



Donation after Circulatory Death

Supported by the
Department of Health.



Organ Donation after Circulatory Death

Report of a consensus meeting

This document is a report of a Donation after
Circulatory Death Consensus meeting held in June 2010.

DCD CONSENSUS MEETING REPORT

Executive Summary

1. This Document is a report from a consensus meeting between representatives of the Intensive Care Society (ICS), British Transplantation Society (BTS), NHS Blood and Transplant (NHSBT) and others on “controlled” Organ Donation after Circulatory Death (DCD), held by the Department of Health in association with the devolved administrations. It has been endorsed by both the ICS and the BTS.
2. There has been a ten-fold increase in the number of DCD donors in the UK in the past 10 years. They now account for 35% of all deceased donors. Kidney transplant outcomes are equivalent to those from Donors after Brain Death, and liver, lung and pancreas transplant outcomes are acceptable.
3. There is wide variation across the UK in both the care of a patient who is a potential DCD donor and the retrieval and transplantation of organs from DCD donors. There is a clear need for guidance on the clinical, legal, ethical and practical steps involved in DCD. The Consensus meeting considered several key steps in the DCD pathway:
4. **Withdrawal of life sustaining treatment on the grounds of “futility”.**
 - a) This is better described as “decisions relating to the best interests of the patient in withdrawing life-sustaining treatment”.
 - b) These decisions should be made transparently and consistently regardless of the potential for organ donation. All Intensive Care Units (ICUs) and Emergency Departments (EDs) should have an explicit local policy based on nationally agreed guidance.
 - c) Patients initially assessed in EDs in whom organ donation is a possibility should be admitted wherever possible to an ICU in order that their clinical and broader interests (including the potential for donation) can be fully assessed. This includes the proper care of the dying patient and their relatives. It is recognised that this course of action is dependent on the availability of resources and may be felt to be

inappropriate by a number of clinicians. All ICUs should have a bed management protocol to manage situations where there is a potential donor but capacity issues are present.

5. Management before Withdrawal of Life sustaining Treatment:

- a) No treatment specifically aimed at organ donation should be instituted before the decision to withdraw treatment has been made.
- b) Potential DCD donors should be cared for by staff with the appropriate competencies, particularly in end of life care. This may involve moving a patient from the ED to an ICU if possible, according to local policy.
- c) Legal Guidance in the UK is that maintenance of life-sustaining treatment may be considered to be in the best interests of someone who wanted to be a donor if it facilitates donation and does not cause them harm or distress. There is less certainty as to whether it is appropriate to initiate new treatments such as inotrope support. To institute treatments against the wishes of the family is inappropriate.

6. Suitable Criteria for DCD donation

- a) Absolute Contra-indications.

There are absolute contra-indications to donation of **any organ** – patients with one or more of the following conditions should not be referred as potential DCD donors -

- i. Active invasive cancer in the last 3 years **excluding** non-melanoma skin cancer and primary brain tumour
- ii. Haematological malignancy – myeloma, lymphoma, leukaemia
- iii. Untreated systemic infection
- iv. variant CJD
- v. HIV disease (but not HIV infection)

- b) There are absolute contraindications to the donation of **individual organs**, detailed in the report. Further work is needed to define additional contra-indications in order to avoid unnecessary and inappropriate referral of patients who are unsuitable DCD donors.

- c) It should be recognized that the time from referral to retrieval is trying on the resources of the host institution and, more importantly, may be difficult for distressed relatives. Therefore the process of donation should be streamlined through:

- i. Early tissue typing and virology screening. The appropriate bottles with the appropriate labels should be kept in the ICU and bloods taken and dispatched by ICU staff before the Specialist Nurse for Organ Donation arrives, if necessary.
- ii. Simultaneous offering of organs to all relevant centres, rather than sequential offering. This would reduce delays significantly.

7. Process of Withdrawal of Life Sustaining Treatment

- a. Ideally, withdrawal of life sustaining treatment should occur after the recipients for liver, pancreas and lung transplants (if to be donated) have been identified and admitted to the transplant centre. However this may not always be possible and the interests of the donor's family must always be recognised.
- b. A clinician should be readily available throughout the period of withdrawal to enable prompt confirmation of death when it occurs.
- c. There is significant variation across the UK in how treatment withdrawal is managed in adult critical care units. Members were aware of very strongly held and apparently conflicting views with regards to airway management during terminal care within the adult intensive care profession. This is in contrast to management in neonatal / paediatric intensive care where a consistent approach was reported, with extubation accompanied by escalating levels of sedation being the standard of care. The Consensus workshop recognised the strength of professional feeling around these management decisions, and was similarly aware that the principles that guide clinicians in this difficult area of practice go beyond the remit of the workshop. There was a strong view that the profession should develop a more consistent approach to airway management during terminal care of adult patients and support was given for the relevant groups to bring this about. In the meantime these guidelines would not be proscriptive on this issue.
- d. Withdrawal of cardio-respiratory support should always be conducted under the close supervision of senior medical staff.

- e. Whilst the interests of the patient as an organ donor might be best served by withdrawal within the theatre complex rather than in the ICU, other considerations also apply:
 - i. the individual's right to comfort, dignity and privacy
 - ii. continuity of care, to be delivered by the ICU / ED team
 - iii. unlimited access for close family and friends.
 - iv. a manner of death that those who were caring for the individual and members of the theatre team could be comfortable with.

The appropriate location of treatment withdrawal should be left for individual critical care teams, supported by their donation committee, to consider.

- f. There should be clear on-going responsibility for the care of the patient and their family, regardless of the location of treatment withdrawal. If necessary this responsibility may be transferred between teams – for example from emergency medicine to intensive care. There should also be a robust and acceptable plan for subsequent care should donation not take place.

8. Actions after the withdrawal of Life Sustaining Treatment

- a. Organ retrieval should be stood down if the blood pressure and/or oxygenation do not reach the threshold for the start of functional warm ischaemia (see section c. for details) within the following times:

Liver and pancreas: 1 hour

Kidney: 2 hours: then reassess, and possibly wait for up to a further 2 hours

- b. Thereafter, the decision to stand down organ retrieval should be based on the duration of functional warm ischaemia, rather than the time interval from withdrawal of life-sustaining therapies to the onset of irreversible asystole.
- c. Functional warm ischaemia starts when the systolic blood pressure falls below 50 mm Hg or the oxygen saturation below 70%. Stand-down times from the onset of functional warm ischaemia vary by organ:

Liver: 30 minutes

Pancreas: 30 minutes

Lungs: 60 minutes (from onset of functional warm ischaemia to mechanical re-inflation of lungs)

Kidney: 120 minutes - then reassess with regard to logistics;

can extend to a further 120 minutes in selected donors.

- d. A scoring system that aids prediction of the likelihood of death within a given time period after withdrawal of life sustaining treatment should be developed and evaluated.
- e. If organ donation becomes inappropriate, the option of tissue donation should remain.

9. Diagnosis of death and post mortem interventions.

- a. The Academy of Medical Royal Colleges Code of Practice for the diagnosis and confirmation of death says, “the individual should be observed by the person responsible for confirming death for a minimum of five minutes to establish that irreversible cardio respiratory arrest has occurred”
- b. Absence of the circulation may be confirmed using an arterial line (or echocardiography if expertise exists). In the absence of an arterial line asystole on the ECG is required. Digital palpation of a central pulse is not sufficiently reliable.
- c. No intervention that can potentially restore cerebral circulation and function is allowed under any circumstances.
- d. Techniques to isolate the cerebral circulation:
 - i. Balloon occlusion of the thoracic aorta is **only** acceptable as a means of excluding cerebral blood flow if non-blood perfusion is used.
 - ii. The optimal way of isolating cerebral circulation is a cross clamp across the relevant cerebral vessels or aortic arch.
- e. Tracheal re-intubation, to facilitate lung donation, may be performed after the declaration of death and before the start of abdominal organ retrieval.
- f. There was no clear consensus as to whether re-intubation should be performed by a clinician from the donor hospital or by a member of the organ retrieval team. It is achieved most easily by the former, although this may be perceived as a conflict of interests. There is a clear need for further discussion, and possible consideration by the UK DEC. In the interim, local policies must ensure that donating hospital staff understand the implications of lung retrieval and identify where responsibility rests for re-intubation.

- g. Re-institution of cyclical mechanical ventilation of the lungs should not be started before exclusion of the cerebral circulation. However, re-inflation of the lungs is appropriate 10minutes after circulatory arrest, using the application of a “recruitment” manoeuvre that does not involve cyclical ventilation.

10. **DCD from the Emergency Department** will be the subject of a further consensus report.

11. Many of these issues are being considered by the UK Donation Ethics Committee and further advice is anticipated in due course.

1. Introduction

1.1 Background.

Donation after Circulatory Death (DCD) has previously been called non-heart beating donation and more recently as Donation after Cardiac Death. The preferred nomenclature refers to brain circulation. Whatever the nomenclature, it refers to organ donation after death has been confirmed on the basis of permanent cardio-respiratory arrest.

There are two broad categories of DCD donors – “uncontrolled”, where death occurs suddenly and unexpectedly, and “controlled”, where death occurs after the withdrawal of life-sustaining treatment. Unless otherwise indicated this document discusses controlled DCD.

Organ transplantation started with DCD donors in the 1950s, but the publication of various international guidelines on the confirmation of death by neurological criteria moved the emphasis very strongly to heartbeating donation, now called Donation after Brain Death (DBD).

The falling number of patients who meet the criteria for DBD and increasing success in the use of organs from DCD donors has led to a rapid rise in the number of DCD donors in the UK over recent years. Significant problems with DCD in the UK nevertheless persist. Unresolved potential professional, ethical and legal objections to DCD mean that critical care clinicians do not always offer this form of donation to patients or relatives who may wish to consider donation, whilst anxieties over the quality of organs from DCD donors have resulted in considerable variation in the retrieval and utilisation of organs from DCD donors.

To address these and other issues the Department of Health (in association with the Devolved Administrations) organised a Consensus meeting on DCD on behalf of the ICS and BTS, supported by NHSBT.

This Report summarises the discussions that took place and the areas of practice where consensus could be reached. It also discusses areas where a range of

divergent views exist and suggests ways in which this variation can be accepted and incorporated into local practice, or through which greater clarity as to good practice can be reached. Of fundamental importance is the recognition that clinicians must always act in the best interests of their patient, and that within the context of end of life care the needs, wishes and aspirations of each individual (and their family) will be different. Thus, whilst uniformity in practice is in many ways desirable, those responsible for offering DCD as a component of end of life care must always be sensitive to, and directed by, their primary obligations to the comfort and dignity of their dying patient.

1.2 Data

NHSBT is responsible for the collection, verification and analysis of UK-wide data on actual organ donors and transplants (held in the UK Transplant Registry) and data on potential organ donors (collected through the Potential Donor Audit (PDA)).

a) National Trends in Deceased Organ Donors.

The number of DBD donors has fallen from 736 in 2000/1 to a low of 609 in 2007/8. In 2009/10 there were 623 DBD donors. The number of DCD donors has risen from 37 in 2000/1 to 336 in 2009/10, and they therefore now account for 35% of all deceased donors. (Figure1). This figure is one of the highest in the world.

b) Contribution of DCD donors to organ transplantation.

Kidney transplantation from DCD donors is well established and in 2009/10 there were 510 such transplants, out of a total of 1616 deceased donor kidney transplants (32 %). 5yr graft and patient survival do not differ between recipients of DBD and DCD kidneys. The contribution of DCD donors to liver transplants (12 %), pancreas and kidney/pancreas transplants (15 %) and lung transplants (7 %) is considerably less and there is some evidence that liver transplant outcomes may be inferior (this must be balanced against the risks for the patient of remaining on the waiting list for transplantation).

c) National trends in DBD and DCD

Whilst the potential for DBD identified through the PDA has fallen by over 20% in the past 5 years, there is increasing awareness of the large number of potential DCD donors and the data suggest that there may be well over 1500 such patients each year. At present, approximately half of these patients are referred to a Specialist Nurse but only about 15% proceed to actual donation. The proportion of DBD and DCD donors that come from neurosurgical units is similar (around 30%) and whilst three-quarters of DBD donors have been in ICU for no more than 2 days virtually half of DCD donors have been in ICU for three days or more.

d) Geographical variation in DCD donors.

There is a four-fold variation in both the referral and conversion rates for potential DCD donors across the ten English Strategic Health Authorities, and variation between individual trusts/health boards is even greater. The actual DCD donor rate across the English SHAs and Scotland, Wales and Northern Ireland ranges from zero to 9.9 per million population (pmp) with a mean of 5.2 DCD donors pmp for the UK (Figure 2). It is estimated that approximately one third of UK ICUs currently do not offer DCD as a component of end of life care.

e) DCD from patients who are brain-stem dead

In the eighteen months from April 2008 to September 2009 there were 15 patients whose death was confirmed by neurological criteria who became DCD donors. Anecdotally, this seems to be primarily determined by the wishes of the family to witness asystole. In addition, there were 38 patients who appeared to fulfil the pre-conditions for brain-stem death testing but who were not tested, and who went on to become DCD donors. These 38 patients represent 9 % of the 441 deceased donors in this period.

1.3 Professional Perspectives on DCD

a) Critical Care

As interest and support for DCD has developed over the past 10 years a number of concerns have been expressed by intensive care clinicians. These include the potential for an actual or perceived conflict of interest, the lawfulness of interventions before death that are required to facilitate DCD, uncertainties over the criteria for the diagnosis of cardio-respiratory death within

the context of DCD and anxieties over the acceptability of some of the post-mortem interventions that may improve the condition of potentially transplantable organs. Recent publications have helped to clarify many, but not all, of these issues. The 2009 GMC guidance on end of life care refers specifically to the need to establish a person's wishes about donation. The Academy of Medical Royal Colleges Code of Practice for the diagnosis and confirmation of death states, "the individual should be observed by the person responsible for confirming death for a minimum of **five minutes** to establish that irreversible cardio respiratory arrest has occurred" and that "it is obviously inappropriate to initiate any intervention that has the potential to restore cerebral perfusion after death has been confirmed". Department of Health Guidance for England and Wales (and similar Scottish Guidance) has given considerable clarity to the assessment of a patient's overall benefit and best interests in relation to DCD and states that, if it is known that the person wished to be an organ donor, "In many cases, actions that can facilitate DCD most successfully will be in a patients best interests". It recognises, however, that there are circumstances where this may not be the case. Very importantly, the key question remains: what other interests compete with donation as part of overall benefit and best interests decision-making in end of life care?

Despite this progress a number of ethico-legal uncertainties persist, and they centre on the extent to which the care of a patient who is dying but not yet dead can be adjusted to facilitate donation. Examples of such interventions include admission to the intensive care unit from other clinical areas (e.g. the ED or Acute Admissions ward), arterial and central venous cannulation, escalation of therapies in order to maintain physiological stability (e.g. introduction of inotropic support) and changing the place and process for the withdrawal of life sustaining treatment (e.g. withdrawal within the theatre complex rather than an ICU). The relationship between DCD and DBD generates further challenges. If donation is considered to be in a patient's best interests, does DBD represent a more complete fulfilment of those interests? Are treatments that allow a diagnosis of brain-stem death to be made (e.g. maintenance of physiological stability) ethical? How does the decision-maker – i.e. the critical care or ED

clinician – balance these interests against other competing interests when planning an individual's end of life care?

b) Transplantation

There are over 8,000 patients actively waiting for a transplant in the UK and on average three of these people die every day before an organ becomes available. Whilst DBD is the optimal form of deceased donation (and, for heart transplantation, currently the only form) it is nevertheless appropriate to consider how the number and quality of organs from DCD donors might be optimised (ever-mindful of a clinician's primary obligations to the comfort and dignity of a dying patient). There are considerable logistical issues in organ retrieval from DCDs. The current geographical variations stem in part from differences in the level of acceptance by transplant units (and even individual surgeons) of organs from DCD donors. This generates uncertainty within referring units and clearly a consensus is required. To optimise the quality of DCD organs it is necessary to produce agreed donor acceptance (and exclusion) criteria, to examine the extent to which the warm ischaemic injury of transplantable organs may be legitimately minimised and to similarly ensure that the cold ischaemia time is kept to a minimum through early (pre-mortem) virology and tissue-typing, rapid organ allocation systems and priority access to the operating theatre for transplantation. DCD donors are surgically resource-intensive: approximately half of these patients will not progress to cardio-respiratory arrest within a realistic time period for donation (and consensus as to what is a realistic time period is needed) and there are similar implications for donor hospital theatre and critical care capacity.

c) Donor Coordination

The essential link between the critical care team caring for the patient who is a potential donor and the retrieval and transplant teams is the Specialist Nurse for Organ Donation (donor transplant coordinator). Specialist nurses experience first hand the whole range of current difficulties with DCD, including - the lack of clear and consistent referral criteria leading to inappropriate referral of patients, with adverse effects on the patient or their family and concerns about the credibility of the DCD process.

- the lack of an effective “tool” to predict the time between withdrawal of life sustaining treatment and death, which on occasions lead to an unrealistic series of options or choices being given to a potential donor’s family.
- inconsistency across the UK in the diagnosis of death, particularly the time interval between the onset of asystole and the diagnosis of death that persists despite the recent publication of guidance from the Academy of the Medical Royal Colleges (AoMRC)
- inconsistencies between different retrieval and transplant teams in their criteria for the acceptable time between the withdrawal of life sustaining treatment and death.
- the often protracted delays in decision making that are the result of the various offering and allocation schemes for the different organs , which can result in intolerable delays for the critical care units and the family of a potential donor.

Resolution of these issues would markedly improve the process of DCD donation and thus its acceptability to all involved.

1.4 The Process.

Representatives of the two professional societies together with specialist nurses, clinicians from Emergency Medicine and professionals from law and ethics discussed the pathway of donation after cardiac death in six discrete stages, whilst recognising that many issues are relevant across the entire pathway. Further description of the pathway of DCD may be found on the Map of Medicine. These six stages, together with the agreements that were reached, are described below, as are several important issues on which a range of opinions remain. Present throughout the discussions was the Chair of the recently-established UK Donation Ethics Committee (hosted by the AoMRC) and it is expected that further advice and guidance will be provided by this committee in the future. It must be recognised that whilst this Report represents a broad consensus endorsed by the Intensive Care Society and the British Transplantation Society the recommendations are likely to be applicable on many, but not all, occasions. A flexible and compassionate approach is needed that recognises the needs of an

individual patient and their family and which reflects the personnel and resources that are available. However there is strong agreement that when a patient wishes to donate their organs after death, steps that are lawful and ethically appropriate should be taken to respect those wishes whenever possible. It is hoped that this Report will help all those involved in the care of dying patients to achieve this.

2. Deciding Futility of Further Treatment

2.1 There was general agreement amongst all the members of the Group that the term ‘futility’, whilst in common use amongst clinicians, was a problematic term and concept when used in a wider setting. This stems from five considerations: (a) its inherent uncertainty and ambiguity, (b) the implication that resources might be a feature of these decisions, (c) the ‘hardness’ of the terminology when used with patients and families, (d) the fact that it conceals the reality that an outcome or objective must be identified beforehand in any event for such an assessment to be made, and this might not be value free or clearly agreed, and (e) its apparently paternalistic implication. It was agreed that the substitution of an alternative form of language and conceptual analysis would be beneficial, especially in terms of communication with families, and that the term ‘best interests’ was a useful one particularly bearing in mind its more frequent usage following the enactment of the Mental Capacity Act 2005 and its recognition in guidance attached to the Adults with Incapacity Act (Scotland). However, it was recognized that this in itself was mere shorthand for ‘overall benefit’ and that this might be an alternative usage (which is reflected in Scottish law and is the terminology used in the 2009 GMC Guidance on End-of-Life Care). It was suggested that a preferred formulation might be ‘decisions relating to the best interests of the patient in withdrawing life-sustaining treatment’.

2.2 There was common agreement that decisions relating to the withholding or withdrawing of life- sustaining treatment should be made transparently and consistently regardless of whether organ donation might be feasible or subsequently occur, in order that no conflicts of interest affecting such decisions should be inferred. Decisions as to the *timing* of such withdrawal (and necessary supporting treatment to that end) would follow thereafter where organ donation was a prospect.

2.3 There was a general view that all units, whether ICUs or EDs, should have an explicit local policy dealing with the withholding or withdrawing of life-sustaining treatment, based on nationally agreed guidance.

2.4 It is recommended that patients initially assessed in EDs in whom organ donation is a possibility should be admitted wherever possible to ICUs in order that they may be fully assessed both clinically and in terms of their interests more broadly. This could enhance their end of life care and would also potentially preserve the option of organ donation where this was desired. It is recognised that this course of action is dependent on the availability of resources and may be felt to be inappropriate by a number of clinicians. All ICUs should have a bed management protocol to manage situations where there is a potential donor but capacity issues are present.

2.5 Finally, it was recognized that the availability of critical care resources plays a major role in the overall provision of intensive care, and that this may currently be having an adverse impact on the care of potential organ donors. Meeting the end-of life wishes of a patient, including their wish to donate organs after death, must be balanced against other pressures on scarce resources – and is a relevant part of the case for additional resources.

3. Management before Withdrawal of Life sustaining Treatment

3.1 The decision to withdraw treatment must be independent, and seen to be so, and must precede any decision to consider organ donation. Organ procurement teams must not be involved in the decision to withdraw life-sustaining treatment. No measures to facilitate organ donation, or any treatment specifically aimed at organ donation, should be instituted before the decision to withdraw treatment has been made. It was agreed that there is no case for any measure that could be seen as elective ventilation – intubation and ventilation of patients where this is not in their best clinical interests (and risks leaving the patient in a vegetative state) solely with the aim of facilitating organ donation. This is felt to be unlawful, but must be distinguished clearly from the maintenance of ventilatory support that was previously initiated as part of the active treatment and assessment of the patient. There has been some discussion of the possibility of extending the period of ventilation for a longer period, in the belief that at least a proportion of these patients will become brain-stem dead were cardio-respiratory treatments not withdrawn. Whilst this might approximate to practice in parts of the world where the incidence of brain death appears to be substantially higher, this is nevertheless highly controversial and would require widespread public and ethical debate. It should be a topic of discussion by UK DEC, but cannot be considered acceptable at present.

3.2 A patient in whom a decision has been made to withdraw treatment and proceed to organ donation should be cared for in an appropriate environment by staff that have the appropriate skills and knowledge to do so. This may involve moving a patient from the ED to an ICU, which has better resources to deal with complex, time-consuming and lengthy issues that can surround withdrawal of treatment and possible deceased donation. There should be a local policy in place to deal with this situation. There may be exceptional circumstances where it is suggested that to allow donation to occur a potential donor should be moved to another hospital. This is contentious and would need very careful consideration, but may be acceptable in some circumstances, such as those hospitals in a very remote geographical location. It would however require the complete support of the family

of the potential donor. Furthermore, every effort should be made to avoid this and to find an appropriate area of the hospital at which the patient is being treated.

3.3 Section 6 of the Department of Health document “Legal issues relevant to non-heart-beating organ donation” gives advice on the management of the patient before withdrawal of treatment. Three relevant paragraphs are:

“6.10. There are occasions when haemodynamic or ventilatory instability ahead of readiness of the surgical retrieval team jeopardises the prospects of successful donation. Some interventions are designed to temporarily reverse such instability and may include: a) the adjustment of existing treatments (for example, increases in inspired oxygen concentration, adjustments to the ventilator settings or alteration of the rates of administration of existing fluid and drug therapies); b) the introduction of new therapies, such as inotropic support, and the siting of venous cannulae.”

“6.11. Decisions to carry out such interventions must be made in line with the Mental Capacity Act 2005. If a person wanted to be an organ donor and such steps facilitate donation, then this will mean that these steps may be considered to be in that person’s best interests. However, these considerations must be weighed against any significant risk of harm in maintaining each treatment and any distress that may be caused to the family by certain procedures, before determining if such steps would be in their best interests.”

“6.12. This guidance cannot cover in detail all possible interventions but in each case the general principles (as set out in this document) will apply. Therefore, if a person has been identified as a person who would have wanted to be a donor, then certain interventions which facilitate donation can be viewed as being in their best interests on the basis that the interventions promote what the person would have wanted and how they are remembered. Before reaching a decision, consideration must be given to the risk of harm or distress the patient or their family may experience. If there is a significant risk of the intervention causing harm or distress it will not be in the person’s best interests.” **“Maintenance of life-sustaining treatment may be considered to be in the best interests of**

someone who wanted to be a donor if it facilitates donation and does not cause them harm or distress, or place them at significant risk of experiencing harm or distress.”

3.4 Guidance in Scotland is similar, and both documents clearly indicate that it is difficult to provide guidance that will apply to all patients on all occasions, but the following recommendations should be followed.

a) Whilst invasive monitoring should be continued if already established, the benefits of institution of further monitoring must be balanced against any harm or distress that doing so may cause.

b) Donor assessment and recipient identification rely in part on a series of blood tests. It is both acceptable and lawful for samples of blood to be taken from the donor to allow these various tests to be carried out (including FBC, U/E, LFT, blood gases, virology screening, HLA-typing, and blood group) and this should be done as soon as possible to minimise delays. It is vital that all blood samples are correctly and fully labelled, particularly if they are to be sent for analysis in laboratories other than those of the donor hospital.

c) Antibiotics should not be routinely administered, but may be given if clinically indicated.

d) Use of vasodilator therapy (eg phentolamine) is not common practice and is not recommended.

e) The use of heparin pre-mortem: Department of Health guidance states that “Anything that places the person at risk of serious harm (such as systemic heparinisation) is unlikely ever to be in the person’s best interests in this situation. A clinician would need strong and compelling reasons to consider these types of actions”. This advice also implies that the insertion of perfusion cannulae under local anaesthesia is not appropriate, on the grounds of possible distress to the patient. Scottish advice follows very similar lines.

f) Bronchoscopy to assess the potential for lung donation may be appropriate, if it does not cause the patient distress. This needs specific discussion with the patient’s family.

g) The institution of Extracorporeal Membrane Oxygenation (ECMO) before death is not acceptable at the present time, and nor is organ biopsy.

3.5 There was considerable debate as to whether inotropic support should be started if the patient's blood pressure falls after the decision to withdraw treatment has been made, but before arrangements for organ retrieval are in place. Whilst this may facilitate organ donation it may theoretically result in an improvement in the patient's condition, or even their level of consciousness. It may therefore be felt that steps to maintain the blood pressure are acceptable but treatment to improve the blood pressure above the level at the time at which the decision to withdraw treatment was made is not. These issues should be resolved through local policies.

3.6 Attention is drawn to two further documents, "Donation after Cardiocirculatory Death in Canada" and "The ANZICS Statement on Death and Organ Donation, Third Edition 2008". Whilst these are statements made within the context of different legal jurisdictions – and specifically in the UK the requirement to act in the patient's overall benefit or best interests in a situation where no other person can give consent for treatment of an incapacitated adult - these documents emphasise the necessity to involve the patient's family in all decision making. To institute treatments against the wishes of the family is not appropriate.

3.7 The meeting noted that the difficult issues raised by DCD, and particularly those that relate to the management of a patient in the interval between a decision that continued treatment is not in a patient's best interest and treatment withdrawal, would be easier to resolve if a person's wish to be a donor was made with greater understanding of the steps that would ideally be taken to maintain the organs in the best possible condition to maximise the chances of successful transplantation.

4. Suitable Criteria for DCD

4.1 Absolute Contra-indications.

a) There are absolute contra-indications to donation of **any organ** – patients with one or more of the following conditions should not be referred as potential DCD donors.

- i. Active invasive cancer in the last 3 years **excluding** non-melanoma skin cancer and primary brain tumour
- ii. Haematological malignancy – myeloma, lymphoma, leukaemia
- iii. Untreated systemic infection
- iv. Variant CJD
- v. HIV disease (but not HIV infection)

b) Further work is needed to define additional absolute contra-indications in order to avoid unnecessary and inappropriate referral of patients who are unsuitable DCD donors. These should include an upper age limit, the presence or degree of multi-organ failure, the need for high dose inotropic support and/or high FiO₂ with poor oxygenation and other clinical criteria. The BTS and NHSBT should address this issue as a matter of urgency.

c) There are absolute contraindications to the transplantation of **specific organs** from a DCD donor. Although critical care staff should still refer these patients as potential donors of other solid organs and tissue, specific organs should not be offered under the following circumstances:

i) Liver

- Known cirrhosis
- Known portal vein thrombosis

ii) Kidney

- Chronic renal failure on dialysis or with GFR under 30 ml/min (CKD Stage 4) – this does not include acute renal impairment, even if this had necessitated acute renal replacement therapy during the current ICU admission
- Acute cortical necrosis on current kidney biopsy

iii) Pancreas

-Diabetes mellitus (type 1 or 2) although this does not include the insulin resistance and glucose intolerance associated with critical illness.

-BMI > 35

-Age >65 years

iv) Lung

The development of *ex vivo* lung perfusion (EVLP) for the objective assessment and reconditioning of lungs may change all the contra-indications described below. EVLP may be widespread within 2 years. However current contra-indications are:

-Age >65 years

-Previous thoracic surgery or empyema (does NOT include cardiac surgery or simple thoracocentesis)

-Existing lung disease, e.g. COPD, pulmonary emboli, asthma (but only if on systemic steroids; does NOT include occasional inhaler)

If EVLP is NOT being considered, the following may also indicate unsuitability:

-Bilateral lung collapse

-Grossly abnormal chest X-ray

-Known, proven pulmonary infection

-Prolonged (>7 days) ventilation

-Need for ventilation with >60% oxygen or PEEP > 5 cm water.

-Patients found on evaluation to be at high risk of being difficult to re-intubate.

4.2 “Optimal” and “sub-optimal,” DCD donors.

The BTS held a meeting of transplant surgeons in April 2010, and the following criteria were agreed. Optimal donors should be utilised without exception, and audits of this category of DCD should be carried out to identify factors for non-usage. This “optimal” group would be also valuable in establishing the incidence of ischaemic cholangiopathy in liver recipients and the identification of relevant risk factors and allow for medical interventions to be evaluated. **However optimal donor criteria should not be used to limit offers and exclude sub-optimal donors (from whom acceptable transplant outcomes may be achieved).** Patients that fall outside the criteria as “sub-optimal” donors for any organ should not be referred as potential DCD donors.

a) Liver: Optimal

- Age <50 years
- Weight <100kg
- Intensive care stay <5 days
- Functional warm ischaemic time <20 minutes
- Cold ischaemia time <8 hours
- No steatosis (<10%)

: Sub-optimal

- Age >50 years
- Weight >100kg
- Intensive care stay >5 days
- Functional warm ischaemic time >20 minutes, < 30 minutes
- Cold ischaemia time >8 hours (up to 12 hours)
- Steatosis >15%

b) Pancreas: Optimal

- Age < 45 years
- Functional warm ischaemic time <20min
- BMI <30 for solid organ pancreas transplantation
- Steatosis – subjective, refer to implanting surgeon

:Sub-optimal

- Age 45-60 years
- Functional warm ischaemic time > 20 minutes, <30minutes

c) Lung: Current referral criteria

- Age <55 years
- Reasonable blood gases with FiO₂ 40%
- No significant thoracic surgery
- Clear x-ray within 24 hours
- Serology/Tissue type available by time of retrieval

d) Kidney: Optimal

- Age <50yrs,
- No hypertension,
- No CVA,
- Terminal creatinine <133 μ mol/l
- WIT: < 1hr

The assessment of a potential DCD donor requires the following information, which should be available at the time of referral:

- Age
- primary diagnosis and past medical history
- The use of inotropes
- Presence of a gag reflex
- Presence of a cough reflex
- Respiratory rate when disconnected from the ventilator
- The fraction of inspired oxygen (FiO₂)
- Arterial oxygen saturation and pH
- Ventilation mode

4.3 Streamlining the Process of DCD donation

The prompt and expedient management of donor referral, organ offering and retrieval carries clear advantages for referring units, retrieval teams, organ recipients and most of all the families of potential DCD donors. Specific attention needs to be given to blood sampling and the offering process:

- a) Early tissue typing and virological screening allows the prompt identification of suitable recipients and reduces cold ischaemia times. Samples should be taken as soon as possible, in line with the legal guidance issued by the Department of Health. The appropriate bottles with the appropriate labels should be kept in the ICU and bloods taken and dispatched by ICU staff before the Specialist Nurse for Organ Donation arrives, if necessary.
- b) At present most organs are offered to transplant centres sequentially rather than simultaneously. This can result in considerable delays that place an intolerable and unnecessary burden on referring units and donor families.

Simultaneous offering to all relevant centres would reduce these delays significantly, and must be addressed by NHSBT as a matter of urgency.

c) Local arrangements should be made between critical care units, donor coordination teams and local retrieval and transplant teams for regular audit of the referral and acceptance of potential donors and the use of specific organs. This should take place within local and regional donation committees, and will provide helpful feedback to the critical care clinicians on donor suitability. In particular it would also monitor the acceptance and use of “optimal” donors by the transplant teams.

5. Process of Withdrawal of Life Sustaining Treatment

5.1 General Comments.

- a) Although there is a substantial amount of national professional guidance relating to the withdrawal of life sustaining therapies, this largely provides guiding principles and responsibilities rather than specific direction upon how the process should be managed. This guidance includes publications from the General Medical Council, British Medical Association and Intensive Care Society.
- b) There seems to be significant variation across the UK in how treatment withdrawal (both within and outside the context of DCD) is managed in adult critical care units. However a more consistent approach was reported in neonatal / paediatric intensive care with extubation accompanied by escalating levels of sedation reported to be the norm.
- c) DCD usually occurs out of hours and is frequently managed by junior medical staff. This, together with a lack of strategic preparedness based on meaningful and influential local policies, may impose unnecessary and avoidable extensions to warm ischaemic injury of transplantable organs and jeopardise the confidence that clinical staff have in DCD.
- d) Ideally, in order to meet the wishes of the deceased and maximise the likelihood of successful organ transplantation, withdrawal of life sustaining treatment would occur after the recipients for liver, pancreas and lung transplants (if to be donated) have been identified and admitted to the transplant centre. However this may not always be possible and the interests of the donor's family must always be recognised.
- e) The potential donor's virology and HLA type should be known before treatment withdrawal. This inevitably takes time, and it is therefore vital that the expectations of the donor family are managed accordingly from the outset, and agreement reached about any delay that will improve the outcome of transplants that result from donation.
- f) A suitably experienced clinician should be readily available throughout the period of withdrawal to enable prompt confirmation of death when it occurs.

5.2 Airway Management during Treatment Withdrawal

- a) There was a broad but not unanimous consensus at the meeting that the likelihood of organ retrieval from a potential DCD donor was influenced by the specific details of airway management during treatment withdrawal. Whilst available evidence is limited it appears to show that DCD was more likely to be possible when treatment withdrawal included extubation / decannulation of the airway. In contrast, withdrawal that is limited to disconnection from mechanical ventilation and which leaves the airway artificially maintained and protected may be associated with a much longer period of terminal care and lower likelihood of donation, unless the patient was apnoeic or dependent on very high concentrations of inspired oxygen.
- b) There was considerable discussion on airway management within the meeting, but no clear consensus. Members were also aware of very strongly held and apparently conflicting views with regards to airway management during terminal care within the (adult) intensive care profession. Practice may include i) a decision not to escalate existing levels of support, ii) gradual reduction in cardiovascular and ventilatory support, iii) disconnection from mechanical ventilation and any form of oxygen therapy, iv) extubation, with conservative airway protection manoeuvres such as lateral position, tracheal suctioning etc, and v) extubation in the supine position with pharmacological management of any subsequent distress.
- c) A strong case for extubation combined with a pre-emptive approach to the pharmacological management of subsequent distress was put forward by some members. There was a unanimous view that there should be a more consistent approach to airway management during terminal care, as appears to be the case within paediatric critical care. **The Consensus workshop recognised the strength of professional feeling around these management decisions, and was similarly aware that the principles that guide clinicians in this difficult area of practice go beyond the remit of the workshop.** There was also consensus that every unit should have a clear and consistently applied protocol for the withdrawal of treatment for potential DCD donors, and the Donation Committee may be an important mechanism through which such local protocols should be developed and implemented.
- d) Current guidance advises that the manner of treatment withdrawal should not be adjusted in order to make donation more likely. The meeting discussed whether such guidance should be reviewed in any way, but recognised the controversial

nature of such a proposal. A strong ethical and professional input to these discussions is needed and this topic should be considered by, amongst others, the Donation Ethics Committee.

- e) Withdrawal of cardio-respiratory support should always be conducted under the direct supervision of senior medical staff, and this is particularly important within the context of DCD. It is critically important that families understand the nature and the reasons behind the various elements of the end of life care that their loved one will receive.

5.3 Location of treatment withdrawal

- a) Current guidance from the ICS advises that treatment withdrawal should only take place within the theatre complex if transfer from the usual point of care (typically ICU or ED) to theatre after death would be too protracted or complex to allow donation to take place. The meeting was clear, however, that withdrawal within the theatre complex reduces warm ischaemic time and thereby, potentially at least, improves organ quality, and was aware that this has been successfully introduced in a number of centres.
- b) The meeting also considered that whilst the interests of the patient as an organ donor might be best served by withdrawal within the theatre complex, there were other interests that would be in possible conflict with this:
 - i. the individual's right to comfort, dignity and privacy
 - ii. the need for continuity of care from the ICU / ED team
 - iii. unlimited access for close family and friends.
 - iv. a manner of death that those who were caring for the individual and members of the theatre team could be comfortable with.

There was a general consensus that clinical practice had moved on from advice received from the ICS in 2005, and that the appropriate location of treatment withdrawal should be left for individual critical care teams, supported by their donation committee, to consider.

- c) The meeting was clear that (regardless of the location of treatment withdrawal) there should be clear on-going responsibility for the care of the patient and their family, regardless of the location of treatment withdrawal. If necessary this responsibility may be transferred between teams – for example from emergency

medicine to intensive care. The family should have the choice to be with the patient in a suitable environment at the point of withdrawal of treatment. A suitable environment should include privacy, space, ready access and necessary facilities. There should be a robust and acceptable plan for subsequent care should donation not take place. The potential resource implications for ICU medical and nursing staffing were noted. Once again, the meeting thought it important to emphasise the operational responsibilities of senior medical staff to this aspect of DCD.

- d) There is the opportunity and need for both qualitative and quantitative research into several aspects of the location of withdrawal of treatment. It is important to determine the views of donor families and their experience of different locations, and also to measure the impact upon warm ischaemia time and subsequent organ function of withdrawal in different locations. It is anticipated that relevant data will in future be recorded by NHSBT that will help answer these questions.

5.4 DCD from the Emergency Department

- a) With the exception of a very limited number of departments with experience of uncontrolled DCD, organ donation from EDs has been introduced relatively recently. The many practical and ethical issues that are raised need much more detailed consideration and will be the subject of a further Consensus Report.
- b) The ability of EDs to support deceased donation may be compromised by a lack of familiarity and expertise, limited resources, lack of a suitable, quiet area for the procedure and the distance between the ED and the theatre complex.
- c) Whilst it might be technically possible therefore for staff within the ED to manage the whole of the DCD pathway, it seems likely that most departments would wish to seek the help of the critical care and/or theatre teams. These teams should be aware of this potential demand, and support it through the collaborative local development of appropriate policies and guidelines.
- d) If a DCD donation programme is being considered, one of the key practical issues is the need to ensure appropriate arrangements are in place for the care of the patient and their family if death does not occur within an appropriate timescale to allow donation to proceed.

6. Actions after the withdrawal of Life Sustaining Treatment

6.1 It is important to define clearly the various terms that are used following the withdrawal of life sustaining treatment.

- a) The withdrawal period (sometimes called the agonal period): the time from treatment withdrawal to asystole
- b) The functional (or True) warm ischaemic period: commences when the systolic blood pressure has a sustained (i.e. at least 2 minutes) fall below 50mmHg (or the haemoglobin oxygen saturation below 70%) and extends up to the onset of cold in situ perfusion.
- c) The asystolic warm period (also known as the primary warm ischaemic time): the time from loss of circulation (asystole) to the perfusion of the organs with cold preservation solution in situ.

The functional (or true) warm ischaemic period reflects the fact that significant warm ischaemic injury can occur before asystole. It is inevitable that there is an empirical element to its definition and it is important that when defining the acceptable duration of functional warm ischaemia clinicians are aware that organs from young donors are likely to tolerate hypotension much more than those from older patients, and organs from patients with a history of hypertension are likely to experience critical ischaemia with systolic blood pressures significantly in excess of 50mmHg. It should also be noted that peripheral pulse oxymetry becomes less reliable as peripheral perfusion falls.

6.2 In principle successful donation can occur regardless of the time from withdrawal of life sustaining treatment to the onset of functional warm ischaemia. However, there may be occasions when for logistical reasons (e.g. theatre capacity, other demands upon surgical time) a decision to stand down a potential retrieval may have to be made.

6.3 The duration of the functional warm ischaemia period is the important determinant of transplant outcomes. It is important that retrieval teams define and agree upon

the minimum limits for the functional warm ischaemia period (the minimum “stand-down time”) to which all retrieval teams will adhere.

6.4 There are two overriding principles governing the minimum functional warm ischaemia time:

- a) Each organ is different and has different requirements.
- b) There is a need for minimum UK wide standards, but the option should nevertheless remain for individual centres to extend the stand-down time, and for outcomes to be shared with other units.

6.5 Stand-down times from the onset of functional warm ischaemia vary by organ:

- Liver: 30 minutes (although 20 minutes is ideal and age is an important factor)
- Pancreas: 30 minutes
- Lungs: 60 minutes (time to inflation of lungs)
- Kidney: 120 minutes - then reassess with regard to logistics; can extend to a further 120 minutes in selected donors.

6.6 Scoring systems. It is important to continue to develop and evaluate the benefits of scoring systems that aid prediction of the likelihood of death within a given time period after withdrawal of life sustaining treatment, and the subsequent outcomes of transplantation. Two systems have been developed in North America – the Wisconsin and UNOS scoring systems –but neither has been fully validated. An accurate and reliable scoring system relevant to UK practice would be of benefit in discussions with families, and in determining the most appropriate use of resources.

6.7 The management of a patient who does not die within an appropriate time period after withdrawal of life sustaining treatment will depend on earlier decisions about the manner and location of treatment withdrawal. However, a number of principles were agreed.

- a) The patient and family should have an identified member of staff to be with them and to provide the necessary care.

b) The family should be fully informed about the process of withdrawal and what may happen afterwards, including the possible timescales and their implications. They must be kept fully informed throughout the process.

c) The patient remains the responsibility of the clinical team under which they were receiving care prior to withdrawal of life sustaining treatment. This will usually be critical care, but if DCD is established from Departments of Emergency Medicine (EM) other arrangements may be necessary, and must be made before treatment is withdrawn.

d) It is essential to ensure that a place is identified prior to withdrawal of treatment where the patient should go to (or remain in) if death does not occur. This may be a return to critical care, but if a patient from an ED has treatment withdrawn in an anaesthetic room then a suitable place to which the patient will be moved should be identified.

e) If a patient does not die in circumstances that allow organ donation to go ahead, tissue donation should always be offered to the family as a further option.

7. Diagnosis of death and post mortem interventions.

7.1 Death is regarded as a state in which there has been an irreversible and simultaneous loss of both the capacity to breathe and the capacity for consciousness. Within the context of DCD, death is diagnosed using cardio-respiratory criteria, and with the “confirmation that there has been irreversible damage to the vital centres in the brain-stem, due to the length of time in which the circulation to the brain has been absent.” (Academy of Medical Royal Colleges Code of Practice, page 11). Any intervention that allows reperfusion of the brain and thereby prevents irreversible brain damage interrupts the otherwise inevitable progression from permanent loss of circulation and respiration to irreversible loss of brain function.

7.2. The term ‘asystole’ refers to the absence of mechanical cardiac function, not residual electrical activity as recorded on an ECG. The meeting supported the view that the starting point for the determination of cardio-respiratory death should be the absence of mechanical cardiac function, and concurred with guidance from the AoMRC that this can be confirmed by the absence of pulsatile flow on a correctly functioning arterial line (or by using echocardiography if expertise exists). Whilst it was acknowledged that residual electrical activity on the ECG may still be present at the onset of asystole as assessed by these means, there was consensus that unless the ECG was normal in morphology and rate this was an acceptable diagnostic criterion. However, it was also recognised that there may be circumstances when invasive arterial pressure is not available. There was consensus that digital palpation of a central pulse could not match the sensitivity of invasive arterial pressure monitoring, and it was therefore concluded that the ECG is the only reliable way of confirming the absence of the circulation in such circumstances. Finally, it was agreed that any return of cardiac or respiratory activity during this period of observation should prompt a further five minutes observation after subsequent asystole.

7.3 Interventions after death. There was consensus that no intervention that might potentially restore cerebral circulation and function could be allowed under any circumstances. The meeting considered several specific interventions in some detail, including both those that might **inevitably** restore cerebral blood flow (e.g. continued

CPR without isolation of the cerebral circulation), or **inadvertently** (e.g. resumption of cardiac contractility following mechanical ventilation of the lungs).

a) Vessel cannulation

This can be undertaken at any time following the diagnosis and confirmation of death using the criteria described within the Academy document.

b) In situ preservation with preservation solutions.

This can commence anytime following the diagnosis and confirmation of death using the criteria described within the Academy document when non-blood fluids are being used. For blood containing fluids, see below.

c) Regional reperfusion of the abdominal organs with blood containing fluids.

This can commence following the diagnosis and confirmation of death. The two essential principles are that no steps should be taken that could restore cerebral perfusion or that could potentially restart the heart in situ. Complete occlusion of possible flow to the coronary arteries and the cerebral circulation must be achieved before regional perfusion is commenced through clamping of appropriate vessels. Cannulae for regional perfusion may be inserted into the femoral vessels, trans-abdominally into the iliac vessels, or directly into the IVC and aorta; the venous cannula may also be passed into the IVC via the right atrium.

d) Systemic reperfusion, including the cerebral circulation:

i) No steps should be taken that are specifically designed to restore the heart beat in situ. Ex vivo restoration of heart function is however acceptable.

ii) Cardiac compression, either manually or by machine, unquestionably has the capacity to restore the cerebral circulation, and should not be undertaken until this has been excluded.

iii) Regional perfusion should not be instituted until the cerebral circulation has been excluded. However if the cerebral circulation has been isolated the meeting felt that any interventions required for organ preservation as currently practiced or envisaged might be appropriate.

7.4 Techniques to isolate the cerebral circulation.

a) It was felt that balloon occlusion of the thoracic aorta was **only** acceptable as a means of excluding cerebral blood flow if non-blood perfusion was used. The group felt that the device is not reliable enough to completely exclude the cerebral circulation and that currently available portable techniques to confirm exclusion of the cerebral circulation at the bedside were also unreliable. Therefore organ preservation techniques using blood perfusion should not be used with this device.

b) The optimal way of isolating cerebral circulation is a cross clamp across the arch of the aorta and further discussion to make this procedure routine should be explored. Individual ligation of vessels via the neck or the use of a neck tourniquet is not acceptable.

7.5 Implications for Lung DCD

- a. If the patient had been extubated as part of the process of withdrawal of treatment, successful lung donation requires re-intubation after the diagnosis of death to protect the lungs from aspiration. There was consensus that tracheal re-intubation per se would not risk provoking resumption of mechanical cardiac function, and it was agreed therefore that re-intubation can be performed after the declaration of death and before the start of abdominal organ retrieval. There was no clear consensus as to whether re-intubation should be performed by a clinician from the donor hospital or by a member of the organ retrieval team. Although it is achieved most easily through a willingness to re-intubate by the anaesthetic team at the donor hospital some members felt that this may be perceived as a conflict of interests. It is essential that local policies are in place that ensure that donating hospital staff understand the implications of lung retrieval, identify where responsibility rests for re-intubation, and that if this is to be performed by an anaesthetist from the donor hospital the individual has the necessary level of experience.
- b. Although there was agreement that re-intubation could occur prior to surgical intervention, there was considerable concern that re-ventilation of the lungs might provoke resumption of mechanical cardiac function. It was agreed therefore that reinstatement of mechanical ventilation should not resume before satisfactory exclusion of the cerebral circulation. However,

there was agreement that re-inflation of the lungs can be achieved 10minutes after circulatory arrest using the application of a “recruitment” manoeuvre that does not involve mechanical ventilation – for example by applying a high level of CPAP (such as 40 cmH₂O) for 45 seconds followed by maintenance of 5 cmH₂O CPAP. Retrieval teams may need to be trained in how to undertake this procedure if an anaesthetist at the donating hospital is not available to help.

7.6 It was noted that auto-resuscitation (the Lazarus phenomenon) has only been described in the context of failed cardiopulmonary resuscitation. Patient movement during transfer to the operating theatre and onto the operating table or vigorous intra-abdominal organ retrieval may theoretically compress and restart the heart, although the meeting was not aware of any reports of this occurring. However, if it is believed this possibility exists, all transplant surgeons should have guidance on what to do should this exceptional circumstance ever occur. A confidential group to examine the details of any such cases should be established.

7.7 A further safeguard would be to check the femoral pulse prior to the start of the retrieval operation to ensure that no circulation has been restored. However the meeting reached no consensus as to whether this should be recommended, and if so by whom it should be performed. Whilst the individual best placed to perform this is the retrieval surgeon, it is important to avoid any actual or potential conflict of interest. Advice should be sought from the UK DEC.

8. Uncontrolled DCD

8.1 “Uncontrolled” DCD is the term used for donation after death when the person has died suddenly and unexpectedly. Typically death, or the fatal clinical event, occurs out of hospital and cardio-respiratory resuscitation occurs during transfer of the patient to hospital and/or in the ED. If resuscitation is unsuccessful and death is confirmed there may be circumstances in which organ donation can occur, but in the UK this has only been established practice in a very limited number of centres. Very occasionally unexpected cardiac arrest may occur in a patient who has met the criteria for death on neurological grounds and who is expected to be a DBD donor, but before arrangements for organ retrieval are in place. Donation from such a patient would also be classified as uncontrolled DCD.

8.2 Re-Institution of cardiac massage after cardiac arrest following CPR. This unquestionably has the capacity to restore the circulation, and should not be undertaken until the cerebral circulation has been completely excluded. In uncontrolled DCD it is acceptable to delay cessation of cardiac massage before the diagnosis of death, to allow the ODR to be checked and preparations for post mortem cannulation to be made. Once death has been diagnosed cardiac massage must not be restarted.

8.3 Consent
In the consensus meeting the discussion about consent was limited to the issue of consent for cannulation and in-situ organ perfusion, after death but before the relatives of the deceased could be approached. It was felt it might be appropriate to insert perfusion cannulae and commence in-situ perfusion if the patient was registered on the ODR. If the patient was not registered on the ODR the group accepted that cannulation and perfusion may be legal (under section 43 of The Human Tissue Act 2004 and similar provisions in Scotland) but felt that doing so before the family was approached can currently not be advised. It was felt that the Donation Ethics Group should discuss the issue.

References used during the Consensus Meeting

Guidelines for Adult Organ and tissue Donation. Intensive Care Society (London). 2005. Available at www.ics.ac.uk/icmprof/downloads/Organ%20&%20Tissue%20Donation.pdf

UK guidance for non-heart beating donation. British Journal of Anaesthesia, 2005 95: 592-5 (a report from the ICS working party on NHBD)

Thomas I, Caborn s, Manara AR. Experiences in the development of non-heart beating organ donation scheme in a regional neurosciences intensive care unit. British Journal of Anaesthesia, 2008, 100: 820-6

A code of practice for the diagnosis and confirmation of death. Academy of the Medical Royal Colleges. <http://www.aomrc.org.uk/publications/reports-guidance.html>

Devey L, Wigmore SJ. Non-heart-beating organ donation. British Journal of Surgery 2009, 96: 833-835.

Ali A et al. Cardiac Recovery in a Human Non-Heart-beating Donor after Extracorporeal Perfusion: Source for Human Heart Donation. Journal of Heart and Lung Transplantation. 2009, 28: 290-293.

Bernat JL et al. The circulatory-respiratory determination of death in organ donation. Critical Care Medicine. 2010, 38: 972-979

Gardiner D, Riley B. Non-heart-beating organ donation - solution or a step too far. Anaesthesia 2007, 62: 431-433

Murphy P, Manara A, Bell D and Smith M. Controlled non-heart beating organ donation: neither the whole solution nor a step too far. Anaesthesia, 2008, 63: 526-530

Coggon J, Brazier M, Murphy P et al. Best interests and potential organ donors. British Medical Journal 2008, 336: 1346-1347.

Legal issues relevant to non-heartbeating organ donation in England and Wales (Scotland awaited)
www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_108825

BTS guidelines 2005 (currently being updated)
<http://www.bts.org.uk/transplantation/standards-and-guidelines/>

HTA Code of Practice on Donation of solid organs for transplantation
<http://www.hta.gov.uk/legislationpoliciesandcodesofpractice/codesofpractice/code2donationoforgans.cfm>

Donation after cardiocirculatory death in Canada Sam D. Shemie, Andrew J. Baker, Greg Knoll et al. CMAJ • October 10, 2006; 175 (8).

Australian and New Zealand Intensive Care Society. *The ANZICS Statement on Death and Organ Donation* (3rd Edition). Melbourne: ANZICS, 2008.
www.anzics.com.au/.../359-anzics-statement-on-death-and-organ-donation-edition-

Not used during the meeting, but quoted in the text:

Map of Medicine
www.mapofmedicine.com/

Figure 1
Deceased Donors in the UK

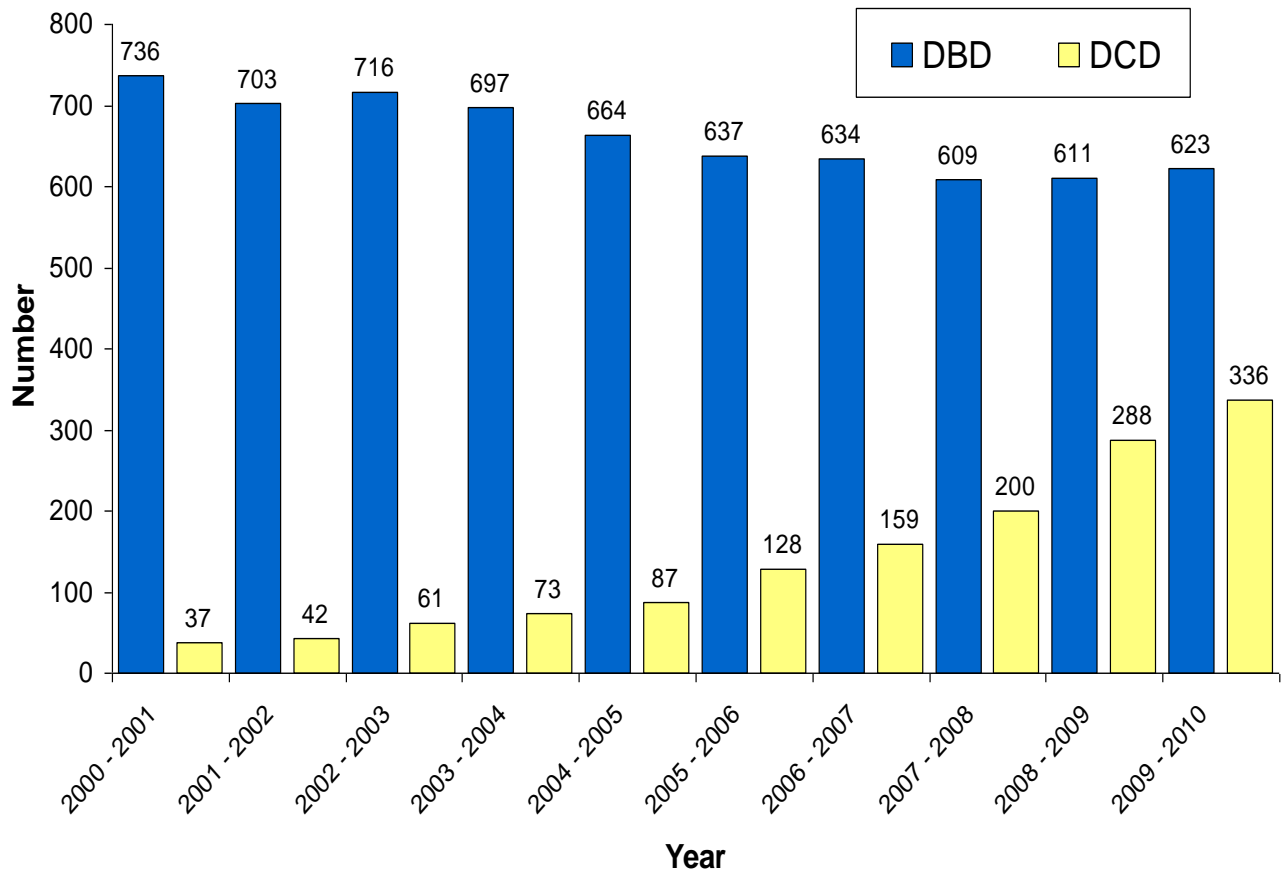
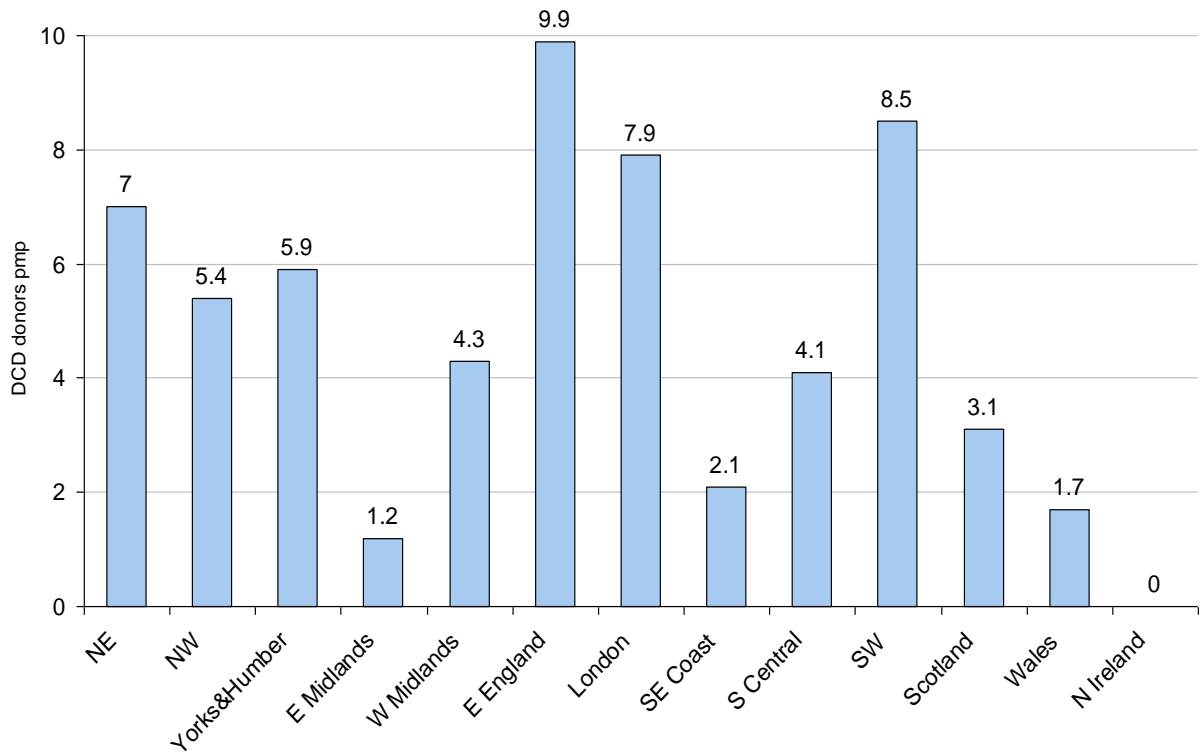


Figure 2

DCD donor rate (per million population – pmp) for English SHAs and Scotland/Wales/N Ireland



Acknowledgements

Members of the Steering Group

Dr Kevin Gunning	-	Intensive Care Society
Mr Keith Rigg	-	British Transplantation Society
Dr Paul Murphy	-	NHS Blood and Transplant – Clinical Lead for Donation
Ms Abigail Martineau	-	NHS Blood and Transplant – Specialist Nurse – Organ Donation
Mr Chris Rudge	-	Department of Health – National Clinical Lead for Transplantation

Special thanks also go to:

- Department of Health
- Welsh Assembly Government
- Scottish Executive
- Department of Health and Social Care Northern Ireland
- NHS Blood and Transplant
- West Midlands Strategic Health Authority