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ORGAN TRANSPLANTATION IN SINGAPORE: HISTORY, PROBLEMS, AND POLICIES

Volker H. Schmidt and Lim Chee Han

Department of Sociology
National University of Singapore
11 Arts Link
Singapore 117 570

Tel:65-68743176
E-mail: **socvhs@nus.edu.sg**
noxology@yahoo.com

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Organ transplantation in Singapore: History, problems, and policies[1]

Volker H. Schmidt and Lim Chee Han

Abstract

The paper explores the politics and policies of organ transplantation in Singapore, especially the rules and criteria used for the allocation of donor kidneys, hearts and livers. Donor organs are extremely scarce, so hard decisions have to be made about who is to receive one of the precious goods. Based on an analysis of documents and interviews done with local program directors, both the admission to a waiting list for transplant and the final selection from that list once an organ becomes available are covered. The observed practices appear remarkably similar to those predominant in several Western countries until recently, when they had to be modified and moderated there following public criticism. It remains to be seen whether Singapore can sustain its much stricter standards and expectations in the future.

Introduction

Organ transplantation has been an object of fascination and controversy since it became practically feasible in the second half of the 20th century. Once the key medical hurdle, known as the rejection problem, had been overcome through powerful immunosuppressive drugs, the procedure soon became the treatment of choice for numerous patients suffering from irreversible, end stage organ failure. Since that time, hundreds of thousands of organs have been transplanted into needy recipients; by 2002, more than 450,000 kidney transplants alone had been performed worldwide.

Being a very costly endeavor, transplant medicine was until recently concentrated primarily in affluent, economically advanced countries, especially in North America and (Western) Europe. Not surprisingly, therefore, the existing research on transplantation mostly focuses on this part of the world, or has been conducted there. Moreover, to the extent that this research concerns itself with non-clinical (i.e., social and ethical) aspects, two issues clearly stand out in terms of the attention they have attracted: one, the concept of brain death (or the problem

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of redefining or reinventing death), and two, the closely connected problem of determining the conditions under which organs can be legally and legitimately retrieved ("procured") from deceased human beings for purposes of transplantation.[2]

Less attention has been devoted in the scholarly literature to a third, equally hard to solve problem: the allocation of donor organs to needy recipients. This is a very serious problem because only few of those who might benefit from a transplant can in fact be supplied with one due to the pervasive scarcity of donor organs. It is also a very difficult problem because on many occasions the decision about how to allocate available organs is a matter of life and death, so that every decision *for* a particular patient is at once a decision *against* someone else who could have lived had another choice been made and whose (moral) claim to the precious good is arguably no weaker than that of the chosen beneficiary. A great deal of normative work has been done about how this problem ought to be dealt with in an ethically appropriate manner, but very little is known empirically about how it is in fact dealt with in the real world. And the few studies that exist, once again focus on Western countries such as the United States or Germany (Fox & Swazey, 1978; Schmidt, 1996, 1998). But transplantation is no longer restricted to the West – it is increasingly spreading to other parts of the world as well. The present study extends, for the first time to our knowledge, the research about the politics and policies of organ allocation to an Asian country: the city-state of Singapore.

In the section following the presentation of our methodology, we provide a brief historical overview of the development of organ transplantation in Singapore and the legal environment in which it took place. We then move on to show, in three consecutive sections, how organs are presently allocated in Singapore. Finally, we discuss our findings in the light of what is known about related policies in some Western countries.

Methods

The data presented below are based on a qualitative study which comprised the analysis of (1) semi-structured interviews with the directors of three Singaporean transplant centers, (2) reports published in the main local newspaper, *The Straits Times Singapore*, (3) documents released by government agencies (e.g., the Ministry of Health) and various other public and private associations, including the transplant programs themselves, and (4) the pertinent laws. The

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[2] Another problem, the buying and selling of organs, has tended to provoke less controversy as there are only few advocates of such practices.

interviews, which were conducted in the first half of 2003, lasted between one and two hours and were fully transcribed. Their purpose was to generate knowledge about both the actual patient selection procedures employed in Singapore and the physicians' attitudes toward, or justifications for, them. The analysis followed an inductive approach of the kind adopted by many studies done in the "grounded theory" (Glaser & Strauss, 1968) tradition, including an earlier study by one of the authors about the politics of organ allocation in Germany (Schmidt, 1996, 1998). As no documentation of the history of organ transplantation in Singapore has as yet been published, the account presented here is based largely on the above newspaper reports. The nature of the study is explorative, not representative. However, given that transplant directors are generally responsible for the policies adopted by their programs, and that presently only altogether six such programs exist in Singapore, it is safe to assume that the three interviews conducted provide a relatively good insight into the main selection patterns and rationales operative in the Singaporean context. To protect the respondents' anonymity, the interviews were coded using the acronym tx for transplant physician and consecutive numbers following the order in which they were conducted (tx 1, tx 2, and tx 3).

A brief sketch of the history and legal environment of organ transplantation in Singapore

In July 1970, the first kidney transplant took place in Singapore. Two years earlier, the National Kidney Foundation (NKF) had been founded by Dr. Khoo Oon Teik, then the professor of clinical medicine at the University of Singapore, as an independent, not-for-profit organization which oversees the treatment of patients with kidney failure and provides numerous services for them, including the running of dialysis centers and the promotion of transplants. Khoo saw the benefits of transplantation primarily in monetary terms: as a less costly alternative to dialysis treatment. At the same time, the NKF lobbied and raised funds for the gradual expansion of its dialysis facilities. By 1995, it was able to admit roughly 95 per cent of all applicants to its programs, and by 1999 it could cater to about 1,000, or about two thirds, of the patients suffering from (end stage) renal disease in Singapore.

Considered experimental during the first few years in Singapore, kidney transplants were declared therapeutic procedures in 1973 after several operations had been carried out successfully and local doctors had gained sufficient experience. In 1976, following about 20 cadaver kidney transplants, the first live-donor transplantation was performed. Due to a severe donor shortage, the country began to import unused organs from the United States in 1983, but discontinued the practice in the same year because of the poor quality of the organs shipped over, as well as its costliness (an export levy was placed on each organ). Despite the organ shortage, the transplant

program gradually expanded. In September 1999, Singapore reported its 1,000th kidney transplant. Since the second half of the 1990s, Singaporean centers transplanted an average of just below 70 kidneys per year. The majority of these kidneys (roughly 60 per cent) came from deceased donors. However, the supply of organs scarcely meets the demand. By 2002, the waiting list for kidney transplants had grown to 666 patients (up from 528 in 1996; see The Gift, 2002; Ministry of Health, 2003). In other words, only one in ten transplant candidates can presently be supplied with a new kidney in Singapore.

Despite a favorable legal and political environment (see below), the donation rate for cadaver kidneys is rather low in Singapore (8 donors per million population and year).[3] The low donation rate affects other fields of transplantation as well, most notably heart and liver transplantation. The first heart transplantation in Singapore took place in 1990, four years after the opening of a state-of-the-art heart surgery center at the National University Hospital. It made Singapore the third Asian country after Taiwan and Thailand to offer the procedure at all. Until 1994, a total of 12 heart transplants were performed. Thereafter, a three-year break had to be taken, partly due to the loss of several heart surgeons to the private health care sector. Only in July 1997 could heart transplantation finally be resumed. Since then, one to two procedures have been performed annually in Singapore, with the waiting list mostly hovering around 10 patients. Thus, only a small fraction of the need can be met with the available organ supply – the majority of waitlisted heart candidates must be let die.

The situation in liver transplantation is similar. Beginning in 1983, preparatory steps were taken to establish a liver transplant program in Singapore. They included the teaching of local doctors in the surgical techniques under the supervision of the famous British transplant pioneer Roy Calne. It took until 1990 before the first liver transplant was actually performed in Singapore. In 1996, the program began to take recourse to living related donation in order to expand its resource basis beyond cadaver livers. As a result, the number of procedures is now higher than that in heart transplantation; from 1996 to 2002, altogether 86 liver transplants (amounting to an average of 12 per year) took place in Singapore. The waiting list tends to be

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[3] Low, that is, by comparison with many Western countries, including Germany which has one of Europe's lowest donation rates (13.5 donors/m/y; see Gubernatis, 1999), or Spain, whose donation rate (33.6 donors/m/y; see *Eurotransplant Newsletter* 184, September 2000: 7) is the highest in the world. However, when compared with other Asian countries, Singapore's rate may not look quite as bad. In Japan, for instance, it would barely be possible to transplant at all were it not for the (still low number of) organs donated by living relatives; between 1997 and 2000, altogether nine cadaveric donors were identified in the whole country (see Lock, 2002).

short and is usually kept twice as long as the actual number of procedures carried out in any given year. Thus, only every second liver patient admitted to the list can be transplanted. The others must be let die.

The Singaporean government has taken several steps to enlarge the donor and organ supply; thus far with limited success though. Amongst the initiatives taken were the passing of various laws that govern transplant activities in Singapore. The three most important bills are (1) The Medical Act from 1972, (2) The Human Organ Transplant Act (HOTA) from 1987, and (3) The Interpretation (Amendment) Bill from 1988. Presently preparations for a further amendment of HOTA are under way.

The passing of the Medical Act from 1972 occurred in response to a "legal hitch" to transplantation disclosed in the main local newspaper, the *Straits Times*, in 1971. This hitch consisted in the right of close relatives to override decisions made by deceased persons to donate their organs upon death for purposes of therapy, education and research. The bill conferred the full and exclusive right over their body parts to the affected individuals (and potential donors) themselves. Where no signed pledge is found in the belongings of a deceased person, the right to decide goes back to the family in the following order of priority: (1) spouse, (2) adult son or daughter, (3) parent, (4) adult brother or sister, and finally (5) guardian. In 1975, Khoo Oon Teik suggested a presumed consent model for organ donation upon death. Interestingly, the transplant community reacted less than enthusiastically because it was concerned about the ethical soundness and legal implications of such a regulation. Six years later, the proposal was taken up by then Minister of Health, Goh Chok Tong, who suggested an opt-out system that implies the consent to organ donation of citizens and permanent residents who die in an accident unless they have formally registered their objection with the Director of Medical Services. This proposal became law in 1987 with the passing of HOTA. HOTA also recognizes brain death as the equivalent of human death, but initially restricted its usage to cases deemed potential organ donors, meaning that in other cases the conventional definition of death continued to apply.[4] To encourage donation, various incentives were introduced as well, such as a waiver for hospital charges (both for the donor's own treatment before death and for his or her immediate family members over a period of five years), partial coverage of the funeral expenses, and a "club-

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[4] The Japanese transplant law of 1997 contains a similar stipulation (see Lock, 2002). In Singapore, a bill was approved in 1998 which no longer restricts the usage of the brain death definition to accident victims, but permits doctors to certify the death of a person both when his or heart has stopped beating and upon irreversible cessation of his or her brain functions.

model" type of provision (see Kliemt, 1993 for a philosophical defense) which, based on the principle of reciprocity, gives organ pledgers priority over non-pledgers for receipt of an organ in a situation of need. Finally, HOTA legalized the live-donation of kidneys. However, given the non-negligible risks for donors, the government does not encourage live-donations.

Muslims, who comprise about 14 per cent of Singapore's population, are exempted from the presumed consent regulation. Given the Islamic understanding of death, according to which death implies the death of the whole body, the notion of brain death (and its concomitant concept of a "living cadaver" kept functioning artificially to preserve the organs for donation) is not unproblematic for Muslims. Therefore, it was decided to adopt an opt-in, rather than opt-out, policy for Muslims. This means that Muslims who die in an accident will not automatically be deemed potential donors, but only if they have explicitly pledged their organs. However, the priority rule for pledgers applies to them as well, so that they can compete equally for receipt of a donor organ with other potential recipients (and non-objectors) only if they have in fact opted in. The deterrence (or incentive) effect of this provision seems weak though. Thus, by 1997, only 6,500 (or 2.6 per cent) of the 250,000 Singaporean Muslims who are eligible under HOTA had opted in – even though 130 Muslim kidney patients had died since 1993 (*Straits Times*, 22/06/97).[5] However, it must be noted that the rate of actual pledgers among other Singaporeans is even lower – only one percent of all Singaporeans had willed their organs for donation by the end of the millennium. At the same time, the percentage of families consenting to the donation of organs from deceased relatives dropped from (an already low) 32 to 22 between 1996 and 1999 (*Straits Times*, 12/10/1999) – despite continuous promotion and awareness raising campaigns organized by the National Kidney Foundation and other public and private associations. It appears as though the idea of organ donation simply does not resonate well with Singaporeans.[6]

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[5] Research conducted (and reported) by Clare Hayward and Anna Madill (2003) revealed similarly low donation rates among Muslims living in Britain. Thus, in the mid-1990s, only 2 per cent of Muslims (compared to between 27-32 per cent of the population at large) were carriers of donor cards. The authors' study confirms that Muslims' objections to organ donation are mainly rooted in religious sentiments.

[6] It is not clear how "special" Singapore is in this respect. Thus, Locke (2002) shows that the Japanese harbor even greater reservations against organ donation due to deep-rooted cultural dispositions, which are detrimental to the whole transplantation enterprise. Since 78 per cent of Singaporeans are ethnic Chinese and the Japanese share a partly common cultural heritage with the Chinese, such factors may play a certain role in Singapore too.

We cannot explore the reasons for this situation here, but whatever they are, they do have consequences for the supply of donor organs and hence for the chances of potential organ candidates to receive an organ, which are fairly low in Singapore. Many needy Singaporeans thus flock overseas, especially to China and India, for kidney (and possibly other) transplants. Such transplant "tourism" is not without risks – some of the patients return with infections so that their new organs have to be removed quickly. The others can only hope for the generosity (in cases of live donations of parts of a liver also for the courage)[7] of one of their kin or for the luck of being chosen for a cadaver organ. But how is this luck "organized"? Who selects the winners and losers, and according to what criteria? These questions are addressed in the next three sections.

Selection stages and indications criteria

As generally in cases of medical triage, the decision as to who gets the desired treatment and who does not is divided into three separate steps or stages: patients must first be *referred* for evaluation by a transplant program, then be *admitted* to the waiting list of such a program, and finally be *selected* from that list once an organ becomes available. Except for the priority it accords to organ pledgers over non-pledgers (as well as to citizens and permanent residents over foreigners), the law contains no stipulations regarding the allocation of donor organs – it leaves the matter entirely to the medical profession. Contrary to many other transplant acts, HOTA permits the designation of pledged organs to specific recipients. Like in cases of live-donation, there is thus little to decide in such cases. However, they are quite rare and also constrained by medical factors as donors and recipients must be at least blood group compatible. In all other cases, the transplant centers themselves are in charge.

Little is known about referrals (or rather, non-referrals) made by general practitioners or various kinds of specialists consulted before the translators come into play – only that the latter complain about too few referrals due to lack of knowledge about (and sometimes sympathy for) the procedure on the part of many physicians who see potential transplant candidates prior to them. The matter cannot be explored any further here. As for the admissions process, its function (and officially its sole purpose) is to determine a patient's need for, and potential benefit from, treatment. If a positive cost-benefit ratio is diagnosed for the patient in question, then he or she is theoretically indicated for a transplant, which means that from a purely medical viewpoint he or she should be admitted to the waiting list. In practice, things are much more complicated though.

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[7] For a recent account of some of the risks associated with the donation of parts of one's liver, see Trotter, Wachs, Everson & Kam, 2002.

Numerous studies (see, e.g., Fox/Swazey, 1978; Aaron & Schwartz, 1984; Schmidt, 1996, 1998) have shown that under conditions of extreme scarcity such as those prevailing in transplant medicine, admissions decisions are almost never based on medical considerations alone, but instead are used to filter out much of the potential demand through rejecting many patients who would in fact be medically suitable for the procedure. Under conditions of scarcity, indications criteria are thus largely a function of the relation between supply and demand.

Equally ambiguous are the criteria used for the final selection of recipients from the waiting lists. Around the world, transplanters claim to be using predominantly (or even exclusively) "objective" medical criteria, but upon closer inspection it quickly turns out that most of the criteria applied in the process have no medical background whatsoever. Instead, they tend to reflect various ethical concerns and/or "political" factors such as the interests of transplant physicians and transplant centers or directives given by state agencies, which are "invizibilized" by couching them in (technical) medical language. A good example is the notion of medical success, which is widely understood as a maximization of aggregate outcomes for the patient population as a whole (measured in terms of years of organ functioning and/or patient survival after transplant) rather than benefit for individual patients (with which it may well collide). But there is nothing in medicine that suggests, or even warrants, that priority should be given to patients with the best long-term prognosis; only utilitarianism (and perhaps politics) does. Utilitarianism, however, is an ethical conception, nothing that springs naturally from medical knowledge and rationality. Nor are politics, including the politics of legitimizing costly medical procedures, an integral part of medicine as such.[8] Instead, they draw on different sources and their concerns sometimes strongly conflict with genuinely medical ones.

The specific criteria chosen differ of course from field to field and with the levels of decision-making concerned. A general condition for admission to a transplant program is that the patients whose organ(s) have failed or are failing must have reached a final, irreversible state of their disease, so that no hope exists that they can be kept alive by conservative means; another condition is that they must have a sufficiently good prognosis. The general indications criteria are well known and documented in the pertinent literature; they need not be repeated here. More "problematic" and hence sociologically interesting are the contraindications. Like elsewhere in the world, they are divided into *relative* and *absolute* contraindications in Singapore, with the

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[8] The term "medicine" is used here to denote medical knowledge or medical logic and rationality, which distinguish medicine "proper" from the organization of health care delivery in actual health care systems.

absolute ones fixed and non-negotiable, and the relative ones permitting a degree of flexibility in their application.

However, several of the absolute contraindications adopted by Singaporean transplant centers are anything but medically self-evident and uncontroversial, and some of the indications criteria indirectly function as contraindications as well by limiting certain patients' access to a transplant program. Thus, heart recipients must fall within an age range between 13 and 60 years (or slightly older, depending on the general condition of the patient in question), meaning that patients below or above that age will usually be excluded (other local programs, such as the kidney transplant program, do in fact use age – 60 or above – as an absolute "contraindication"). Likewise, infection with the HIV virus is considered an absolute contraindication by all Singaporean transplant centers even though several studies have shown that HIV patients can be successfully transplanted[9] – so that there is no firm medical basis for excluding such patients generally. The same is true of alcoholism, which also serves as an absolute, rather than relative, contraindication in all Singaporean transplant programs.

When medical personnel use criteria whose medical basis is rather shaky, then this raises questions about these criteria's justification. In interviews conducted with transplanters in Singapore it quickly turned out that they are fully aware of the less than imperative nature of some of the "contraindications" they use – the main reason given for their usage is the organ shortage and the relative smallness of the local transplant programs which purportedly leave no alternative to making some tough decisions. What follows is a brief description of the decision-making procedures at the admissions and (in the next section) selection stages, and a discussion of some of the reasons given for them.

Admission to the waiting list

We begin with a number of exclusion criteria. As noted, among the non-medically based "contraindications" is an age limit of 60 and above. According to the directors of the programs

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[9] See, e.g., Gow, Roland & Mutimer, 2001; Kuo, 2001; Prachalis, Pozniak & Taylor, 2001. Halpern, Ubel & Caplan (2002: 286) summarize the present state of clinical knowledge pertaining to the transplantation of HIV-infected patients as follows: "We have no evidence of poorer survival among otherwise healthy HIV-positive patients who are receiving antiretroviral therapy, yet both overt and covert barriers to transplantation remain. This contraindication is not justifiable according to any ethical theory". Whether or not there is an *ethical* theory that might justify the general exclusion of such patients can be left open here. More important for present purposes is that there seems to be no sound *medical* justification for doing so.

included in our sample, the upper age limit is fixed in kidney transplantation, but handled slightly more flexibly in heart transplantation where a patient just above the limit may be considered if he or she is generally in good health, as well as in liver transplantation where physiological, rather than chronological, age is said to matter. However, it is quite clear that the admissions chances of patients aged 60 or above are very limited in these programs too. Now, given that age limits have been significantly relaxed in Western countries many years ago, and that the results for elderly patients who are transplanted have proven to be remarkably good (Hesse et al, 1995; Schmidt, 1998), one wonders what lies behind their exclusion in Singapore. Not surprisingly, the real reasons are not medical but, as one respondent called them, "practical" ones. The waiting lists are already far too long, and even though rationing according to age is "artificial", it is "the easiest" way to do it (Tx 3). It makes the rationing process at least somewhat transparent, and when applied uniformly to all patients, it also protects against favoritism. Third, given that the life prospect itself decreases with age, the average functioning span of organs increases when transplanted into younger patients, thus raising the outcome levels or "success" rates of transplant programs, which in turn is a major concern in the centers' bid for national/international reputation and recognition (and hence also of the physicians' career aspirations).[10]

Several other exclusion criteria serve the same purpose. Thus, patients with multiple organ failure are most likely to be rejected candidacy status. The same is true of patients with vascular diseases. Drug addiction, HIV-infection and even Hepatitis B infection are further grounds for exclusion – no patient afflicted with the first two of these conditions has ever been transplanted in Singapore;[11] not because it makes no medical sense to transplant such patients, but because their long-term results are comparatively worse, and because, as one of our respondents

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[10] Not just in Singapore of course, but all over the world, including the United States where according to Starzl & Fung (1996, 454) the long-standing tendency to determine a transplant center's performance solely in terms of its output figures until recently resulted in surreptitious restriction of candidacy "to an elite low-risk group of young, affluent, white, primary kidney recipients free of comorbid conditions". A recent plea for the age-rationing of organs to optimize their usage is to be found in Chang, 1996.

[11] In kidney transplantation, infection with the Hepatitis B virus is only a relative contraindication. Affected patients may be admitted to the waiting list, but get minus points which reduce their chances of being chosen for a donor organ that becomes available.

put it, "Singapore finds it hard to forgive" (Tx 3), that is to say for moral reasons.[12] Most cancerous patients are also rejected – "if the prognosis is not good", asks a heart transplanter, then what is "the point transplanting" such a patient? (Tx 2)

Generally (and comparatively) speaking, the admissions process is very stringent and highly selective in Singapore. In line with a philosophy that puts paramount emphasis on success, understood as long-term aggregate outcomes, only patients with a good prognosis are admitted; risk patients are virtually chanceless. In addition to the factors mentioned above, patients are also screened for various other conditions.

Alcoholism is one such condition that merits a somewhat lengthier discussion. As is well known, alcohol abuse is the most common cause of liver cirrhosis. But even though studies have shown that transplanted alcoholics tend to do remarkably well and to have very good results (e.g., Hesse et al., 1995; McMaster, 2000), very few of them are actually transplanted. In Singapore (like in many other countries), they are theoretically expected to stay abstinent for an extended period of time (ranging from a minimum of six months to one year) before they are even considered for the procedure. But in practice no alcoholics have ever been transplanted here. Three main reasons are given for this: First, alcoholics are deemed "non-trustable" (Tx 2), i.e., they are expected to be non-compliant with the postoperative treatment regimen, especially with the requirements of regular intake of immunosuppressive drugs and permanent self-monitoring of the body for early detection of signs of graft rejection. Singaporean doctors are of course aware of the difficulties in measuring or predicting compliance. At the same time, transplanters are greatly frustrated about the loss of valuable organs due to non-compliance, which apparently accounts for a large amount of premature graft failure.[13] So they feel they cannot ignore the problem merely because it is hard to predict patients' postoperative behavior. Therefore, transplant centers often resort to the expertise of various other specialists, especially psychiatrists and social workers, who are believed to be in a better position to judge the matter and who tend to play a significant role in the admissions process. In Singapore, such non-transplanters are also involved. What they look out for will be discussed shortly.

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[12] Singapore has very tough anti-drug laws, and people infected with the HIV-virus are not allowed to enter the country. There is a tendency to view drug addiction and HIV-infection as signs of immoral behavior and weak character in Singapore.

[13] One American study (Schweizer, Rovelli, Palmeri, Vossler, Hull & Bartus, 1990) estimates that between 34 and 60 per cent of all transplanted patients are a least temporarily non-compliant, and that non-compliance accounts for up to 90 per cent of premature graft losses through avoidable rejection.

A second, seemingly evident aspect of the concern about alcoholism is the fear that continued drinking after a transplant would quickly destroy the graft. However, there are voices according to whom this concern is misplaced because it takes at least ten years of excessive drinking to destroy a liver, and only few transplanted livers last much longer than that even under ideal conditions anyway (Schmidt, 1996). Singaporean transplanters nevertheless insist on the futility of transplanting alcoholics – not just in liver, but also in heart transplantation. One respondent justified their exclusion as follows:

"[A]lcoholism does affect the heart. [If] the heart disease was due to the chronic consumption of alcohol in the first place, then what's the point of giving them another heart and let them waste a valuable" resource? (Tx 2)

This statements adds a third reason, that of self-infliction. Note that both of the latter two reasons reflect purely *moral* concerns – whether or not one should give limited resources to those who can make the most of them (a weak form of utilitarianism), and whether patients who are (held) personally responsible for their illness should be given less priority (or rejected altogether) than those whose organs have failed through no fault of their own. To be sure, *if* transplanting alcoholics were indeed futile, then doing so would also make no *medical* sense. But that is obviously not the case – the available evidence suggests otherwise. So the questions that are at issue here are thoroughly moral ones. And moral questions cannot be answered by means of medical expertise.[14]

Nevertheless, medical doctors are increasingly faced with such questions – not just in transplant medicine, but wherever rationing decisions have to be made within contemporary medicine (see Ubel, 2000 for an overview). As indicated above, in transplant medicine some of the burdens that such decisions involve are taken off their shoulders by sharing the ultimate responsibility with various other professionals. The measurement of compliance is a good example. Before patients are admitted to a waiting list in Singapore, they are seen not only by one or more transplant physicians, but also by a psychiatrist and a social worker. Together, the team assesses a patient's suitability for transplant. The suitability criteria are quite strict in Singapore. In addition to the factors already discussed (and partly overlapping with the compliance problem), the following two were strongly emphasized in the interviews: (1) a patient's quality of life after the transplant, and (2) what one of the respondents called "personality traits".

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[14] This (and related observations) has prompted several observers to question the physicians' decision prerogatives in medical triage decisions (see, e.g., Veatch, 1991).

Quality of life is understood primarily in non-clinical terms: whether the patient will likely be able to lead an independent life, to work and support his or her family, to enjoy life and leisurely activities, to maintain "a normal good relationship" (Tx 2), etc. This, in turn, is seen as being determined in large part by one's family situation that is also looked at to predict the patient's compliance. Thus, patients with a supportive social network, especially a supportive family, with relatives or spouses willing and able to look after them following the transplant, are favored over ones lacking such "social capital". Patients without sufficient family support are believed to exhibit poor compliance. Hence they have little chance of being accepted.

Until recently, another important requirement for getting admitted to the kidney transplant waiting list was gainful employment – with patients in full time employment prioritized over ones working "only" part time, and housewives considered as unemployed, making them less eligible for a transplant. Being responsible for the care of dependent relatives, on the other hand, could offset the disadvantages accruing from one's employment status.

These two factors have now been taken off the check list; the first of them not least due to the observation that dialysis patients often lose their jobs or have a hard time finding (a new) one, so that by transplanting them one would actually improve their otherwise paltry job prospects, and by excluding them one would punish them for something beyond their control. And even though it could be argued with some degree of plausibility that one's employment status, or at any rate one's ability to work, *may* (at least indirectly) affect one's quality of life (which in turn *may* affect one's compliance), just as it *may* also be somewhat indicative of one's reliability[15] and determination to put up with the many uncertainties, fears, restrictions and adverse side-effects of a life after transplant (which in turn *may* influence one's compliance), it seems clear that both one's employment status and one's status as care taker of dependents reflect *primarily* (controversial) views about a person's social worth or value to society.[16] Such views seem to play a major role in the determination of a patient's eligibility for a transplant in Singapore.

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[15] "[I]f a guy doesn't keep a schedule for the tests, then he cannot be taken seriously" (Tx 1). Even though they have much less spare time, employed people are widely regarded as being better able than the unemployed to keep schedules, lead a disciplined, regular life, etc.

[16] To be more precise, like almost everything that is viewed as conducive to compliance, they tend to reflect typical middle class values and biases – the values of the very social class to which the doctors making the respective decisions usually belong (see Stone, 1989). The finding of a study done in the American Midwest (Kjellstrand, 1988) that transplant physicians often favor (and sympathize most with

They also surface in connection with the second of the above criteria, namely "personality traits". The term is interpreted quite broadly, blending a whole range of distinct factors. Traits regarded as favorable include the willingness and ability to lead a healthy lifestyle[17], to care for oneself, and to contribute to society; negative ones include alcohol abuse, drug addiction (and the weakness of will or self-discipline that it is taken to suggest)[18] or a criminal record (ex-convicts are rejected in Singapore) – what a German cardiologist, in a similar vein, once deemed "social contraindications" (Schmidt, 1996).[19] "All these are unwritten biases", says one of the respondents, "unspoken rules we adopt because, basically, what [we] are responsible for are the precious organs" (Tx 2). And given their preciousness, one cannot give them indiscriminately to anyone needing them. One must make difficult choices, and one must make them responsibly. Singaporean transplanters are willing to take on this responsibility. Or so their accounts and self-perception as guardians of society's morality suggest. And they seem to have little doubt about the rightness and appropriateness of their selection practices.

So much for the criteria regulating patients' chances of getting admitted to a waiting list in Singapore. As all respondents stressed, the suitability assessment is very strict and highly success-driven in Singapore. But being admitted in no way guarantees that one will actually receive a donor organ – as was noted earlier, only a minority of listed patients can eventually be

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the plight of) patients with whom they share key material and symbolic features is therefore not surprising.

[17] In order to be trusted as compliant, "you have to be interested in your own health. Some people are not interested in looking after themselves. They go on leading an unhealthy lifestyle. Some patients smoke, eat unhealthily, don't exercise". Transplanted patients must always be alert to subtle signs of graft rejection, so that the rejection can be contained and reversed through as early as possible treatment. "That's why personality traits are very important". When a patient undergoes a transplant, it is like signing a contract with the physicians. "The contract is to look after yourself, help us look after yourself" (Tx 2).

[18] "The fact that you succumb to all the, you know, drug abuse, (…) it's a personality trait" (Tx 2).

[19] In addition to a criminal record ("we don't do any murderers or drug dealers"), homelessness, which was taken to indicate an unstable life pattern as well as unsocial behavior ("Someone who excludes himself from the larger community arguably forfeits his claim to solidaristic help"), served as another social contraindication at this cardiologist's center (see Schmidt, 1996: 65f.; translation from the German original). A recent defense for excluding criminals from receipt of a transplant is given by Scheidermann & Jecker, 1996.

supplied with an organ. This raises the question as to how the final recipients are selected from among the waitlisted candidates.

Selection from the waiting list

One main difference between kidney transplantation on the one hand and heart and liver transplantation on the other, is that the former is not necessarily a life-saving procedure because of the availability of a technical treatment substitute (dialysis) that can sustain the patients' lives for an extended period of time. No such substitute exists as yet in the other two fields, although gradual progress is apparently being made in the development of both artificial hearts and livers. This non-substitutionality (which basically means that patients who cannot be supplied with a donor organ in time will have to die) has implications for the patient selection procedures. Generally speaking, the procedures tend to be more success (or outcome) driven in kidney transplantation, and to place more weight on need (understood as urgency of a patient's condition) in heart and liver transplantation.

The Singaporean selection rules are no exception in this regard, although the ones used for the allocation of kidneys tend to be even more success-oriented than they are in other parts of the world, for instance within the Eurotransplant network (comprising Austria, the Czech Republic, Germany, The Netherlands, Belgium and Luxembourg) or in the United States.[20] Thus, while a good tissue match between donor and recipient is the most important selection criterion (in line with numerous studies showing that the long-term organ functioning rates increase with the degrees of histocompatibility), unlike many Western countries Singapore does not give preference to patients with preformed antibodies (which make most organs unsuitable for such patients because they would likely be rejected by their organism) in cases when organs become available against which they are not sensitized. Instead, the Singaporean kidney allocation system gives such patients minus points which further reduce their already low chances of organ receipt based on the observation that these patients' rejection rates are higher than those of unsensitized patients, thus decreasing the overall success rates. At the same time, Singapore accords waiting time, which has the capacity to offset the disadvantages facing patients with rare antigen patterns and/or preformed antibodies in a match-driven system to a certain degree, a rather low weight.

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[20] The systems used by Eurotransplant and the institution in charge in the US, UNOS, are constantly overhauled and updated, based on new clinical knowledge, (negative) experience with earlier versions, newly raised concerns, etc. Their most recent versions can be found at http://www.transplant.org for Eurotransplant and http://www.unos.org for the US.

Waiting time is usually considered in the name of justice to compensate patients for bad genetic luck. Singapore does that too, but while some countries (like the United States) give identical or near identical weight to waiting time and a good tissue match because the actual impact of tissue matching on the outcome, though real, is quite limited, and because ignoring waiting time differences can result in some patients being served within a matter of weeks whereas others have to wait almost indefinitely, Singapore clearly makes the trade-off between justice (or fairness in the access to a donor organ) and success (or efficiency in the utilization of a precious resource) in favor of the latter. Those who do best, get the organs, says the director of one of the three kidney transplant programs in the city-state. "We have among the best results in the world", with the half-lives of cadaver kidneys (the point in time at which 50 per cent of all transplanted kidneys have stopped functioning) significantly higher those than in the United States and many other countries. "This is because we have strict (…) criteria. We don't transplant (…) anybody; we only do those who are likely to keep their kidneys the longest." Prioritizing patients with worse than optimal prospects would be seen as "illogical" (Tx 3).

However, this very strong outcome orientation prevails only in kidney transplantation; in heart and liver transplantation, Singaporean doctors (or patient selection teams) place lesser import on the patients' long-term survival prospects in favor of prioritizing the sicker ones.[21] When comparing two or more candidates who may be suitable for an available donor heart, says one of the respondents, then what matters most "is the need, not the success". In other words, the patient who is closest to death will get the organ, not the one with the best survival prospect – provided the former's condition has not deteriorated so much while on the waiting list as to render it hopeless (in which case he or she will be taken off the waiting list). Of course, the respondent continues, "we all like to have a good success rate". But one also has an obligation toward one's patients. Moreover, "if I pick and choose all my patients and don't operate on sicker" ones, then it is no wonder that "I'll have very good results". But in and of itself a center's survival rates do not say much about its quality: "Sometimes we see that the mortality rate is higher" in one center than in another, but that does not imply "that you're a bad doctor". It only

[21] It should be remembered that patients with a rather poor prognosis are filtered out at the admissions stage already, so that the remaining few are the better risks anyway.

means that one is willing to take greater risks and does not give up on patients too quickly (Tx 2).[22]

This is not just a self-serving rationalization; it is a concern shared by liver and, especially, heart transplanters in many places, and given recent improvements in conservative treatment methods, several cardiologists actually believe only the very sickest patients should be transplanted at all, not least because the long-term survival prospects of transplanted patients continue to be rather poor.[23] However, despite the willingness to relax their outcome expectations to a certain degree, Singaporean heart and liver transplanters still put much emphasis on success. One indicator is the way they deal with marginal organs, i.e., donor organs whose quality, while good enough to make them usable for transplantation, is severely compromised. Such organs are never given to patients with a good prognosis. Instead, they are given to high-risk patients: "patients who we know are not going to make it anyway. But we give them a chance. At least there is a slight hope. A little hope is better than no hope" (Tx 2). A second group of patients that may qualify for marginal organs are foreigners who under Singaporean legislation are low-priority candidates and who can be considered for a transplant only if the organs in question are deemed unsuitable for citizens or permanent residents. "We have done quite a few foreigners. If we have (…) a marginal liver, we will give it to the foreigner" (Tx 1).[24]

In other words, good-quality organs are reserved for patients with a promising outlook and without traits making them otherwise less desirable. Again, similar practices are heard of in

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[22] In a similar vein, the liver transplant program has adopted Unos' MELD system for determining the priority of waitlisted patients. MELD, or Model for End-Stage Liver Disease, is a numerical scale that gives each patient a score based on how urgently he or she needs a liver transplant within the next three months. The number is calculated by a formula using lab test results for various conditions indicative of the patients' urgency. The score may go up and down over time depending on the status of a patient's disease. The rationale underlying the development of MELD was to ensure that donated livers go to the patients in greatest need – not to those most likely to survive the longest after a transplant. Although the ranking it yields is not considered binding by Singaporean liver transplanters, it does serve as an important selection guide. For more on MELD, see http://www.unos.org. Results for the liver transplant program at Singapore's National University Hospital are similar to those attained in Europe and the USA (see Lee, Lo, Quak, Prabhakaran & Tan, 1998). No results for Singaporean heart and kidney transplant programs have as yet been published.

[23] See, e.g., Deng, de Meester, Smits, Heinecke, Scheld, Treasure et al., 2000.

[24] Foreigners also have lower priority in kidney transplantation, but the kidney transplant programs in Singapore don't discriminate among recipients according to the quality of organs.

other countries, but there are also those who believe that organs of lesser quality should never be given to risk patients because that doubles these patients' risks (Schmidt, 1996). If one's primary concern is to produce good (measurable long-term) results, however, then such a policy makes perfect sense. And there can be little doubt that success considerations are paramount in Singapore.

This success philosophy is also reflected in Singapore's retransplant policies. Retransplantation is a sensitive issue because it means giving some patients two or more organs while others never get even one, and because the outcomes are generally worse for retransplanted patients than they are for first-time recipients.[25] For this reason, the Singaporean kidney transplanters consider retransplants only under two strictly observed conditions: first, a perfect antigen match must be obtained (which is very unlikely in Singapore given the city's small donor pool) in order to secure as well as possible outcomes, second, the recipient must not have lost his or her first donor kidney through non-compliance (in which case a second transplant would be out of the question – Singapore finds it "hard to forgive", as noted before). The heart transplanters follow a similar policy. Because of the higher than usual risk of failure, they generally prioritize first time recipients and would give a second heart to someone whose first graft is failing only when the new heart cannot be used for anyone else. Such instances do occur, but they a very rare. Only the liver transplant program "deviates" from this philosophy by prioritizing retransplant candidates over first time recipients based on compassion and commitment to patients who are already under its care: "Usually priority is given to someone who has already [had] a transplant, because he's going to die. Others can wait. Once we promise the guy [to transplant him], we make a commitment. (…) We don't give up" – at least unless the patient in question has a recurrent disease in which case a retransplant is ruled out (Tx 1).

It remains to be seen whether Singapore will retain its highly success-oriented selection policies in the long run. For the time being, however, patients in need of a transplant must not only meet stringent medical conditions, but also very strict moral expectations. If they don't, they will either have to stay on dialysis or, in case they suffer from heart or liver failure, die.

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[25] See, e.g., Lauchert, 1992; Loebe, Hetzer, Schüler, Hummel, Friedel, Weng et al., 1992; United Network of Organ Sharing, 1993. A philosophical defense for prioritizing first-time organ recipients over retransplant candidates on grounds of justice is given in Brock, 1988; similar arguments are to be found in Ubel, Arnold & Caplan, 1993.

Discussion and conclusion

As the findings of the research reported in this paper show, the selection of recipients for organ transplants in Singapore is driven primarily by two utilitarian concerns: (1) maximizing the output attainable from given resources – what could be called medical utilitarianism, and (2) putting society's interests above those of the individual by emphasizing such notions as a patients social worth and/or ability to contribute to the community's well-being – what could be called socio-moral utilitarianism.

In both respects Singapore's organ allocation policies appear remarkable similar to what is known about (the history of) such practices in the West. Only few social scientific studies have been done about the subject, but the ones that exist (e.g., Scarce Medical Resources, 1969; Fox & Swazey, 1978; Schmidt, 1996) confirm a tendency for decision makers to be, at least initially, highly success-oriented and moralistic in their selection behavior in order to gain acceptance for the procedure and/or because they feel this is what they should do with the precious resources under their command. Once transplantation medicine was firmly established, indications and selection criteria were gradually "liberalized". As a result, patients who would previously have been rejected as borderline cases were increasingly accepted for treatment. This is not to say that success, understood as output maximization, plays no role anymore – on the contrary, it continues to be the dominant concern in many countries and in many fields of transplant medicine, especially in kidney transplantation. But relatively speaking, it has lost in weight, while fairness, understood as equal access to a transplant, has gained more significance.

At the same time, a semi-public debate set in about the legitimacy of using criteria like social worth or self-infliction once their role in actual patient selection practices became known through social scientific and journalistic accounts.[26] Although the dispute between protagonists and critics of such criteria is anything but settled,[27] the debate certainly fostered greater tolerance toward lifestyles and "personality traits" which hitherto almost automatically lead to the exclusion

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[26] A highly influential newsmagazine article about patient selection procedures using social worth as a criterion was Alexander, 1962.

[27] To give but a few references: An early protagonist of social worth is Shatin, 1966, a recent advocate of considering self-infliction is Glannon, 1998. Early critics of using social worth criteria are Sanders & Dukeminier, 1968, more recent critics of both social worth and personal responsibility as bases for patient selection are Olsen, Richardson, Dolan & Menzel, 2003, and Gutmann, Schneewind, Schroth, Schmidt, Elsässer, Land & Hillebrand, 2003.

of their bearers; and to the extent that such characteristics are still considered, this is now less publicly acknowledged. There are many reasons for this. One is probably that with the radical value change that took place in Western countries from the late 1960s onward, people have lost (some of their) confidence in dooming others based on contentious (substantive) morals.

What does this mean for Singapore? Perhaps it means nothing because Singapore, or for that matter, Asia is different. Those who believe in the existence of distinctly Asian values are likely to view the practices described in this paper as exemplifications of these values, and if they identify with them, they may well hold them up against what they consider to be mere excesses of Western decadence, rather than outcomes of ethical learning processes. And it is certainly true that the utilitarianism (both in its "medical" and moralistic variants) that seems to underlie, albeit unwittingly, the Singaporean allocation policies square well with a morality that is generally more collectivist- and/or communitarian-oriented than the increasingly individualistic morality of the West. However, it has also been noted that the West's morality until recently was no less collectivist and communitarian than that of the East, and indeed of all traditionalistic societies (Senghaas, 1998), so that given the West's longer modernization experience, its present morality may well suggest the likely shape of future moralities in societies undergoing rapid modernization – such as Singapore.[28] In this case, it would not be unlikely to witness a gradual conversion process in which some of Singapore's present allocation criteria would step by step be replaced by morally less demanding ones. Needless to say, only the future itself can tell what course it will take.

References

Aaron, H.J., & Schwartz, W.B. (1984). *The painful prescription: Rationing hospital care*. Washington, D.C.: Brookings Institution.

Alexander, S. (1962). They decide who lives, who dies. *Life* 53 (November 9), 102-125.

Brock, D. (1988). Ethical issues in recipient selection for organ transplantation. In D. Mathieu (Ed.), *Organ substitution technology. Ethical, legal, and public policy issues* (pp. 86-99). Boulder: Westview.

Chang, R.W.S. (1996). How should cadaver kidneys be allocated? *The Lancet* 348, 453-454.

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[28] Support for this view comes, amongst others, from Inglehart's research on the linkage between modernization and value changes around the world (see, e.g., Inglehart 1995).

Deng, M.C., de Meester, J.M.J., Smits, J.M.A., Heinecke, J., Scheld, H.H., Treasure, T., & Murday, A. (2000). Effect of receiving a heart transplant: Analysis of national cohort entered on to a waiting list, stratified by heart failure severity. *British Medical Journal* 321, 540-545.

Fox, R., & Swazey, J.P. (1978). *The courage to fail. A social view of organ transplants and dialysis*. Chicago: University of Chicago Press.

Glannon, W. (1998). Responsibility, alcoholism, and liver transplantation. *Journal of Medicine and Philosophy* 23, 31-49.

Glaser, B.G., & Strauss, A.L. (1968). *The discovery of grounded theory: Strategies for qualitative research*. London: Weidenfeld and Nicolsen.

Gow, P.J., Pillay, D., & Mutimer, D. (2001). Solid organ transplantation in patients with HIV infection. *Transplantation* 72, 177-178.

Gubernatis, G. (1999). Organization of organ donation – concepts and experiences in Niedersachsen/Ostwestfalen. *Nephrology Dialysis Transplantation* 14, 2309-2314.

Gutmann, Th., Schneewind, K.A., Schroth, U., Schmidt, V.H., Elsässer, A., Land, W., & Hillebrand, G.F. (2003). *Grundlagen einer gerechten Organverteilung. Medizin, Psychologie, Recht, Ethik, Soziologie*. Berlin: Springer.

Halpern, S., Ubel, P.A., & Caplan, A.L. (2002). Solid organ transplantation of HIV-infected patients. *New England Journal of Medicine* 347, 284-287.

Hayward, C., & Madill, A. (2003). The meanings of organ donation: Muslims of Pakistani origin and white English nationals living in North England. *Social Science & Medicine* 57, 389-401.

Hesse, U.J., Troisi, R., Tattyn, P., Decruyenaere, J., Preat, M., Versieck, J., Mortier, E., Berrevoet, F., & de Hemtine, B. (1995). Erfahrungen und Resultate der Lebertransplantation bei erweitertem Indikationsbereich. *Zeitschrift für Transplantationsmedizin* 7, 47-52

Inglehart, R. (1995). Changing values, economic development and political change. *International Social Science Journal* 145, 379-403.

Kjellstrand, C. (1988). Age, sex and race inequality in renal transplantation. *Archives of Internal Medicine* 148, 1305-1309.

Kliemt, Hartmut (1993). "Gerechtigkeitskriterien" in der Transplantationsmedizin – Eine ordoliberale Perspektive. In E. Nagel & Ch. Fuchs (Eds.), *Soziale Gerechtigkeit im Gesundheitswesen. Ökonomische, ethische, rechtliche Fragen am Beispiel der Transplantationsmedizin* (pp. 262-276). Berlin: Springer.

Kuo, P.C. (2001). Reconsideration of HIV as a contraindication to transplantation. *Transplantation* 71, 1689.

Lauchert, W. (1992). Indikation und Ergebnisse der Lebertransplantation. *Zentralblatt für Chirurgie* 117, 663-669.

Lee, K.H., Lo, S.K., Quak, S.H., Prabhakaran, K., & Tan, K.C. (1998). Liver transplantation in Singapore – coming of age. *Singapore Medical Journal* 39 (February), 49-52.

Lock, M. (2002). *Twice dead. Organ transplants and the reinvention of death*. Berkeley: University of California Press.

Loebe, M., Hetzer, R., Schüler, S., Hummel, M., Friedel, N., Weng, Y., & Schliessler, A. (1992). Herztransplantation – Indikation und Ergebnisse. *Zentralblatt für Chirurgie* 117, 681-688.

McMaster, P. (2000). Transplantation for alcoholic liver disease in an era of organ shortage. *The Lancet* 355, 424-425.

Ministry of Health (2003). *Proposed amendments to the human organ transplant act*. Singapore: Ministry of Health.

Olsen, J.A., Richardson, J., Dolan, P., & Menzel, P. (2003). The moral relevance of personal characteristics in setting health care priorities. *Social Science & Medicine* 57, 1163-1172.

Prachalis, A., Pozniak, A., & Taylor, Ch. (2001). Liver transplantation in adults coinfected with HIV. *Transplantation* 72, 1684-1688.

Sanders, D., & Dukeminier, J. (1968). Medical advances and legal lag: Hemodialysis and kidney transplantation. *UCLA Law Review* 15, 357-413.

Scarce Medical Resources (1969). *Columbia Law Review* 9, 620-692.

Scheidermann, L.J., & Jecker, N.S. (1996). Should a criminal receive a heart transplant? Medical justice versus social justice. *Theoretical Medicine* 17, 33-44.

Schmidt, V.H. (1996). *Politik der Organverteilung. Eine Untersuchung über Empfängerauswahl in der Transplantationsmedizin*. Baden-Baden: Nomos.

Schmidt, V.H. (1998). Selection of Recipients for Donor Organs in Transplant Medicine. *Journal of Medicine and Philosophy* 23, 50-74.

Schweizer, R.T., Rovelli, M., Palmeri, D., Vossler, E., Hull, D., & Bartus, S. (1990). Noncompliance in organ transplant recipients. *Transplantation* 49, 374-377.

Senghaas, D. (1998). *Zivilisierung wider Willen. Der Konflikt der Kulturen mit sich selbst*. Frankfurt: Suhrkamp.

Shatin, L. (1966). Medical care and the social worth of a man. *American Journal of Orthopsychiatry* 36, 96-101.

Starzl, Th.E., & Fung, J.J. (1996). The politics of grafting cadaver kidneys. *The Lancet* 348, 454-455.

Stone, D.A. (1989). At risk in the welfare state. *Social Research* 56, 591-633.

The Gift (2002). *Critical statistics. Multi organ donation development, Singapore*. http://www.thegift.org.sg/why_organ_donation/critical_statistics.html.

Trotter, F, Wachs, M., Everson, G., & Kam, I. (2002). Adult-to-adult transplantation of the right lobe from a living related donor. *New England Journal of Medicine* 346, 1074-1082.

Ubel, P.A. (2000). *Pricing life. Why it's time for health care rationing*. Cambridge, Mass.: MIT Press.

Ubel, P.A., Arnold, R., & Caplan, A.L. (1993). Rationing failure. The ethical lessons of the retransplantation of scarce vital organs. *Journal of the American Medical Association* 270, 2469-2474.

United Network of Organ Sharing (1993). *UNOS 1993 annual report – OPTN & scientific registry of transplant recipients*. Richmond: United Network of Organ Sharing

Veatch, R. (1991). Who empowers medical doctors to make allocative decisions for dialysis and transplantation? In W. Land & J.B. Dossetor (Eds.), *Organ replacement therapy: Ethics, justice, commerce* (pp. 331-336). Berlin: Springer.