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## The Eurotransplant Kidney Allocation Algorithm— Moral Consensus or Pragmatic Compromise?

*Abstract:* The selection and balancing of values for the Eurotransplant kidney allocation algorithm poses both practical and ethical challenges. The paper argues that any allocation algorithm can only be justified by reference to some substantive conception of a good life that reflects our value preferences regarding the allocation of scarce donor kidneys. It is concluded that the criterion of HLA compatibility maximizes overall rather than individual utility. The paper emphasizes that good pragmatic arguments for maintaining the primacy of HLA matching can never replace a more systematic, independent ethical justification. As neither the selection nor the balancing of the different allocation criteria are based on an explicit ethical justification, the paper concludes that the choice of the Wujciak-algorithm was rather a product of pragmatic compromise than moral consensus.

### 1. Introduction

Many issues in applied ethics involve the weighing of different ethical norms or principles. The specification and balancing of principles is, for example, a central feature in the very popular principle-based approach to biomedical ethics by Tom L. Beauchamp and James F. Childress (2001). Balancing conflicting values or principles, however, poses a serious methodological problem: With reference to what standard can we determine the different weights of the values involved? How can we make and justify trade-offs between sometimes incompatible values or principles?

These still unresolved methodological issues explain, why the Eurotransplant kidney allocation system is such a fascinating study object for ethical analysis. The Wujciak-Opelz algorithm aggregates five different, partly incompatible value dimensions—each with a specific relative weight—into a single point value that determines to which patient a given donor kidney will be allocated. Does the Eurotransplant algorithm provide an ethically sound solution to the problem of balancing conflicting ethical values, norms and principles that might be applicable to other issues of ethical conflict? I will return to this methodological question at the end of my paper.

My ethical comment on the Eurotransplant algorithm will be (implicitly) guided by two different questions: (1) Are *all* and the *right* value dimensions included in the allocation algorithm? (2) Are the relative *weights* of the different dimensions ethically justified? Before I start my discussion of the papers in this volume, however, a more fundamental ethical question has to be answered: Is

there a single morally right answer to the problem of allocating scarce donor kidneys?

## 2. Organ Allocation Between Justice and the Good Life

In the search for a just allocation system for donor kidneys, we can start with a *formal* principle of equality that is traditionally attributed to Aristotle: Equals should be treated equal, and unequals should be treated unequally only if they are different in a morally relevant way. The problem with this formal principle is to determine which differences are morally relevant. In the case of organ allocation, we have to decide whether factors like tissue matching, waiting time, the national kidney import-export balance, age or social responsibility are morally relevant for allocation decisions. How can we determine which of these characteristics are relevant for a just distribution of donor organs? We need a theory of distributive justice to specify and justify *material* principles of a fair distribution. Unfortunately, several theories compete for the right account of distributive justice and yield quite different results when applied to concrete allocation issues. *Utilitarian* theories interpret justice in terms of maximizing public utility. *Libertarian* theories emphasize rights of property and liberty and traditionally favor the free market as ideal model for the distribution of scarce goods. According to *communitarian* theories, principles of justice develop locally based on the traditions of the community ('spheres of justice'). *Egalitarian* theories stress the principles of equal access and equality of opportunity.

Concerning the problem of organ allocation, these theories imply different allocation criteria. From a utilitarian perspective, for example, donor kidneys should be allocated according to factors that maximize graft survival rates, like HLA compatibility or age of the recipient, in order to maximize public utility. An egalitarian approach, however, would give primacy to the criterion of waiting time to provide equal opportunity for all patients on the waiting list to receive a donor organ. A libertarian probably would question a central allocation procedure and stress the right of the individual donor to decide about the further 'use' of his or her organs. These examples show that we cannot infer a single morally right allocation rule by appeal to theories of distributive justice. Rather, different theories support different allocation criteria.

Under the assumption that each distributive theory reflects some aspect of our common morality, we might be inclined to use a combination of different criteria—which actually has been the approach by Eurotransplant. However, the allocation factors apparently were not selected by reference to any specific ethical theory. If at all the choice of the Eurotransplant algorithm can be modeled as ethical reasoning, it was the ongoing search for a *reflective equilibrium* of considered moral judgments about the fair allocation of donor kidneys that resulted in the new Eurotransplant allocation system.<sup>1</sup> But there are good reasons to believe that the choice of the Wujciak-algorithm was a product of pragmatic compromise rather than explicit moral reasoning (see below).

<sup>1</sup> For the method of (wide) reflective equilibrium see Rawls 1971 and Daniels 1979.

Given the plurality of theoretical approaches to distributive justice, it seems quite plausible from a practical point of view to use a set of criteria instead of a single one. Still, the difficult task remains to assign relative weights to the selected criteria. And this problem definitely cannot be solved by ethical theory because there is no meta-theory by which we could rank the competing ethical approaches. In the case of kidney allocation, for example, the central question is how to balance the factors graft survival rate (HLA matching) and waiting time. Is there a principled way within *normative ethics* to determine the right trade-off between these two allocation criteria? The answer is no. We cannot determine the trade-off by reference to some normative theory of distributive justice. Balancing waiting time against 'medical' criteria rather seems to be a decision that depends on some substantial notion of the *good life*.<sup>2</sup> In this case, we must frame the problem as follows: How can we agree on one conception of the good life that adequately reflects our value preferences regarding the different trade-offs that are involved in a system of organ allocation? The empirical findings presented in this volume show how heterogeneous allocation preferences are among the population.

Under the tenets of liberal justice, we then must question whether it is ethically justified that a centralized allocation system imposes a certain conception of the good life, i.e. a predefined trade-off between waiting time and graft survival (which is implicit in the relative point values of the allocation algorithm) on the patients waiting for a donor organ.

In the line of this argument, the alternative proposal for kidney allocation by Matthias Hild in this volume seems to be quite attractive. In his proposal, donor kidneys are primarily allocated by waiting time and the patients (together with their medical advisers) have the opportunity to determine their own trade-off between additional waiting time and a compromised HLA match according to their individual preferences. This allocation method can not only promote equality of opportunity among patients on the waiting list, but also maximize the patients' individual utility, because only the patients themselves can take into account the physical and psychological suffering that additional waiting time will inflict on themselves and their families. While patients certainly have a strong incentive to maximize their graft survival time, it remains open whether this alternative allocation method may reduce the overall graft survival rate. The practical realization of these locally determined trade-offs, however, would pose hard decision problems for the individual patient and a logistical challenge for the Eurotransplant organization.

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<sup>2</sup> Cf. Ezekiel Emanuel, who claims that "any scheme of just health care will have to be informed by a conception of the good life" (Emanuel 1991, 98).

### 3. Collective versus Individual Elements in the Wujciak-Opelz Algorithm

According to Ahlert, Gubernatis and Kliemt, who give a systematic account of the Wujciak-Opelz algorithm in this volume, there are two normative challenges in specifying an allocation algorithm: (1) How can the selection of value dimensions included in the algorithm be justified? (2) How can we find and defend a method of weighing the different dimensions? Unfortunately—from an ethical perspective—the authors intend to address these substantial issues in a follow-up paper. While their current paper mainly focuses on the formal characteristics of the Wujciak-Opelz algorithm, it also provides a more substantive critique based on the assumption of an ethical individualism. It is certainly right that traditional medical ethics have focused on the well-being of the individual patient. However, we cannot ignore that more recent approaches in medical ethics do take into account questions of distributive justice which transcend the exclusively individualistic focus.

Any (explicit) allocation system under conditions of scarcity necessarily involves a trade-off between individualistic values (like maximizing individual benefit) and more 'collective' values (like equal distribution of benefits). A purely individualistic allocation procedure seems unrealistic.<sup>3</sup> Still, the inclusion of the regional donation rate and the national exchange balance needs a separate justification. As the dimensions have been included mainly for pragmatic reasons (maintaining the viability of Eurotransplant), it is perfectly adequate to look for alternative strategies that might serve the same purpose without having a direct impact on single allocation decisions. Ahlert, Gubernatis and Kliemt suggest to include the value of reciprocity on an individual rather than 'collective' (i.e. national) level. This is certainly a justified claim from the perspective of reciprocal fairness. However, this criterion probably will discriminate against lower class people who might lack the necessary educational background to declare their willingness to donate organs which will compromise their opportunities in the allocation system.

### 4. The Ethical Ambiguity of the HLA-Compatibility Criterion

In this context, another distinction is important: Individual patient characteristics can be used to realize collective values and thereby do not necessarily yield a purely individualistic allocation. I would like to illustrate this problem by discussing the ethical implications of the criterion of HLA compatibility. While the HLA matching usually is referred to as a 'medical' criterion, it is important to realize that it is in fact an *ethical* and not a medical decision to include the tissue matching as allocation factor, i.e. a decision that must be justified with

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<sup>3</sup> A free market might come closest to an individualistic distribution, however at the price of undesirable distributive consequences.

reference to ethical principles rather than medical knowledge.<sup>4</sup> Before modern immuno-suppressive drugs were available, the HLA match was the most important determinant of graft survival time. Allocating organs according to tissue compatibility hence was ethically justified by the goal to maximize the *individual* benefit (or utility) of the patient. To improve the average tissue match by creating a larger pool of organs was the central aim of forming Eurotransplant—certainly to the benefit of each individual patient waiting for a suitable donor kidney.

But do we really maximize *individual* utility by using HLA matching as the dominant factor in the allocation algorithm?<sup>5</sup> If we have one potential recipient and several donor organs with different numbers of HLA mismatches, we would certainly maximize *individual* utility by allocating the organ with the best HLA match to the patient. The Eurotransplant algorithm, however, is applied in a different situation: There is only *one* organ that comes available at the time and *many* potential recipients on the waiting list. By allocating this organ to the patient with the best HLA match, we apply the ethical standard of maximizing *overall* utility, which is—whether we like it or not—the fundamental ethical principle of *utilitarianism*. The ethical principle of maximizing *individual* utility does not give us much guidance for the allocation of *one* organ among *several* potential recipients: Especially with the improved immuno-suppressive drugs it is very likely that the utility of *several* (not only the best matching) patients could be maximized by receiving the donor organ rather than by remaining on the waiting list. Consequently, the principle of maximizing *individual* utility would require us to give the single available organ to *several* patients at the same time—which is definitely impossible. Hence, we need an interindividual standard like the utilitarian principle of maximizing overall utility to make interindividual allocation decisions.

Several authors in this volume emphasize that the dominance of the HLA criterion is deeply rooted in the history of the Eurotransplant allocation system. While the “rational conservatism” (Ahlert and Kliemt) and the model of “boundedly rational choice making” (Güth, Kliemt and Wujciak) certainly provide good *pragmatic* arguments for maintaining the primacy of HLA matching, I would like to stress that historical facts can never replace a more systematic, independent *ethical* justification. For this ethical justification we should keep in mind that HLA compatibility is no end in itself but rather a means to benefit the patient by increasing graft survival time. In as much as HLA compatibility loses its overwhelming importance for graft survival rates (e.g. by improved immuno-suppressive drugs), it will be harder to ethically justify its dominant position in the allocation algorithm. In addition, there might be good ethical reasons to take waiting time instead of tissue matching as lexicographically pre-ordered value dimension.

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<sup>4</sup> For a more thorough account of this argument cf. Wiesing 1997.

<sup>5</sup> This still seems to be the dominant view in the literature on organ allocation (cf. Wiesing 1997 or Ach/Anderheiden/Quante 2000).

## 5. Modeling Rule Choice in Organ Allocation

The two papers by Ahlert and Kliemt and Güth, Kliemt and Wujciak try to model the choice of the Wujciak-algorithm as new allocation rule for the Eurotransplant allocation system. While it is beyond the scope of this comment to give a detailed critique of both papers, I will try to touch on some points that might be of special interest from an ethical perspective. As already mentioned above, both models build on the historically established dominance of the criterion of HLA matching without including the possibility of an independent ethical justification. We certainly cannot ignore the status quo (and sometimes our options are severely limited by the status quo), but it would be a naturalistic fallacy to take the status quo as a *normative* standard.

Ahlert and Kliemt represent the almost lexicographical pre-ordering of one value dimension with some tolerance for the inclusion of other value dimensions (criteria) as a “lexicographic decision rule with tolerances”. For any criterion two different thresholds are defined that play an important role in the model to characterize the situation in which an alternative rule is considered superior to the status quo and some action is warranted. Changes in the fulfillment of a criterion that are smaller than the *evaluative* threshold  $\epsilon$  are considered insignificant and hence can be tolerated. To warrant taking some action, a predefined *action* threshold  $\delta$  must be transcended. In case of the Wujciak-algorithm, only minor reductions (smaller than  $\epsilon$ ) in the dominant value ‘HLA matching’ were necessary to achieve rather substantial gains (larger than  $\delta$ ) in the value dimensions ‘waiting time’, thereby warranting a change of the allocation system, i.e. the inclusion of waiting time as additional allocation factor.

While this seems to be a plausible model of rule choice in organ allocation, two questions remain open: (1) Does the threshold model adequately represent how we make trade-offs between different value dimensions? (2) How can the thresholds be determined and justified? With regard to question (1), I have serious doubts that we have *fixed* and *independent* thresholds  $\epsilon$  and  $\delta$  for each value dimension. It seems more likely that our thresholds will vary continuously with the expected gains and losses that are involved in the trade-off. In other words: what reduction in HLA matching we consider tolerable ( $\epsilon$  threshold) will depend on the possible gains ( $\delta$  threshold) on the dimension of waiting time. For example, it seems rather counterintuitive that we do not take any action to achieve a gain much larger than  $\delta$  in one dimension  $k$  only because it involves a loss slightly bigger than  $\epsilon$  in one prior dimension  $i$ . My (brief) answer to question (2) is that the thresholds cannot be justified without reference to some substantial conception of the good life (see above).

In my opinion, the concept of *elasticity*, that Güth, Kliemt and Wujciak discuss in their paper, might be a more attractive candidate to model the trade-off between two continuous value dimensions. The concept of elasticity, however, does not solve the problem of setting a threshold for change completely. Rather, the threshold will have to be defined as a certain elasticity, thereby taking into account a specific (differential) relationship between both value dimensions. However, Güth, Kliemt and Wujciak believe that within a bounded

rationality perspective the consideration of marginal trade-offs involved in the concept of elasticities is inappropriate. Relative changes should be assessed in discrete rather than continuous alterations of variables. I do not see why we shouldn't use the concept of elasticity, especially in an allocation scenario in which we have computer simulations at hand to determine the technical trade-offs between different value dimensions.

The authors correctly emphasize that preferences regarding the trade-offs between different value dimensions are not given, but rather developed on the basis of the technologically determined trade-offs between these value dimensions (cf. figure 1 in their article). Güth, Kliemt and Wujciak also assume a certain threshold ('aspiration') level, expressed by the  $\gamma/\delta$  ratio, that must be met to warrant any change of the status quo. The size of the ratio reflects the relative importance of both values and determines the tolerable trade-offs. Still, the normative question remains how we can define and justify (!)  $\gamma$  (the acceptable loss) and  $\delta$  (the required gain). And: are  $\gamma$  and  $\delta$  fixed *absolute* values or is it just the *relative* size, expressed by the  $\gamma/\delta$  ratio, that matters?

## 6. Choosing a Conception of the Good Life: Common Sense and Expert Judgment

If we have to invoke a substantial conception of the good life to determine the components of the allocation algorithm and their relative weights, we are faced with the question which conception we shall choose as a normative standard. There are three extremely interesting papers in this volume that present empirical findings on value judgements in different populations and therefore could provide an answer to this question. Ahlert, Gubernatis and Klein studied the attitudes toward alternative allocation criteria among 348 students of medicine and economics. Medical criteria received most support by the students, closely followed by the criterion of waiting time, which is in agreement with the Eurotransplant algorithm. Unfortunately, the students were not asked directly to assign relative weights to the different criteria. However, from the percentage of support for each criterion we can (cautiously!) infer that 'waiting time' is not considered significantly less important than the 'medical' criteria. This could challenge the dominant status of the HLA matching criterion in the Wujciak-algorithm. The two criteria of 'collective reciprocity' didn't receive much support by the students and might indicate that their justification mainly rests on the pragmatic constraints of the Eurotransplant organisation. Other criteria, like age or individual reciprocity, received considerable support among the students but are not included in the Eurotransplant algorithm. One of the most interesting findings of this study is that the students can be grouped into different clusters of allocation preferences, i.e.—in ethical terms—according to different conceptions of the *good life* concerning the allocation of scarce donor kidneys. Apparently, there is no single homogeneous set of allocation preferences in society, from which we could infer with certainty the components of the allocation algorithm, including their relative weights.

Adele Diederich used the method of conjoint analysis to assess *expert* judgements in organ allocation. Her study revealed considerable differences between the experts: 25 out of 33 experts ranked the HLA match as the most important factor, while waiting time received highest values by seven out of 33 experts—a result that was also confirmed by a cluster analysis. The high ranking of HLA match and waiting time is in agreement with the Eurotransplant algorithm, while individual experts attribute comparably lower values to the criteria of regional distance and donation willingness of the patient's country. This plurality of value judgements concerning organ allocation can also be found in the analysis by Marlies Ahlert. A majority of the participating experts ranked the criterion of HLA match lexicographically first, while a minority ranked waiting time first. Depending on how they include further aspects of the remaining criteria they can be divided into further subgroups. However, there are no completely identical rankings in the whole data set. This again stresses the big challenge of aggregating individual orderings into one collective order. Interestingly, her analysis of the decision-making procedures shows that the experts do not consider trade-offs between the criteria they regard most important. The empirical findings in these studies suggest that on the one hand we find considerable variability in the value preferences regarding organ allocation. On the other hand, there is significant overlap between the allocation preferences of different individuals and subgroups of the population and—fortunately—also between these elicited value preferences and the current Eurotransplant algorithm. There will certainly be more agreement in the *selection* of allocation criteria than in determining the *relative weight* of each value dimension.

## 7. Ethical Consensus or Pragmatic Compromise? Some Concluding Remarks

Altogether, the papers in this volume provide an excellent account of the patterns of decision making in the choice of the Eurotransplant allocation algorithm. However, with exception of the empirical studies the papers mainly focus on the formal and procedural aspects of rule choice in organ allocation. The more substantive normative questions underlying the choice of the Wujciak-algorithm need further analysis: How can we (ethically!) justify the selection and the relative weights of the different value dimensions included in the allocation system?

After reviewing the decision procedure, I am inclined to draw the—from an ethical perspective rather sobering—conclusion that the resulting Wujciak algorithm is rather a product of pragmatic compromise than ethical consensus: Neither the selection of value dimensions nor the balancing of the different criteria are based on an *explicit* ethical justification. The lexicographical pre-ordering of the HLA criterion, for example, is justified by the pragmatic “status quo relatedness” (Güth, Kliemt and Wujciak) rather than by systematic ethical argument—especially given the decreasing importance of the HLA compatibility for graft survival rates. The empirical findings suggest that there might be a considerable proportion of experts and lay people that actually would consider



waiting time as the most important allocation factor, which certainly challenges the lexicographical dominance of the HLA criterion. Most clearly, the inclusion of the factors distance and national import-export balance were the result of a pragmatic compromise that was necessary to maintain the viability of the Eurotransplant organization.

In addition, the relative weights of the different factors apparently do not reflect an explicit ethical balancing of the value dimensions. It is important to emphasize that the weights assigned to the five allocation factors *do not* represent the relative importance of the different value dimensions in the allocation algorithm. Instead, the relative weights are included in “the multi-attribute standards for evaluating the rules” (Ahlert and Kliemt). If I understood the models correctly, they are (implicitly) reflected in the thresholds  $\epsilon$  and  $\delta$  by Ahlert and Kliemt and the  $\gamma/\delta$  ratio by Güth, Kliemt and Wujciak. However, I have never found the actual values for  $\epsilon$  and  $\delta$  or  $\gamma$  and  $\delta$  that formed the normative basis for the ‘fine-tuning’ of the current version of the Wujciak algorithm. As it was rather an “incrementalist trial and error process” (Ahlert and Kliemt) in which Thomas Wujciak has been looking for a superior allocation rule than explicit moral reasoning, the choice of the Eurotransplant algorithm does not provide a solution to the aforementioned methodological problem of balancing conflicting ethical norms and principles within applied ethics. In spite of the rather weak ethical justification, the Wujciak-algorithm has important ethical advantages for the kidney allocation. It provides a transparent and impartial allocation method with a high degree of interpersonal validity. All patients on the waiting list are treated by the same allocation rules and the physicians’ burden to make potentially tragic choices can be reduced. Last but not least, having a (pragmatic) compromise between the participating transplant programs that allows the creation of a large pool of organs is certainly of tremendous value for all patients waiting for a donor kidney.

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