DOPKI NEWSLETTER 2009

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Participants and Organisation of the Work

DOPKI´s consortium is composed by 13 organisations on behalf of 16 European countries. p.4

The Dopki Project

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Dissemination of Dopki Project

Because the characteristics of DOPKI project, it is extremely important that all the knowledge acquired through this project is spread in general terms and, in particular, to those figures direct or indirectly involved in the donation process. Dissemination should be a tool itself to increase donation activity not only in Europe, but also in other regions in the world. In the end of this project, DOPKI consortium will publish a **guide** providing a set of general recommendations to build up these programmes in European countries, as well as organise one **last event** in 24th March 2009, in Auditorio Fundación Mutua Madrileña, Madrid. p.18

EUROPEAN COMMISSION

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PARTICIPANTS AND ORGANISATION OF THE WORK

DOPKI´s consortium is composed by 13 organisations on behalf of 16 European countries, which represent 80% of the population and 80% of all the donation and transplantation activity in Europe.

Activities in DOPKI are organized in 7 work packages:

WP 1 Project management / Co-ordination/Communication system (leader: ONT)
WP 2 State of the Art (leader: DSO)
WP 3 Design of the work methodology (leader: CNT)
WP 4 Implementation of the study (leader: ABM)
WP 5 Statistical data and cost/benefit analysis (leaders: ET, HNBT)
WP 6 Dissemination plan. Information to stakeholders (leader: ASST)
WP 7 Conclusions and Policy implications (leaders: UKT, ONT)

Autoridade para os Serviços de Sangue e Transplantação (ASST), Portugal (PT)

Organización Nacional de Trasplantes (ONT), Spain (ES)

Agence de la Biomédecine (ABM), France (FR)

Poltransplant, Poland (PL)

Centro Nazionale Trapianti (CNT), Italy (IT)

Slovenija Transplant, Slovenia (SI)

Deutsche Stiftung Organtransplantation (DSO), Germany (DE)

Swisstransplant, Switzerland (CH)

Eurotransplant International Foundation (ET), The Netherlands (NL)*

Transplant Coordinating Centre of the Czech Republic (KST), Czech Republic (CZ)

Hungarian National Blood Transfusion Service (HNBT), Hungary (HU)

UK Transplant (UKT), United Kingdom (UK)

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*Eurotransplant International Foundation provides information on behalf of Austria (AT), Belgium (BE), Luxembourg (LU) and The Netherlands (NL).

THE DOPKI PROJECT

During the DOPKI project several meetings were organized; hundreds of e mails circulated among the partners. and more than 300 hundred documents were produced.

The DOPKI Project started in the 1st January 2006 and ends in 31 March 2009 DOPKI project aimed to develop a harmonized and applicable methodology that could be used to determine both, the potential for organ donation and its outcome, as well as to define the limits for organ's safety and quality.

To achieve the objectives of DOPKI project, (as described on the first newsletter and also available on DOPKI website (www.dopki.eu)), for three years the consortium has developed tools and methodologies that can be used to develop actions to improve organ availability.

Several meetings were organized; hundreds of e mails circulated among the partners. and more than 300 hundred documents were produced.

This newsletter intends to provide some information on the achievements by the project. It includes:

- The analysis of data related with donation and transplantation activities and information on socio-demographic, economical and health-care data, as well as general and specific mortality rates,
- Information about the dopki registry for expanded criteria donors,
- Some results of a pilot action in DOPKI project of a methodology to estimate the potential of donation and evaluate the performance in the deceased donation process,
- A Markov Spreadsheet Model: Report on the Kidney Transplantation
- Information about the Dopki website and other dissemination activities

The editorial entitled "Measuring the Potential Supply of Organs for Transplantation, highlights the organ shortage as a global problem and the potential contribution of the DOPKI project all around the world. It's written by three Personalities, the Director of Medical Affairs of the Transplantation Society, the Coordinator "Clinical Procedures" (EHT / CPR)- World Health Organization and the National Transplant Coordinator- Organización Nacional de Trasplantes from Spain. This editorial is an important contribution to disseminate DOPKI, once dissemination itself will increase awareness on the need to improve the performance in the donation process. The link between DOPKI and the WHO is one particular objective of the project.

Meeting Participants hold in Madrid, 11-12 Dec 2008

MEASURING THE POTENTIAL SUPPLY OF ORGANS FOR TRANSPLANTATION

Organ transplantation is the best and frequently the unique therapeutic alternative for patients with end stage organ failure and many other life-limiting conditions. Excellent results achieved with this therapy have made transplantation become a victim of its own success with supply of organs for transplantation not being able to fulfil the demands.

Francis L. Delmonico, Luc Noel and Rafael Matesanz.

Organ transplantation is the best and frequently the unique therapeutic alternative for patients with end stage organ failure and many other life-limiting conditions. Excellent results achieved with this therapy have made transplantation become a victim of its own success with supply of organs for transplantation not being able to fulfil the demands. Organ shortage has dramatic individual and global consequences. Many patients deteriorate or even die while waiting for an organ and many will never be placed into the waiting list. Organ shortage has another dramatic consequence in the trafficking of human organs and the progressively better known phenomenon of transplant tourism. Organ trafficking and transplant tourism violate the most basic human rights and hence they have been banned by the international community. Besides, these practices facilitate the creation of a climate of distrust in the donation and transplantation system that may increase the scarcity of donors and organs for transplantation even more. As a global problem, organ shortage must be faced through global solutions, providing the standards and pillars over which locally tailored actions must be developed. In this context, The Transplantation Society (TTS), the World Health Organization (WHO) and the Spanish National Transplant Organization (ONT) are actively developing a global plan to overcome the problem of shortage, provide high quality and safety standards in transplantation and promote ethical practices in the field.

As assessed by Guiding Principle number 3 of the WHO on human cell, tissue and organ transplantation, "donation from deceased persons should be developed to its maximum therapeutic potential"[1]. Hence, living donation should represent a complementary activity, not preventing the development of solid deceased donation systems. Accordingly, the "Istanbul Declaration on organ trafficking and transplant tourism" states that "each country should (…) provide organs to meet the transplant needs of its residents from donors within its own population or through regional cooperation. The therapeutic potential of deceased organ donation should be maximized not only for kidneys but also for other organs, appropriate to the transplantation needs of each country. Efforts to initiate or enhance deceased donor transplantation are essential to minimize the burden on living donors"[2]. Therefore, there exists a wide consensus that the international transplant community must have successful programs of deceased donor transplantation in every country to be realize the therapeutic potential of transplantation.

The process of deceased organ donation has been described as a long and complex one, with the implication of many professionals from a different profile and background. This process, which starts and ends in the society, can be easily broken at any time, precluding potential donors from becoming actual donors. Every single step of the process (donor identification, evaluation, maintenance, obtaining the consent to proceed with organ donation, organ allocation, recovery and transplantation) represents an area of potential donor losses. However, it has been widely recognized that the weakest link in this chain is the failure to identify and subsequently refer potential deceased organ donors.

Hence, one of the first steps when facing organ shortage is to determine the potential of deceased organ donation. It will be on the basis of that estimated potential, to which performance in the process should be referred to. While available methodologies have been applied in different countries adapted to their local circumstances, it seems essential to develop international standards for such estimation. These international standards would rationalize the task and provide guidance thus simplifying and allowing many countries to develop local estimates. Additionally, these standards would ensure comparability between the countries, allowing the study of factors with an impact on that estimated potential and lead to the identification of benchmarks and best practices behind.

DOPKI is a project funded by the European Commission that has been able to agree on a common methodology to estimate the potential of deceased donation after brain death and evaluate the performance in the deceased donation process, identifying areas where improvement is possible. This initiative has provided a first approach to the establishment of standards in the field at a European level and has led the grounds for developing this effort at a global scale. In fact, the knowledge and experience acquired by this multinational European Task Force, will serve as the basis to associate the experience of other countries within the world, whether they have a long history of organ donation and transplantation or they are in the process of setting up a transplantation service. Thus a Global

1 WHO guiding principles on human cell, tissue and organ transplantation
2 Steering Committee of the Istanbul Summit. Organ trafficking and transplant tourism and commercialism: the Declaration of Istanbul. Lancet 2008;372 (9632): 5-6.

initiative will be launched under the title: “Data harmonization in transplantation: measuring the potential supply of organs from deceased donors”. This initiative, driven by TTS, WHO and ONT, will have two preliminary objectives: provide common procedures to estimate the potential of deceased organ donation and define triggers to facilitate the prospective identification and referral of the potential deceased organ donor. The methodology agreed under the umbrella of this project, should be applicable to every country or region, regardless of the level of development of its health system and baseline situation of the deceased donation activity.

Organ shortage is one of the main obstacles to be faced today in the field of transplantation. Consequences of shortage are dramatic and of universal concern. DOPKI and this new global project, linked by their nature and scope, aim in the end to promote the development and progressive increase of deceased donation activities and new programmes and hence facilitate the access of citizens to transplantation across the world.

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MORTALITY RATES IN COUNTRIES

Standardised death rates across the countries ranged from 519.96 to 1090.63 per 100,000. Six out of the 28 countries had SDRs over 1,000 per 100,000. Investigations of differences in country wide mortality showed no significant relationship between specific death rates and donation rates in the countries.

The aim of this analysis was to assess differences in general and specific mortality rates between countries. Two sets of data were investigated, the first was national mortality and the second was intra-hospital mortality, both for the year 2004.

National mortality

For national mortality in general and for specific causes, data were collected from the World Health Organisation (WHO) website by ONT for 34 countries. Although not all 34 countries had data available for each of the death rates investigated. The table below shows the range of values for the general and specific death rates.

	No. of countries	Min	Max
Crude death rate per 1,000 population	29	6.23	14.15
Standardised death rate per 100,000	28	519.96	1090.63
Infant deaths per 1,000 live births	30	2.83	28.00
External cause injury and poison SDR[1]	28	27.29	142.95
Cerebrovascular SDR[1]	28	31.08	213.42
Motor vehicle traffic accidents SDR[1]	27	3.36	21.47
Suicide and self inflicted injury SDR[1]	28	0.69	38.92

Table 1: Range of values for general mortality and specific causes
[1]SDR – standardised death rate

A univariate analysis of variance was performed to investigate the relationship between each specific standardized death rate and the heartbeating donation rate per million population. Countries were grouped by their donation rate into three groups; high, medium and low donation. The specific death rates used were: external cause injury or poison; cerebrovascular, motor vehicle and suicide SDR. Each of these were looked at in turn, but no significant relationships were found.

Intra-hospital mortality

The majority of countries participating in DOPKI did not have national intra-hospital mortality figures available, but data were provided by six countries, as shown in Table 2.

Country	Total hospital deaths (% of all deaths)		All deaths	HB donor rate pmp
Czech Republic	58,721	54.8%	107,173	20.48
France	294,196	56.3%	522,915	20.74
Hungary	76,608	57.8%	132,505	15.83
Italy	214,704	39.3%	546,465	20.78
Poland	122,000	33.6%	363,476	14.72
Portugal	41,582	40.6%	102,394	21.14

Table 2: Hospital deaths, all deaths and heartbeating (HB) donor rate per million population (pmp) in countries

The percentage of all deaths occurring in hospitals in the six countries ranged from 33.6% in Poland to 57.8% in Hungary. Poland has the lowest heartbeating (HB) donor rate per million population (pmp) of the six countries, 14.72 pmp, and the lowest percentage of deaths occurring in hospitals, 33.6%. However, Hungary also has a low donation rate of 15.83 pmp but has the highest hospital deaths percentage of 57.8%.

Conclusions

Standardised death rates (SDRs) across the countries ranged from 519.96 to 1090.63 per 100,000. Six out of the 28 countries had SDRs over 1,000 per 100,000. Investigations of differences in country wide mortality showed no significant relationship between specific death rates and donation rates in the countries.

A cluster analysis performed on data from 27 countries grouped 14 countries together based on four specific SDRs, these countries included Germany, Spain, UK, France and Switzerland.

Intrahospital mortality information was available for six countries and the percentage of deaths that occurred in hospital ranged from 33.6% to 54.8%. These rates were compared to the heartbeating donor rate pmp but there was no indication that the greater the proportion of hospital deaths, the higher the donation rate.

EFFECT OF SOCIAL, ECONOMIC AND STRUCTURAL HEALTH CARE FACTORS ON DONATION AND TRANSPLANTATION RATES

A multiple regression analysis was performed, for each of the three outcome measures as pmp rates: number of heartbeating donors, deceased kidney transplants and the number of patients on the kidney transplant waiting list at 31 December 2004.

The second country analysis was to assess the effect of social, economic and structural health care factors on donation and transplantation rates. Data for 2004 were again collected from the WHO website on various health care factors and data on donation and transplantation rates were obtained from the Council of Europe transplant newsletter.

Due to a large amount of missing data for countries three outcome measures were investigated: number of heartbeating donors, deceased kidney transplants and the number of patients on the kidney transplant waiting list at 31 December 2004. The following factors were investigated although a few were missing for some countries: total area, gross national product, gross domestic product, percentage of population less than 15 years, percentage of population greater than 65 years, Life expectancy at birth, Life expectancy at 65, Total fertility rate, Hospital beds, Acute care beds, Physicians, Nurses, Crude death rate, standardized death rate, infant deaths, external cause injury or poison deaths, cerebrovascular deaths, motor vehicle deaths and deaths by suicide or self-harm.

Firstly, the three outcome measures were calculated as per million population (pmp) rates in order to compare across the countries.

The initial analysis plotted each of the factors individually against the three outcome measures to identify any outliers and any trends. An example is given below.

None of the plots showed an obvious relationship between the outcome variables and the factors investigated.

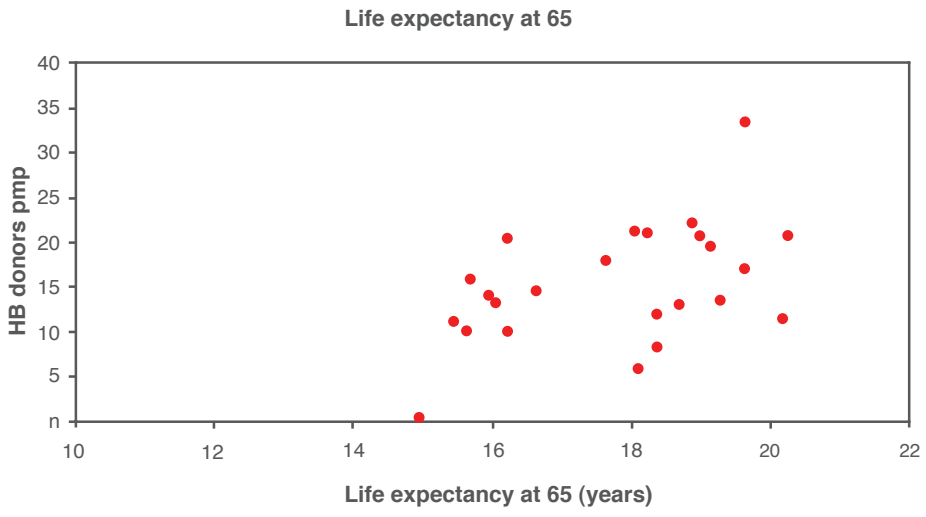


Figure 1

There is considerable variation between the number of heartbeating donors, the number of deceased donor kidney transplants and the number of patients on the kidney transplant waiting list at 31 December 2004 in the countries. In this analysis, we examine whether this variation can be attributed to any of the social, economic and health care factors mentioned above.

A multiple regression analysis was performed, for each of the three outcome measures as pmp rates: number of heartbeating donors, deceased kidney transplants and the number of patients on the kidney transplant waiting list at 31 December 2004. For each analysis, countries that had more than 10 observations for the outcome variable were included. For each of these outcome measures, data from countries where all of the factors were present were included in the model building process and a stepwise selection method was used. Significant factors were identified at a 1% significance level due to the number of tests being performed.

For the heartbeating donors pmp analysis, data from 13 countries were used and the 19 factors identified were included in the model. One factor was significant at the 1% level, the number of infant deaths per 1,000 live births. However, it cannot be concluded that this factor is predictive of HB donor numbers.

In the deceased kidney transplant pmp analysis 13 countries were used and 19 factors were included in the model. No factors were found to be significant at the 1% level.

In the kidney transplant waiting list pmp analysis, 14 countries were used and the same 19 factors were included in the model. No factors were found to be significant at the 1% level.

A further analysis has been carried out based on categorising the same outcome variables into three groups: high, medium and low. This analysis considers each factor as an ordinal categorical variable and uses ordinal logistic regression to establish whether the response category is associated with any of the social, economic and health care factors considered previously. For each analysis, countries that had more than 10 observations for the outcome variable were included. For each of the three outcome measures, data from countries where all of the factors were present were included in the model building process and a stepwise selection method was used. Significant factors were identified at a 1% significance level due to the number of tests being performed.

For the heartbeating donors pmp analysis data from 13 countries were used and 19 factors were included in the model. Countries with a heartbeating donor rate of 20 pmp or more were categorised as high, and those with 11.5 pmp or lower as low. In between 11.5 and 20pmp was medium. No factors were found to be significant at the 1% level.

In the deceased kidney transplant pmp analysis 13 countries were used and 19 factors were included in the model. Countries with a deceased kidney transplant rate of less than 22.5 pmp were categorised as low, 28.1 pmp or higher as high and were medium otherwise. No factors were found to be significant at the 1% level.

In the kidney transplant waiting list pmp analysis 14 countries were used and the same 19 factors were included in the model. Countries with a kidney transplant waiting list rate of less than 60 pmp were categorised as low, 99 pmp or higher as high and were medium otherwise. No factors were found to be significant at the 1% level.

Conclusions

For this data set there was no indication that any social, economic or structural health care factors analysed were associated with the number of deceased heartbeating donors, deceased kidney transplants or patients waiting for a kidney transplant.

Smaller numbers of observations for other possible outcome measures make it less likely that any relationship with the factors will be identified.

PERFORMANCE IN THE DECEASED DONATION PROCESS: RESULTS OF A PILOT ACTION IN DOPKI PROJECT

There are two different methods of estimating the potential of donation: the use of mortality data and the registry of potential deceased organ donors on the basis of a retrospective clinical chart review or, more ideally, on a prospective fashion. This last methodology also provides the unique opportunity of identifying areas in the process where improvement is possible.

DOPKI intended to develop a common, agreed and applicable methodology to estimate the potential of deceased donation and evaluate the performance in the deceased donation process. Representing the potential of deceased donation on the basis of the living population has been the common standard to represent performance in the process. Not by chance, donors pmp is a universal and easy indicator to be constructed. However, the living population is far from being accurate to represent the potential of deceased donation and hence it is insensible to local factors affecting that true potential. There are two different methods of estimating the potential of donation: the use of mortality data and the registry of potential deceased organ donors on the basis of a retrospective clinical chart review or, more ideally, on a prospective fashion. This last methodology also provides the unique opportunity of identifying areas in the process where improvement is possible.

The DOPKI consortium agreed on a methodology to estimate the potential of donation after brain death and evaluate the performance in the process on the basis of both analysis of mortality data and clinical chart review (retrospective assessment) of patients dying in the ICU. In summary, the group agreed on:

- A set of ICD codes (table 3), representing pathologies accounting for a big percentage of brain deaths. The analysis of this mortality data could be a first approach to the potential of donation after brain death.
- Representing the potential of donation through the number of possible (brain death diagnosis initiated) and confirmed (brain deaths diagnosis completed) brain deaths. This would allow misinterpretations related to differences between the countries regarding relative and absolute contraindications to organ donation.
- A list of reasons precluding a brain dead person from becoming an actual (=effective) donor, where actual donor was defined as the person from whom at least one organ was recovered for the purpose of transplantation.
- A set of indicators to represent the potential of donation, areas of improvement and global effectiveness of the process.
- Demographic data to be collected from brain dead persons, mainly age.
- Hospital and ICU factors and characteristics to evaluate their impact on key indicators.

	ICD 9	ICD 10	Description
Craneoencephalic Traumatism	850	S060	Cerebral concussions
	851	S062, S063 – S068	Cerebral laceration and contusion
	852	S064, S065, S066, S068	Subarachnoid, subdural and extradural haemorrhage following injury
Cerebrovascular Accidents	430	I-60	Subarachnoid haemorrhage
	431	I-61	Intracerebral haemorrhage
	432	I-62	Other intracranial haemorrhage
	433	I-65	Occlusion of precerebral arteries
	434	I-63	Occlusion of cerebral arteries
	436	I-64	Stroke (not specified as haemorrhage or infarction)
Anoxic Brain Damage	348.1	G-93.1	Anoxic brain damage

Table 3: ICD codes representing pathologies

To validate the agreed methodology, a pilot action was developed in 30 hospitals from 10 European countries. The study was focused on the year 2006. Hospitals were selected for convenience and hence results are not expected to be extrapolated to make inferences about the countries involved. As a pilot action, its intention was to validate the agreed methodology. The most outstanding results of this pilot action are summarized in the next page.

Mortality Data

The number of hospitals providing the complete set of requested data on mortality was low and deaths in the emergency department were not codified, as expected. Keeping in mind these limitations, almost 26% of deaths occurring within the hospitals and almost 23% of deaths occurring within the ICU contained any of the previously mentioned codes. Notably, only 21% of deaths within the hospital containing any of these selected codes occurred within the ICU.

We also intended to determine whether significant correlations could be established between deaths with selected codes and brain deaths, and whether this correlation was stronger than that between the number of total deaths, ignoring ICD codes. As represented in fig. 2, a significant correlation was found between the number of ICU deaths and the number of BD (fig. 2a). However, such correlation was clearly stronger when considering ICU deaths with selected codes (fig. 2b). Our finding suggests that hospital and ICU deaths containing among their diagnosis any of the preselected codes might be used to calculate more accurate estimations/indicators of the potential of donation.

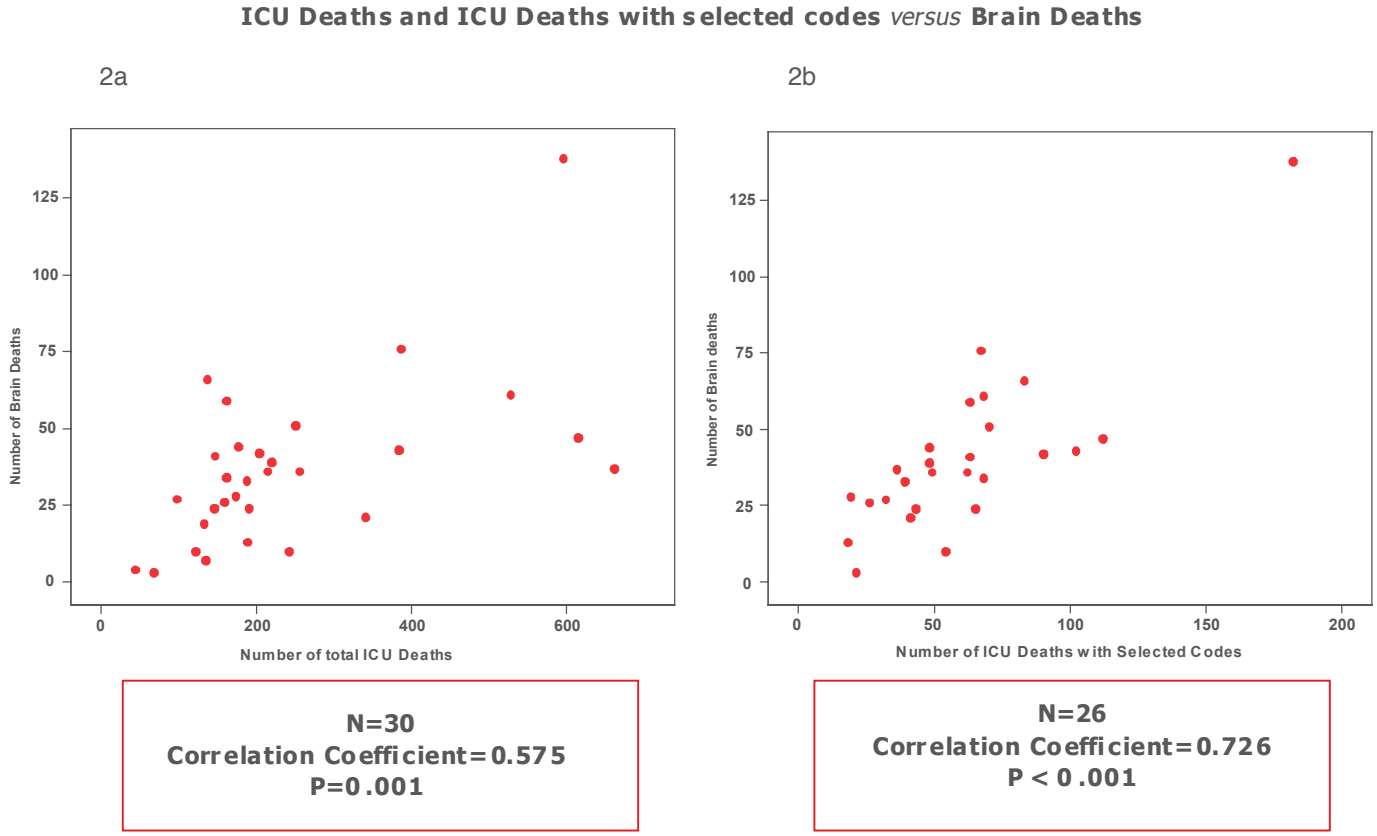


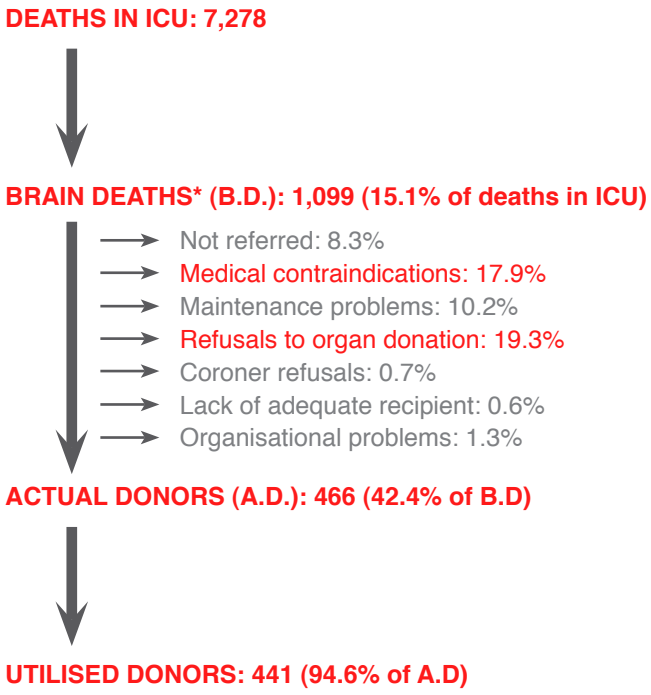
Figure 2 (a and b)

PERFORMANCE IN THE DECEASED DONATION PROCESS: RESULTS OF A PILOT ACTION IN DOPKI PROJECT

Indicators of potential of donation, areas of improvement and global effectiveness

Key indicators on the potential of donation, areas of improvement and global effectiveness are represented in figure 3. In summary, out of the total number of deaths occurring within the participating hospitals in the year 2006, 2.9% were BD and out of the total number of deaths occurring within the ICUs in the same period of time, 15.1% were BD. There was an important variation in the value of these indicators between the hospitals.

Figure 4 represents areas of improvement according to age of brain dead persons. Notably, 8.3% of all BD were not referred to the coordination system. Although the number of hospitals providing the data according to the different age groups is limited, it can be easily seen that losses of BD for organ donation due to this lack of referral was higher for the group of age over 65 years. This may imply that age has been somehow considered a contraindication to organ donation in some cases. Approximately 10% of all BD were



*Brain death possible and confirmed

Figure 3

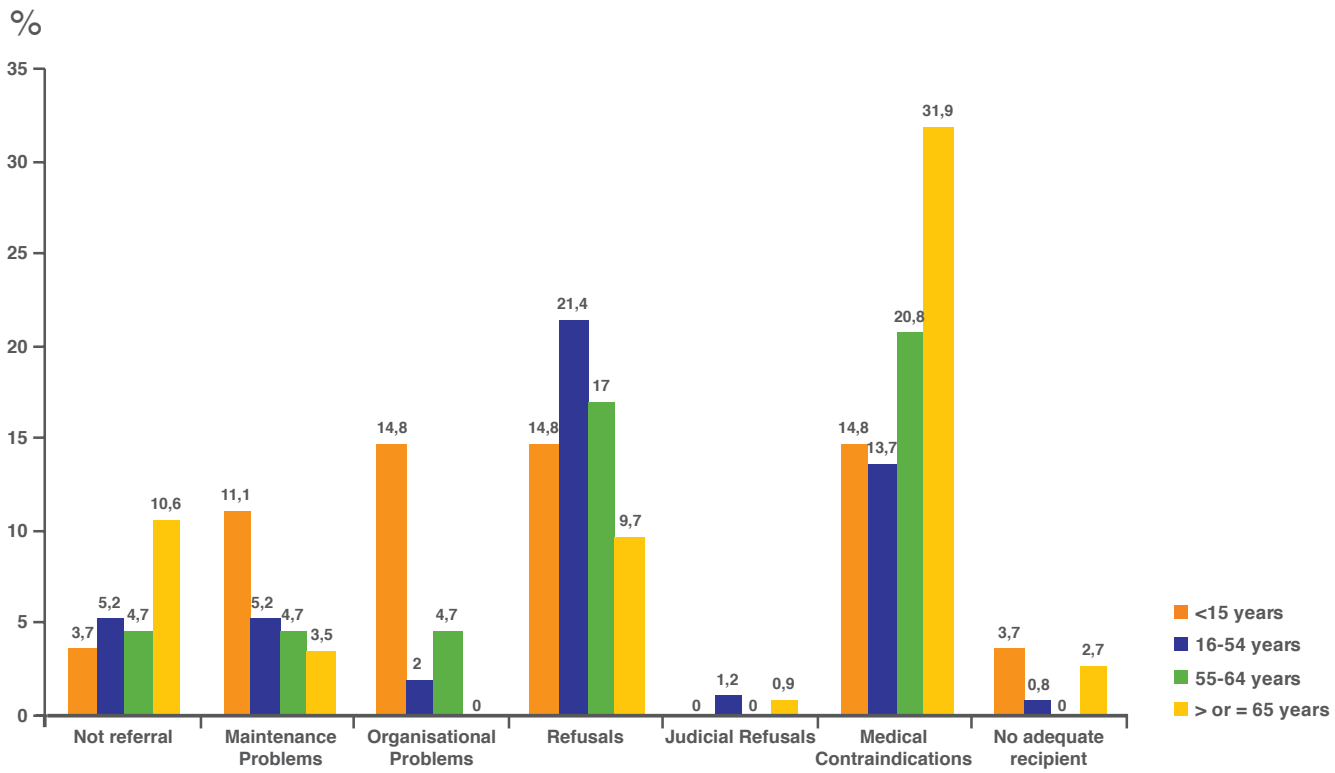


Figure 4

lost due to hemodynamic problems during the maintenance of the potential donor. Losses due to maintenance problems were apparently higher in the group of potential donors aged less than 15 years of age, a finding that could be related to the cause of death. The two quantitatively most important areas of improvement were refusals to donate expressed by the relatives and medical contraindications. Notably, variations regarding these two indicators were apparent according to the age group.

Finally, 42.4% of BD were actual donors, with 3.24 organs recovered *per* actual donor. Out of the actual donors, 94.6% were utilized, with 3.08 organs transplanted per utilized donor. The value of the indicators of global effectiveness was also affected by age, as represented in Figure 5.

Hospital factors potentially affecting the value of key indicators of potential, areas of improvement and global effectiveness were analyzed in our project, in particular, the type of hospital (neurosurgical facilities availability), size of the hospital (number of hospital and ICU deaths) and ICU workload (patient turnover index). The ICU workload and the type of hospital were significantly related to key indicators of the potential of donation. The presence *versus* the absence of neurosurgical facilities significantly affected also some of the indicators of areas of improvement and hence key global effectiveness indicators.

In conclusion, our experience has served to validate the agreed methodology by helping to identify weaknesses and by providing the opportunity of exploring all the possibilities for learning through the collected data. We expect that this study provides a useful basis for constructing solid programmes in European countries targeted to study and monitor the potential of deceased donation and the performance in the deceased donation process, i.e., quality assurance programmes. Information acquired through this type of programmes will allow the implementation of specifically tailored actions targeted to ensure a continuous improvement and better face organ shortage for transplantation, which remains being a universal challenge.

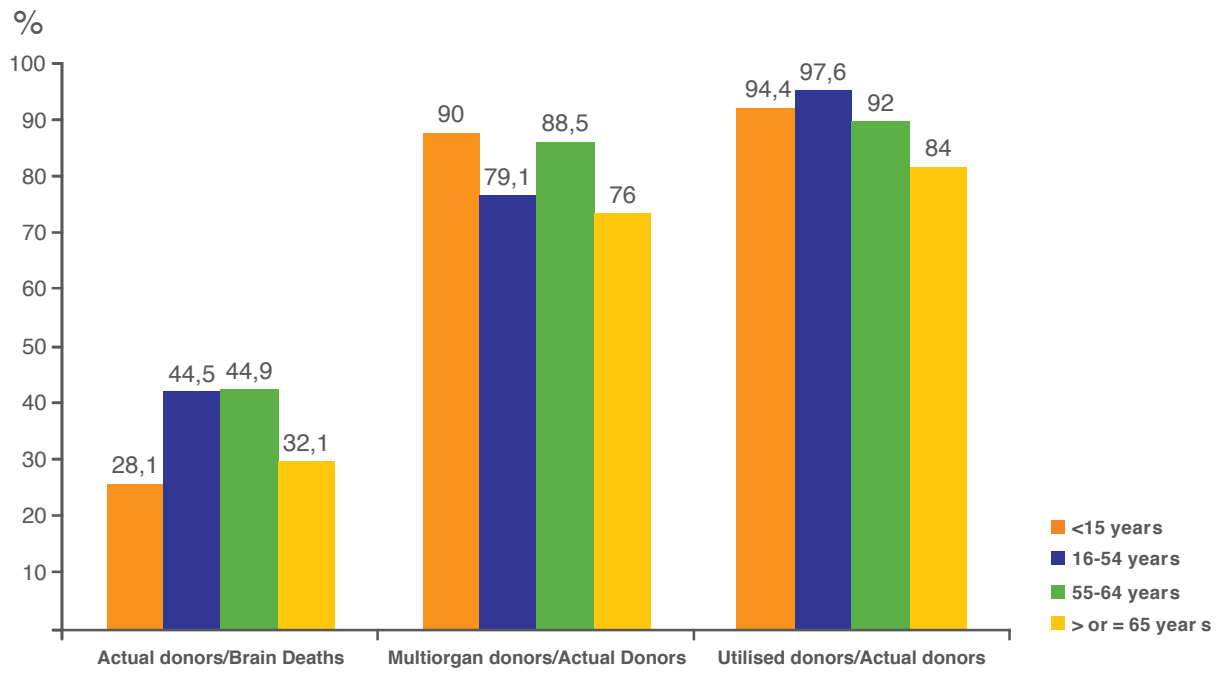


Figure 5

DOPKI REGISTRY FOR EXPANDED CRITERIA DONORS

DOPKI deals with organ shortage but also with quality and safety aspects in donation and transplantation. DOPKI project intended to contribute to define the limits in the use of organs for transplantation, from donors with specific and infrequent conditions that might benefit from an international cooperation.

DOPKI deals with organ shortage but also with quality and safety aspects in donation and transplantation. The intended increase in the number of donors and available organs for transplantation cannot be achieved at any price. The establishment of guidelines to prevent transmissible diseases through an adequate evaluation of the donor must be an objective tightly linked to the previous one. There is a need for drawing up clear protocols to discard those organs that should not be used but "only" those, on the basis of a good case by case evaluation and hence on the basis of a good clinical reason to discard them. Research in this area seems imperative and has been addressed by the consortium. In particular, DOPKI project intended to contribute to define the limits in the use of organs for transplantation, from donors with specific and infrequent conditions that might benefit from an international cooperation.

With this global aim, DOPKI agreed to focus on donors with at least one of the following conditions:

- **Acute intoxication as direct or indirect cause of death:** Donors in whom a drug or poison has been the direct or indirect cause of death.

- **Neoplasia or positive tumour background:** Donors with an active or previous history of malignant neoplasia. Low grade skin tumours, with low capacity to metastasize, as basal cell carcinoma or epidermoid carcinoma with no metastases and Group I central nervous system neoplasias (according to *Council of Europe Consensus Document: Criteria for Preventing the Transmission of Neoplasic Diseases in Organ Donation*.) being excluded.

- **Rare diseases:** Donor with a life-threatening or chronically debilitating disease which is of a low prevalence, of less than 5 *per* 10,000 in the Community (European Comission on Public Health).

- **Positive viral markers:** Anti- HCV positive and/or HBsAg positive donors.

- **Risky behaviour for a viral disease**

- **Emerging or rare infectious diseases**

The purpose was to harmonize the minimum information to be collected from donors with any of the above mentioned conditions and from their recipients, regarding clinical outcomes and survival. Even more, we aimed to share this agreed information at an international level for the very first time. This effort could lead in the future to more robust and generalized conclusions on the limits in the use of these organs for transplantation.

These ambitious goals have been accomplished through a set of sequential steps along the duration of the project:

- **Harmonization on information to be collected** from donors, whether referred, actual or utilized, according to DOPKI definitions, and baseline and outcome variables of recipients transplanted from these donors. These outcome variables included information on: graft and patient survival and specific safety incidents, according to the type of donor. Information was conceived in order to ensure that outcome information on each recipient, regardless of the type of transplanted organ was able to be systematically collected.

- **Creation of a web registry**, with high safety levels, to share information at an international level on this specific types of donors. The registry was made available at the private domain of the DOPKI website (www.dopki.eu) and accessible to authorized figures at each of the participating organizations. Different levels of access were constructed.

- **Load of information** in a retrospective-prospective fashion, according to each partner's possibilities on donors with the above mentioned conditions and the outcome of their recipients, in the event organ transplantation had taken place.

- **Analysis of the collected information** for a very first approach on the use of donors with the previously mentioned conditions and the outcome of their recipients.

Published experience in the use of organs from these donors is scarce and not enough to establish safety limits in the practice. Cooperation between the countries by collecting and merging this information is essential to provide the basis to construct in the future quality and safety practice guideless for those cases. These first steps are being accomplished in DOPKI project.

COST-EFFECTIVENESS STUDY

Successful organ donation programs require a substantial initial financial investment. (...) We have constructed a Markov model capable of estimating the net present value cost savings and additional quality-adjusted life years (QALYs) in renal transplantation that occur as the result of improved organ donation activities.

Report on the Kidney Transplantation Markov Spreadsheet Model

Any intervention that can substantially increase the rate of organ donation and thereby increase transplantation rates may well be cost-effective, depending upon the implementation cost of the program and the number and quality of extra kidney transplants that occur as a result. Successful organ donation programs require a substantial initial financial investment. Moreover, additional expenditures will be necessary to maintain the program's initial momentum to effect sustained improvement in donation rates. As organ donation initiatives compete with other health care interventions for public funding, their net present value has to be calculated.

We have constructed a Markov model capable of estimating the net present value cost savings and additional quality-adjusted life years (QALYs) in renal transplantation that occur as the result of improved organ donation activities. The model is developed for participant organizations of DOPKI's consortium (see www.dopki.eu). Several publications on health economics and organ donation initiatives are available as a starting point to populate the model in representative countries of DOPKI.
The model is designed to capture the value of benefits from additional organs and improved organ allocation.

Model structure

The length of a Markov cycle is one month, with a 20-year time-frame. Within this period treatment costs and quality adjusted life years (QALYs) are calculated for patients with end-stage renal disease from the payers' perspective. Half cycle correction is employed for QALYs and costs.
The model can be adapted from the societal perspective, as benefit from increased employment rate and the QALY gain for caregivers of pediatric recipients can also be captured. However, pediatric recipients grow up and employment benefit depends on several certain and uncertain factors (e.g. age of recipients, economic stability of countries, long-term complications of ESRD), these societal benefits are calculated only within a 5-year time-frame.
For societal benefits half cycle correction is not employed, as presumably transplanted patients do not work in the cycle of graft loss or death.

Results

The spreadsheet model indicates the value of additional kidney transplantations from the health care (20 year time-frame) and the societal perspectives (5 year time-frame). The willingness to pay for a QALY gain conversion rate is employed to express the monetary value of QALYs gained.
Discounted financial balance and Net Present Value (NPV) are calculated for one year operation of the organ donation initiative. If the organ donation initiative is sustained over subsequent years with the same outcomes, the model also calculates the expected NPV of the extended programme.
Pre-defined one-way deterministic sensitivity analysis depicted by a tornado diagram indicates the most sensitive input parameters.

Deliverables

Project deliverables consist of an Excel Spreadsheet Model, a Model User Guide and a Literature Review with published input variables from the international literature.
The model can be adapted to any DOPKI countries. The User Guide includes necessary information about country adaptations; however authors of the model can provide further personal assistance. The first country adaptation in Hungary is completed by February 2009.
The model was designed to enable extension to capture the social value of other solid organ transplants.

DISSEMINATION OF DOPKI PROJECT

DOPKI aims to address the universal problem of organ shortage, improving the knowledge and developing a common and applicable methodology for the estimation of the potential of deceased donation and the evaluation of the outcome of the deceased donation process, also considering the safety and quality of marginal organs.

Because the characteristics of DOPKI project, it is extremely important that all the knowledge acquired through this project is spread in general terms and, in particular, to those figures direct or indirectly involved in the donation process. Dissemination should be a tool itself to increase donation activity not only in Europe, but also in other regions in the world.

The targets in dissemination of the DOPKI project included all the figures direct or indirectly involved in the process of donation: the public, the patients, the health care professionals and authorities, the transplant and transplant related organisations. A list of these figures was organised and all relevant information and documents generated during the DOPKI project has been sent to them. A newsletter and an informative brochure has been designed and distributed among the different transplant organisations, hospitals, patients associations, transplant conferences and others, and are available at the DOPKI website and the Global Transplant Observatory on Donation and Transplantation.

The Website

DOPKI's website represents a useful framework to disseminate all the information and knowledge derived from DOPKI. As part of WP1, ONT had to establish an efficient communication system. ONT designed, developed and implemented a communication platform and a website at the beginning of the project. DOPKI platform has proven to be an efficient communication system and crucial for the project, as it:

- Allows continuous exchanging of information, including methods for internal communication, webmail, agenda, calendar, forum and FAQ.
- The access to the database created to collect information on expanded criteria donors (ECD) and the outcome of their recipients is physically located at DOPKI website. Information can be efficiently up and downloaded with high levels of security, which is mandatory, according to the type of information used and this information may be may be extracted for descriptive purposes and statistical analysis.
- More than 300 documents, generated within the project (final versions) are available at the website.
- Provides a link with the Global Transplant Observatory on Donation and Transplantation, as well as to other EC funded projects on donation and transplantation activities (Alliance-O, EQSTB, ETPOD, EULID, EUSTITE, RISET and TRIE).
- Allows a direct e-mail request, once a site in DOPKI web page is created to provide a tool for quick and precise information to the public on specific issues related to donation and transplantation.
- Provides a link to partners and many other organisations, and vice versa.

A public access containing general information on DOPKI and relevant documents are easily accessible to the public.

- More than 50% of the visitors that used search engines employed DOPKI as keyword.
- It was estimated that 13,2% of the visitors added DOPKI's website as a favourite.
- The link in the partner's website was an important way of promoting the project, since it was responsible for more visits then search engines.

United States	45	244	2.24 MB
France	42	80	2.35 MB
Italy	41	116	3.39 MB
Panama	34	34	110.01 KB
Great Britain	21	143	1.22 MB
Netherlands	19	64	933.72 KB
Greece	14	44	1.46 MB
Poland	13	59	627.60 KB
Brazil	9	115	1.71 MB
Others	199	926	14.52 MB

Pageload Activity
Page Requests
Traffic

Table 4: Statistics for www.dopki.eu by countries (TOP 10), October 2008

WHO link

In order to facilitate the dissemination of knowledge and initiatives to other WHO regions, a link with the WHO is created. This has been established through the Global Observatory on Donation and Transplantation, an observatory developed by the ONT in cooperation with the WHO, in response to the Resolution 57.18 of the World Assembly. This link allows the immediate access to information on donation and transplantation activities and organizational issues in European countries and other WHO regions.
This link offers the possibility to disseminate the information and knowledge generated in DOPKI as well as the final recommendations that will derive from the project to Europe and other WHO regions.

However, the most important activity related to the link with the WHO is represented by a unique and already running initiative entitled "Data harmonization in transplantation: measuring the potential supply of organs from deceased donors" which aims to agree on a common methodology to estimate the potential of donation and prospectively identify potential deceased organ donors. This project is organized by the WHO, The Transplantation Society (TTS) and ONT. DOPKI project and the experience acquired along the project will help to the development of this project, which represents an important step forward on ensuring a global approach to the estimation of the potential of deceased organ donation and hence a way of improving donation and transplantation activities in many WHO countries.

Scientific activities

Communications to national and international congresses have been produced, publications have been released and fluent, periodical conferences have been held and a constant relationship with running and future EU funded projects in the field has been maintained.

The Guide

DOPKI consortium will publish a guide providing a set of general recommendations to build up quality assurance programs (QAPs) in the deceased donation process in European countries. The consortium, in its efforts to construct a common methodology to estimate the potential of deceased donation and evaluate the outcome of the deceased donation process, acknowledges the need to develop these kind of programmes in countries which lack of this continuous and systematic approach to organ donation. Recommendations provided are based on the experience and knowledge acquired along the DOPKI project, particularly on the current state of the art of QAP in place in the participating countries, discussions on specific aspects held by the group and the pilot experience developed along the project in a group of volunteer hospitals intended to validate the pre-agreed methodology.

Final Event

The last event will take place in 24th March 2009, in Auditorio Fundación Mutua Madrileña, Madrid. This event will intend to transmit the information and knowledge derived from DOPKI to stakeholders, in the context of the benefits of transplantation and the problem of organ shortage.