

# National Standards for Organ Retrieval From Deceased Donors



Version 2.6  
Agreed 14th December 2012  
Policy active from 1st January 2013  
Review date 1st April 2013

British Transplantation Society Guidelines



# NHS BLOOD AND TRANSPLANT

## **NATIONAL STANDARDS FOR ORGAN RETRIEVAL** **FROM DECEASED DONORS**

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### **Introduction**

Transplantation is well established as the best and often the only treatment for many patients with end-stage kidney, liver, intestinal, cardiac and pulmonary failure. Whilst some types of transplant can be achieved with organs from living donors, most patients are reliant upon organs from deceased donors.

Because of an increasing shortfall between the diminishing number of deceased donor organs available and the increasing waiting list of patients in need of transplantation in the UK, the Department of Health assembled an Organ Donation Task Force in 2006 with a brief to identify the obstacles to organ donation and suggest solutions which would deliver a substantial increase in the number of transplants performed each year.

Following an extensive analysis of systems in the UK and in other countries, the Task Force produced a report in January 2008 which concluded that a 50% increase in organ donation after death was possible and achievable in the UK within five years provided that three key issues were resolved: effective donor identification and referral; improved donor co-ordination; and efficient organ retrieval arrangements.

### **Background**

Transplantation involves two operations: retrieval of organs from the donor and organ replacement in the recipient. Both these operations are highly specialised procedures requiring special skills and training. However, whilst the recipient operation focuses on the replacement of one or two organs, the donor operation requires a co-ordinated approach to the retrieval of multiple organs and tissue.

In 2008, when the Task Force reported, organs were retrieved from approximately 900 deceased organ donors in the UK each year, yielding approximately 3,000 organs for transplantation. The Task Force estimated that, following implementation of their recommendations, the number of transplants should increase by 50%. The increase was expected to come mainly from an increased number of donors. However, by optimising donor management, there was also the potential to increase the number of transplantable organs retrieved from each individual donor.

### **Evolution of Retrieval Arrangements**

Historically, until the early 1990s, the responsibility for retrieving organs from donors in the UK lay with the surgical team at the recipient's transplant centre. Thus the local transplant coordinator at the donor hospital invited separate kidney, liver, cardiothoracic and, occasionally, pancreas transplant teams to assemble at the donor hospital, retrieve their various organs and transport them to their individual transplant centres for use in their various recipients.

These *ad hoc* arrangements were modified in the 1990s following the introduction of liver and cardiac zones which were introduced to facilitate a more rational allocation system for donated livers and hearts. Each liver and cardiac centre was responsible for retrieving all livers or hearts from a defined zone of the country and, in general, had first option for use of donated organs within their zone. Subsequently, pancreas zones were also introduced. The sizes and configurations of the zones surrounding each liver, cardiothoracic and pancreas centre differed and were based upon the annual transplant activity of individual centres for each type of organ. Following implementation of these zonal arrangements, further rationalisation resulted in many of the liver teams retrieving kidneys and often pancreas, without the need for separate renal or pancreatic teams to attend.

## **Organ Donation Task Force Report**

The Task Force remarked upon several aspects of the current retrieval arrangements:

- Although liver transplant units performed the majority of liver and kidney removals, a number of renal units also played a role – predominately in kidney removal in the case of donation from “kidney only” donors.
- Whilst some liver transplant centres provided a single team able to retrieve all abdominal organs, others were joined by a separate team to retrieve the pancreas.
- Removal of cardiothoracic organs was the responsibility of the cardiothoracic transplant centres which were usually based at separate institutions from the abdominal transplant centres.
- The retrieval teams varied in size and composition, their funding was often obscure and their level of experience and expertise was variable.
- The smaller teams relied heavily on consultant staff, and few teams were available specifically for organ retrieval – many team members had elective clinical commitments which restricted their ability to respond quickly.
- The teams all relied, to a greater or lesser extent, on significant help from medical and nursing staff from the donor hospital.
- Changes to both junior and consultant contracts, and the effects of the European Working Time Directive, threatened the sustainability of the retrieval service because of incompatibility with good clinical governance.
- Finally, few teams were able to provide early, expert assistance in donor management to donor hospitals which might influence both the number and quality of transplantable organs.

The Task Force recommended that a UK-wide network of dedicated Organ Retrieval Teams should be established to ensure timely, high quality organ removal from all deceased donors. These teams would be responsible for working with critical care staff in the donor hospital to ensure optimal donor care and maximise the number and viability of organs retrieved from every donor.

Based upon advice from a working party of the British Transplantation Society, the Task Force recommended that the national network of the retrieval teams should be developed such that:

- Each team is virtually self-sufficient and not require anaesthetic, theatre or surgical staff from the donor hospital other than the minimum needed for local liaison.
- Each team is available 24 hours a day, without elective commitments during their time on call for retrieval.
- Teams are able to respond appropriately if there is more than one donor in the same region on the same day.
- Teams are able to provide opportunities for training.

The Task Force recommended that NHSBT should take on the responsibility for commissioning national organ retrieval teams and for audit and performance management. Commissioning should be based upon a framework of common standards covering retrieval arrangements, infrastructure, staffing levels, training and qualifications, and audit of outcomes such as response time, transplantable organs retrieved, organ damage and graft survival.

## **The Rationale for National Standards**

Standards are required to ensure that:

1. The best possible outcomes are achieved for all organs offered for transplantation by donors and their families.
2. Organs offered for transplant are retrieved in a timely and coordinated fashion.
3. All donors are managed by experienced personnel whose objective is to optimise subsequent function of all organs retrieved for transplantation.
4. The retrieval operation is performed by experienced surgical teams to ensure that the quality of transplantable organs is not compromised during the retrieval process.
5. Donor hospitals throughout the UK receive a rapid and efficient service, minimising disruption to their other services.
6. Respect for the donor and donor family are given high consideration throughout the retrieval process.
7. Finally, the Standards are based on the overriding principle that the safety of transplant recipients with respect to the quality of the organs that they receive is paramount.

This document specifies the Standards which solid organ retrieval teams in the UK should fulfil in order to provide a high quality national organ retrieval service (NORS) in the UK.

The standards cover cardiothoracic, renal, pancreatic and liver retrieval from deceased DBD and DCD donors [formerly termed HB and NHB donors – see glossary]. They do not cover retrieval of organs from uncontrolled DCD donors or from living donors, nor do they cover retrieval of tissues such as corneas, bone and skin.

The Task Force Recommendations included the suggestion that retrieval teams should aim to be independent of on-call anaesthetic staff at the donor hospital. The options for anaesthetic and donor management support to DBD donors are currently being explored in consultation with the relevant national bodies.

## SECTION ONE

### 1. Topic 1 Retrieval Zones

- 1.1. A national system of multi-organ retrieval zones will be established centred upon national multi-organ retrieval teams appointed by NHSBT.
- 1.2. The NORS teams will be responsible for retrieving from DBD donors and from controlled DCD donors.
- 1.3. The retrieval zones will be based primarily upon the proximity (measured by response time by ambulance from liver or cardiac centres) of multi-organ retrieval teams to donor hospitals.
- 1.4. Organ retrieval at each donor hospital will be provided primarily by the closest (1<sup>st</sup> on-call) abdominal and cardiothoracic retrieval teams, with back-up from the closest available NORS team (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> etc on-call) if that 1<sup>st</sup> on-call retrieval team is already committed to retrieval elsewhere.
- 1.5. Following provisional acceptance of a donor heart by a UK cardiac transplant centre, that centre will be allowed to send their retrieval team to attend the donor if they wish to do so **provided** that the co-ordinating SN-OD judges that this will not unduly delay the retrieval process and will not compromise the retrieval of other organs. The centre would also be obliged to retrieve the lungs from that donor if these had been accepted by another centre. Otherwise the 1<sup>st</sup> on-call cardiothoracic team or, if they are already committed to retrieval elsewhere, the closest available (2<sup>nd</sup>, 3<sup>rd</sup> etc on-call) team must retrieve.
- 1.6. In the event that specific organs are offered and accepted from a donor outside the UK (e.g. Republic of Ireland), then the NORS retrieval team covering the recipient centre will retrieve if asked to do so by the Specialist Nurse (or Practitioner) – Organ Donation (SN-OD) (formerly known as Donor Transplant Co-ordinator or DTC) at the donor hospital.
- 1.7. In cases of intestinal donation, then the recipient intestinal transplant centre will be called to retrieve the intestine, and will also retrieve the other abdominal organs if they are able to do so. Alternatively, the intestinal transplant centre may send a surgeon to join the NORS abdominal team to assist their lead abdominal surgeon in removing the intestine.
- 1.8. Because of the critical impact of cold ischaemia on cardiac transplant outcomes, the heart should be dispatched as soon as possible after explant. In the event that a cardiac recipient centre requires air travel to retrieve a heart from outside their primary retrieval zone, they may request that the zonal team retrieve the lungs if they are available to do so.
- 1.9. For paediatric cardiothoracic donors of  $\leq 30$  kg, a paediatric cardiothoracic retrieval team will be asked to attend. In the event of a paediatric cardiothoracic donor  $>30$ kg the paediatric cardiothoracic recipient centre will be given the option to retrieve.

- 1.10. The Papworth team, supplemented if required by a surgeon from Great Ormond Street, will provide the 1<sup>st</sup> on-call paediatric cardiothoracic retrieval service for the South (Birmingham, Harefield and Papworth zones), whilst Newcastle will provide this service for the North (Glasgow, Wythenshawe and Newcastle zones) and for paediatric donors outside the UK. These teams will provide a paediatric 2<sup>nd</sup> on-call service should the other paediatric team already be committed to a retrieval elsewhere.
- 1.11. In the event of a paediatric liver donor, the paediatric liver recipient centre will be given the option to provide the abdominal retrieval team or to send a surgeon to assist the designated retrieval team if they wish to do so.
- 1.12. Abdominal retrieval teams are expected to be capable of retrieving kidneys, pancreas and liver from paediatric donors aged five years or older. For small paediatric donors aged less than five years, a first on-call abdominal team that is not confident to retrieve from a small paediatric donor may request that the closest available centre with experience in paediatric liver transplantation (Birmingham, Kings or Leeds) attend in their stead.
- 1.13. In the event that an organ from either a DBD or a DCD donor has been accepted by a recipient centre, then that recipient centre may send a surgeon to assess the organ in-situ if they wish to do so provided that this does not delay the retrieval process and prejudice the chance of donation occurring. That surgeon may scrub in provided the lead surgeon for the NORS team is happy for him/her to do so.
- 1.14. In the event of a DBD or controlled DCD “kidney only” donor (i.e. if consent/authorisation has only been granted for kidney retrieval, or if liver, pancreas and cardiothoracic organs have been offered but declined by all recipient centres), then the local renal transplant team may retrieve if they are willing and able to do so without the support of a multi-organ team.
- 1.15. If, for any reason, the local renal transplant team is unwilling or unable to retrieve, then the national multi-organ retrieval teams will retrieve the kidneys from such “kidney only” donors.
- 1.16. In the event that, in a donor attended by a retrieval team, a specific organ is found to be unsuitable for transplantation and is declined by the relevant transplant centres, then the retrieval team may retrieve it for research purposes provided that appropriate consent/authorisation has been obtained. **N.B.** Under HTA rules, if material is being removed from the deceased for the primary purpose of research then that operating theatre must have an HTA licence. The Human Tissue Act only applies to England, Wales and Northern Ireland. There is no requirement for an HTA licence in order to procure organs and tissue for research for hospitals in Scotland.

- 1.17. Following withdrawal of treatment from a potential DCD donor, retrieval teams must wait as follows:
- Cardiothoracic teams must wait at least two hours for the onset of functional warm ischaemia (defined as systolic BP <50mmHg).
- Abdominal teams must wait at least three hours for the onset of functional warm ischaemia (defined as systolic BP <50mmHg).
- If the systolic blood pressure has not fallen <50mmHg after the times stated above then they may stand down at that stage.
- 1.18. Abdominal teams may wait longer than three hours from treatment withdrawal if progressive cardiovascular instability suggests that asystole is likely to occur and the family has no objections.
- 1.19. Once the systolic BP has fallen below 50mmHg (i.e.onset of Functional Warm Ischaemia), the teams will wait 30 minutes before abandoning the liver and pancreas, one hour before abandoning the lungs, and two hours before abandoning the kidneys as untransplantable due to excessive warm ischaemia.
- 1.20. The NORS teams are not expected to attend uncontrolled DCD donors. Due to time constraints, such donors will continue to be attended by the local transplant team.
- 1.21. When possible, retrieval teams will travel by road. However, if this is not possible (e.g. for Northern Ireland), or if estimated road travel time is greater than 3 hours, or if organ viability might be compromised by any delay, then air transport may be used.

## **2. Topic 2 Donor Hospitals**

- 2.1. All hospitals in the UK should comply with the Organ Donation Task Force recommendations which have been accepted by the Department of Health and the Devolved Health Administrations
- 2.2. The current arrangements for critical care and for anaesthetic and theatre support will remain unchanged until, and unless, robust alternative arrangements can be made. (These arrangements are currently under discussion with input from the relevant national bodies.)
- 2.3. The donor hospital will provide a fully equipped operating theatre for the retrieval procedure, including appropriate anaesthetic equipment and drugs to support the donor.
- 2.4. The donor hospital is responsible for the safe transfer of the donor to the operating theatre.

- 2.5. The donor hospital will provide an anaesthetist to support DBD donors in the operating theatre during the retrieval procedure.
- 2.6. The donor hospital will provide a suitable member of staff, such as a qualified theatre nurse and/or operating department assistant, who is familiar with the theatre facilities and the whereabouts of the surgical and anaesthetic equipment, instruments and drugs which may be needed by the retrieval surgeons and anaesthetist.
- 2.7. This/these individual(s) will remain in theatres during the retrieval procedure to provide assistance to the scrub nurse (provided by the retrieval team) and the anaesthetist, and assist the SN-OD with the final act of care.

### **3. Topic 3 The Specialist Nurse – Organ Donation (SN-OD)**

- 3.1. Every potential donor hospital in the UK will have access to a SN-OD who, in collaboration with the consultant intensivist, will be responsible for assessing the patient, approaching the family and ensuring that appropriate consent/authorisation has been obtained, and for organising and co-ordinating organ retrieval at that hospital.
- 3.2. The SN-OD will liaise, when necessary, with the Coroner/Procurator Fiscal to obtain permission to proceed with organ retrieval.
- 3.3. As soon as consent /authorisation for donation is obtained, the SN-OD will contact the nominated retrieval centre point of contact to alert the appropriate NORS abdominal and cardiothoracic retrieval centres, as per the rotational sequence.
- 3.4. The timing of the retrieval operation will depend upon the proximity of the retrieval team to the donor hospital, the stability of the donor, the prospect that active donor management will improve the quality of the organs, and the wishes of the family.
- 3.5. Once one abdominal donor organ has been allocated and theatre time arranged the SN-OD will contact the retrieval team and instruct them to attend at the agreed time.
- 3.6. Theatre arrangements should take account of the time required for effective donor assessment and management to optimise the quality of the donated organs as well as the wishes of the donor family. They should also take into consideration the time required to prepare recipients for surgery.
- 3.7. If, during the offering process, other organs are accepted but require a delay in the timing in order to effect a transplant (e.g. to get a cardiac recipient over from Northern Ireland) then the SNOD should alter the timing appropriately so that the maximum number of transplants in the most needy patients on the waiting list can take place.

- 3.8. The SN-OD will ensure that all potential donor organs are offered to transplant centres, subject to any absolute contra-indications specified by relevant organ Advisory Groups (e.g. disseminated malignancy).
- 3.9. In the event that a potential DCD donor is subsequently diagnosed with brainstem death during preparations for retrieval and consent/authorisation for DBD donation is obtained, donation may be delayed whilst the SN-OD offers the heart and any other organs that have been turned down because DCD donation was initially anticipated, provided that the donor family agrees to such a delay. If recipients for DCD organs from that donor have already been identified and notified, then their recipient centres may retain those organs for use in those identified recipients.
- 3.10. A potential DBD or DCD donor kidney will only be deemed unsuitable for transplantation if the organ is declined for the same clinical reason (with the exception of patients who test positive for hepatitis B core antibody) by the local renal team and the five renal transplant centres at the top of the kidney offering sequence, and is also not accepted by any of the centres that participate in the 'declined kidney scheme'.
- 3.11. A potential DBD cardiothoracic organ donor will only be deemed unsuitable for transplantation if the organs are declined because of grossly subnormal organ function by at least four centres in the cardiothoracic offering sequence. Well functioning organs declined for other reasons (e.g. hepatitis C positive donor) must be offered to all cardiothoracic transplant units, except where the Cardiothoracic Advisory Group have notified NHSBT of absolute contra-indications to donation.
- 3.12. For liver, pancreas and bowel a potential DCD or DBD donor organ will only be deemed medically unsuitable for transplantation if all potential recipient centres decline the organ except where the Liver, Pancreas and Bowel Advisory Groups have notified NHSBT of absolute contra-indications to donation.
- 3.13. The SN-OD should document reasons for the decline of any organ, or the loss of any organ for transplantation due to the non-availability of a retrieval team and feed back this information to staff at the donating hospital.
- 3.14. In the event that consent/authorisation has only been granted for kidney donation, or if all organs other than kidneys have been offered but declined by all centres (i.e. a "kidney only" donor), then the SN-OD will contact the local renal transplant team to inform them that a NORS team will retrieve unless they are willing to retrieve the kidneys themselves and if they are able to do so in a timely fashion without support from a NORS team.
- 3.15. If the local renal team is unwilling or unable to retrieve from such a "kidney only" donor, then the closest available NORS abdominal retrieval team must attend the donor to retrieve the kidneys.

- 3.16. The SN-OD will liaise with the donor hospital, the donor retrieval teams and with recipient transplant centres so that organs offered for transplant are maintained in the best possible condition and are retrieved and dispatched expeditiously to recipient centres.
- 3.17. In conjunction with staff at the donor hospital the SN-OD will ensure that operating facilities for the retrieval operation and for the safe transfer of the donor to theatre have been arranged.
- 3.18. For DBD and DCD donors, the SN-OD will ensure that the necessary tests for either the establishment of brain stem death or death after circulatory arrest have been completed and recorded by the appropriate medical staff at the donor hospital before organ retrieval, and that the retrieving surgeons have checked that death has been recorded appropriately and verified the donor blood group before embarking on the retrieval operation.
- 3.19. The SN-OD will ensure that appropriate investigations (e.g. blood group, virology, ECG) are performed before the retrieval operation and that the results of these investigations are available for the surgeons to review in theatres.
- 3.20. The SN-OD should record details of any transfusions the donor received prior to consent/authorisation. If blood transfusion is required the SN-OD should request that CMV negative packed red blood cells are used whenever possible.
- 3.21. The SN-OD will ensure that appropriate consent/authorisation has been obtained and recorded for the removal of individual organs prior to organ retrieval and that the retrieving surgeons have checked the identification of the donor, the consent/authorisation form and all other relevant documentation before commencing the retrieval operation.
- 3.22. The SN-OD must ensure that the pre theatre section of the **FRM4135** NHSBT Surgical Safety Checklist is completed before the start of the retrieval operation.
- 3.23. The SN-OD will maintain a presence in theatre to ensure continued co-ordination of the retrieval process.
- 3.24. The SN-OD will undertake the perfusion of the abdominal organs in line with responsibilities set out in the 'Role of the Co-ordinator in Abdominal Perfusion' protocol\*, as required.
- 3.25. The SN-OD will record all the necessary key time points required both for the Electronic Offering System (EOS) and for each of the organ specific donor record forms, including the time that each organ was removed from the operative field and placed in cold solution.

- 3.26. The SN-OD is responsible for ensuring the correct packaging and labelling of organs retrieved for transplant in line with responsibilities set out in the 'Role of the Co-ordinator in Abdominal Perfusion' protocol\*, and that the organs are dispatched to the correct recipient centres.
- 3.27. The SN-OD, with the help of the lead surgeon, will ensure that any samples to support transplantation (e.g. blood samples, lymph nodes, spleen and vessels) required by recipient centres are placed in pots to accompany the organs and are appropriately labelled in line with responsibilities set out in the 'Role of the Co-ordinator in Abdominal Perfusion' protocol\*.
- 3.28. The SN-OD will ensure that the core donor information has been fully completed on EOS and that the Organ Specific donor forms and any necessary vessel forms have been fully completed by the surgeons and are dispatched with the retrieved organs and tissues to recipient centres.
- 3.29. It is the SN-OD's responsibility to legibly record the donor demographics on the HTA Organ Specific forms. It is the lead surgeon's responsibility to legibly record all surgical and anatomical details on the form and then to sign and return it to the SN-OD.
- 3.30. The SN-OD is responsible for ensuring that the relevant copy of the HTA organ specific form A is returned to NHSBT within 7 days in accordance with the Human Tissue Act 2004 and Human Tissue (Scotland) Act 2006.
- 3.31. The SN-OD will ensure that a copy of the donor's blood group form accompanies each organ.
- 3.32. The SN-OD will liaise with recipient centres via the nominated recipient point of contact, to keep them informed about the progress of the retrieval process, and alert them when the organs are dispatched from the donor hospital.
- 3.33. The SN-OD will report any significant adverse occurrence during retrieval no later than the next working day by accessing the NHSBT Incident reporting form via <https://www.organdonation.nhs.uk/IncidentSubmission/> or via the Organ Donation website [www.organdonation.nhs.uk](http://www.organdonation.nhs.uk) .
- 3.34. If a post mortem examination is carried out by a pathologist after organ donation, the SN-OD is responsible for immediately reporting any relevant abnormal pathology (e.g. unexpected cancer) to the NHSBT Duty Office who will then immediately pass on this information to all the relevant recipient centres.

- 3.35. The SN-OD must write in the patient's medical records a note for the pathologist stating:

“If a post-mortem examination is performed and identifies pathology that is, or may be, relevant for the health or future health of the transplant recipient(s) and/or the patient's family, then the Pathologist must immediately contact NHS Blood and Transplant (NHSBT) Duty Office on telephone number 0117 975 7580 in line with NHSBT's MPD910- Medical records Entries for Proceeding and Non-Proceeding Organ and/or Tissue Donors.”

\*Applies to team members undertaking abdominal perfusion in hospitals covered by the Birmingham/Cardiff, Leeds/Manchester and Newcastle retrieval teams and on occasions when these three teams retrieve in hospitals routinely covered by the Kings, Royal Free/Oxford, Cambridge and Scottish retrieval teams.

#### **4. Topic 4 Retrieval Centres**

- 4.1. Abdominal and cardiothoracic retrieval centres must provide fully staffed on-call retrieval teams available 24 hours per day, 7 days per week for organ retrieval.
- 4.2. Retrieval teams will be 1st on-call for donors within their designated retrieval zones (primary catchment areas) and 2<sup>nd</sup>, 3<sup>rd</sup>, etc on-call for donors in other zones. NHSBT will provide a list of on-call arrangements for every potential donor hospital in the UK.
- 4.3. The retrieval centre must be able to dispatch their team within one hour of notification of an organ donor, unless the team is already committed to retrieval elsewhere.
- 4.4. Each retrieval centre must be prepared to attend more than one donor per day if requested with a fully staffed retrieval team (although they will not be required to attend simultaneous donations).
- 4.5. If, when notified, the 1st on-call team is already committed to retrieval elsewhere and is unable to attend within three hours of the intended theatre time, then the retrieval centre must inform the SN-OD who will then contact the closest available team (2<sup>nd</sup>, 3<sup>rd</sup>, etc on-call). This closest available team will be asked to retrieve if it can attend the donor three hours sooner than the 1<sup>st</sup> on-call team.

- 4.6. Following provisional acceptance of a donor heart by a UK cardiac transplant centre, that centre will be allowed to send their retrieval team to attend the donor if they wish to do so provided that the co-ordinating SN-OD judges this will not unduly delay the retrieval process and will not compromise the retrieval of other organs. The centre would also be obliged to retrieve the lungs from that donor if these had been accepted by another centre. Otherwise the 1<sup>st</sup> on-call cardiothoracic team or, if they are already committed to retrieval elsewhere, the closest available (2<sup>nd</sup>, 3<sup>rd</sup> etc on-call) team must retrieve.
- 4.7. A Retrieval Centre Point of Contact must be available 24 hours to receive calls from SN-ODs and to muster and dispatch the retrieval team when called upon to do so.
- 4.8. Each retrieval centre must provide NHSBT with a single contact telephone number which must be available 24 hours to enable SN-ODs to access the Retrieval Centre Point of Contact.
- 4.9. The Retrieval Centre is responsible for making transport arrangements for their retrieval team.
- 4.10. An on-call Consultant Surgeon must be available by telephone for the team to consult during the retrieval process.
- 4.11. Robust, published duty rotas must be in place for all team members including, when available, anaesthetic and donor care support, and for on-call Consultants and the Retrieval Centre Point of Contact.
- 4.12. Rotas must conform to working time directives as advised by the Departments of Health and be made available to NHSBT upon reasonable request.
- 4.13. There should be clear and accountable leadership of the retrieval service at each centre with a named consultant notified to NHSBT.
- 4.14. The named consultant is responsible for ensuring that all members of the team are competent and possess the appropriate qualifications, experience and skills to perform the roles and duties assigned to them.
- 4.15. The named consultant will provide a list of all lead abdominal and cardiothoracic surgeons together with a declaration that each has been assessed as competent to lead the team.
- 4.16. A named manager notified to NHSBT should support the Named Consultant.
- 4.17. Each centre must have clear, written protocols for the retrieval procedures that they will undertake, including for both DCD and DBD operations. These protocols should be sent to NHSBT for approval by the relevant advisory groups to NHSBT.

- 4.18. Each centre must develop clear guidelines for the management of the multi-organ DBD donor. These guidelines should be approved by the relevant advisory groups to NHSBT, and distributed to all intensive care units and all clinical leads for organ donation at donor hospitals in their primary catchment area.
- 4.19. Currently some retrieval centres provide donor care practitioners who assist with donor management in the donor hospitals. This role is currently under review. Where provided, donor care practitioners must possess appropriate qualifications, experience and skills to perform the duties required of them.
- 4.20. There should be effective and sustainable workforce planning covering all professional disciplines included in the multidisciplinary team. All staff should have regular appraisal and agreed professional development plans.
- 4.21. Retrieval centres must provide opportunities for training for all members of the team. There should be explicit consultant involvement in the educational aspects of the retrieval programme and the assessment of competency of the lead surgeons.
- 4.22. All retrieval centres must hold monthly meetings to audit their own activity and performance, and to identify and rectify deficiencies in donor care, organ integrity, inefficient processes and poor communications.
- 4.23. Audit meetings should address outcome of retrieved organs, organ damage and dysfunction, punctuality and delays, difficulties encountered in donor hospitals, transport problems and feedback from donor hospitals and SN-ODs.
- 4.24. Audit meetings should be chaired by the named consultant and attended by as many members of the team as possible. Members of the relevant SN-OD teams and Clinical Leads for Organ Donation (CLODs) in the primary (1<sup>st</sup> on-call) catchment area should be invited to attend these meetings
- 4.25. Minutes of audit meetings should be recorded, distributed to all members of the team and made available to NHSBT on request.
- 4.26. All centres should, when requested, contribute data to national audits and registries. Such data should be accurate, complete and transmitted on time.
- 4.27. There should be provision of appropriate staff for the collection, storage and transmission of audit and registry data.
- 4.28. Each centre should provide NHSBT with an Annual Report, which includes activity and progress during the year, compliance with these Retrieval Standards and their plans for a sustained and improved service.
- 4.29. All centres are expected to participate in national clinical research projects aimed at improving the quality of retrieved organs when called upon to participate.

- 4.30. There should be clear accounting for all income to the Trust/NHS Board that is designated for the delivery of retrieval services in accordance with the fiscal guidance issued by NHSBT. This will include finance directly managed by the transplant service and finance that is managed by the financial infrastructure within the Trust/NHS Board. Methods should be used which ensure an equitable comparison of costs of the service between centres.
- 4.31. There should be regular business meetings to address issues specific to the transplant service including financial reports, activity reports, education, audit, clinical governance and research.
- 4.32. Robust arrangements should be in place for timely and accurate collection of data. Data should be made available to NHSBT under agreed reporting mechanisms.

## **5. Topic 5 Retrieval Teams**

- 5.1. All team members must be qualified and competent to perform the roles to which they are assigned.
- 5.2. When the retrieval is confined to abdominal organs only, the team should include, as a minimum, a lead abdominal surgeon, an assistant surgeon and a scrub nurse. If they wish, centres may also provide an abdominal perfusionist; otherwise, the SN-OD will assist with setting up and running the perfusion fluids for the abdominal organs.
- 5.3. A cardiothoracic retrieval team should include, as a minimum, a lead cardiothoracic surgeon, a scrub nurse and a trained individual able to provide the necessary technical support for organ perfusion and retrieval. An assistant cardiothoracic surgeon will usually accompany the team; otherwise the abdominal team will provide assistance.
- 5.4. Lead abdominal surgeons must be capable of accurately assessing and retrieving liver, kidneys and pancreas; lead cardiothoracic surgeons must be capable of accurately assessing and retrieving heart and lungs.
- 5.5. The scrub nurses and perfusionists (both abdominal and cardiothoracic) are responsible for taking all necessary equipment, perfusion fluids, drugs, ice, organ transfer boxes and documentation (organ specific HTA forms) for the retrieval process.
- 5.6. Every cardiothoracic retrieval team should bring the equipment needed for cardiac output and pressure measurements within the central circulation and to perform bronchoscopy.
- 5.7. All members of the retrieval team must be available 24 hours a day, without elective or other transplantation commitments, whenever they are on-call for retrieval. They must be prepared to attend more than one donor per day.

- 5.8. The team is expected to respond rapidly when notified of a potential donor; team members must be able to leave the retrieval centre within one hour of call-out. The lead surgeon must notify the SN-OD of any unexpected delays due to traffic problems etc.
- 5.9. Before embarking on the retrieval operation, the lead retrieval surgeons should review the patient notes. In particular they must check:
  - The identity, blood group and virology status of the donor;
  - That brain stem death or confirmation of cardiac death has been confirmed and documented correctly;
  - That appropriate consent/authorisation has been obtained for the organs and tissues to be retrieved;
- 5.10. Cardiothoracic and abdominal lead surgeons must discuss and agree details of the procedure before retrieving the organs.
- 5.11. Any novel or uncommon procedure or deviation from accepted protocols which might have an adverse impact on other organs retrieved from that donor can only be carried out after discussion and agreement of all parties involved in the retrieval.
- 5.12. If a recipient team wishes that an organ is placed on machine perfusion immediately after retrieval then it is their responsibility to liaise with the retrieval surgeon to ensure that he is willing and competent to do this. Otherwise, the recipient surgeon should arrange for a competent member of his/her team to attend and place the organ on the machine. If this is not possible then the retrieval surgeon must package the organ in static cold storage in accordance with standard protocols. It is the responsibility of the retrieval surgeon to ensure that the organs are either perfused or packed before leaving the theatre.
- 5.13. Livers may be split *in situ* provided that the attending cardiothoracic team does not object but must be abandoned if, in the opinion of either the abdominal or the cardiothoracic team, the donor becomes unstable.
- 5.14. All aspects of the retrieval operation should be conducted in accordance with appropriate infection control procedures.
- 5.15. Members of the retrieval team should be aware that they are ambassadors for transplantation and must behave in a professional manner throughout the retrieval process.
- 5.16. Retrieval teams must work to agreed protocols during the retrieval procedure.
- 5.17. If, for any reason, there is an unusual aspect which is not clear in previously agreed protocols, and agreement cannot be reached by the attending retrieval surgeons, then they must refer to their respective consultants who will discuss the situation and reach an agreement.

- 5.18. Retrieval surgeons must take all reasonable steps to exclude malignancy in the donor. The entire gastro-intestinal tract, pancreas and liver must be examined at the start of the procedure. The kidneys should be inspected directly after retrieval by incising Gerota's fascia and clearing the fat adequately not only to confirm satisfactory organ perfusion but also to exclude renal tumours. Whenever possible, a median sternotomy as well as a laparotomy should be performed and the lungs examined.
- 5.19. It is important that malignancy in a retrieved organ is identified before any other organ from that donor is transplanted. If an unexpected tumour is discovered in a retrieved organ then the Duty Office must be informed immediately so that they can pass this information on to all the relevant recipient teams.
- 5.20. The Lead Retrieval Surgeons from both the Abdominal and Cardiothoracic (where applicable) teams must complete the 'Peri-Theatre' section of **FRM4135** NHSBT Surgical Safety Checklist before leaving theatre.
- 5.21. On completion of the operation, the lead surgeon from each team is responsible for producing an accurate operation record in the donor patient notes. This should include clear documentation of all organs and tissues removed from the body, a note of any abnormalities/injuries noted during laparotomy or thoracotomy, and the time of respiratory and/or cardiac arrest.
- 5.22. After signing the notes the surgeons must clearly write their names and the names of their retrieval centre together with a contact number in case the coroner/procurator fiscal wishes to contact them.
- 5.23. In conjunction with the SN-ODs, the retrieval surgeons must ensure that organs are appropriately packaged and labelled and that any specimens required by recipient centres to support transplantation are also appropriately packaged and labelled and accompany the organs.
- 5.24. The retrieving surgeons must notify the recipient centre point of contact and NHSBT Duty Office immediately if any organ appears sub-optimal or if any unexpected damage or abnormality is encountered which might compromise the function or safe use of that organ.
- 5.25. It is the lead retrieval surgeon's responsibility to complete the organ specific HTA forms including a legible record of all surgical and anatomical details and a legible name and contact telephone number of the lead retrieving surgeon. The lead surgeon must ensure that the appropriate documents accompany each retrieved organ and tissue, including specific forms for blood vessels that have been introduced to satisfy HTA requirements for vessel storage.
- 5.26. All abnormalities/anomalies, organ damage (severe if organ untransplantable; moderate if organ can be repaired surgically to render it transplantable; or mild if of no consequence), sub-optimal perfusion or donor instability during the procedure must be documented in the organ specific forms.

- 5.27. Any abnormality (e.g. unexpected cancer) that might compromise any recipient of an organ or tissue retrieved from that donor must be reported immediately to the NHSBT Duty Office and should be communicated directly to the consultant surgeon(s) at all the recipient centre(s).
- 5.28. NORS teams are not expected to retrieve tissues such as corneas, bone and skin but they should be aware that these may, on occasion, be retrieved in theatre by local staff.
- 5.29. All members of the team are expected to participate in continuing professional development by attending appropriate courses and meetings.
- 5.30. Trainees in higher surgical training programmes should be instructed in all aspects of organ retrieval and maintain a log book of surgical procedures in accordance with SAC guidelines.

## **6. Topic 6 Recipient Centres**

- 6.1. A nominated recipient centre point of contact e.g. recipient coordinator, transplant nurse or clinician, must be available at all times to take calls on donor offers and to liaise with the SN-OD and the transplant team.
- 6.2. Recipient centres must provide NHSBT with a single contact telephone number which must be available 24 hours for notification of organ offers.
- 6.3. If there is no response from that telephone or pager after 15 minutes of trying to make contact, then the SN-OD or NHSBT Duty Office may move on to offer the organ to another centre.
- 6.4. Whilst transthoracic and/or transoesophageal echocardiography are considered desirable by some cardiac transplant centres, they are not mandatory investigations for cardiac retrieval teams. Recipient centres may be required to make a judgement on whether or not to accept a heart based upon the information available without these investigations.
- 6.5. The recipient centre is responsible for arranging transport of retrieved organs from the donor hospital to the recipient transplant centre with the exception of kidneys. NHSBT will continue to make transport arrangements for retrieved kidneys.
- 6.6. A consultant transplant surgeon must be available at all times to receive information from SN-ODs and give advice to retrieval teams.
- 6.7. The names and contact numbers of both the recipient co-ordinator and the consultant surgeon must be supplied to the SN-OD when an offer of a donor organ is accepted.
- 6.8. Surgeons accepting an organ offer should be mindful of the guidance given by The Advisory Committee on the Safety of Blood, Tissues and Organs regarding the risks of disease transmission from donors with specific infections or tumours.

- 6.9. Recipient centres should maintain a record and summary of all offers of donor organs assessed and accepted or rejected for transplantation. Transplant centres will undertake a rolling audit of donor offers, and notify NHSBT of their reasons for declining individual organs.
- 6.10. On receipt of a retrieved organ, the consultant transplant surgeon is responsible for checking the integrity and suitability of the retrieved organ, including donor details on the organ specific HTA form and the blood group, before implanting it into the recipient.
- 6.11. The recipient centre should record the time that the organ arrived at the centre and the time that the organ was transferred from cold solution into the operative field (i.e. end of cold ischaemia time).
- 6.12. The transplant surgeon must complete a HTA B form for each organ intended for transplant in accordance with the Human Tissue Act (2004) and the Human Tissue (Scotland) Act, 2006.
- 6.13. Recipient centres must record on the HTA B form any abnormality or damage to organs that they receive. Retrieval damage should be classified as severe if organ untransplantable; moderate if organ can be repaired surgically to render it transplantable; or mild if of no consequence.
- 6.14. The recipient centre must return the HTA B forms to NHSBT within seven days of receipt of the organ.
- 6.15. If, due to retrieval damage, the organ fails to function following transplantation, and after the HTA B form has been returned, then the recipient centre must notify NHSBT by accessing the NHSBT Incident reporting form via <https://www.organdonation.nhs.uk/IncidentSubmission/> or via the Organ Donation website [www.organdonation.nhs.uk](http://www.organdonation.nhs.uk) .
- 6.16. Recipient centres have an obligation to report immediately any abnormality such as a suspected or proven malignant tumour which might impact adversely on recipients of other organs. Any such abnormality must be reported immediately to the NHSBT Duty Office who will then immediately notify other recipient centres.
- 6.17. Recipient centres must notify retrieval teams of any organ damage or abnormality that was not recognised or recorded on the organ specific HTA A form during the retrieval process.
- 6.18. Recipient centres must participate in organ retrieval audits when called upon to do so.
- 6.19. Centres should have a clear policy on the storage and disposal of any unused organs or surplus tissue in compliance with the Human Tissue Act (2004) and the Human Tissue (Scotland) Act, 2006.

## **SECTION 2**

### **GLOSSARY OF ABBREVIATIONS**

**CLODs**

**Clinical Leads for Organ Donation**

**DBD**

**Donation after brain death (formerly referred to as a “heart-beating” donor)**

**DCD**

**Donation after circulatory death (formerly referred to as a “non heart-beating” donor)**

**SN-OD**

**Specialist nurse (or practitioner) – organ donation (formerly known as donor transplant co-ordinator {DTC})**

**EOS**

**Electronic Offering System**

**HTA**

**Human Tissue Authority**

**NHSBT**

**NHS Blood and Transplant organisation**

**NORS**

**National Organ Retrieval Service**

**ODT**

**Organ Donation and Transplantation directorate of NHSBT**

## **SECTION 3**

### **AUDIT AND MONITORING OF RETRIEVALS**

#### **A. Times to be Recorded:**

- Time that each retrieval centre (abdominal & cardiac) is first notified of the donor
- Time of telephone call from a SN-OD asking retrieval centre to muster a team
- Time agreed with the SN-OD that the retrieval team should leave base hospital
- Time that the main surgical retrieval team leaves base hospital
- Time that the main surgical retrieval team arrives at donor hospital
- Time that donor arrives in theatres
- Time that cardiac assessment in theatres starts and ends (if applicable)
- Abdominal surgical start time ("knife to skin")
- Cardiothoracic surgical start time

The following times are collected as part of the HTA-A forms which are signed by the surgical lead:

- Time of aortic cross clamp, cessation of ventilation and start of in situ perfusion
- Time that each organ is removed from the body and placed in cool solution for ex situ perfusion
- Time that each organ is placed under ice in the transport box
- Time donor operation ends (completion of skin closure)

The following times are reported by the transplanting centre on the Transplant return form:

- Time each organ is removed from cool solution for implantation into a recipient
- Time each organ is re-perfused with blood

**In addition For DCD Donors:**

- Time treatment withdrawn
- Time systolic BP < 50
- Time Oxygen Saturation < 80%
- Time of asystole
- Stand-down time for DCD donors that do not progress to donation

**B. Constituent Personnel of Retrieval Team**

**Identity, Role and Status**

e.g. Mr Smith, Lead abdominal surgeon, Consultant  
Ms White, Assistant surgeon, SpR  
Mr Green, Scrub Nurse, ODA

**C. Record of Organ Damage**

- Details of damage to be recorded by both retrieving and implanting surgeon at the time of retrieval/transplantation:
  - No damage
  - Mild if it is of no consequence
  - Moderate if the organ requires surgical repair to render it transplantable
  - Severe if the organ is untransplantable

[NB: If initially graded as Moderate, but subsequently the damage had a significant impact on the recipient's health, then the recipient centre should formally report this as a SAEAR.]

- Indicate whether the organ was physically injured or whether damage was inferred because the organ perfused badly during cold perfusion.
- Indicate whether the organ suffered physical injury:
  - prior to retrieval (e.g. during a RTA)
  - or due to surgical injury during the retrieval
  - or during transport between centres
  - or during back table preparation at the recipient centre
  - or during implantation at the recipient centre
- If the organ was physically damaged or poorly perfused before it was sent to the recipient centre, was this recognised and reported by the retrieving surgeon?

#### **D. Reasons for Non-Use of an Organ**

- Declined without attempt at retrieval due to:
  - Unsuitable donor
  - Poor quality graft
  - Other
- Declined following surgical exploration due to:
  - Poor quality graft
  - Graft damaged during the retrieval process
  - Poor perfusion
- Unable to Place the graft due to:
  - No suitable recipients in the UK or abroad
  - Prolonged ischaemia
  - Other specified
- Failure to retrieve
  - Retrieval centre unable to muster a team
  - Donor becomes too unstable before the team can reach donor hospital.

#### **E. Outcome Measures**

- “Primary non-function”

Liver and Heart	No evidence that the organ ever functioned leading to death or re-transplantation.
Kidney	No evidence that the organ ever functioned with need for permanent dialysis post transplant.
Pancreas	No reduction in insulin requirements post transplant.
- “Primary dysfunction”

Liver:	Peak AST/ALT > 2000iu/l
Kidney:	Need for temporary post-operative dialysis within the first seven days.
Cardiothoracic:	Need for device support
- 30 day Patient and Graft Survival using risk-adjusted funnel plots for each organ type.

## SECTION 4

### EXTRACT FROM DOCUMENTS OF PARTICULAR RELEVANCE TO NORs TEAMS

#### DCD DONORS

In June 2010 The British Transplantation Society held a collaborative meeting with the Intensive Care Society, supported by the Department of Health, the Devolved Administrations and NHS Blood and Transplant. The two societies subsequently issued a Consensus Document on Organ Donation after Circulatory Death.

In January 2011 the UK Donation Ethics Committee of the Academy of Medical Royal Colleges issued a Consultation Document entitled *An Ethical Framework For Controlled Donation After Circulatory Death*.

A selected summary of recommendations from these documents pertinent to the National Organ Retrieval Service are outlined below. **Readers are reminded that this is an evolving topic and they should refer to current documents if and when these quoted documents are superseded.**

1. No treatment specifically aimed at organ donation should be instituted before the decision to withdraw treatment has been made.
2. Following the decision to withdraw treatment, maintenance of life-sustaining treatment and interventions to facilitate donation may be considered to be in the best interests of someone who wanted to become a donor if it facilitates donation and does not risk causing them harm or distress.
3. Following a decision by staff at the donor hospital to withdraw treatment it is acceptable to take blood samples for blood group, tissue typing and virology. These should be taken and dispatched by the ICU staff as soon as possible to minimize delays.
4. Invasive procedures such as the insertion of perfusion cannulae which may cause distress to the patient, or administration of drugs to facilitate donation such as heparin which might cause complications in the patient before the diagnosis of death is established are not appropriate.
5. Bronchoscopy to assess the potential for lung donation may be appropriate provided it does not cause the patient distress and is agreed by the patient's family.
6. The Specialist Nurse for Organ Donation should not care for the potential donor whilst they are still alive.
7. Members of the retrieval team and the recipient's clinical team should not be involved in the care of the potential donor, nor in the diagnosis of death.
8. If the retrieval team has any doubts about whether the correct process has taken place to establish the diagnosis of death then they should contact the clinician who was managing the patient.

9. Death can be confirmed for DCD after five minutes of continuous absence of cardio-respiratory function. There must be no attempt at cardiopulmonary resuscitation or any measure that might restore blood flow to the brain.
10. Should the heart temporarily restart (theoretically possible when moving the donor e.g. during transfer to the operating table) then a further period of five minutes asystole must elapse and be confirmed by donor hospital medical staff before organ retrieval can begin.
11. No intervention that can potentially restore cerebral circulation is allowed. This has particular relevance for lung retrieval. The accepted method to isolate cerebral circulation is a cross clamp of the relevant cerebral vessels or aortic arch. Balloon occlusion of the thoracic aorta is only acceptable if non-blood perfusion is used.
12. Tracheal re-intubation to facilitate lung donation, may be performed after the declaration of death but under no circumstances should cyclical mechanical ventilation be re-instituted before exclusion of the cerebral circulation. However, reinflation of the lungs using a single recruitment manoeuvre is appropriate after 10 minutes of circulatory arrest. Further single recruitment manoeuvres may be performed during the lung retrieval process, as deemed necessary by the retrieval team.
13. The management of a patient who does not die within an appropriate time period remains the responsibility of the clinical team under which they were receiving care prior to treatment withdrawal. The family should be warned beforehand that this may happen. It is essential that the patient and family have an identified member of donor hospital staff with them able to provide necessary care. A suitable place for the patient to be cared for in this eventuality must be identified before treatment withdrawal especially if withdrawal does not take place on the critical care unit.
14. Definition of terms used following treatment withdrawal:
  - The Withdrawal Period (or agonal period). Time from treatment withdrawal to asystole.
  - Asystolic warm period. Time from asystole to the onset of cold perfusion.
  - Functional Warm Ischaemic Period. Starts when systolic blood pressure falls below 50mm Hg or oxygen saturation falls below 70%, and extends to the onset of cold in situ perfusion.

## **SECTION 5**

### **PATHWAY FOR RETRIEVAL FOR DCD DONORS IF THE LUNGS ARE TO BE RETRIEVED**

1. Abdominal and Cardiothoracic teams in theatre.
2. Treatment withdrawn.
3. Cessation of circulation (most commonly asystole).  
If asystole does not occur within 2 hours the lung retrieval is abandoned.
4. Death certified by donor hospital medical staff.
5. Five minute stand off time.
6. Following stand off, the cardiothoracic team's priority is attention to the airway, whilst the abdominal team's priority is to perfuse the abdominal organs with cold solution as quickly as possible. The Cardiothoracic team must not delay or obstruct the abdominal team in any way during cannulation and abdominal perfusion.
  - If the patient has not been extubated as part of their withdrawal of treatment, and provided the ET tube is >7.5mm, a flexible bronchoscopy is usually performed.
  - If the patient has been extubated a rigid bronchoscopy is usually performed and the patient is reintubated.  
NB: The cardiothoracic team must be suitably equipped, staffed and competent to reintubate the donor themselves unless they have previously arranged with the donor hospital for provision of a local anaesthetist.
  - The lungs are inflated.
7. During the above 3 steps the Abdominal team perform a laparotomy, cannulate, and perfuse the abdominal organs. The Cardiothoracic team will stand back from the table until the abdominal perfusion has commenced.
8. Once abdominal perfusion has commenced the Cardiothoracic team may open the chest and should assist the abdominal team in clamping the thoracic aorta if requested to do so. They then assess the lungs, open the pulmonary artery, remove any clot and flush the lungs.
9. The heart-lung block is removed. If no consent/authorisation for heart valve donation the heart is put back in the body.
10. The lungs are flushed retrogradely on the back table and packed for transportation.

Time from sternotomy to the end of retrieval will be approximately 1 hour.

## **SECTION 6**

### **PROTOCOLS FOR ORGAN RETRIEVAL**

1. Each centre must have clear, written protocols for the retrieval procedures that they will undertake, including for both DCD and DBD operations. These protocols should be sent to NHSBT for approval by the relevant advisory groups to NHSBT.
2. When separate Cardiothoracic and Abdominal teams attend a donor the surgeons must discuss and agree details of the procedure before retrieving the organs.
3. Any novel or uncommon procedure, or modification of a recognised procedure which might impact on other donated organs (e.g. use of cardio-pulmonary bypass or of ECMO, *in-situ* liver split, multi-visceral retrieval, DCD lung retrieval protocol which differs from that in Appendix 4) may not be performed unless it has been discussed and agreed by both abdominal and cardiothoracic retrieval teams.
4. A thorough laparotomy and, if the chest is opened, a thorough inspection of thoracic organs should be performed both to exclude pathology such as malignancy which might preclude organ transplantation and to inform the coroner in case he/she subsequently requires a report on the condition of the body. Pre-existing injury, (e.g. damage to organs sustained during a road traffic accident) should be recorded.
5. Care must be taken to identify and report abnormal anatomy such as aberrant or accessory renal and hepatic arteries.
6. Care must be taken to avoid surgical injury to organs and their vasculature. In particular
  - a. Ventilation (DBD) or lung inflation (DCD) should be interrupted during median sternotomy to prevent injury to the lungs.
  - b. The liver should be protected with a swab during median sternotomy and, during mobilisation; it should be retracted gently to prevent avulsion of its peritoneal attachments.
  - c. Handling of the pancreas should be kept to a minimum; during mobilisation the spleen should be used to act as a handle.
  - d. During kidney retrieval the ureters should be kept as long as possible together with sufficient soft tissue to preserve ureteric blood supply. Care must be taken not to exert undue traction on the renal pedicle.
7. The gall bladder should be opened and gently sucked out. Repeated saline washes should be performed to clear the biliary tract of bile before the onset of cold ischaemia.

- 8.** If there is a replaced right hepatic artery which cannot be safely preserved in its entirety either because it travels through the pancreas or gives a major branch to the pancreas then, before transecting it, the retrieving surgeon must contact the liver implanting surgeon to discuss whether he/she is happy to accept a liver with a short hepatic artery. If not then the artery is preserved with the liver. In this situation the pancreas cannot be used as an intact organ but should be offered for islet purification.
- 9.** Prior to insertion of the abdominal arterial perfusion cannula in DBD donors 300units/kg of heparin should be given intravenously at least 2 minutes before cannulation.
- 10.** If the pancreas is retrieved then aortic perfusion alone using 4 - 6 litres (or 75-100ml/kg in children and small adults) of UW solution is usually sufficient. However if the liver is for splitting then portal perfusion must be performed using 1 litre (or 20 -25ml/kg) UW solution via the portal vein.
- 11.** If the pancreas is retrieved then portal perfusion, when employed, should be directly into the portal vein which must be transected first to allow adequate venting of the pancreas. Perfusion via the SMV or IMV must not be employed if the pancreas is retrieved.
- 12.** If the liver is retrieved without pancreas or bowel then aortic perfusion can be performed using Marshall's solution. Portal vein perfusion with UW solution must always be employed if Marshall's is used for aortic perfusion.
- 13.** Aortic perfusion should be performed using a pressure bag at 100 -150mmHg. Portal perfusion should be performed under gravity alone.
- 14.** Ice slush should be packed around the kidneys, pancreas and liver.
- 15.** Immediately after retrieval all abdominal organs must be flushed on the bench until the effluent is clear. Kidneys may be flushed and then packed using Marshall's solution. Livers and pancreas must be flushed and packed using UW solution. For the liver ~500ml UW is flushed via into the portal vein and ~250ml via the hepatic artery. Refer to National Perfusion Protocol agreed October 2012.
- 16.** All organs must be triple bagged for transport. The liver should be placed in a sterile bowl before bagging.
- 17.** All organs must be accompanied by appropriate specimens (blood samples, lymph node, and spleen) and by completed organ-specific NHSBT and blood group forms. Liver and pancreas must be accompanied by the blood vessels needed for reconstruction in the recipient.
- 18.** In cases of cardiothoracic retrieval, once the heart and/or lungs have been removed abdominal surgeons should interrupt their cold phase dissection to supply lymph node and spleen samples to the cardiothoracic team so that the heart and lungs can be shipped to recipient centres without delay.

## **SECTION 7**

### **Additional reference documents:**

- **NHSBT Contraindications to organ donation**
- **NHSBT/BTS Responsibilities of clinicians for the acceptance of organs from deceased donors**
- **NHSBT Policy on pregnancy in donation**