boat. Ever since that night, the question has been asked: Who is to be sacrificed if others are to live? Is there a humane way to make such decisions in a context of absolute scarcity?

Like the lifeboat dilemma – is it moral to throw some passengers into the sea so the majority can survive? – the context of absolute scarcity in the realm of organ transplantation challenges our ethical paradigm. It may be that principles of self-interest and loyalty – not beneficence and justice – dominate protocols in the context of absolute scarcity. If a person is too weak to survive the rigors of the life boat, or is unable to assist in its maintenance, then their position will go to someone better able both to survive and to contribute to the survival of others in the boat. Similarly, if a patient cannot assist in his or her own maintenance, or contribute to the group’s security he or she may be perceived as failing social requirements for an organ transplant. Traditional guides to moral behavior are, in this context, a luxury applicable only when abundance reins. In addition, the lifeboat dilemma requires not merely an individual’s judgment – captain, first mate, or physician – but as well the agreement of other parties in the

lifeboat. After all, whatever the official's decision, he or she alone can not force the weak to leave the boat, or those who are stronger to dispatch them *en mass*. Thus in the context of lifeboat dilemmas, decisions must be consensual, whatever the authority of an individual arbiter.

The question of appropriate protocols and procedures in transplant allocation – or any other context of absolute scarcity – is therefore not one which can be clearly resolved by reference to traditional moral language or official judgment alone. More simply, it is a question of the scale of our allegiance.¹⁵ In this sense, it is a proof of Michael Walzer's insistence that morality is thin from the beginning, an attitude based on personal reciprocity and allegiance, employing moral language only in special cases.¹⁶ What are the individual qualities which create a context of loyalty, which qualify a man or woman to receive a transplant and stay in the lifeboat, leaving another to be cast out?

3. CONTEMPORARY CONTEXT AND PROTOCOLS

Maintained under federal contract in the United States by the United Network for Organ Sharing (UNOS), existing normative protocols rank potential organ recipients on the basis of a supposedly impartial, clinical standard designed to balance a number of complimentary, medically relevant factors. This set of criteria is almost universally accepted and has been well described.¹⁷ Similar protocols are used in Canada, which some researchers believe could be efficiently included in the UNOS program,¹⁸ as well as in western Europe. The 18,251 transplantation procedures performed in 1994 at 278 participating U.S.-based medical institutions operating under the UNOS umbrella can be taken as a measure of the importance of both the program and its criteria.¹⁹

Normative criteria include urgency of recipient need, defined by a five point scale whose primary function is to define potential compatibility between donor organ and a prospective client (histocompatibility, etc.).^{20, 21} Patients who have already rejected a transplant, or who require multiple organ replacement, are deemed less desirable candidates on this scale than those waiting for a single organ replacement who have no history or organ rejection. In addition, those with complicating medical histories – cancer, for example – are usually perceived as less desirable candidates. Social values of justice and equity are primarily served in this scale by the inclusion of rank waiting time criteria – first come, first served – which supposedly assures better access to newly available organs for those who have waited longest.

Table I presents a previously published summary of this multifactoral approach, with values assigned through the Analytic Hierarchy Process described below.²² While it is based on normative criteria for liver transplantation, the model is, with minor changes, applicable to all organ transplant protocols. Graft preservation time will vary depending on the organ in question, for example,²³ while the matching of donor organ size to recipient body weight is critical in some but not all organ transplantation allocation procedures.

Normative criteria in this set define medically viable matches between donor organ and potential recipient with the best probability of long term,

Table I. Transplantation criteria: medical*

Criteria	Sub-criteria	Sub-criteria (2)
Compatibility (0.502)	Adequate (0.126) Perfect (0.376)	
Medical status (0.265)	Urgent (0.092)	Urgent stage 3 (0.009) Urgent stage 4 (0.027) Urgent stage 5 (0.037) Urgent stage 6 (0.018)
	Replantation (0.173)	Primary (0.073) Secondary (0.084) Multiple (0.016)
Financial (0.065)	No dollars (0.005) Dollars (0.026) Insurance (0.034)	
Waiting (0.037)	> 24 months (0.018) 13-24 months (0.026) 7-12 months (0.006) 0-6 months (0.003)	
Logistics (0.131)	Graft preservation (0.104)	> 20 hours (0.008)† 11-20 hours (0.020) < 10 hours (0.076)
	Complexity (0.027)	Procedural difficulty (0.005) Routine (0.022)

Notes on Individual Criterion:

Logistics: Graft preservation. Distance of available organ from patient, as a measure of ability to preserve organ for transplantation.

Logistics: Complexity : difficulty because of previous surgery or other conditions.

Replantation: single or multiple organ transplant? First or second attempt at transplantation.

Waiting: Time on waiting list.

† Graft preservation times differ for specific organs. Thus for lungs, the maximum preservation time is six hours. Unos Scientific Registry, July, 1994.

* After Cook DR, et al. See Note 20.

positive outcome. Exceptions are the scale of medical urgency, defining the patient's condition at the time an organ becomes available, and the ranked waiting time on the list of potential recipients. Medical urgency criteria reflect a traditional principle of medical triage: treat the sickest first if they have a chance for survival. Rank waiting, however, reflects a social principle of equality commonly described as "first-come, first served." It thus supposedly gives precedence to those who have waited longest for a transplant organ.

This normative set is applied, however, only *after* a patient is placed on the transplant eligibility waiting list. Whether a patient is accepted or rejected as a transplant candidate remains a fundamentally idiosyncratic determination based on prescriptive, social values applied by individual transplant centers. There is at present neither a uniform set of prescriptive, social criteria assuring equal justice in the process of evaluating patients for the transplant eligibility list or a methodology generally accepted as applicable to the creation of a prescriptive set.

Indeed, social valuations are routinely applied at this level of the allocation process. "Criteria such as the person's relationship to authority figures, past irresponsible behavior, and intelligence . . . [t]he patient's marital status, number of dependents, income, educational background and employment record were all evaluated to determine the patient's potential to return to a 'productive life' [after a transplant]."²⁴

Employment of these and other social criteria are erratic. Where intelligence is perceived as counterindicative, for example, the level at which it may be employed – either as a dominant or a non-compensatory factor – varies from institution to institution. In an international survey of transplantation centres, for example, Olbrisch and Levenson found that IQ was used frequently but not uniformly as a non-compensatory criterion, one automatically denying a patient's candidacy.²⁵ Further, among those using IQ as a criteria in transplant allocation, there was no unanimity regarding either the level of intelligence at which it was to be applied or the method by which it was to be measured.

Loosely grouped under the heading of "psychosocial" eligibility,²⁶ prescriptive criteria may also include prior health or social habits (alcoholism, for example), probability of longevity, chronological age, social standing, and other non-medical standards. In some venues, still other ill-defined and difficult to measure criteria, including emotional stability, have been suggested.²⁷ In the United States, both citizenship (or legal residency)²⁸ and a potential organ recipient's ability to pay for services – alone or through an insurer – are also sometimes considered in determining patient eligibility.

Thus it is not surprising that systemic inequities in health care allocation based on race are mirrored in the organ transplant records.²⁹ African-Americans are less likely to receive either long-term hemodialysis or kidney transplants, for example.³⁰ This follows a general rule of resource allocation, noted by health care researchers, that the most disadvantaged receive the least care at every level.³¹

It is at this stage of the process that the veneer of equitable treatment and justice necessary to the process at large most obviously breaks down. At the worst, the specter of two classes of citizen, those who are “donors” and those who would be recipients, is created. Members of the donor class would include, for example, those who by reason of social inequity or economic disparity are disadvantaged as potential recipients but available as potential donors. It would also include a class of patients with illnesses which, for one or another reason, deny status as a potential organ recipient. Examples of this group currently would include anencephalic infants³² as well as people with chronic developmental disorders. Organs from this group might be sought as a resource even though the patients are themselves barred by at least some institutions from receiving organs by reason of their infirmities. With the perspective of such division based on social criteria, disability prejudice, and economic disadvantage, the concept of equitable, distributive justice becomes an empty hope.

More generally, assumptions of fairness and justice have recently been critiqued by several high profile cases which in 1995 received broad public scrutiny. As a group, these cases demonstrate not only the failure of prescriptive criteria in the process at large, but also the failure of rank waiting as a criterion assuring fairness and justice in the allocation process. The question therefore becomes: how one can describe a precise set of criteria which will be accepted by both professionals and the general public as equitable, just, inclusive, and fair.

4. JUSTICE CRITERIA: RANK WAITING

Canadian and U.S. officials charged with organ procurement and transplantation procedures seemed genuinely puzzled by recent criticism arising from cases of disputed organ transplantation allocation decisions. These included decisions to allocate livers to former baseball player Mickey Mantle³³ and actor Larry Hagman,³⁴ – both public figures diagnosed with cirrhosis of the liver and with a history of cancer – while refusing placement on the transplant waiting list to other patients on the basis of their

intelligence. The latter included U.S. disabilities activist Sandra Jensen,³⁵ 34, and a teenage Special Olympics gold medal skier, Terry Urquart,³⁶ both persons with Down Syndrome requiring heart-lung transplants.

Public questions arising from these cases ranged from the suitability of intelligence as a criteria in transplant allocation to the rapidity with which famous people were swiftly allocated organs. Were they “jumping the line?” Mantle received his organ transplant in three days while Hagman was allocated a liver in one month, a quarter the normal waiting time.³⁷ Physicians insisted no favoritism was involved. Patients like baseball player Mantle, those in dire need of an organ transplant, are typically advanced to the front of the line, even when others have been on the eligibility waiting list for a longer period.

And yet, as a class, these cases make clear the degree to which social criteria contribute to the inconsistency and inequity that appear to pervade the process. Certainly, public assumption of procedural fairness based on rank waiting – first come, first served – is unfounded. Potential transplant candidates are commonly treated on a basis of medical urgency, even if they are recent additions to the waiting list. For example, of 162 liver transplantation procedures carried out at one transplant centre over an eight-month period, “more than two thirds of the operations were performed after the patients had deteriorated to the point of requiring chronic hospitalization, and in 37.7 percent of the total cases, the recipients had entered the lethal classes 5 and six from which even short-term survival was not possible without transplantation.”³⁸ Simply, patients who wait until their medical status is critical – like Mickey Mantle – apparently are routinely “jumped” to the head of the waiting line, irrespective of social justice promises or concerns.

Chart 1	
Histocompatibility	0.502
Medical status	0.265
Logistics	0.131
Financial status	0.065
Waiting time	0.037

This is confirmed by other researchers.³⁹ Chart One summarizes the weighting of relative criteria derived from analysis of allocation criteria assigned by a University Health Center at Pittsburgh team of “surgeons, anesthesiologists, procurement coordinators, transplantation coordinators, financial officers, ethicists, and other interested parties.”⁴⁰

In other words, once a compatibility between donor organ and recipient

is identified, medical status irrespective of rank waiting is the overwhelmingly primary consideration in the allocation process. Of all primary criteria in this normative set, waiting time was least considered by members of that hospital transplant centre. In short, despite the public perception of “waiting time” as a just criteria insuring fairness, it is one devalued if not ignored in actual practice.

If justice and fairness are desirable elements in this process, it would seem that a higher value must be given to “time waiting,” irrespective of the relative urgency of a competing patient’s condition. Rank waiting by time is, after all, the critical criteria popularly perceived and generally promoted as assuring that patients in need of organs will be treated equally and equitably. Were such a change to be made at an organ transplant centre, however, it would require physician notification, discussion, and a phasing in period of at least one to two years. This would be necessary to assure that patients whose physicians have not entered a patient on the waiting list because they were not yet critical would not be unduly penalized by a late entry and the change in procedure.

5. SOCIAL WORTH AND PATIENT ASSESSMENT CRITERIA

Even where transplant centers make this change, it would not address the problem of prescriptive criteria affecting placement on or rejection from the transplant waiting list. Despite a veneer of justice and equality based on rank waiting, social worth valuations, “have been central in society’s attempts to allocate limited medical resources.”⁴¹ Typically, these are applied informally and in an ad hoc manner. Since the question is which person should be saved – who should be allowed to remain in the lifeboat – at issue is a social rather than a purely clinical judgment, albeit one typically left to medical professionals. It can be made on the basis of greatest probability of survival (and thus, best “use” of the donor organ), on the basis of potential social contribution (“pay back” to society for its support), or by other criteria purporting to reflect both goals.

A set of consistent and uniform prescriptive criteria could be constructed in various ways. For example, a series of focus groups can be designed to elicit from various stake-holders those criteria they believe equitable and important.⁴² These would then be discussed with other involved parties until a consensus is reached. Another approach would be to define a preliminary set of criteria based on case reviews, published public discussions, or a literature review. This deconstructed set would then serve as a starting point for research and debate. The second approach is described here.

Because public support is the linchpin of transplant organ procurement, statements and concerns expressed in news stories, editorials, and editorial letters arising from four cases previously cited – those of athletes Mickey Mantle and Terry Urquart, activist Sandra Jensen and actor Larry Hagman – were deconstructed to create a tentative set of allocative criteria. This allowed for the generation of a general set of both prescriptive criteria currently employed, and those public participants believe to be important. A literature review was then carried out to compare these stated, public concerns with prescriptive social criteria described in the bioethical literature. This is, I believe, the first use of public narrative as a source for the creation of medico-legal standards. While rarely used in the generation of bioethical models, narrative analysis and narrative deconstruction has achieved a general acceptance in both social science⁴³ and law.⁴⁴ Combined with a more traditional literature review, this approach allows the integration of both technical and public concerns, prejudices, and viewpoints in a single model.

6. PRESCRIPTIVE CRITERIA

Six separate prescriptive criteria, each representing a social value identified as operative in the allocation process, were identified in this process. Described here, they are also summarized in Table II.

Intelligence: While supporters of Sandra Jensen and Terry Urquart insisted that intelligence levels should not be a barrier to transplant eligibility, most people would agree that at some level, cognitive capacity is a contributing criteria. The questions are: at what level and to what degree is “intelligence” relevant? After all, few people would argue for the candidacy of a person in a permanent vegetative state, or a psychopathic serial murderer with an IQ greater than 140 points.

A survey of physicians involved in heart transplantation found use of intelligence, usually defined by performance on the Stanford Binet scale (IQ) as a non-compensatory criteria, increased as patient IQ declined.⁴⁵ Thus while only 25.6% of U.S. programs considered an IQ between 70 and 50 points an absolute contraindication to transplantation, 74.4 percent believed an intelligence measured as lower than fifty points an absolute bar to transplantation. Others might argue the inverse: extremely high intelligence (an IQ above 140 or 1,250 points, perhaps) is something to be preserved at all costs.

Thus measurable intelligence (IQ) is clearly a criterion to consider. At

Table II. Prescriptive criteria for organ transplantation candidacy

Goal Criteria	Candidacy requirements for Transplant Waiting List Sub-criteria
Intelligence (IQ)	> 140 120–139 100–119 80–100 60–80 40–60 20–40 < 20
Survival probability	10 years + 5–10 years 3–5 years 1–3 years < 1 year
Independence	Self sufficient Needs family support Needs insurer support Needs social assistance Requires combination 2–5
Activity level	Working (office, school) Home bound but independent Home bound, requiring care Hospital bound, stable ICU bound ICU bound with life support systems
Productivity/participation	Superior: International recognition Excellent: National recognition Average: Productivity/participation Below average: Minimal/neutral Negative productivity
Social function	Superior: The “saint” extreme selflessness Excellent: Community participation Average: “Average” community activity Below average: Asocial person Negative: Anti-social person
Patient participation	Compliance (with medical directives) Responsibility (for condition)

issue is the level of intelligence and its relation to other criteria in a multifactoral hierarchy.

Long Term Survival: Transplant organs should go to those who may live longer, some Albertans said, than the presumably fragile Down Syndrome person.⁴⁶ Certainly, given the absolute scarcity of available

kidneys, lungs and hearts, to transplant an organ to a person with a chronic and rapidly terminal condition would seem wasteful. Indeed, one criticism levied against the Mickey Mantle's candidacy was that his medical history decreased his probability of long-term survival, irrespective of other factors.⁴⁷

But as others have pointed out, the power of future probabilities diminish the further forward they are projected.⁴⁸ A limit of ten years following transplantation was chosen for this exercise as the farthest forward that can be projected. The question thus becomes, first, the degree to which long term survival is a factor in waiting list eligibility, and secondly, how long a future is considered reasonable in allocation decision making. For the purpose of this analysis, future time was subdivided into five separate periods, each representing a different sub-criterion.

Physical Independence: Some argue that physically self-reliant persons who do not need social support should receive priority in this process. Reflecting that assumption, Alberta hospital officials substituted a criteria of "independence" or "self-sufficiency" for those defining reasonable intelligence. In their construction, independence can refer to either the candidate's ability to physically maintain his or her own existence, or the presence of another person qualified, able, and willing to maintain the patient.⁴⁹ The question then is whether a patient will be able to maintain him or herself, (a) without any support (b) with the assistance of others, (c) through support of an insurer, or (d) only at public expense.

Activity: Those opposed to Terry Urquart's candidacy insisted he would not be able to "use" the organ sufficiently, that his level of activity was necessarily diminished because of his Trisomy 21.⁵⁰ The normative scale of medical urgency now used in organ allocation provides a gross measure of activity which can be projected forward to the expected patient state following a transplant. It include five distinct ability levels: working (at office or in school); homebound but independent; homebound and requiring support; hospital or institutionally bound, but not in ICU; ICU requiring continuous ventilation or other life sustaining treatment.

Productivity: Will the patient be able to "repay" society for its support through active contributions to the community at large? Surprisingly, there is no adequate measure for this criterion. Is Terry Urquart less an athlete, for example, than was Mickey Mantle because the former's gold medal in skiing was won in the Special Olympics? And yet, most would agree that a person in a permanent vegetative state, or a severely anencephalic infant, are unable to actively contribute to society. Nor is there disagreement about the ability of some individuals with significant deficits to make significant contributions to society at large.⁵¹

We can conceive of a descending scale of social contribution, with the highest level representing individuals whose contributions are recognized internationally. Level two candidates would be those whose contribution is recognized nationally; level three would represent the “good average,” the family person of community participation. Level four would describe a person whose level of contribution is perceived as minimal or neutral, for example, a recluse or childless dilettante uninvolved in community service. Level five would define individuals whose social presence is perceived as actively negative (a pathologic killer, for example).

Compliance/Responsibility: Patient compliance or non-compliance with medical regimes is a frequently cited criterion in organ transplant allocation discussion.⁵² Sandra Jensen’s candidacy, for example, was rejected by two University of California hospitals on the assumption that as a Down syndrome patient, she “might not be able to mentally negotiate through the complications that could occur after surgery.”⁵³

Public concern, on the other hand, has focused on patient responsibility as a contributing factor to a medical condition requiring organ transplantation. Some suggested, for example, that even arrested alcoholics like Mickey Mantle and Larry Hagman should be penalized in the allocation procedure because their respective conditions were caused, at least in part, by self-abuse. Responsibility is, in this sense, perceived as a matter of non-compliance with physician directives for health. Experts who perceive alcoholism as a disease, however, are opposed to this popular interpretation of responsibility for an addiction-related condition. Both compliance and responsibility are joined in the proposed model as sub-criteria of a single parent criterion.

7. ANALYTIC HIERARCHY PROCESS (AHP)

In the debate arising from these cases, advocates of respective candidates did not argue that specific criteria were discriminatory. Instead, they insisted individual criteria should be weighed against other factors. University of Chicago clinical ethicist Dr. Mark Siegler, for example – an advocate of Mickey Mantle’s transplant – suggested that “we should give deference to the rare heroes in American Life [public service].”⁵⁴ Supporters of Sandra Jensen’s candidacy did not deny the importance of self-sufficiency or intelligence as criteria. Rather, they insisted on the demonstrable fact of her capacity for self-sufficiency and public activity. Thus in constructing a hierarchy that includes social values, the challenge is to identify generally acceptable criteria which can be evaluated impartially, and then to

identify a method which allows them to be seen as interactive elements in a complex, socio-medical, decision making process.

One way to balance a candidate's demonstrable strengths with his or her obvious deficits is through the Analytic Hierarchy Process (AHP).⁵⁵ A tool for the generation and analysis of interrelated sets of multiple attribute criteria, it has been used previously to quantify subjective elements and so-called intangibles in problems of evaluation, prioritization, and resource allocation. Its applications in the medical field have included problems in infertility treatment,⁵⁶ general diagnostic decisions and their attendant risks,⁵⁷ as well as normative standards in organ transplantation.⁵⁸

The hallmark of the AHP lies in its assessment of local priorities within a broader context. Because not all criteria in a set are equally valued, it is necessary to determine their relative importance through pair-wise comparison within any AHP-defined model. The resulting hierarchy expresses those determinations as a percentage of the whole. The hierarchy summarized here as Table I, is a useful example.⁵⁹ University Health Center at Pittsburgh staff members involved in organ transplantation were interviewed to ascertain what factors should be included in the multicriterion hierarchy, and the relative importance of each factor in pair-wise relation to other criterion. Level one criteria (Medical Status, Replantation, Financial, etc.) were compared, one to the other, with relative ranking defined by group valuations. Those determinations in turn influenced the impact of comparisons occurring at the level of sub-criteria (for example, Urgency), which together clarified each parent criterion. Finally, those determinations are further refined through sub-criteria (2) elements (Urgency Stage, etc.) representing determinations which may be assigned to a single patient.

8. APPLICATION OF A MULTICRITERION HIERARCHY

Application of the deconstructed set of prescriptive criteria using the AHP approach is currently under discussion at the Hospital for Sick Children in Toronto, Canada. The intention is to develop a prescriptive criteria profile which will compliment current hierarchies defining histocompatibility and patient condition. The first addresses social eligibility for the organ transplant waiting list – the life boat – the second defines donor-recipient compatibility within a context of rank waiting and urgency criteria based on a prospective recipient's condition. This approach will permit the standardization and standard application of prescriptive criteria, defined by members of both the hospital and the greater community, without sacrificing

necessarily clinical determinations of patient-perspective donor compatibility.

The multi-stage process now under review requires only brief description here. In the first phase, a tentative set of criteria defined by literature review and news story deconstruction is to be evaluated using the AHP process by members of the hospital transplant team. Focus group participants will be provided on the day of the meeting with both a general description of the Analytic Hierarchy Process and a copy of the proposed hierarchy itself. In the focus group, all participants will be asked to participate in a pair-wise comparison of deconstructed criteria and sub-criteria. In this approach, participants will be encouraged to discuss each pair-wise comparison, and where possible, to arrive at a consensus determination of its relative importance. When views differ among focus group members, divergent responses are to be recorded, totaled and averaged before being recorded. Following the exercise, participants then will be asked to critique the general model, suggesting additions or changes to the model itself. Both pair-wise comparisons and the group's discussion are recorded by the moderator.

Finally, all participants will receive a short questionnaire designed to elicit the degree to which the process assisted in clarifying their concerns and operative values. In addition, they will be asked first to identify other groups who might benefit from the focus group experience, and then encouraged to define other criteria which were not discussed but which, to them, are important.

In consultation with hospital ethicists, transplant team members, and with reference to the literature review, other stake holders in the transplant process are now being identified and invited to participate in separate focus groups. All are offered a similar description of the process, an outline of criteria, and a request for their help in identifying and defining the relative importance of the stated criteria. Focus groups with these representatives will follow the same protocols as the one described for the transplant team. The following stake-holders have been identified as potential program participants: organizations representing patient groups (Down Syndrome Society, for example), patient family organizations, transplant team members, hospital ethicists and pastoral representatives, as well as representatives of the legal and journalistic professions.

Differences between the focus groups – both in terms of relative valuation and perhaps criterion definition – are expected. It is likely, therefore, that a second iteration with a modified hierarchy will be required. This second-tier model will then be resubmitted to project participants for consideration.

This admittedly novel approach to the quantification of social values through focus group participation represents a departure from traditional models of medical decision making. There are, however, a number of reasons to believe that not only can a consensus be reached through this process, but that the resulting hierarchy will be accepted by the courts, the public, and transplant center professionals. Most importantly, a multicriterion strategy has already won acceptance in the area of organ transplant allocation at the level of organ allocation. The proposed approach simply extends that approach to the level of the transplant waiting list. Further, it does so using criteria already acknowledged in both public and professional literatures in a way which more accurately represents the complexity of patient selection in a context of absolute scarcity. Thus severe disability may be balanced, for example, by personal performance and social contribution.

Finally, this approach offers a methodology for public consensus building previously requested by the courts but until now lacking in the arena of bioethical disputes. *In re T.A.C.P* is a well discussed example of the need for such procedures.⁶⁰ In that case, parents of an anencephalic infant requested that the child be declared legally dead so her organs could be transplanted to others. While the request was refused, "the case might have been decided differently had T.A.C.P.'s parents shown there was a 'consensus' in society . . . to approve the harvesting of organs from infants with anencephaly."⁶¹ The process outlined here, using a multicriterion hierarchy, offers a potential for such a consensus.

9. CONCLUSION

Organ transplantation allocation procedures are at present neither just nor equitable. Normative criteria defining donor-recipient matches do not assure that all patients will be treated equally, or that decisions on organ allocation are free of prejudice against classes with specific disabilities. Social worth criteria are used in a variety of ways across the system, most significantly in denying those with cognitive challenges entry to the organ participant waiting list. The proposed approach is not a panacea. Issues of systemic social inequity related to race or income level are not addressed, for example, unless they become matters of stated public and professional concern. A consultative multicriterion strategy is only as equitable and complete as the concerns of the communities which formulate and then apply them. Still, the gains in consistency and standardization represent

a major advance over the currently accepted system of idiosyncratic acceptance or rejection to institutional organ transplant waiting lists.

Transplantation demands that choices be made between different patients who may be equally compatible with potential organ donations. Rather than denying the obvious and probably inevitable application of social criteria in transplant allocation decision making, it is suggested instead that prescriptive criteria be embraced, critiqued, and standardized through a system of public analysis and critical evaluation.

REFERENCES

1. Ethics Committee of the United Network for Organ Sharing. General principles for allocation of human organs and tissues. *Transplant Procedures* 1992;24:2226–2235.
2. Benjamin M, Cohen C, Grochowski E. What transplantation can teach us about health care reform. *N E J Med* 1994;330:12,858–860.
3. Benjamin, et al. 860.
4. Henton D. “Wasted” transplants under fire in Alberta. *Toronto Star* April 7, 1995:A10.
5. Organ transplantation is a basic service covered under the Canada Health Act, which is at present administered by the individual provinces. Thus in Canada, questions of third party insurance and the cost of transplant procedures is not an issue.
6. For a brief discussion of the “Americans first” policy adopted by the Federal Task Force on Organ Transplantation, see: Perkins HS Commentary: distributing American hearts for transplantation. *Cambr Quart Healthcare Ethics* 1995;4(2):233–234.
7. Charlesworth M. *Bioethics in a Liberal Society*. NY: Cambridge University Press, 1993:133.
8. Benjamin, et al.
9. Current proponents of health care rationing, for example, typically assume a context of relative scarcity. See for example, Menzel PT, *Strong Medicine: The Ethical Rationing of Health Care*. NY: Oxford University Press, 1991; Callahan O, *Setting Limits: Medical Goals in an Aging Society*. NY: Simon and Schuster, 1987.
10. See, for example: Glover JJ, Rushton CH. From Baby Doe to Baby K: evolving challenges in pediatric ethics. *J Law Med Ethics* 1995;23:5–6; Lantos J. Baby Doe five years later: implications for child health. *N Engl J Med* 1987;317: 444–447; York GY, Ballarno RM, York RO. Baby Doe regulations and medical judgment. *Social Science Med* 1990;30:657–664.
11. Indiana Senator Vance Hartke told the U.S. Congress that a society able to afford billions of dollars annually on cosmetics and other, non essential items, *should* “set our national priorities through a national effort to bring kidney disease treatment within reach of all those in need.” *Congressional Record* September 30, 1972;33,004–33,008. Since then, the approximately \$3 billion annual cost for dialysis treatment for 150,000 U.S. patients has been federally funded.
12. UNOS Scientific Registry, July 9, 1995. UNOS statistics are available through various sources, including Internet nodes, and are updated periodically.
13. Helga Kuhse defines the principle in this manner: “It is absolutely prohibited either intentionally to kill a patient or intentionally to let a patient die, and to base decisions relating to prolongation or shortening of human life on considerations of quality or kind.” Cited in Post SG, Baby K: Medical futility and the free exercise of religion. *J Law, Med & Ethics* 1995;23(1):21.

14. Lasagna L. Mortal decisions: the search for an ethical policy on allocating health care. *The Sciences* January, 1991:43.
15. Roorty suggests that all justice may, in fact, be a matter of loyalty and allegiance. See Roorty J. Justice as a larger loyalty. Presented at the *Seventh East-West Philosopher's Conference*. Honolulu, HI, January, 1995.
16. Walzer M. *Thick and Thin: Moral Argument at Home and Abroad*. Notre Dame: Notre Dame University Press, 1994:4. Cited in Roorty J.
17. Startzl TE, Hakala T, et al. A multifactorial system for equitable selection of cadaver kidney recipients. *J Am Med Assoc* 1987;257(22):3073-3075; Startzl TE, Gordon RD, et al. Equitable allocation of extrarenal organs: with special reference to the liver. *Transplantation Proceedings* 1988;20(1):131-138.
18. Startzl TE et al. 1988:132-133.
19. UNOS Scientific Registry, April 6, 1995.
20. Cook DR, Staschak S, Green WT, Vargas LG. A method to allocate livers for orthotopic transplantation: an application of the analytic hierarchy process. *Proceedings of the International Conference on Multiple Criteria Decision Making Applications in Industry and Service*. Asian Institute of Technology. Bangkok, 6-8, December, 1989, 779-791.
21. UNOS. *The Feasibility of Allocating Organs on the Basis of a Single National List*. Richmond: National Organ Procurement and Transplantation Network, Dec. 1991:6-7.
22. Cook DR, Staschaks, et al.
23. The graft preservation time for lungs is six hours, not the twenty hours given in Table I for the livery. UNOS Scientific Registry. July 29, 1994.
24. Banks GJ. Legal and ethical safeguards: protection of society's most vulnerable participants in a commercialized organ transplantation system. *Am J Law Med* 1995;XXI(1):92.
25. Olbrisch ME, Levenson JL. Psychosocial evaluation of heart transplant candidates: an international survey of process, criteria, and outcomes. *J Heart Lung Transplant* 1991;10:948-955. Quoted in Rachel Majeske. Criteria for Transplant Candidate Selection. Internet: *BIOMED-L conference list*. August 16, 1995.
26. See for example Gottlieb L, Zucker MJ. Organs for undocumented aliens? a transplantation dilemma. *Cambr Quart Healthcare Ethics* 1995;4(2):229-236. At Newark (NJ) Beth Israel Medical Centre, "The individual must be evaluated and accepted in accordance with all appropriate clinical standards . . . including psychosocial compatibility," 231.
27. Crespi GS. Overcoming the legal obstacles to the creation of a futures market in bodily organs. *Ohio State Law Journal* 1994;55:14-15.
28. Perkins HS. Commentary: Distributing American hearts for transplantation: the predicament of living in the global village. *Cambr Quart Healthcare Ethics* 1995;4(2):232-236.
29. Watson SD. Minority access and health reform: a civil right to health care. *J Law, Medicine & Ethics* 1994;22:127-128.
30. American Medical Association Council on Ethical and Judicial Affairs. Black-white disparities in health care. *JAMA* 1990;263:2344-245. Cited in Watson: 133.
31. Tesh S. *Hidden Arguments: Political Ideology and Disease Prevent Policy*. NJ: Rutgers University Press, 1988. Quote: 34. Quoted in Charlesworth, 7:119.
32. See, for example, Banks: 63-64.
33. Hoppe A. Mickey Mantle's lucky liver. *San Francisco Chronicle* June 16, 1995:A29. "Doctors said he was at death's door with hepatitis, cirrhosis and cancer of the liver." Also see, Russell S. Livers for transplant can show up quickly. *San Francisco Chronicle* June 9, 1995:A6.
34. Miller M. *Reuters News Service*. August 27, 1995. (America Online: TVnewsnut). Miller quotes the director of transplant surgery at Cedars Sinai Medical Center, Los Angeles,

- as saying that upon biopsy, a previously diagnosed liver tumor was “dead,” presumably as a result of intense radiation therapy carried out prior to the transplant procedure.
35. Delsohn G, Philip T. Activist takes on fight of her life. *Sacramento Bee* August 11, 1995:A1.
 36. Dawson C. Supporters rally for teen’s transplant. *Calgary Herald* March 28, 1995:B3; also, Henton D.
 37. Miller M.
 38. Startzl T, et al. 1988:131.
 39. Startzl, for example, states “our long-held position that the sickest patients should be treated first” irrespective of rank waiting or other criteria. Startzl et al. 1988:131.
 40. Cook DR, et al. 782.
 41. Banks GJ: 2.
 42. See, for example, Ridgley MA, Rijsberman FR. Multicriteria evaluation in a policy analysis of a Rhine estuary. *Water Resources Bulletin* 1992;28(2):1097–1098.
 43. Ewick P, Silbey SS. Subversive stories and hegemonic tales: toward a sociology of narrative. *Law Soc Rev* 1995;29:in press.
 44. Fraser MA. Autonomy, credibility, and preunderstanding: a defense of outsider narratives in legal scholarship. *Georgetown Law Review* 1994;82.
 45. Olbrisch ME, Levenson JL: 559–564.
 46. Henton D: 4
 47. “If the former Yankee slugger had any strikes against him in his bid for an organ transplant, they were his history of alcoholism and the presence of cancer.” Hoppe A: 33.
 48. Churchman CW. *The Systems Approach*. rev. ed. NY: Dell, 1979:139–141.
 49. Henton D: 4.
 50. See Dawson C, Henton D.
 51. This has been a constant theme of Oliver Sack’s work with infant savants. See, for example, Sacks O. *An Anthropologist on Mars*. NY: Knopf 1995.
 52. Corley MC and Sneed G. Criteria in the selection of organ transplant recipients. *Heart Lung* 1994;23:446–457. Quoted in Majeske RA. Criteria for Transplant Candidate Selection. *BIOMED-L. Conference List*. Internet, August 16, 1995.
 53. Rooney B. ABC Newsone, August 22, 1995, 10 a.m. morning feed. Copy courtesy of ABC News. Also see, Delsohn G, Philip T.
 54. Kolata G. Transplants, morality and Mickey Mantle. *New York Times* June 11, 1995; June 11: Section 4: Also cited by Hoppe.
 55. See: Saaty TL. *The Analytic Hierarchy Process*. New York: McGraw-Hill, 1980; revised, Pittsburgh: RWS Publications 1991; and Saaty TL. *Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process*. Pittsburgh, RWS Publications, 1994.
 56. Iyengar S, Ghandi V. Infertility decision making. In Saaty TL, Vargas LG, eds. *Decision Making in Economic, Political, Social, and Technological Environments*. Pittsburgh, PA: RWS Publications, 1994:Chapter 23.
 57. Dolan JG, Bordley DR. Should concern over gastric cancer influence the choice of diagnostic tests in patients with acute upper gastrointestinal bleeding?. *Proceedings of the Second International Symposium on the Analytic Hierarchy Process*. Pittsburgh: RWS Publications, 1991.
 58. Cook DR, et al.
 59. Cook DR, et al.
 60. In re T.A.C.P. 609 So. 2d 588,599 (Fla. 1992).
 61. Henley Ruth A. In: re T.A.C.P. *Issues in Law and Medicine*. 1993;9:1:67.