Organ transplantation is a well-established therapeutic procedure. However, too many patients must wait for a transplant and many of them die on the waiting list. In the rich Western countries, further expansion of organ transplantation is not prevented by a lack of financial means. Rather, the ‘disaster’ of not being able to provide valuable and often life-saving treatment which is, in principle, available is caused by the shortage of transplantable organs.

In looking for a remedy for organ shortage, it is important to understand the true reasons for its emergence. As far as this is concerned, it should be observed first that across European countries consent rates are quite similar, whereas realized organ donation rates per million inhabitants vary between different countries from 13 (in some countries even less) to more than 30. Thus, variations in the willingness to donate cannot be the main reason for organ shortage.

Contrary to conventional wisdom, in particular in Europe, neither a lack of medically suitable potential donors nor an insufficient willingness of the public to donate organs is the most prominent reason for organ shortage. The main reason for the shortage of transplantable organs is located elsewhere: hospitals and doctors do not participate sufficiently in the process of organ donation. In particular, potential donors are not indicated in all cases in which organ donation would, in principle, be possible. In brief: organ shortage is mainly an organizational problem.

New concepts for the organization of organ donation should, therefore, be considered. I will present one example of such a new organizational form subsequently.

Steps towards a new regional organization of organ transplantation

In 1994 the transplantation centres Hannover and Hann.-Münden handed over the basic responsibility for the organization of organ donation in the region of Niedersachsen/Ostwestfalen (N ds./Ow) to the regional subdivision of the German foundation for organ transplantation, the ‘Deutsche Stiftung Organtransplantation’ (DSO). The DSO has developed new organizational structures for N ds./Ow. Its subdivision for N ds./Ow works in close cooperation with the transplantation centres but it is an organization in its own right, independent from the transplantation centres.

The DSO-N ds./Ow serves an area of 6.8 million inhabitants, 150 hospitals (126 of which are quite small, having less than 500 beds) and seven transplantation programmes (now also including programmes in Göttingen and Bad Oeynhausen).

Under the new institutional arrangement, the number of organ donations has increased to a level of 21 donors per million inhabitants in 1998 (in comparison, the average level in Germany is 13). Therefore, it may be viewed as a paradigm indicating possible reforms for the system of organ donation in other areas as well. The basic approach, the results, the experiences and the potential consequences of this new organ donation system in N ds./Ow shall be outlined in the following.

Underlying idea and basic approach

Potential donors exist in every intensive care unit in every hospital, irrespective of the size of the hospital. However, many potential donors are not recognized as such. In principle, the following problems may be responsible for this: (i) the hospital staff’s lack of information about the criteria and procedures of donation; (ii) the lack of motivation of hospital staff; (iii) the lack of experts or necessary equipment, e.g. to perform the brain death diagnosis. (iv) Also, the hospital staff might be afraid of jeopardizing the hospital’s routine procedures by a time-consuming realization of potential organ donations.

To cope with the four potential obstacles to organ donation, a new strategy has been developed. It is based on four elements each specifically designed to solve one of the aforementioned problems.
Better informed hospital staff

All hospital staff members have been informed about criteria for identifying suitable donors. Especially the fact that broadened medical criteria allow organ retrieval in nearly all cases of brain death has been brought to general attention. Whether or not a potential donor should be considered at all, can in fact be decided by almost every hospital staff member. Such a decision is based on extremely simple exclusion criteria: H1V and malignancy. The second step concerning the suitability of each organ of a donor can only be decided jointly by hospital staff and transplant coordinators together since age and other medical criteria vary in their impact on suitability from organ to organ. Moreover, considering the medical situation of a specific recipient's condition might play a decisive role as well. For example, in a high urgency situation the liver from a 75-year-old donor can be life saving for an unhepatic recipient, but that requires that a potential donor is reported at all rather than being excluded from consideration prematurely by the hospital staff. Beyond the simple exclusion criteria, staff members need only know a simple and direct phone number, and, last but not least, must be motivated to report the donor.

Enhanced motivation by means of changes in perspectives and structures

Motivation to report strongly depends on considerations and feelings of personal responsibility. But many present arrangements are not conducive to inducing feelings of personal responsibility. In particular, patients waiting for a transplant are registered at transplantation centres while living all over the country. Whether or not these patients have a chance of treatment is, in the last resort, decided by the local hospital's willingness to participate in organ donation. However, under present arrangements, hospitals tend to feel that the realization of donations is not their responsibility, but that of the transplantation centres. In order to change this, members of hospital staff should be induced to make the problem of organ donation their own problem. As the experience in Nds./Ow shows, this can be accomplished by organizing organ donation as a common task of the medical system as a whole. The organizational structure has to express clearly that organ donation is a common task rather than a particular one of transplantation centres. This lends additional moral credibility to appeals for greater voluntary participation in the donation process in hospitals. The DSO-Nds./Ow works under the supervision of the General Medical Council (GMC), an interdisciplinary, 'permanent committee (for) organ transplantation' which supervises and evaluates the practice of organ donation in the region. The GMC provides background and transparency for both medical professionals and the public at large. It assists in showing the process of donation for what it is: the common task of well-intentioned people who want to assist other individuals in their pursuit of their vital health and in their survival interests. Under the supervision of the GMC, hospitals provide organs and are directly involved in the donation process as active participants rather than being treated as secondary agents of the transplantation centres. This change of perspective makes it much easier to motivate colleagues in peripheral hospitals to participate in organ donation. But to render the moral motivation to participate in the donation process fully operatively, the non-monetary and monetary costs (peripheral) hospitals incur by their participation must be low. That is to say that it is not only required that monetary costs be fully reimbursed, but also that participating in organ donation must become an easy and smooth process for hospitals. In Nds./Ow, therefore, great care is taken to assist hospitals in each and every step of the donation process.

(iii) Comprehensive service

The procedure of organ retrieval is an additional and sometimes difficult task for hospitals along several dimensions: organizational, physical and psychological. Especially in smaller hospitals, necessary facilities, e.g. for diagnosing brain death, may not be available. In consequence, in order that every potential donor be reported, hospitals have to be supported. To enable all hospitals to participate in organ donation, the regional organization of DSO has established a comprehensive service (Table 1). This core service is permanently available and can be easily contacted directly by a (telephone) hotline. A very unique element of this service is the mobile team for the diagnosis of brain death: more than 20 experts are available to support or perform brain death diagnosis in peripheral hospitals. The team is organized by the DSO-Nds./Ow, but it works under the supervision of the GMC, which is responsible for the quality control of this team. Thus, the organizational responsibility for brain death diagnosis and that for organ donation are separated. The members of the regional organ procurement teams are well-known in our regional hospitals. This facilitates the development of mutual trust, reduces the time requirements for retrievals and improves the psychological situation in peripheral hospitals. As far as donation at large is concerned, it should be observed that the regional organ procurement teams always offer to remove organs that are destined to be transplanted in other regions by other transplantation centres.

Table 1. Core service for hospitals: Permanently (24 h, 7 days) available

| 1. | Competent person on the phone |
| 2. | Coordinator for organization and medical problems |
| 3. | Complex laboratory examinations incl. toxicological and viral examinations |
| 4. | Mobile team for diagnosis of brain death: neurologist, neurosurgeon, EEG-MTA, EEG and Doppler-ultrasound |
| 5. | Regional organ procurement teams for abdominal and thoracic organs |
(iv) Optimization of retrieval processes by means of management

Each part of the whole retrieval process is permanently under evaluation. A system of quality management has been developed and implemented for continuous improvement of the DSO's service. The main objective is to meet the requirements and needs of donor hospitals, i.e. to guarantee that the process is organized such that it can be completed as swiftly as possible without jeopardizing other procedures in the hospital. Being independent from transplantation centres, the organization can bundle all of its resources to fulfill its core duties of supporting all hospitals as comprehensively as possible. This is the main and only objective of the DSO. The main objective of transplantation centres is, however, transplantation; thus, the organization of organ donation inevitably remains a mere secondary responsibility for them, falling outside of their main focus and major area of competence. The DSO Nds/Ow's independence from transplantation centres allows for the implementation of a system of management by objectives exclusively directed towards organ donation. In addition to supporting acute donor processes, a continuous support for hospitals, including not only information but also the training of colleagues (e.g. in conversation techniques, etc.) is offered. In the terminology of business administration, such comprehensive 'care' could be described as 'comprehensive marketing' for donor hospitals as well. A admittedly, this mode of speech somehow does not quite fit in with the task at hand. However, that service must come first if we intend to help patients and to increase organ donation rates is also obvious, and the terminology of business may help keep us aware of this fact. As well as the introduction of so-called hospital transplantation representatives (also referred to as 'in-hospital-coordinators') who basically serve as organizers of the internal hospital procedures of organ donation and as communication partners for the DSO-coordinators, the strategy of putting service first in a new regional mode of organization (as described above) has proven very successful.

Results

Organ donation rates have increased significantly within the last few years in NDS/Ow (Figures 1 and 2). The greatest increase can be detected in small and medium-sized hospitals, i.e. in hospitals not belonging to the 'maximum care' category. In 1998, 84% of all donors were located in non-university hospitals, i.e. hospitals without any transplant activity (Figure 3). In total, the organ donation rate achieved a level of 21 per million inhabitants in 1998 (Figure 4).

The utilization of some parts of the core service by non-university hospitals is shown in Table 2. This demonstrates that a considerable number of donations would not have been realized without offering such a service. By means of quality management, the time requirements for each step of the whole procedure have been reduced. The time-span between the confirmation of the brain death diagnosis with consent given and the end of the whole procedure, including the multiple organ donor operation, may serve here as a central illustration: in peripheral hospitals this time-span is less than 6–6.5 h (median time). A hospital survey was performed to evaluate the DSO's service. Ninety-nine per cent of 411 staff members asked were satisfied (51%) or very satisfied (48%). Only 1% said to be less satisfied, while no one was unsatisfied. The coordinators were described as competent, friendly, reliable and quick in most cases (Figure 5).
Discussion

Rational choice dictates that a strategy achieving more rather than less with certain (or) the given means is better. Ceteris paribus a strategy with higher effectiveness has to be preferred. The pursuit of ends like realizing organ donation is no exception to this principle. In fact, the high moral standing of such ends makes it even more urgent to pursue them effectively. That the pursuit of these ends is exclusively organized on a non-profit basis, and very rightly so, does not change this. If in Nds./Ow, in comparison to other regions in Germany, a much higher effectiveness in organ donation could be achieved within basically the same financial constraints, introducing more effective strategies should, at the very least, be considered in other regions of Germany and, perhaps, beyond. Certainly, establishing organ donation concepts in other regions might not be a simple process of copying, but the essential features of the basic approach adopted in Nds./Ow may be helpful in developing specifically adapted approaches suitable for other regions.

What are the structural presuppositions and which structural proposals can be derived from the experience in Nds./Ow? Especially the service for donor hospitals has to be comprehensive and permanently available. To provide such a service, a sufficient financial basis is indispensable. For economic reasons, the entire range of services is only realizable in a sufficiently large region with a sufficient basis of reimbursement. For example, in our region the costs for the neurological team amount to more than 100 000 DM/year. The smaller, neighbouring region of Bremen, serving only 15 hospitals, cannot afford to offer such an expensive service.

Economies of scale and indivisibility in service provision are important. There is, therefore, a minimum size for effective donor regions. In addition, single and/or decentralized resources should be efficiently combined. Therefore, in Nds./Ow, a central coordination structure was implemented. Now all coordinators work together in one central office. (Nota bene: local transplantation offices still exist; they are adjacent to each transplantation centre and fulfill the tasks involved in managing the waiting lists and in dealing with donations from living donors.) Contrary to other regions in Germany, the coordinators are supervised by the medical head of the donor organization rather than by the transplantation centres. Thus, they can focus on their core duties without interference by anyone else.

That all coordinators work together in pursuit of shared aims is very important for psychological reasons. In general, the central coordination structure better facilitates the fulfillment of tasks by allowing for an efficient division of labour: acute duties can, in fact, be performed without delay while other duties such as presentations, activities for motivating hospital staff in the region, etc. can go on uninterrupted since coordinators can substitute each other.

In Germany, Nds./Ow is the donor region with the
highest number of donor referrals, 278 in 1998. Nevertheless, the number of referrals per month varies strongly: in 1998, from 16 in February up to 28 in May. Figures 6 and 7 show the time of referral, and it is obvious that especially in February, referrals took place in a clustered manner within a few days. On most days, however, there were no referrals. In May, the number of referrals was distributed more evenly.

The time of the beginning of organ removal, as depicted in Figure 8, demonstrates clearly that most of the organizational work has to be done outside of regular working hours. If the phone call for a referral is to go directly to the person on duty for that special purpose, such a service can only be assured if backed up by a large and competent organization in which coordinators can substitute for and/or complement each other in times of overwhelming workload.

One major feature of the organizational strategy described here is its independence from transplantation centres. With the exception of Nds./OW, organ donation in Germany has been chiefly organized by transplantation centres. Undoubtedly, this was the right solution for the pioneer phase of transplantation. However, it is doubtful whether such a system is suitable for the future.

This is not to say that transplantation centres are unable to organize organ donation. But under increasing economic constraints and concurrent interests in the health care system, it would be advisable for transplantation centres to focus on their core competence, which is transplantation rather than the organization of organ donation.

Diverting the resources of transplantation centres to tasks other than transplantation may in fact be inefficient nowadays. At least it must be noted that under the evolved system in which transplantation centres are responsible for organ donation, it has not been possible to increase the average donation rate in Germany over the last 10 years; it is still about 12–13 per million. In view of this, it may be deemed significant that the donation rate in Nds./OW corresponds to the donation rate in those areas of the USA in which organ donation is organized by independent organizations. Thus, the argument that only transplantation centres can organize organ donation seems to be without empirical support.

Though there are several viable ways to organize organ donation, it seems quite obvious, too, that it is most effectively performed by an organization that focuses exclusively on this task. The independence of transplantation centres from organ donation has, however, a second effect which is especially relevant for public relations. Once the philosophy that organ donation is a responsibility shared by the whole community is reflected by the system and its structures, the public at large will naturally tend to treat organ donation as its own cause. Public participation in the process and trust in the system will be very much improved. Trust will be enhanced also by the fact that the mobile team for diagnosing brain death is working under the supervision of the Medical Council. New German transplantation law reflects this philosophy by requiring that transplantation medicine be divided organizationally into the three fields, namely, donation, allocation and transplantation, as of December 1, 1999.

A professional organization of organ donation can only give maximal support where such a support is wanted. The organization can only stimulate latent motivation or re-enforce existing involvement, but it cannot force hospitals and colleagues to participate in organ donation. This observation raises the issue of making participation legally mandatory, an issue which is rarely discussed in Europe. However, if organ transplantation is to be regarded as an integral part of health care, it may seem quite natural to follow the example of the USA, where hospitals not participating in donation risk the imposition of fines and penalties.

In Germany, the transplantation law obliges all hospitals to report potential donors. However, this
obligation does not come with the legal threat of a punishment or a fine. Voluntary compliance is indeed preferable for ethical reasons. To bring this about, besides the other measures described above, the implementation of so-called hospital representatives or hospital coordinators may be helpful. Hospital-based coordinators can organize the process of organ retrieval inside the hospital and can cope with psychological problems. This facilitates—if not guarantees—the participation of the hospital. As far as this is concerned, Bavaria intends to oblige every Bavarian hospital with an intensive care unit to name at least one hospital coordinator for transplantation.

**Conclusion**

In view of the empirical evidence gathered in N.d.s./Ow and elsewhere, a re-organization of organ donation seems highly advisable. The commonly shared end of increasing the number of organs available for transplantation can be achieved within the present budget constraints to a far higher degree than is currently the case. An institution pursuing the sole objective of organizing organ donation combines structural effectiveness with individual engagement. It can offer a comprehensive service, combine resources in a powerful central organization run according to the principles of management by objectives. It will stimulate and enforce voluntary participation of those who are willing to participate in principle. Beyond this, the imposition of legal sanctions would seem necessary.

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