

Organ donation

More organ transplants are taking place across the UK than ever before. In 2016/17, 1413 people donated organs after death, a 4% increase compared with the previous year, enabling 3710 deceased donor transplants (NHS Blood and Transplant, 2017a). A further 1043 living donors brought the total number of life-transforming or life-saving transplants to a total of 4753, a UK record. Nonetheless, there is still a large discrepancy between the number of donors and the number of people on the organ transplant waiting list (*Figure 1*).

There has been considerable improvement in identifying potential organ donors since the first UK Organ Donation Taskforce report in 2008. Promoting registration on the organ donation register has resulted in a yearly increase to 23.6 million at the end of March 2017 (NHS Blood and Transplant, 2017a). The overall referral of potential donors has increased from 86% to 88%, as has the proportion of approaches involving a specialist nurse for organ donation, from 83% to 86% in the last financial year (NHS Blood and Transplant, 2017a).

However, the one area that remains most resistant to change is the proportion of families who permit organ retrieval to occur (NHS Blood and Transplant, 2017a). Four in ten families do not agree to donate a relative's organs (NHS Blood and Transplant, 2017a), resulting in the UK having one of the highest refusal rates in the western world (NHS Blood and Transplant, 2013b).

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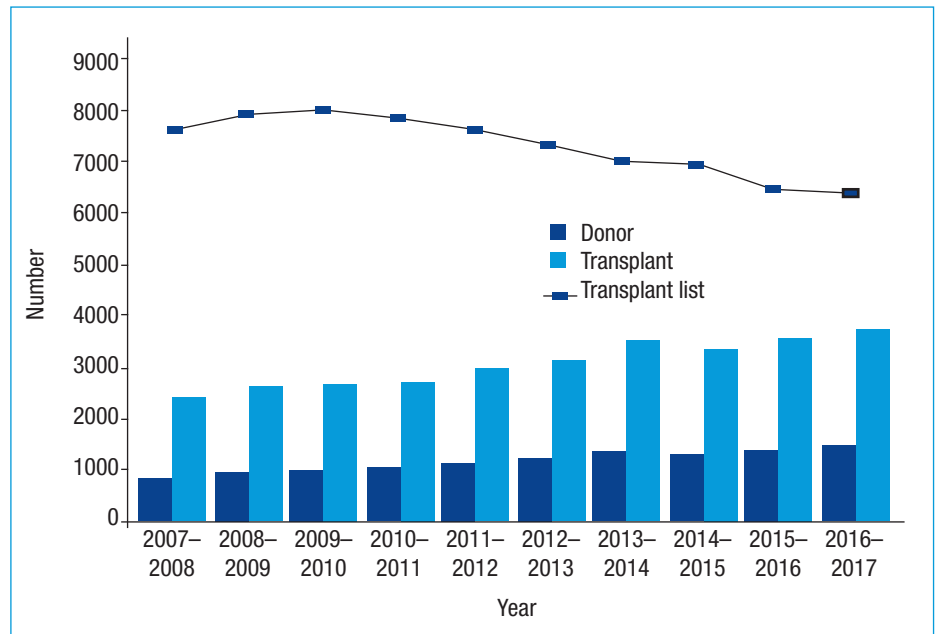


Figure 1. Number of deceased donors and transplants in the UK, 1 April 2007–31 March 2017, and patients on the active transplant list at 31 March. From NHS Blood and Transplant (2017a).

Furthermore, there remains a significant gap between the proportion of white families agreeing to donate (66%) compared to those from black, Asian and other minority ethnic communities (35%). This results in only 6% of all deceased organ donors being from black, Asian and other minority ethnic backgrounds, despite these communities representing one third of the active kidney transplant waiting list (NHS Blood and Transplant, 2017b).

Different strategies have been proposed for increasing the number of donors available. At present, all of the UK, except Wales, has a soft 'opt-in' policy, meaning a patient is assumed to have not wished to donate his/her organs unless he/she is registered on the organ donation register. In 2015, Wales adopted a soft 'opt-out' option, which assumes a potential donor has no objection to organ donation unless previously stated. The Scottish government has recently announced plans to adopt this approach and the Department of Health in England is consulting on whether to move to an opt-out policy for organ donation.

With this in mind, this article discusses the different types of donation possible and the logistics of organ donation, and explores current UK legislation.

Types of organ donation

Donation after circulatory death

Donation after circulatory death refers to the retrieval of organs for the purpose of transplantation from patients whose death is diagnosed and confirmed using cardiorespiratory criteria, as specified by the Academy of Medical Royal Colleges' (2008) Code of Practice.

Professional guidance recommends that donation after circulatory death should be considered for all patients in whom there is the intention to withdraw life-sustaining treatment and/or in patients with a life-threatening or life-limiting condition, which will, or is expected to, result in circulatory death (General Medical Council, 2010; National Institute for Health and Clinical Excellence, 2011).

Donation after circulatory death can be categorized broadly into two types:

uncontrolled, in which the patient has already died before donation is considered, and controlled, in which death occurs after a planned withdrawal of treatment. The clinical circumstances can be further categorized using the Maastricht criteria (Table 1) (Kootstra et al, 1995). In the UK, donors currently only come from category 3.

Donation after circulatory death is inevitably associated with a period of ischaemia before organ retrieval occurs. Different organs have different susceptibilities to ischaemia-induced injury and irreversible loss of function (Cota et al, 2013). Two types of ischaemia in retrieved organs have been described: warm ischaemia, which can be further divided into donor and recipient warm ischaemia, and cold ischaemia (Halazun et al, 2007):

- Donor warm ischaemia – starts at the time of asystole until cold perfusion begins
- Cold ischaemia – starts at the time of initiation of cold preservation until restoration of warm circulation following transplantation. Reducing the organ's metabolic rate reduces the rate of ischaemic injury
- Recipient warm ischaemia – starts at the time of removal of the organ from ice until reperfusion.

In addition, there is the concept of functional warm ischaemia. This commences following withdrawal of treatment when the patient's systolic blood pressure falls below 50 mmHg and ends with cold perfusion. Organ-specific guidelines exist for the maximum functional warm ischaemia time for an organ to be appropriate to use (Table 2) (NHS Blood and Transplant, 2016).

Furthermore, there is a time limit in place for the time taken between withdrawal of active medical treatment and reaching the threshold for functional warm ischaemia to

Table 1. Modified Maastricht classification of donation after circulatory death

Category	Circumstances	Controlled/ uncontrolled	Location of care
1	Dead on arrival	Uncontrolled	Emergency department in a transplant centre
2	Unsuccessful resuscitation	Uncontrolled	Emergency department in a transplant centre
3	Anticipated cardiac arrest	Controlled	Intensive care unit and emergency department in transplant and non-transplant centres
4	Cardiac arrest in brain-dead donor	Controlled	Intensive care unit and emergency department in transplant and non-transplant centres
5	Unexpected arrest in intensive care unit patient	Uncontrolled	Intensive care unit in a transplant centre

From Kootstra et al (1995)

start (Table 3) (NHS Blood and Transplant, 2016). If this time is exceeded, it is recommended that the transplant cannot proceed and that the National Organ Retrieval Service team stands down.

Donation after brain death

Donation after brain death was introduced in 1976 when clinical tests were introduced to confirm death using neurological criteria.

In order to allow a diagnosis of death following irreversible cessation of brainstem function to be made, the following conditions need to be fulfilled (Academy of Medical Royal Colleges, 2008):

- The aetiology of the irreversible brain damage must be known
- Potentially reversible causes of coma must be excluded, including absence of depressant drugs, hypothermia, circulatory, metabolic and endocrine disturbances (e.g. hypernatraemia, diabetes insipidus)
- Potentially reversible causes of apnoea must be excluded
- The absence of brainstem reflexes must be confirmed.

Testing should be performed independently by at least two medical practitioners who have been registered for at least 5 years and one of whom must be a consultant. For a diagnosis of death to be made, a complete set of tests should be performed twice, with the diagnosis of death being timed to the completion of the first set of tests.

Donation after brain death donors do not have a warm ischaemic time therefore more organs are transplanted per patient donating after brain death (3.7) than per patient donating after circulatory death (2.8) (NHS Blood and Transplant, 2017a).

Living donors

Living donors now account for 42% of all organ donors and represent almost 25% of total transplant activity (NHS Blood and Transplant, 2017a). Living donor kidney transplantation accounts for 96% of living donor activity in the UK and accounts for 32% of all adult and paediatric kidney transplants (NHS Blood and Transplant, 2017a).

The proportion of donation after circulatory death, donation after brain death and living donors is shown in Figure 2.

Table 2. Organ-specific guidelines for maximum functional warm ischaemia

Organ	Maximum functional warm ischaemia time
Liver	30 minutes
Pancreas	30 minutes
Lung	60 minutes
Kidney	120 minutes

From NHS Blood and Transplant (2016)

Table 3. Standdown rules for donation after circulatory death

National Organ Retrieval Service team	Duration between withdrawal of life-sustaining treatment and functional warm ischaemia	Comments
Cardiothoracic team	120 minutes	
Abdominal team	180 minutes	May wait longer if progressive cardiovascular instability suggests that asystole is likely to occur

From NHS Blood and Transplant (2016)

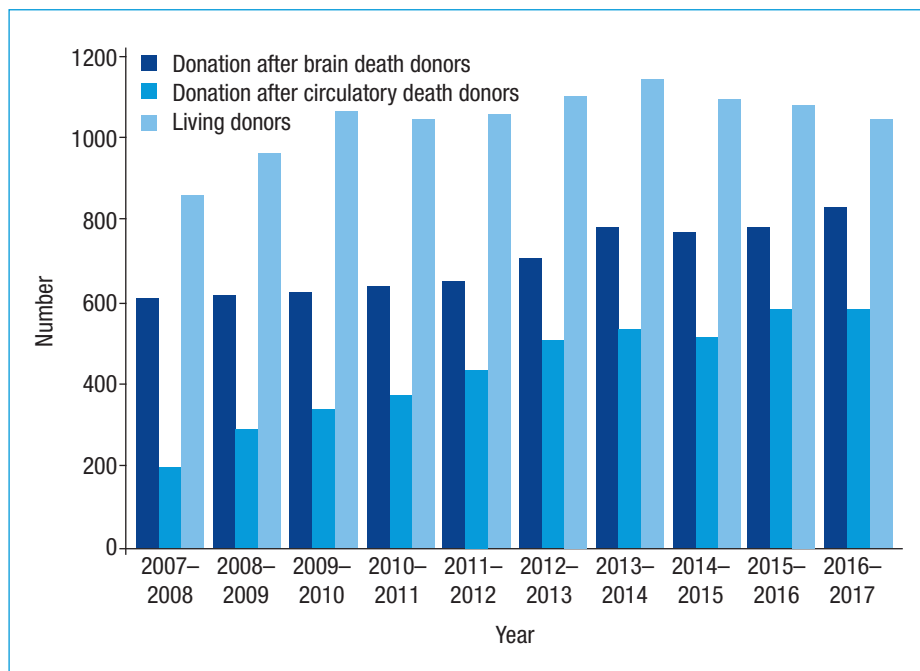


Figure 2. Number of deceased and living donors in the UK, 1 April 2007–31 March 2017. From NHS Blood and Transplant (2017a).

The organ donation process

Professional guidance states that organ donation should be considered as a usual part of ‘end of life care’ planning (General Medical Council, 2010; National Institute for Health and Clinical Excellence, 2011). Several steps often need to occur, before death, to facilitate organ donation. It is recommended that these are undertaken by the multidisciplinary team (National Institute for Health and Clinical Excellence, 2011), which comprises:

1. Medical staff, including a named responsible consultant
2. Bedside nursing staff
3. The specialist nurse for organ donation
4. Local faith representatives where applicable.

The specialist nurse for organ donation is the main coordinator of the organ donation process. Through formal training in approaching the families of potential donors, he/she is able to recognize and avoid factors that inadvertently and unnecessarily lead to family distress and refusal (NHS Blood and Transplant, 2013b).

Best practice guidance advocates that a specialist nurse for organ donation should always be involved in planning the family approach and wherever possible in the initial discussions that raise the possibility of organ donation as a part of end-of-life care, thus allowing time for a relationship

to develop between the family and the specialist nurse for organ donation (General Medical Council, 2010; National Institute for Health and Clinical Excellence, 2011; UK Donation Ethics Committee and Academy of Medical Royal Colleges, 2011). Furthermore, audit data from NHS Blood and Transplant repeatedly reveal higher family consent rates when specialist nurses for organ donation are involved in the family approach (NHS Blood and Transplant, 2017a).

Individual steps

The steps will vary slightly depending on whether it is donation after circulatory death or a donation after brain death, as illustrated by *Figure 3*.

Shared steps

Plan for neurological death testing or withdrawal of life-sustaining treatment

The first step is either the identification that continuing life-sustaining treatment is no longer for the overall benefit of the patient and should be discontinued, or the recognition that the patient meets the criteria for neurological death and brainstem testing should be undertaken. This decision should be made by the consultant responsible for the patient’s care independently of the donation process (National Institute for Health and Clinical Excellence, 2011). At

this point, the specialist nurse for organ donation should be contacted.

Seeking consent for organ donation

NHS Blood and Transplant has issued best practice guidance regarding approaching the family for consent for organ donation (NHS Blood and Transplant, 2013b). Three key stages are involved:

1. Planning the approach
2. Confirming understanding and acceptance of loss
3. Discussing donation.

Donation should only be raised when it is clear that the family has understood and accepted their loss.

Allocation of organs

Organs are allocated based on recipient prioritization, safety and organ suitability. The specialist nurse for organ donation will take a full history of the potential donor’s current admission, past medical history, social history and go through an extensive questionnaire completed with the patient’s GP. Individual organ function is thoroughly evaluated. Once the organs are allocated, the specialist nurse for organ donation will arrange a vacant theatre and mobilize the National Organ Retrieval Service.

Management before withdrawal of life-sustaining treatment

While assessing the best interests of the patient and the allocation of organs is taking place, the patient should be clinically stabilized, ideally in a critical care setting. It is advocated that, providing the delay is for the patient’s overall benefit, life-sustaining treatments should not be withdrawn or limited until the patient’s wishes around organ donation have been explored and the clinical potential for the patient to donate has been assessed (General Medical Council, 2010; Intensive Care Society and British Transplantation Society, 2010).

Donation after circulatory death-specific steps

Withdraw life-sustaining treatment

Once the retrieval team is set up in theatre, the specialist nurse for organ donation will request the withdrawal of life-sustaining treatment. This step usually occurs in the intensive care unit or anaesthetic room. The specialist nurse for organ donation documents the timing of the withdrawal of life-sustaining

treatment and the onset of functional warm ischaemia to facilitate clear communication with the retrieval and transplant teams. Once death is confirmed, the family will only have 5 minutes with the deceased before he/she is transferred to theatre, to minimize donor organ warm ischaemia time. This is always clearly communicated to the family during the consent process.

Donation after brain death-specific steps Proceed to theatre

Once the retrieval team is ready in theatre, the patient will be transferred to theatre accompanied by an anaesthetist and specialist nurse for organ donation. Asystole will occur at the point of cross-clamping the aorta.

End of life care

The specialist nurse for organ donation will perform last offices in keeping with the deceased's cultural and religious practices before he/she is transferred to the mortuary. Further support is offered to the donor family and they are updated as to the outcome of the organ donation.

Legislation

The legislative framework for donation in the UK is that of a soft opt-in system of consent. Practice in England and Northern Ireland is governed by the Human Tissue Act 2004.

The Human Transplantation (Wales) Act 2013 has a soft opt-out system, which was introduced in 2015.

Currently Scotland also has a soft opt-in system, governed by the Human Tissue (Scotland) Act 2006. However, following a public consultation, the Scottish government has recently announced its intention to introduce legislation for a soft opt-out system of organ and tissue donation (Scottish Government, 2017). At the time of writing the Department of Health in England is consulting on whether to move to an opt-out policy for organ donation.

Comparison with other countries

Worldwide, countries now face the dilemma whether to adopt an opt-out policy. A 2014 study compared different consent methods with the number of organs donated (Shepherd et al, 2014). Of the 88 countries evaluated, 43 adopted an opt-in approach and 45 opt out. Their analysis demonstrated that adopting an opt-out system results in a higher total number of kidneys donated (the

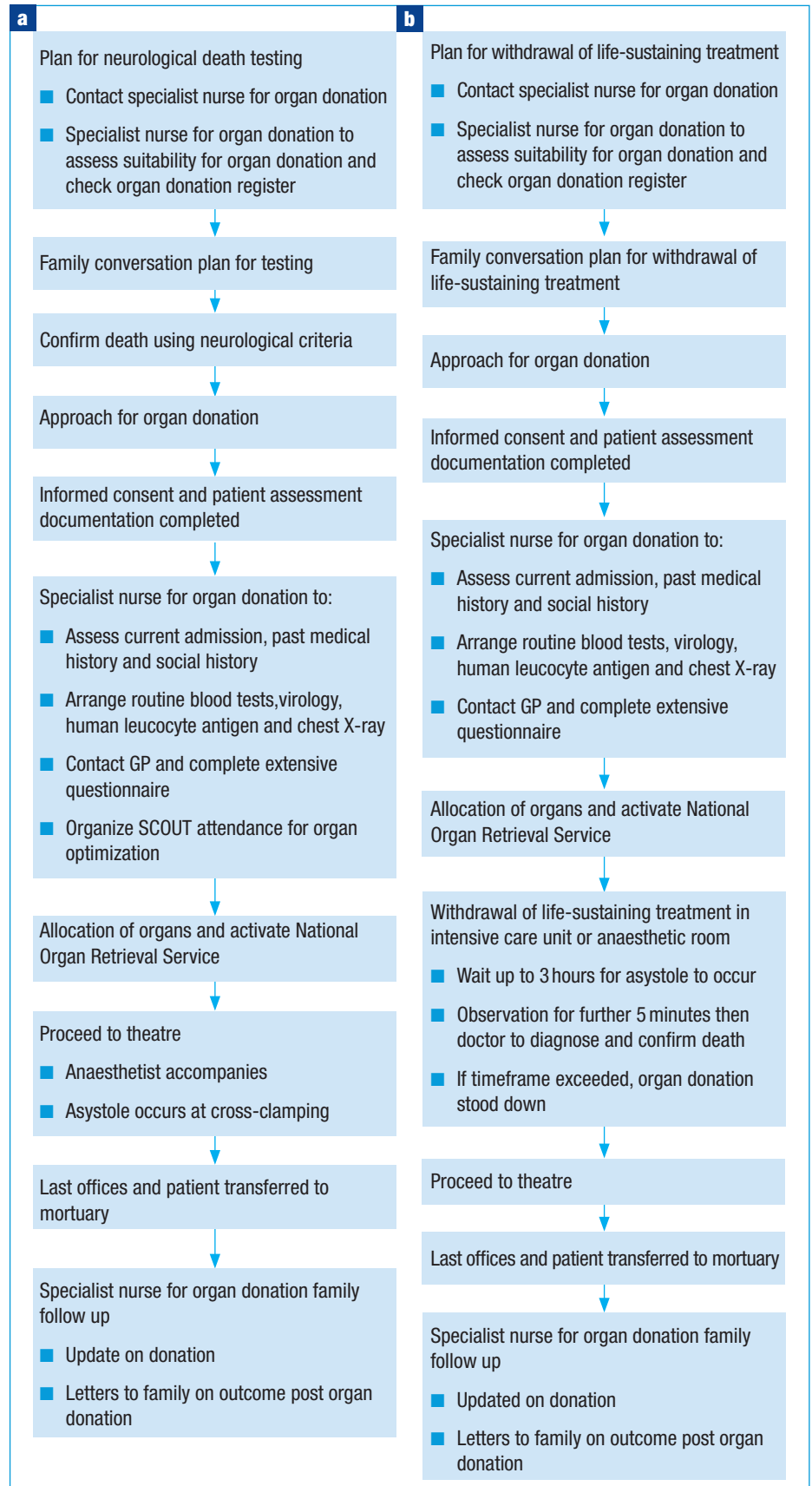


Figure 3. Schematic representation of individual steps involved in (a) donation after brain death and (b) donation after circulatory death. SCOUT = donor care practitioners whose role is to optimize the heart and lungs of the donation after brain death donor.

KEY POINTS

- Organ donation should be considered as a usual part of 'end of life care' planning.
- The specialist nurse for organ donation is a key facilitator and increases family consent rates.
- Donation after circulatory death should be considered in all patients in whom there is an intention to withdraw life-sustaining treatment.
- Donation after brain death can occur after strict neurological criteria are met to confirm irreversible cessation of brainstem function.
- The UK is divided in its system of consent.
- Increasing family consent is the biggest obstacle to the UK achieving a world-class donation and transplantation service.

most in demand organ) and a greater overall number of organ transplants. Interestingly, however, the number of living donors was greater in opt-in than opt-out countries. Of note, no increase in deceased donor numbers has yet been seen in Wales since adopting a soft opt-out policy (NHS Blood and Transplant, 2017a).

Conclusions

Organ donation in the UK is at record high levels. Initiatives such as living donation, changing legislation to opt-out policies and the introduction of specialist nurses for organ donations have all contributed to this success. However, there is still considerable room for improvement with patients dying

on the transplant waiting list each year. Disappointingly, the UK has one of the highest family refusal rates in the world. Perhaps, by improving awareness of the organ donation process to both clinicians and the general public, societal acceptance of organ donation will improve and thus further improve organ donation rates. **BJHM**

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