Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Report of the Inquiry into the circumstances that led to the failed transportation of Meadhbh McGivern for transplant surgery and the existing inter-agency arrangements in place for people requiring emergency transportation for transplant surgery

12 August 2011

Safer Better Care

About the Health Information and Quality Authority

The Health Information and Quality Authority is the independent Authority established to drive continuous improvement in Ireland's health and social care services.

The Authority's mandate extends across the quality and safety of the public, private (within its social care function) and voluntary sectors. Reporting directly to the Minister for Health, the Health Information and Quality Authority has statutory responsibility for:

- **Setting Standards for Health and Social Services** — Developing person-centred standards, based on evidence and best international practice, for health and social care services in Ireland (except mental health services)
- **Social Services Inspectorate** — Registration and inspection of residential homes for children, older people and people with disabilities. Inspecting children detention schools and foster care services
- **Monitoring Healthcare Quality** — Monitoring standards of quality and safety in our health services and investigating as necessary serious concerns about the health and welfare of service users
- **Health Technology Assessment** — Ensuring the best outcome for the service user by evaluating the clinical and economic effectiveness of drugs, equipment, diagnostic techniques and health promotion activities
- **Health Information** — Advising on the collection and sharing of information across the services, evaluating information and publishing information about the delivery and performance of Ireland's health and social care services

Table of Contents

1. Introduction and background to the Inquiry

Meadhbh McGivern is 14 years old and lives in Ballinamore, Co Leitrim with her parents Joe and Assumpta. Meadhbh was diagnosed with biliary atresia* soon after birth and has been attending Our Lady's Children's Hospital Crumlin (OLCHC), Dublin, and King's College Hospital (KCH), NHS Foundation Trust, London, for care and treatment.

In August 2010, the KCH liver team placed Meadhbh on the list for liver transplantation.

In April 2011, Meadhbh was escalated to the KCH priority list for a liver transplant and put on both the child and adult list for transplantation.

On Saturday, 2 July 2011 at 19:20**, 11 months after she was first listed for transplant, Meadhbh's mother Assumpta received a telephone call from the KCH on-call Liver Transplant Coordinator who enquired if Meadhbh was well enough and available to travel to KCH for liver transplantation. Assumpta replied that she was and the KCH on-call Liver Transplant Coordinator advised that there was a potential 'non-heartbeating'*** donor liver available and the family should get to KCH as soon as possible.

Over the subsequent hours, events unfolded in relation to the care and transportation of Meadhbh and culminated in Meadhbh not reaching King's College Hospital and not receiving a liver transplant.

At the request of the Minister for Health, this Inquiry was established in order to ascertain the events that culminated in the failed transportation for Meadhbh on 2 July 2011, to review the existing inter-agency arrangements in place for people requiring emergency transportation for transplant surgery, and to identify any actions that need to be taken to improve these arrangements.

This Inquiry is not intended to be a full review of all of the arrangements for organ donation, transportation and transplantation in Ireland****. Rather, it is a focused Inquiry in accordance with the Terms of Reference (see Section 2).

---

*Congenital condition in which the common bile duct between the liver and small intestines is blocked or absent.

** Throughout this report, the 24-hour clock format is used.

*** Non-heartbeating donation takes place when death has been established following irreversible cessation of the heart (that is, following cardio-respiratory arrest) and further active treatment for these patients is futile.

**** Throughout this report, unless otherwise indicated, Ireland refers to Republic of Ireland.

This report outlines the background and context of transplant surgery for adults and children in Ireland, it details the governance of the arrangements for the transportation of patients requiring transplant surgery outside of the jurisdiction and the process that should have been followed at the time of Meadhbh's failed transportation. It goes on to outline the chronology of events on the night of 2 July 2011 and the findings of the review of these events.

The report then details the improvements that have been made by the relevant agencies since 2 July 2011 and the development of a new process and finally the report makes a series of recommendations that will improve the quality and safety of services for people requiring transportation for transplant surgery outside of Ireland.

During the course of the Inquiry, in addition to the coordination of patients requiring transportation for transplant surgery outside of Ireland, the Authority was also made aware of a lack of overall coordination of the communication, logistics and deployment of aeromedical transportation for patients in emergency situations who require an 'air ambulance' service within Ireland.

For the benefit of improving the quality and safety for patients who require these types of services, and following discussions with relevant agencies, the recommendations of the Inquiry also extend to identifying actions that will improve the overall coordination of aeromedical resources in meeting the needs of the full range of patients who may require such assistance.

The night of 2 July 2011 resulted in a devastating outcome for Meadhbh – a failed transportation for a liver transplant. It was clear from the findings of the Authority's Inquiry that the people involved in attempting to get Meadhbh to KCH for her transplant on that night entered into desperate means to try to do so. However, this was in the absence of any organised or managed system, or the requisite knowledge of logistics to adequately do so – no one person or agency was in charge.

Every person who was involved on the night, as well as those interviewed by the Authority, were visibly distressed at how the events unfolded resulting in Meadhbh's failed transportation. All expressed their commitment to improving the arrangements to ensure that this did not happen again in Ireland.

The Authority would like to express its sincere thanks to the McGivern family for sharing their experience with us, to other families who came forward to also outline their experiences, and to every agency and organisation involved in Ireland and to King's College Hospital, all of whom cooperated fully with the Inquiry.

2. Terms of Reference

The Terms of Reference for the Inquiry were discussed with the McGivern family prior to being finalised in order to ensure that the Inquiry would also answer questions that they may have. They expressed their desired outcomes for the Inquiry (see Appendix 1).

The Terms of Reference were as follows.

This Inquiry will ascertain the circumstances in relation to the failure to provide timely integrated transfer of care to Meadhbh McGivern on 2 July 2011, in order to allow her to undergo transplant surgery at King's College Hospital, London. It will also review the current arrangements in place, within and between the relevant agencies and those contracted to provide services, for the purpose of the safe and prompt emergency transfer of care for people requiring transplant surgery. Arising from this Inquiry, the Authority will make recommendations to ensure that such arrangements are coordinated, safe and effective. The Terms of Reference for the Authority's Inquiry are to:

1. Review the chronology of events in relation to the attempted transfer of Meadhbh McGivern, following confirmation of an available donor organ, up to and including the standing down of transportation.
2. Review the governance, communications, management and systems and processes in place for the current operational arrangements, within and between the relevant agencies, for the emergency transportation of a person requiring transplant surgery.
3. Make recommendations, where required, to ensure a person requiring care and transportation for transplant surgery receives integrated care which is coordinated effectively within and between the relevant agencies and service providers.
4. Make recommendations that the Inquiry deems appropriate in relation to the implementation by the relevant and accountable agencies of any findings and recommendations that may emanate from this Inquiry.

3. Methodology

The Inquiry was conducted by members of the Authority and involved ongoing liaison with the McGivern family and direct engagement with the main service providers and agencies responsible for aspects of the care and transportation of people requiring transplant surgery outside of Ireland on 2 July 2011.

These were:

- Our Lady's Children's Hospital Crumlin, Dublin (OLCHC)
- Health Service Executive (HSE)
- Department of Defence – Air Corps
- Department of Transport – Irish Coast Guard (IRCG)
- Department of Health, Ireland
- King's College Hospital, NHS Foundation Trust, London (KCH)
- Emergency Medical Support Services (EMSS).

3.1 Information Request

The Authority wrote to the service providers and agencies listed above, requesting their cooperation in informing the Inquiry. Detailed information was requested from them including:

- the chronology of events in relation to the attempted transfer of Meadhbh McGivern, following confirmation of an available donor organ, up to and including the standing down of transportation
- the current operating and governance arrangements in place for the purpose of the safe and prompt emergency transfer of care for people requiring transplant surgery
- any other information that they felt relevant to informing the Inquiry.

Further information requests were made to a number of other stakeholders that were interviewed to inform the Inquiry.

3.2 Interviews and meetings

The Authority met with 20 key individuals involved in the various aspects of the Inquiry. These included individuals involved with Meadhbh's care and transportation who were involved on the night of 2 July 2011, along with others who represented service providers or agencies with responsibility for aspects of the process.

The Authority also had discussions with 15 additional people including other families who wanted to share their experience of transportation for transplant surgery and other individuals representing service providers who are involved in transplant surgery or logistics within Ireland, the United Kingdom (UK) and New Zealand, who could inform elements of the Inquiry.

These included:

- National Organ Donation and Transplant Office, HSE
- St Vincent's University Hospital, Dublin
- Mater Misericordiae University Hospital, Dublin
- Children's University Hospital, Temple Street, Dublin
- Beaumont Hospital, Dublin
- Royal Belfast Hospital for Sick Children, Belfast
- Woodgate Aviation Limited
- Leeds Teaching Hospitals, NHS Trust, Leeds
- Birmingham Children's Hospital, NHS Foundation Trust
- New Zealand Liver Transplant Unit.

The Authority held an inter-agency meeting on 21 July 2011 with the main service providers and agencies listed in Section 3 above, for the purpose of identifying further improvements in the current arrangements for the transportation of people requiring transplant surgery outside of Ireland.

4. Background and context to organ donation and transplantation

Organ donation and transplantation have seen tremendous success in Ireland over the years and for many patients, transplantation is now the treatment of choice for end-stage organ failure. Transplantation adds years of life as well as quality of life to patients who receive organs.[1]

At the time of the Inquiry there were approximately 650 patients awaiting organ transplantation in Ireland. One donor can potentially help nine other people. In recent years, Ireland has had one of the highest rates of organ donation per capita in the world. In 2009, European figures show that Ireland was in tenth place with 20 donors per million of population.[1] According to the Irish Kidney Association (IKA), almost 2,600 people in Ireland are enjoying extended life as a result of receiving organ transplants. In recent years, there was on average 80 donations resulting in approximately 250 transplants being performed each year. However, 2010 saw the biggest decline in organ donation on record in Ireland; the total number of transplants dropped from 261 in 2009 to 174 in 2010.

There are currently three transplant centres in Ireland:

- Beaumont Hospital, Dublin – kidney (also in conjunction with the Children's University Hospital, Temple Street) and pancreas transplants
- Mater Misercordiae University Hospital, Dublin – heart and lung transplants
- St Vincent's University Hospital (SVUH), Dublin – adult liver transplants.

Beaumont Hospital

In Ireland, ethical guidelines are in place with the aim of protecting the interests of organ donors, their families, and transplant recipients. All organ donations in Ireland are coordinated through the Irish Organ Procurement Office in Beaumont Hospital. This coordination includes transport logistics. The transportation of the retrieval teams and organs is generally by road and this is outsourced to a third-party provider.

Currently, non-heartbeating donor organs are not used for transplants in Ireland.

Mater Misercordiae University Hospital

Since 1999, the Department of Health has funded a heart and/or lung transplant programme in the Mater Misericordiae University Hospital (MMUH). This is a joint venture between MMUH and St Vincent's University Hospital aimed at meeting the needs of those people in the Republic of Ireland who require a heart and/or lung transplant. MMUH also has strong links with the Freeman's Hospital, in Newcastle, England who undertake heart and lung transplant procedures for a number of Irish patients each year. At the time of this Inquiry, it was reported that there were 18 patients on the active transplant list in Freeman's Hospital, Newcastle. The majority of these patients were living at home.

The MMUH reported that the Transplant Coordinator in Freeman's Hospital coordinates the travel arrangements for a patient travelling there for transplantation, and a chartered aircraft is used to transport the patient from Dublin to the UK.

If a patient is having their transplant operation undertaken in Ireland, travel arrangements, usually by road, are coordinated by the MMUH Transplant Coordinator. Currently, non-heartbeating donor organs are not used for transplants in Ireland. It was reported that patients who are having their transplant operation undertaken in Freeman's Hospital give their consent to heartbeating and non-heartbeating organ transplantation.

St Vincent's University Hospital

The role of St Vincent's University Hospital (SVUH) in organ transplantation in Ireland is outlined in Section 4.2.

National Office for Organ Donation and Transplantation

A National Office for Organ Donation and Transplantation has recently been established by the HSE. The aim of the National Office is to enhance organ donation and transplantation in Ireland and underpin the quality of outcomes for patients following organ donation in line with the European Union Directive on Organ Transplantation*.

One of the first actions of the National Office has been to convene a National Transplant Advisory Group and initiate an external review of organ donation and transplantation in Ireland.

4.1 Liver transplantation

Liver transplantation is an operation that replaces a patient's failing liver with a whole or partial healthy liver from another person. It is the preferred treatment in a range of acute and chronic end-stage liver disorders.[2]

The first ever paediatric liver transplant was performed in 1963 in Denver, in the United States of America.[3] However, it was not until the early 1980s, following the discovery of the immunosuppressant cyclosporine (which suppresses the body's rejection of the newly transplanted liver) that liver transplantation became a clinical reality for both adults and children.

Donor livers are obtained from 'heartbeating' and 'non-heartbeating' donors. Living donors may donate a portion of their liver for transplantation into another individual.

*Directive 2010/45/EU of the European Parliament and of the Council of 7 July 2010 on standards of quality and safety of human organs intended for transplantation. *Official Journal of European Union*, 6.8.2010

Heartbeating livers are donated from patients who have been certified dead after brainstem testing.[4] Non-heartbeating donation takes place when death has been established following irreversible cessation of the heart (that is, following cardio-respiratory arrest) and further active treatment for these patients is futile. In 2008, the Academy of Medical Royal Colleges in England issued guidance on the diagnosis and confirmation of death.[5]

In recent years, the availability of non-heartbeating organs has been increasing slowly in Europe with seven countries, including the Netherlands, UK and Spain, now using non-heartbeating donor organs for transplantation.[1] KCH informed the Authority that 19% of all liver transplants performed at KCH in 2010/11 have been from non-heartbeating donors.

One of the key issues in relation to donor organs is ensuring the viability of the organ so that it can be successfully transplanted. For organs from non-heartbeating donors, this is taken to be the time from when supportive treatment has been withdrawn to the time the donated organ can be flushed with cold solution. This period is called 'warm ischaemia' time. With livers for transplantation, there is evidence that this time should not exceed 30 minutes.[6]

The interval from when the liver is flushed with cold solution to when it is transplanted into the recipient patient is called 'cold ischaemia' time and should not exceed 8 to 10 hours.[6,7]

There is evidence of poorer outcomes for recipients when either of these time intervals is exceeded for donated livers from non-heartbeating donors.[6, 7]

The maximum cold ischaemic times for heartbeating donor livers is up to 18 hours.[1]

In conclusion, liver transplantation is the only definitive treatment available in the case of a failing liver. It is also entirely dependent on donor organs. However, the demand for donor organs continues to exceed the supply.[8] When donor livers are offered, particularly non-heartbeating donor livers, time is of the essence due to the fact that there is only a short time period for transferring and transporting recipients to transplant centres for a successful transplant and to ensure that available donor organs are utilised.

4.2 Governance of liver transplantation in the UK and Ireland

The Liver Transplant Unit Directors in the UK and the Republic of Ireland specified and published the Donor Organ Sharing Scheme principles.[9] UK Transplant administers the Scheme on the transplant community's behalf. The principles include the registration of recipients, donor definition and liver allocation priority. Patients placed on the liver transplant list must be registered on the National Transplant Database at UK Transplant.[9]

The Department of Health in England has published a document - *Legal issues relevant to non-heartbeating organ donation* - for use when developing guidance

to support clinical practice.[10] There are guidelines from the Intensive Care Society, British Medical Association and the General Medical Council in relation to non-heartbeating organ donation.[11]

Liver transplantation in Ireland

The National Adult Liver Transplant Programme for Ireland began in 1993 with the official opening of the Liver Unit in St Vincent's University Hospital (SVUH). In 2007, SVUH carried out its 500th liver transplant.

It is anticipated that 50 to 60 adults annually in Ireland will require liver transplantation.[12] It is predicted that this figure will increase in the future as further types of liver disease are added to the list of indications for liver transplantation.[12] In 2008, St Vincent's University Hospital performed 58 liver transplants on 53 patients.[13] In 2009, there were 68 liver transplants and in 2010, 38 transplants. At the time of the Inquiry, the Unit did not use non-heartbeating donor livers for transplants.

Paediatric liver transplantation

Paediatric liver transplantation has been recognised as a major success and is now an established therapeutic entity. In the UK, there are three paediatric liver transplant centres which are:

- King's College Hospital, NHS Foundation Trust, London (KCH)
- Birmingham Children's Hospital, NHS Foundation Trust
- Leeds Teaching Hospitals NHS Trust.

In the mid to late 1980s, paediatric liver transplantation was performed at OLCHC, Dublin. However, following a review of patient outcomes, the Department of Health commissioned extensive international research and had discussions with leading specialists and this surgery ceased in 1991. One of the principal reasons for ceasing the service was the low caseload volume and the inability to maintain the expertise in Ireland for this type of surgery. There was no Paediatric Gastroenterologist/Hepatologist at OLCHC until the first post holder was appointed in 1991.

From 1991 to the present day, children in Ireland requiring liver transplantation are referred to KCH, London for surgery[14] under an arrangement between the Department of Health in Ireland and Camberwell Health Authority in the UK. KCH is a successor organisation to Camberwell Health Authority which was disbanded in the early 1990s. Since 2007, 21 Irish children have had liver transplantations in KCH. Eleven of these patients were transported from their homes to KCH. The remaining nine patients were inpatients in either OLCHC or KCH at the time of the transfer with one patient, an elective transplant, who was transported using

a commercial airline. In addition, over this period two Irish children who had been referred to the Freeman Hospital, Newcastle post-bone marrow transplant with serious immunological conditions were referred by the Freeman Hospital, Newcastle to Birmingham Children's Hospital for liver transplantation.

Children who are assessed and considered for liver transplantation usually have chronic liver disease, acute liver disease, liver tumours or metabolic liver disease with life-threatening extra-hepatic complications.

The indications for liver transplantation for children with chronic liver disease are usually accepted as:

- life expectancy: anticipated length of life (in the absence of transplantation) is less than 18 months (because of the liver disease)
- unacceptable quality of life
- growth failure or impairment due to liver disease
- reversible neuro-developmental impairment due to liver disease
- likelihood of irreversible end organ damage
- an expectation that they have a greater than 50% probability of survival at five years after transplantation with a quality of life that is acceptable to them and their family.[15]

4.3 Transporting children to liver transplant centres for surgery – a series of case studies

Scotland

All children in Scotland requiring a liver transplantation are referred to one of the three paediatric liver transplant centres in England which are KCH, NHS Foundation Trust, London, Birmingham Children's Hospital, NHS Foundation Trust and Leeds Teaching Hospitals NHS Trust.

The paediatric liver transplant centre is responsible for organising the transfer and transport for the recipient patient from Scotland to the hospital for surgery. The Royal Hospital for Sick Children in Edinburgh is not involved in the transport of the recipient patient.

England

Leeds Teaching Hospitals NHS Trust

In general, patients who attend Leeds Teaching Hospitals NHS Trust for liver transplantation are from a geographical area which is within a reasonable distance from the Hospital for road transfer. However, a number of patients come from Wales, Scotland and more remote areas of the North of England. When a patient is listed for transplant, the Hospital Transplant Coordinator will discuss, with the

patient and their family, how they will travel to Leeds when they are called for transplant. If the patient has no family member who is able to transport them, a note is made on the Hospital's waiting list file to indicate that the patient will need ambulance transportation. At the time of transplantation, the on-call coordinator will organise suitable road transport arrangements, usually an emergency ambulance.

For those patients living at a distance from the Hospital, for example in Scotland, a transportation plan is formulated in liaison with the local ambulance team which is communicated to the patient and all the transplant coordinators.

The Hospital's ambulance providers for organ retrieval are also able to broker air transportation. The Hospital has an additional external supplier who has the ability to source and coordinate air transport arrangements. In circumstances where air transportation is required, the Hospital has a number of companies to access. Every case is discussed and considered on a case-by-case basis. The transplant coordinators are aware of and have access to details of the recipient's transports needs and this is routinely considered when discussing offers of donor livers with the consultant transplant surgeon on call.

Generally, the Hospital asks patients awaiting transplantation not to holiday at a distance of any more that three hours' travelling time from Leeds. However, if patients do, they are suspended from the transplant list until their return.

Birmingham Children's Hospital, NHS Foundation Trust

Birmingham Children's Hospital, NHS Foundation Trust, has patients on its transplant lists from both Scotland and Northern Ireland.

A transport plan, which includes road travel and flight times, is established in collaboration with potential transplant recipients from Scotland and this is then faxed to Scottish Air Ambulance. On occasion, commercial flights may be used to transport these patients. Due to the time and transport logistics, non-heartbeating donor livers are very rarely considered suitable for patients based in Scotland.

For patients in Northern Ireland, the Hospital contacts the patient's Health Board and collaboratively develops an individualised protocol for each individual patient. This includes plans for transfer from home (or hospital) to the airport, flight plans and transport arrangements from Birmingham Airport to the Hospital. Flights are normally arranged through the appointed person at the patient's referring hospital. Where it is possible scheduled flights are sometimes used, although it was reported that this happened rarely.

Northern Ireland

There is no liver transplant programme in Northern Ireland, with patients requiring a liver transplantation travelling to either Scotland or England for surgery. Adult

patients tend to travel to KCH, London or to the Royal Infirmary of Edinburgh, while children tend to travel to Birmingham Children's Hospital.

For the transportation of patients to other parts of the UK, a private contractor was appointed following an open tendering process. This contractor currently coordinates and provides all aeromedical transfers into and out of Northern Ireland using fixed-wing aircraft.

The contractor develops a detailed transfer plan which will identify patients' needs, travel logistics and relevant contacts and patients' details. This service is pre-authorised and hospitals advise the contractor of all patients who are placed on the transplant list. Hospitals then have a single point of contact to coordinate and arrange road and air transfer and provide an accompanying trained medical escort. All patients are required to travel to Belfast. An ambulance transfer can be arranged if 'blue light' transfer is required. Otherwise, transfer is organised with a family relative and a taxi has been used on occasion. The contractor also organises a private ambulance service to transfer the patient from the airport in England to the transplant centre. It was reported that feedback is reported to the referring hospital on completion of a transfer.

New Zealand

Up to 1998, there was no liver transplant programme in New Zealand and patients were transferred for surgery to Brisbane, Australia. The New Zealand Liver Transplant Unit was established in Auckland City Hospital (located in the North Island) where all transplant surgery is now performed. The Unit reported that it has had minimal experience with non-heartbeating donors.

The Unit also has a well established paediatric programme with the majority of paediatric transplants being from live donors.

Due to the geography of New Zealand, the unit is faced with many different scenarios for getting patients to Auckland for their transplant. Around one-quarter of patients awaiting liver transplantation live in the Auckland region or within a two- to three-hours' drive from Auckland. These patients will normally be driven to Auckland by a family member. At the time of the Inquiry, 18 patients on the Hospital's waiting list were within driving distance of Auckland and 13 would require air transfer to Auckland.

Patients will normally stay at home until they are called for transplant and at that time, the transplant coordinator will liaise with Auckland Hospital's designated travel agency to arrange to get a patient on the next available commercial flight. When referrals are received during the day, patients will be placed on an evening flight. In situations when a referral is received during the night, the Unit will endeavour to get the patient on the first flight in the morning (their travel agent provides 24-hour on call).

Because of the remoteness of some parts of New Zealand, the Unit has, on occasion, used a private helicopter to transport patients to larger airports where later flights to Auckland were available. This ability to get patients from remote areas in New Zealand to Auckland is facilitated by the fact that the Unit mainly uses heartbeating donors for transplantation.

If the Unit perceives that there is a high likelihood of a patient, near the top of the waiting list, not getting to Auckland City Hospital on time, patients may be asked to relocate if possible to one of the major cities so that they can fly directly to Auckland.

4.4 Summary

Organ donation and transplantation have seen tremendous success in Ireland over the years and for many patients transplantation is now the treatment of choice for end-stage organ failure. Transplantation adds years of life as well as quality of life to patients who receive organs.[1] Liver transplantation is the only definitive treatment available in the case of a failing liver. It is also entirely dependent on donor organs. However, the demand for donor organs continues to exceed the supply.[8]

A National Office for Organ Donation and Transplantation has recently been established by the HSE. The aim of the National Office is to enhance organ donation and transplantation in Ireland and underpin the quality of outcomes for patients following organ donation in line with the European Union Directive on Organ Transplantation. The National Office has convened a National Transplant Advisory Group and initiated an external review of organ donation and transplantation in Ireland.

Time is of the essence when transferring and transporting any patients to transplant centres for transplant surgery. However, when donor livers are from a non-heartbeating donor, there is a shorter window before transplantation. It is therefore critical that careful logistical pre-planning for patient transfers and transport is carried out and that this information is available to those coordinating and managing patient transfers in these circumstances. When a donor becomes available and a patient requires urgent transport for transplant surgery outside of the jurisdiction then the most appropriate available asset to transport the patient within the required timeframe should be deployed.

However, the use of non-heartbeating donor livers is increasing and, as KCH has advised the Authority, a decision to not offer these organs to patients with greater distances to travel could result in much longer waits for these patients and may also result in some available organs not being utilised. It is therefore fundamental that this information must be provided to parents and patients to ensure that they can consider the implications, contribute to decisions at an early stage of transplant planning and make informed decisions in relation to possible relocation.

5. Background to the governance and arrangements for the provision of hepatobilary and liver transplant services in Ireland

5.1 Model of care

In 1991, the Irish Department of Health, following a review of paediatric liver transplantation, put in place an arrangement with Camberwell Health Authority in England for children requiring liver transplantation to be referred to King's College Hospital, London, (KCH) for surgery.[14] KCH is a successor organisation to Camberwell Health Authority which was disbanded in the early 1990s. The HSE was established on 1 January 2005 and became responsible for implementing the Department of Health's policies through the management and delivery of health and personal social services in Ireland. At that time, the management of the arrangements in relation to the provision of paediatric liver transplantation was transferred from the Department of Health to the HSE.

5.2 Funding of paediatric hepatobilary and liver transplant services

The HSE funds Our Lady's Children's Hospital Crumlin (OLCHC), Dublin, through a service level agreement (SLA) for the national provision of paediatric gastroenterology and hepatology services. OLCHC refers children who require possible liver transplantation to KCH and, at that time, provides assistance to the parents of the child in making an application for referral under the Treatment Abroad Scheme.

The HSE operates the Treatment Abroad Scheme for people entitled to treatment in another European Union member state.[16,17] This allows the HSE to provide financial assistance for treatments, such as paediatric liver transplants, that are not provided in Ireland 'following referral from an Irish-based consultant'.[18]

Once the HSE has approved a referral for treatment abroad under the Scheme, the consultants at OLCHC refer children for clinical assessment to KCH in relation to liver transplantation.

The funding for treatment abroad is directly from the HSE and not the referring hospital.

5.3 Provision of paediatric hepatobilary services

OLCHC provides care for children with complex liver and/or bowel disease from all over Ireland with the following specialist services (the Authority has not undertaken a review of these services as part of the Inquiry):

- paediatric gastroenterology
- hepatology
- hepatobiliary surgery
- nutrition.

In accordance with a 1991 Department of Health arrangement (see Section 5.1), children who require liver transplantation are referred to KCH. OLCHC was unable to provide the Authority with the exact number of children who have undergone liver transplant at KCH since 1991 to the present day. However, OLCHC informed the Authority that in 2010 there were 19 occasions where children were successfully transferred to KCH to undergo liver transplantation assessment or liver transplantation procedure. In 2011, at the time of the Inquiry, there were six children listed for liver transplant. The Authority was also informed that some children have been referred to Birmingham Children's Hospital for specific reasons including children who require a combined liver and intestinal transplant; a combined liver and bone marrow transplant and paediatric intensive care availability for children in fulminant hepatic failure.

It was suggested that these numbers may increase as patients who had transplants at a young age may need further transplantation in the future.

In relation to children who have had a liver transplant, the Authority was informed that all adolescents are transferred to the National Adult Transplant Service at St Vincent's University Hospital on completion of their formal schooling, if an adolescent older than 16 years of age requests to transition or if pregnancy occurs. An annual clinic is held at OLCHC attended by the Hepatologist from SVUH and serves as an introduction to the adult services. Patients who may need a re-transplant soon are offered the choice to go to KCH for the re-do procedure and all subsequent follow-up in Ireland is at SVUH. However, for adolescents who have not received a transplant, there was no information provided to the Authority that describes how the transition and transfer of care from children to adult services is planned, managed and coordinated with the child, their family, OLCHC, KCH and the adult service in Ireland.

Children with chronic liver disease, who are on the waiting list for transplantation and who are well enough to live at home, may have their care provided by their general practitioners (GPs), the OLCHC paediatric gastroenterology and hepatology service and the KCH hepatobilary service. There is also a twice-yearly outreach clinic for children held at OLCHC by a consultant paediatric hepatologist from

KCH. However, there was no information provided to the Authority by OLCHC or KCH that clearly described the overall governance and accountability for the coordination of this shared model of care.

5.4 Provision of liver transplant services

KCH is an NHS Foundation Trust based in Denmark Hill in the Camberwell Borough in South East London. Its Liver Transplant Unit runs the largest transplantation programme in Europe, carrying out more than 200 procedures a year.[19] KCH assisted in setting up the adult liver transplant programme in Ireland and maintains close links to facilitate discussion and advice on complex cases.[13]

In 1991, KCH was awarded the contract for the provision of paediatric liver transplant services for Irish children.[14] OLCHC did not provide the Authority with figures on the number of Irish children who have been referred to KCH from OLCHC for transplant assessment since 1991. Children are assessed at KCH and, when it is clinically appropriate, are placed on the waiting list for transplants. All children added to the waiting list receive a comprehensive education session plus an information pack from KCH. When a suitable organ becomes available it is allocated to the most appropriate patient on the waiting list. When this occurs, the KCH on-duty Liver Transplant Coordinator will contact the patient or their guardian and ask them to come to KCH as soon as possible for assessment prior to surgery. Children with chronic liver disease referred to KCH may continue to be seen at the OLCHC's paediatric gastroenterology and hepatology unit while waiting to be called for transplant.

5.5 Summary

It is essential that patients receive integrated care which is effectively coordinated within and between clinicians and service providers. Children with chronic liver disease, who are on the waiting list for transplantation and who are well enough to live at home, may have their care provided by their GPs, the OLCHC paediatric gastroenterology and hepatology service and the KCH hepatobilary service. The provision of the clinical care by OLCHC, KCH, GPs, and the funding arrangements by the HSE, are all key elements in this shared model of care.

Clear governance arrangements for the coordination of care, and clarity of accountability for each element of care, are critical in order to ensure the provision of safe integrated care to this patient group. Although there is a close system of liaison between clinical consultants, histopathologists, clinical nurse specialists and dieticians in OLCHC and KCH, there was no information provided to the Authority that clearly described the totality of the governance arrangements, including accountability, to ensure the funding and coordination of this model of shared care in Ireland.

6. Governance and arrangements in place, within and between the relevant agencies and those contracted to provide services, for the purpose of the safe and prompt emergency transfer of care for people requiring transplant surgery

6.1 Treatment Abroad Scheme

As outlined in Section 5.2, the Treatment Abroad Scheme, operated by the HSE, provides financial assistance for children having liver transplants, 'following referral from an Irish-based consultant,'[18] because this treatment is not provided in Ireland.

It was reported to the Authority that the rules of the Treatment Abroad Scheme were not nationally established and that regional or local health area decision making was applied. A number of families reported that there was no clarity about entitlements, in particular for families who were not covered by the General Medical Services (or medical card) Scheme. Parents are required to travel abroad with their child when they are being initially assessed and again at the time of transplant surgery. KCH requests that both parents accompany a child so that parents are informed of the benefits and risks of surgery.

There are a variety of logistical, financial and social arrangements that must be planned, sometimes at very short notice, at a time when a child is critically ill. These may include obtaining birth certificates, passports, approval to travel outside the jurisdiction, UK entry visa, travel booking and payment, transport and accommodation arrangements.

In June 2009, OLCHC wrote to the HSE outlining difficulties that it was experiencing with the HSE's procedures and arrangements for the assessment and treatment of children abroad. The correspondence stated that:

- there was no standardisation of E112 forms[18] in the different HSE areas
- there was no equity or consistency in the financial support available to families in relation to travel and subsistence
- some HSE areas required OLCHC to obtain costs from hospitals to which children were referred
- in emergency situations, OLCHC were experiencing difficulties in having E112 applications processed, with financial assistance unclear and often disputed

- in the event of the Air Corps in Ireland not being available, OLCHC reported that it was difficult and 'highly bureaucratic' to get financial approval for private aircraft in an emergency situation when time is crucial to a patient's survival or eligibility for availability of a transplant organ.

As a result of this correspondence, and a series of subsequent meetings with the HSE, a number of improvements have been implemented over the last 18 months in relation to the processing and approval of E112 applications. These include:

- the processing of E112 applications for patients from OLCHC for treatment abroad has been centralised to the HSE office in Dr Steevens' Hospital, Dublin
- a standardised application form for the E112 has been implemented
- a protocol for emergency cases, specifically including transplant cases, where OLCHC may bypass the normal E112 pre-approval and required paperwork is completed after the transfer of critically ill patients from the hospital.

There was no information provided to the Authority in relation to the overall governance of the Treatment Abroad Scheme service model and the transport and transfer arrangements for patients. The decision to treat a child abroad (that is following referral of the child to KCH for assessment and transplant) is in line with the service model which is directly funded by the HSE.

While the processing of E112 applications for patients attending OLCHC has been centralised, it was reported that other welfare benefits must be accessed through HSE local health offices. The Authority heard from parents examples of the inconsistent application of the process by a number of HSE offices, minimal access to welfare information or support and limited psychological services. The Authority was also told of examples of parents with low incomes who had to urgently find money to arrange travel and transport to bring their child to KCH for assessment which included the costs of passports, premium flights to London, transfer to KCH as well as the extra associated daily subsistence costs, then travelling home on commercial flights with an immunocompromised child following surgery.

These are additional unnecessary burdens for parents at a time when their child is critically ill or going abroad for lifesaving liver transplant surgery, and when parents need to focus on their child's health and wellbeing. Parents reported that the support, both clinical and social, provided by the paediatric hepatobilary service and team at OLCHC in helping them navigate the scheme to ensure they had the necessary requirements to travel abroad was useful. This support also included liaison with the Passport Office and the Garda National Immigration Bureau. However, concerns were expressed at interview about the continuing challenges in trying to gain approvals and documentation due to changing roles and unclear information.

There was no information provided to the Authority that indicated that the HSE had evaluated the broader welfare, psychosocial and financial needs of the parents of children travelling abroad for treatment or had put in place clear arrangements and structures to provide the necessary supports.

6.2 Coordination of travel and transport arrangements for liver transplant patients

In 2001, the then 'Gastroenterology/Liver unit' of OLCHC entered into an arrangement with Emergency Medical Support Services (EMSS), a private service provider, through a memorandum of understanding, to coordinate the medical transportation of children from their homes to KCH for liver transplantation. However, at that time, the memorandum of understanding was specifically between the 'unit' and EMSS and not OLCHC as a corporate entity. This service had previously been provided on a less formal basis between 1999 and 2001. EMSS provided a 24-hours-a-day service that included the:

- initial point of contact for KCH Liver Transplant Coordinators
- initial contact point for patient/next of kin requiring medical transport
- coordination of communication between various agencies, organisations and hospitals once a patient is required to travel for transplant
- coordination of third-party aircraft hire if required
- provision of transport planning including routes, maps and updates.

From 1999 to 2007, EMSS reported that it had coordinated the travel and transportation for 49 children from their homes to KCH for assessment or transplantation. While this arrangement was never formally evaluated from a user or commissioner perspective, there was no evidence reported to the Authority that suggested any concerns about its effectiveness.

In 2007, a service level agreement (SLA) between the Department of Defence and the Department of Health, in consultation with the HSE, for the provision of air ambulance services by the Air Corps and the coordination of these services by the HSE was put in place. The SLA defined the:

- totality of the relationship between each agency in respect of the provision of air ambulance services and defined the terms and conditions within which the air ambulance service would operate
- scope of the agreement which included air transport of patients requiring specialised emergency treatment in the UK
- availability of services to be dependent on the availability of:
  - suitable aircraft
  - flying crews
  - weather and flight conditions.

The agreement clearly stated that all requests for Air Corps air ambulances for the transport of patients requiring specialised emergency treatment in the UK must be through the designated HSE National Ambulance Service Emergency Medical Controller using a request form. The request form must be faxed by the HSE National Ambulance Service Emergency Medical Controller to the Air Corps.

In July 2010, the HSE wrote to every hospital manager and hospital chief executive advising them that the HSE National Ambulance Service had implemented a SLA with the Air Corps and had engagements with the Irish Coast Guard for the provision of air ambulance transport of patients overseas.

However, there is no formal agreement with the Irish Coast Guard. The HSE National Ambulance Service's Patient Transplant Transportation Protocol (see Appendix 2) specified that where the HSE National Ambulance Service confirms to a hospital or its nominated agent that there was no Air Corps or Irish Coast Guard service available, it then becomes the responsibility of the hospital to organise suitable alternative air ambulance transport.

6.2.1 Air Corps

The Air Corps is the air component of the Permanent Defence Forces, based at Casement Aerodrome, Baldonnel, Co Dublin. The Air Corps provide an air ambulance service to the State which is subject to a service level agreement between the Department of Health and the Department of Defence as referred to in Section 6.2.

The Air Corps has four fixed-wing aircraft which can be used for the air ambulance role. Only one of these aircraft has a specific 'Lifeport' air ambulance system which may be integrated into the aircraft power system. All other fixed-wing aircraft require self-contained oxygen and power supplies to be carried on board for patient life support. The Air Corps do not retain life support resources for this purpose. For the purpose of transporting patients who require specialised emergency treatment in the United Kingdom, different fixed-wing aircraft may be used depending on whether or not the patient is carried on a stretcher. Fixed-wing aircraft are not on standby for this type of mission and could be unavailable due to prior tasking or unavailability of aircraft or crews. The service is operated on an 'as available' basis. The Air Corps currently has a fully medically equipped Eurocopter EC135 light twin helicopter for daylight-only response for air ambulance service and other missions. There is also a larger Augusta Westland AW139 twin-engined air-ambulance equipped helicopter, whose service has been expanded to a 24-hour service subject to weather conditions and availability.

6.2.2 Irish Coast Guard

The Irish Coast Guard (IRCG) is a division of the Department of Transport and has responsibility for our national system of marine emergency management in Ireland's exclusive economic zone. It is responsible for the response to emergencies at sea, inland waterways, offshore islands and the mountains of Ireland (32 counties).

The IRCG helicopter service can be used inland for assistance in flooding, severe weather, major emergency support, pollution response, aerial surveillance, underslung load lifting, transport of passengers/patients and operations as requested by the other emergency services which are within its Irish Aviation Authority (IAA) approved Air Operators Certificate (AOC). Crewmembers are trained to ambulance paramedic standard.

In addition, the IRCG provides a back up to the HSE's National Ambulance Service for the provision of intra-hospital transfers, when the Air Corps is not in a position to provide the service. However, at the time of the Inquiry, there was no formal agreement between the IRCG and the HSE for the provision of this service.

The IRCG maintains and operates a 24-hour search and rescue helicopter service, from four airport locations in Ireland – Dublin, Shannon, Waterford and Sligo – which is provided under contract to the State. The IRCG currently has six Sikorsky S61N helicopters in its fleet. The IRCG is in the process of acquiring five new helicopters (Sikorsky S92), the first of which is to be put in place by July 2012, with the remaining four being introduced in 2013. The current and older helicopters will then be decommissioned. The new helicopters (Sikorsky S92) will be HEMS (Helicopter Emergency Medical Service) compliant and have considerably faster travel times than the current helicopters. The IRCG reported to the Authority, that due to the increased speed, endurance and capacity of the Sikorsky S92 the IRCG would be in a position to commit, subject to availability, to one east coast helicopter being available on a 24 hours' basis (15 minutes' notice daylight; 45 minutes' notice night time) as back up for air ambulance missions nationally. Currently the aircraft availability at all four bases is in excess of 97%.

The travel time estimates for the current Sikorsky S61N compared with the new Helicopters Sikorsky S92 are outlined in Table 1 as follows:

Table 1. Travel time estimates for existing Sikorsky S61N helicopters compared with Sikorsky S92 helicopters

From /To	Travel time S61	Travel time S92
Waterford to London (Northolt)	2 hours and 20 minutes	1 hour and 42 minutes
Dublin to London (Northolt)	2 hours and 12 minutes	1 hour and 37 minutes
Shannon to London (Northolt)	3 hours and 27 minutes (Fuel stop required)*	2 hours and 31 minutes
Sligo to London (Northolt)	3 hours 36 minutes (Fuel stop required)*	2 hours and 39 minutes

**Refuel time dependent on location and whether provided by a third-party provider or by the Coast Guard in Waterford or Dublin. Minimum time estimate of 30 minutes when a third party is providing the service.*

The travel time estimates information was not available to the HSE National Ambulance Service on 2 July 2011.

6.3 Implementing the arrangements

In August 2007, the HSE National Ambulance Service notified EMSS that as a result of the air ambulance SLA:

- the HSE National Ambulance Service had been tasked with coordinating the booking of all air ambulance flights sourced from the Air Corps
- the task of making all the arrangements around the transportation on either side of the air transport element of each call for patients going to KCH for liver transplants had been subcontracted by OLCHC to EMSS
- EMSS, as the first organisation that will become aware of the need for a patient to travel to the UK, should immediately notify Ambulance Control
- the role of Ambulance Control was to immediately contact the Air Corps to source an aircraft. In line with the SLA, the Air Corps was asked to give a go/no go decision within 30 minutes. (However, the stated timeframe for a go/no go decision in the SLA is 15 minutes.)

From that time, EMSS continued to coordinate the transfer and transport arrangements for OLCHC for patients from their homes going to KCH for liver transplantation. Consequently, following confirmation from KCH of a potential available organ for a child on the transplant list in Ireland, and when arranging this 'time-critical' transfer and travel for the patient, EMSS had to first contact the HSE National Ambulance Service to check the availability of State air ambulance assets. It then had to confirm by fax to EMSS if the State assets were not available and EMSS had to send this confirmatory fax to OLCHC before OLCHC would give consent to book a private air ambulance.

Both OLCHC and EMSS reported to the Authority that from 2007 to 2009, there was confusion about the funding of private air ambulances despite a memorandum of understanding being in place. The funding authority was at the time, and at the time of this Inquiry continued to be, the HSE through its Treatment Abroad Scheme.

EMSS reported that it had experienced difficulties in receiving payment of invoices by the HSE when private planes were chartered due to the unavailability of State assets. At that time, EMSS wrote to the HSE seeking pre-authorised approval to book private air ambulances, and raised the potential risks in the absence of pre-authorised approval. The Authority received documentation that demonstrated this pre-authorisation was refused by the HSE.

EMSS developed a patient-detail form, which was required to be completed at the time a child was put on the transplant list, which included details of the HSE funding authority details. EMSS also required nursing administration in OLCHC to fax approval of authorisation before it proceeded with a booking of a private air ambulance.

OLCHC reported that, in the event of Air Corps being unavailable, it: 'was difficult and highly bureaucratic to obtain financial approval from the HSE for a private aircraft in an emergency situation when time is crucial to patient's survival or eligibility for availability of transplant organ.'

OLCHC reported to the Authority that, due to these issues, at that time, in July 2010, OLCHC authorised Nursing Site Managers to approve the booking of a private air ambulance and it instigated a series of meetings with the HSE's commercial unit and the HSE's National Ambulance Service with a view to improving the service.

These meetings considered that, since the introduction of the SLA in 2007, EMSS's main role was sourcing a private air ambulance when there was no State asset available. It was reported to the Authority that it was therefore agreed by the HSE and the OLCHC that for all new patients who were put on the transplant list, the HSE and OLCHC would take on this role without the need for the service that was being provided by EMSS. OLCHC also informed the Authority that, in order to ensure the continuity of care to patients, staff awareness and the provision of information to patients and families, it had decided that a phased approach to the change in these arrangements was necessary. This involved the development of new protocols and procedures by the HSE and OLCHC and the communication of these to all families, in particular to families with patients already on the list to whom EMSS were continuing to provide the transport and transfer service until such time as the EMSS contract had ceased.

However, there was evidence provided, including minutes of a meeting between OLCHC and the HSE in February 2010 and the subsequent HSE Patient Transplant Transportation Protocol (Appendix 2) and in interviews, that identified confusion between OLCHC and the HSE National Ambulance Service in relation to the respective roles and responsibilities for the logistics of the process.

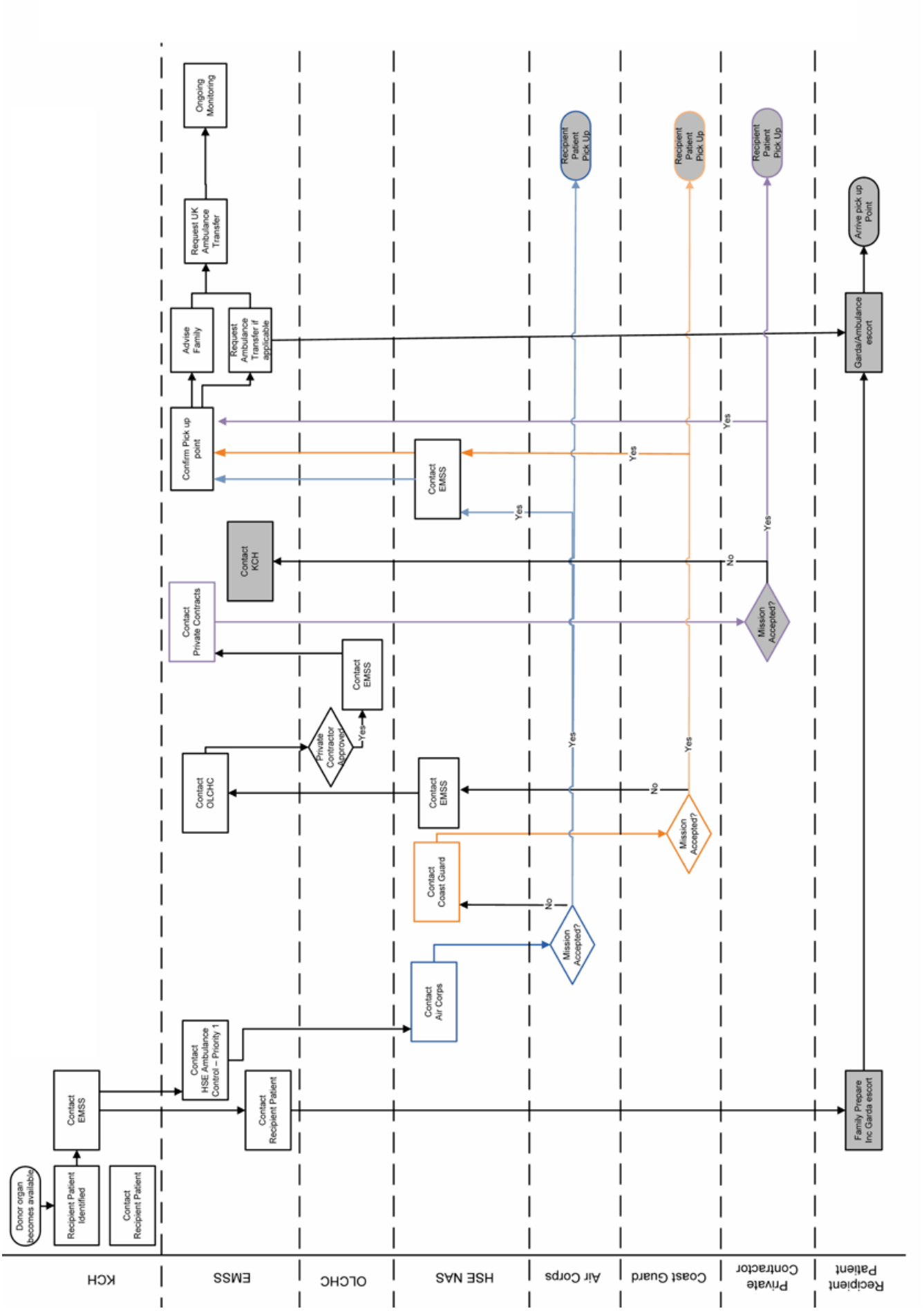
In May 2011, OLCHC notified EMSS of its intention to terminate the memorandum of understanding with effect from 31 July 2011. At that time, EMSS was coordinating the transfer and transport arrangements, on behalf of OLCHC, for three children who were at home awaiting liver transplantation. One of these children was Meadhbh McGivern. Subsequently, on 6 July 2011 EMSS terminated the contract with OLCHC.

6.4 The arrangements and operating protocols in place on 2 July 2011

In order to fully understand the arrangements and operating protocols that were in place for the care and transportation of patients requiring transplant surgery outside of Ireland on 2 July 2011, the Authority reviewed all of the information provided and met with representatives from the agencies involved in these arrangements.

The Authority mapped the 'as-was' protocol that was in place on 2 July (that is, what the arrangements stated should happen) from the point at which KCH identified

Figure 1. Process for the transfer of children from home to KCH for transplantation (in place on 2 July 2011)



Meadhbh as having a potential donor liver available until her arrival at Sligo. This can be seen in Figure 1 on the preceding page.

This process map (see Figure 1) was compiled by the Authority with information from the relevant agencies in relation to their documented role in the process and, where such documentation was missing, it was compiled from interviews where specific steps were detailed verbally and triangulated by the respective agencies. The process map identifies the different agencies involved, as named down the left hand side of the process map, and the steps that should have been followed on 2 July 2011. The reader should follow the map from left to right.

6.5 Summary of Findings

Prompt, consistent and transparent decision making is essential to ensure the safe, effective and timely transfer and transport of patients. The Authority found that there was no overall effective governance of the Treatment Abroad Scheme service model. The overly administrative focus on the funding and reimbursement of travel and transport diverted attention from the safe and timely transfer of care for patients.

The process of the Treatment Abroad Scheme was not nationally established and historically, variable regional or local health area decision making was applied. Children, their families, and those in charge of their medical care do not have a choice about where children can have liver transplants and, in accordance with the policy, these children must be referred abroad. Travelling abroad for a treatment not provided in Ireland involves transportation and transfer. These arrangements should be pre-determined and planned with the funding pre-authorised within a clear governance structure.

The documented process demonstrated the complexity of the protocol and multiple interactions for the transfer of patients from the time they are contacted by KCH to the time they arrive at the departure venue. The process shows that KCH, the HSE National Ambulance Service, OLCHC, the Air Corps, the IRCG, EMSS as the then appointed transport coordinator, and the patient's family were all contributors to coordinating a patient's transfer and transport abroad for transplantation.

In relation to the process, there was no evidence that checklists were developed, considered or used for minimising error and optimising patient safety and outcomes. Each organisation involved in this process relied on the individual experience of the people involved in a process that was inherently risky and logistically challenging because of its complexity and the consequences for patients if it went wrong. Consequently, the system was not designed to be reliable.

It was evident from mapping the process that there was no single coordinating agency or person with overall accountability.

Although it was reported to the Authority that there were some concerns raised to OLCHC and the HSE about aspects of the transfer and transport process, the Authority found that there was no evidence that the risks to patients associated with the totality of this model of care, including the travel and transfer components particularly in the area of logistics, had been fully identified, analysed or managed effectively. There was no evidence provided to the Authority that OLCHC, the HSE corporately or the National Ambulance Service within the HSE, understood or managed the risks of this model of care or that these risks were recorded on risk registers. Accordingly, there were no mitigating actions or contingency plans in the event of no State asset or private air ambulance being available – again, this was mainly due to the fact that no agency had overall accountability for the process.

The Authority found that there was confusion between OLCHC and the HSE National Ambulance Service in relation to the respective roles and responsibilities for the logistics of the process. In addition to this, and of particular concern to the Authority, was the fact that OLCHC had recently taken on the role of coordinating the road and air travel, including aircraft logistics and flight times and the booking of private air ambulances for children going from home to KCH when State assets were not available, without the required skills and competencies to effectively undertake the function, or to understand or consider the associated risks.

The fact that the process was going through a phased change for different groups of patients at any one time, with OLCHC taking on the additional role that had been fulfilled by EMSS, added to the complexity and increased the potential risks to patients.

There was no evidence of any formal evaluation of the impact of the changes in services to identify and address any unanticipated adverse consequences to patients of the proposed changes. The resulting risks to the change in the process were identified by the Authority during the course of the Inquiry and measures were put in place to mitigate these risks.

The Authority found that the necessary governance and accountability arrangements were not in place and, where individual agencies or service providers had their own governance arrangements in place for their specific part of the process, these were not sufficiently coordinated with other key agencies or providers for the purpose of the safe and prompt emergency transfer of care for children requiring transplant surgery. This contributed to the events of 2 July 2011 that led to the failure to transfer Meadhbh McGivern to KCH for transplant surgery.

7. Chronology of events on the night of 2 July 2011

7.1 Meadhbh's story

Meadhbh McGivern is 14 years old and lives in Ballinamore, County Leitrim with her parents Joe and Assumpta. She was diagnosed with biliary atresia* soon after birth and has been attending the paediatric hepatobilary services at OLCHC for care and treatment.

From May 2007 to August 2010, Meadhbh attended KCH for treatment for chronic liver disease. In August 2010, she was placed on the waiting list for liver transplantation. In April 2011, Meadhbh was escalated to the KCH priority list for a liver transplant and was placed on both the paediatric and adult list.

Due to her disease progression, Meadhbh was unable to attend school but was stable enough to remain at home in Ballinamore in the care of her parents while she waited for the call from KCH.

Meadhbh and her family received information from KCH about what to expect when the time for transplantation came. The types of donor livers were explained and both parents were aware of what a non-heartbeating donor liver was. Assumpta advised the Authority that she was aware that this meant a short time period between the notification of a potential donor and the time of the transplant surgery.

However, Joe and Assumpta reported at interview that neither of them were aware of the exact window but said they thought it was between four and six hours.

The family were advised by OLCHC that OLCHC had contracted the transport arrangements to Emergency Medical Support Services (EMSS) and that EMSS was the sole and only point of contact for the transfer to KCH.

The family and EMSS were in regular contact. Joe had, on a number of occasions, discussed with EMSS the distance and travel times to Dublin, Belfast, Sligo and Knock airport. He had also advised them of the global positioning system (GPS) coordinates of Ballinamore football pitch (five minutes away from the family home) should an airlift be required. EMSS advised Joe that the decision on which mode of transport to be used would be taken based on availability and Meadhbh's needs. In line with EMSS's contract, the order was described as firstly Air Corps, then Irish Coast Guard, then commercial air travel and finally a private charter. The family reported that no written protocol, information, process algorithm or flow chart of transport arrangements was ever provided to them.

*Congenital condition in which the common bile duct between the liver and small intestines is blocked or absent.

7.2 Chronology overview

On Saturday, 2 July 2011 at **19:20**, 11 months after she was first listed for transplant, Meadhbh's mother Assumpta received a telephone call from the KCH on-call Liver Transplant Coordinator who enquired if Meadhbh was well enough and available to travel to KCH for liver transplantation. Assumpta replied that she was. The KCH on-call Liver Transplant Coordinator advised that there was a potential 'non-heartbeating' donor liver available and the family should get to KCH as soon as possible.

At **19:30**, Meadhbh, her mother Assumpta and father Joe were ready for departure with a driver and a Garda Síochána escort in place.

The ensuing travel arrangements were made by OLCHC and its agent EMSS, and the HSE National Ambulance Service. These arrangements resulted in Meadhbh and her family at **22:00** being requested to travel to Sligo Airport to board a helicopter provided by the Irish Coast Guard (IRCG). At that time, there was no travel time confirmed by the IRCG. However, the flight time had been estimated by the HSE National Ambulance Service as being 1.5 hours.

In Sligo at **23:00**, the IRCG helicopter crew advised Meadhbh's father Joe that the take-off time would be **23:30** with an estimated 4 hours' travel which included two stops for refuelling. Joe contacted EMSS who in turn contacted the on-call Liver Transplant Coordinator with the new estimated **04:00** time of Meadhbh's arrival to KCH. The on-call paediatric liver transplant surgeon was contacted and made the decision that, as Meadhbh would not be in KCH by **02:00**, then the 'non-heartbeating' donor liver should be offered to another patient. At approximately **23:20**, the on-call Liver Transplant Coordinator relayed this information to EMSS.

At **23:23**, Meadhbh and her parents were in life jackets and about to board the IRCG helicopter when Joe received a call from EMSS advising them to 'stand down' as KCH required them to be at the hospital before **02:00** if the transplant surgery was to go ahead.

The Authority found that the necessary planned arrangements and processes were not in place or were not adequate for the coordination of a safe timely transfer of Meadhbh McGivern to KCH for transplant surgery.

7.3 The detailed chronology and findings

In order to understand the complex series of events on the night of 2 July 2011 that culminated in the failure to transport Meadhbh to KCH to receive an available donor liver, the Authority reviewed the detailed chronology provided by each agency. The chronology was validated through interviews and mapped against the process.

An overview of what happened on 2 July 2011 shows that there were multiple additional steps taken that were not in the agreed process that was outlined in

Section 6.4 above, which are demonstrated in Figure 2 (on the next page). Some of the additional steps were taken because of knowledge that the new process was due to come into place for the transfer of children to KCH and some were due to desperate and uncoordinated attempts by a number of agencies to have Meadhbh transferred.

On 2 July 2011, there were two transfer processes in place: one for the children who were on the EMSS list and another for those children who were only listed with OLCHC, the HSE National Ambulance Service and the Air Corps. The Nursing Site Managers at OLCHC had protocols in place to approve EMSS's booking of a private air ambulance and for patients not on the EMSS list to book air ambulances directly if the HSE National Ambulance Service was unable to source a State asset.

In relation to the role of the HSE National Ambulance Service, all calls regarding the transport of children requiring transplant surgery outside of Ireland are managed within the normal rostered resources within the HSE National Ambulance Service's control centre at Townsend Street, with staff simultaneously managing all 999 patient emergency demand – this was the case on the night of 2 July. The HSE informed the Authority that the Ambulance Control Staff have no access to any managers on call and contact with managers was on a 'goodwill basis' – this was also the case on the night of 2 July.

The following detailed chronology and findings are depicted in the form of a process map of the various steps that took place, a table representing a commentary of the actions that occurred within blocks of time as time elapsed and a hand-off diagram of telephone interactions that took place on the night.

7.3.1 Process map of the chronology of process steps on 2 July 2011

The Authority reviewed the process along the timelines and identified the critical points and the factors that contributed to the failure to transport Meadhbh.

Figure 2 on the next page was compiled by the Authority following information from the relevant agencies in relation to their documented role in the process and, where such documentation was missing, it was compiled from interviews where specific steps were detailed verbally and triangulated by the respective agencies.

The process map identifies the different agencies involved, as named down the left-hand side of the process map, and the steps that were taken on 2 July 2011. The reader should follow the map from left to right which depicts the elapsing of time during the event. The process map illustrates (in yellow) the critical decision points in the process and the information requirements necessary to make informed decisions at the time.

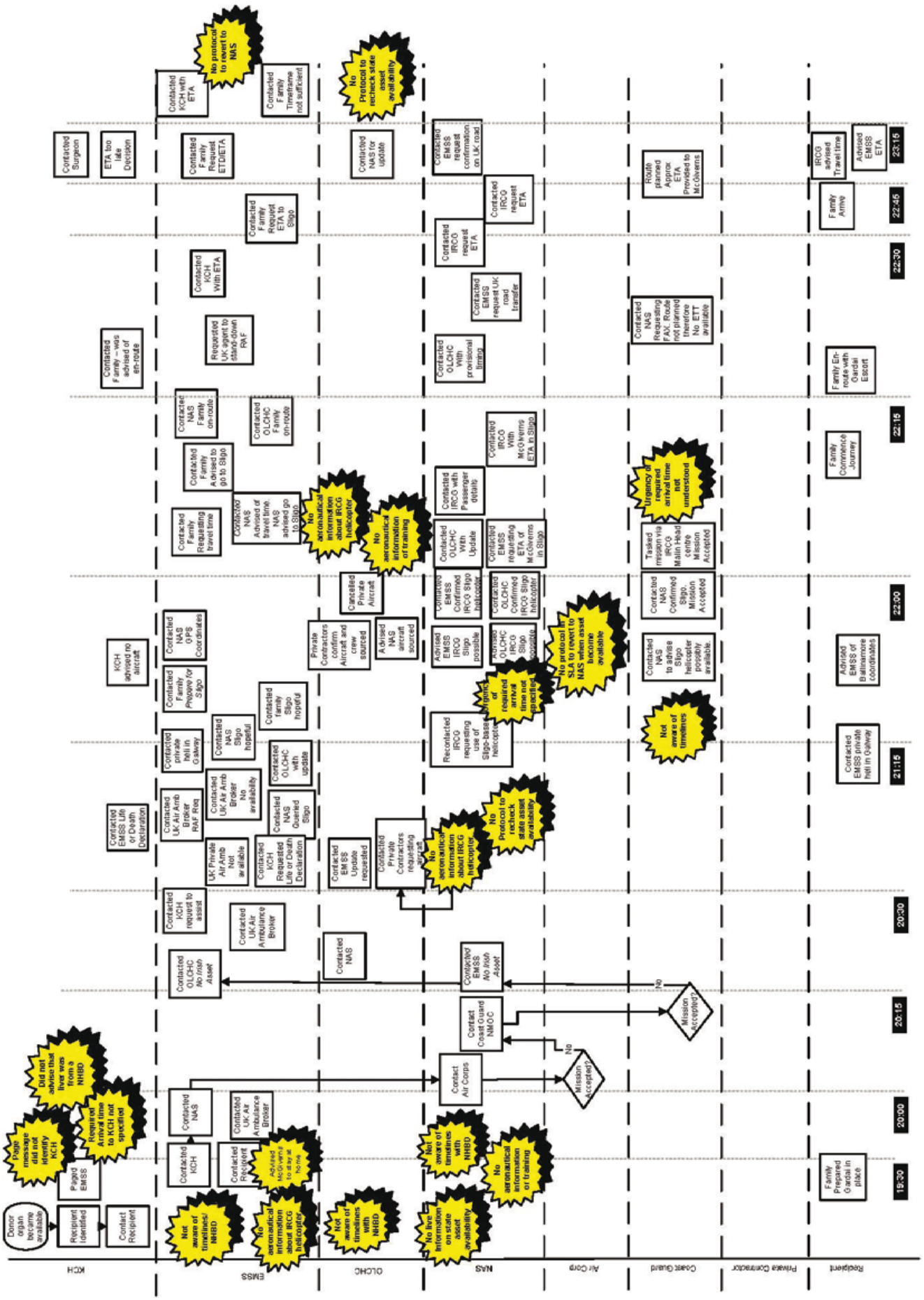


Figure 2. Process map of events on 2 July 2011

7.3.2 Commentary on the chronology of the events of 2 July 2011

Table 2 represents a commentary of the actions and events that occurred chronologically during the night of 2 July 2011. The timelines are presented in 15-minute blocks in order to allow for variances identified in the times submitted by each of the agencies. Transcribed timelines and recordings were only available from the HSE National Ambulance Service. Accordingly, these timelines form the basis for the chronology of events. However, it was aligned with the timelines submitted by the other agencies. Where appropriate, the Authority has made comments in relation to the events as they transpired at certain blocks of time intervals.

Table 2. Commentary on actions and events that occurred within 15-minute rolling blocks of time on 2 July 2011

Timeline	Activity
19:15 – 19:30	■ The KCH on-call Transplant Coordinator contacted the McGiverns and advised them that there was a 'non-heartbeating' donor liver available and to get ready to travel to KCH. ■ The KCH on-call Transplant Coordinator paged EMSS.
	Comment: The paged message from the on-call Transplant Coordinator to EMSS did not identify the hospital that sent the pager message. There was an initial delay in responding to the page. EMSS reported that all previous pages from KCH, which identified the message as coming from KCH, were answered immediately due to the time critical nature of the calls.
19:30 – 19:45	■ The KCH on-call Transplant Coordinator requested EMSS that Meadhbh be transferred to KCH as soon as possible although no maximum timeframe was given. It was reported to the Authority that no reference was made to a 'non-heartbeating' donor organ or that the window for transfer was shorter than usual.
	Comment: EMSS had transferred children from home for transplantation since 1999. Until 2 July 2011, a 'non-heartbeating' donor organ had never been offered to any child from Ireland on the transplant list. Consequently, there was no experience of a 4-6 hour time window and at no stage throughout the evening was there any reference to the fact that this was the case.

Timeline	Activity
19:45 – 20:00	■ EMSS contacted the HSE National Ambulance Service requesting an Air Corps air ambulance. The HSE National Ambulance Service queried the timeline and was advised by EMSS that no definite timeline had been given. ■ EMSS contacted Meadhbh's father and advised him to 'stay put' while they organised the air travel. ■ EMSS contacted its UK air ambulance broker to check availability of a private air ambulance.
	Comment: The McGiverns being told to stay at home at this point was a critical point in this process. EMSS informed the Authority that it was normal practice for a patient to stay at home until an aircraft and airport were confirmed. The Authority was not provided with documentation that outlines this practice.
20:00 – 20:15	■ The HSE National Ambulance Service contacted the Air Corps requesting a Priority Level 1 air transport from Leitrim to London for a transplant with a possible pick-up in Knock. ■ The Air Corps responded that there was no aircraft availability for a priority level 1 mission.
	Comment: A 'Priority Level 1 Call' means that an aircraft must be scrambled within 60 minutes. At that time, the Air Corps responded that there was only one fixed-wing aircraft in service and this was overseas with an estimated time of departure from Nice in the South of France of 21:30 but that this was yet to be confirmed. The other three fixed-wing assets were out of service and grounded for maintenance. A further call from the Air Corps to the HSE National Ambulance Service advised that the fixed-wing plane was estimated to land in Baldonnel at approximately 22:30. The use of a helicopter was discounted at this stage by the Air Corps due to an ongoing air ambulance spinal transfer of a patient being conducted at the time by the duty helicopter and crew. Other helicopter options were discounted by the Air Corps as not being feasible for a number of reasons including the time that would be required to gather the flight crew and have a helicopter airborne, and also due to the fact that a direct night-time flight to Heathrow Airport outside London is beyond the fuel range of the Air Corps helicopter fleet.

Timeline	Activity
20:00 – 20:15	■ The HSE National Ambulance Service contacted the Irish Coast Guard (IRCG) through its National Maritime Operations Centre in Dublin requesting a helicopter for priority level 1 air transport from Leitrim to London for a transplant as no Air Corps aircraft available. ■ The IRCG replied that it had no helicopter available until midnight.
	Comment: The IRCG provide, maintain and operate a 24-hours a day search and rescue helicopter service, from four airport locations in Ireland – Dublin, Shannon, Waterford and Sligo. The helicopters are designated wheels up from initial notification in 15 minutes during daylight hours and 45 minutes at night. At the time of the HSE request, the Dublin aircraft had developed a failure of a component (of the aircraft's back-up hydraulic system) and the crew were en route to Shannon to pick up the spare helicopter and fly it back to Dublin for 23:00. Consequently, the Sligo helicopter was providing the contracted service for the top half of the country and could not be tasked.
20:15 – 20:30	■ The HSE National Ambulance Service advised EMSS that there was no aircraft available from either the Air Corps or the Coast Guard. ■ EMSS contacted the Nursing Site Manager in OLCHC to advise that there was no aircraft available from either the Air Corps or the Irish Coast Guard and that it would revert to its UK broker and advise. ■ The Nursing Site Manager in OLCHC contacted the HSE National Ambulance Service who confirmed the unavailability of State assets. ■ EMSS contacted its UK air ambulance broker to check availability of a private air ambulance. ■ The broker advised EMSS that it was experiencing difficulties in sourcing an aircraft due to the fact that aircraft were being used by three retrieval teams and private charters as a result of the Wimbledon Tennis Final and the Royal Wedding in Monaco. ■ EMSS contacted the KCH on-call Transplant Coordinator to request KCH assistance in organising transport.

Timeline	Activity
20:30 – 20:45	■ The Nursing Site Manager in OLCHC contacted EMSS for an update who advised that no aircraft had been sourced. ■ The Nursing Site Manager in OLCHC contacted the Hospital's air ambulance provider and requested an air ambulance.
20:45 – 21:00	■ OLCHC was advised by its air ambulance provider that it had sourced a jet but was yet to source a crew. ■ EMSS's UK air ambulance broker advised no aircraft available. They said that if KCH declared a 'life or death' then they could contact the Royal Air Force (RAF). ■ EMSS contacted KCH to request declaration of 'life or death'. ■ KCH contacted EMSS with confirmed declaration of 'life or death'. ■ EMSS contacted its UK air ambulance broker to request RAF assistance.
21:00 – 21:15	■ HSE National Ambulance Service re-contacted IRCG and requested use of Sligo-based helicopter. ■ EMSS contacted the HSE National Ambulance Service advising that it had not been able to source an aircraft and ask if the HSE National Ambulance Service could check if the IRCG helicopter from Sligo had become available. ■ EMSS contacted its UK air ambulance broker for an RAF update and none was available. ■ EMSS updated OLCHC.
21:15 – 21:30	■ Joe McGivern contacted EMSS with contact details for a private helicopter provider in Galway. ■ EMSS contacted a private helicopter operator in Galway, using contact details supplied by Joe McGivern. However, the call was diverted.

Timeline	Activity
21:30 – 21:45	■ KCH advised that it was unable to source an aircraft. ■ EMSS contacted the McGivern family and informed them that the HSE National Ambulance Service was requesting use of the IRCG helicopter. ■ Joe McGivern advised EMSS of Ballinamore GPS coordinates. ■ OLCHC's air ambulance provider confirmed its air ambulance provider had sourced an aircraft and crew which could transfer from Knock or Dublin. The earliest approximate departure time was 23:30 with an arrival time at Stansted Airport outside London at 00:35, and ambulance transfer to KCH at least one hour after landing. ■ OLCHC contacted the HSE National Ambulance Service directly and advised it had sourced a private aircraft.
	Comment: There have been suggestions that the OLCHC would not authorise the booking of a private air charter on the night. The Authority did not find any evidence to substantiate these suggestions. This is examined in more detail at the end of this section.
21:45 – 22:00	■ EMSS contacted the National Ambulance Service, to advise it of the GPS coordinates obtained from Joe McGivern for a football pitch near to the family home in Leitrim, where it was reported that the Air Corps had landed previously. ■ IRCG contacted the HSE National Ambulance Service and confirmed that it may have a helicopter available from Sligo. The HSE National Ambulance Service advised that OLCHC had secured a jet but that it was still in Europe. ■ The HSE National Ambulance Service contacted OLCHC and advised of the possibility of the Sligo helicopter. ■ The HSE National Ambulance Service contacted EMSS and advised of the possibility of the Sligo helicopter. ■ IRCG confirmed availability of the Sligo helicopter and confirmed acceptance of the mission. ■ The HSE National Ambulance Service contacted EMSS and confirmed the availability of the Sligo helicopter. ■ The HSE National Ambulance Service contacted OLCHC and confirmed the availability of the Sligo helicopter. ■ OLCHC contacted its air ambulance provider and cancelled the booked private fixed-wing aircraft as a State asset was available.

Timeline	Activity
21:45 – 22:00	**Comment:** There were many discussions with the IRCG in relation to the coordinates for the Ballinamore pitch and the medical requirements needed for the transfer. However, there were no timelines confirmed and no discussion about the urgency of the transfer. However, the initial request had specified a 'Priority 1' call for a patient going to London for Liver Transplant. There was no formal contract between the ICRG and the HSE in place, and therefore there was no understanding or defined terminology in place in relation to urgency. The IRCG had not previously provided the HSE National Ambulance Service with details of its aircraft type or estimated travel times to London. Neither the Emergency Controller in the Ambulance Service nor the OLCHC Nursing Site Manager had experience or received training in aeronautical logistics and therefore did not understand the flight time and refuelling differences between the different types of helicopters and between helicopters and fixed-wing aircraft. When EMSS were unable to secure an aircraft it asked the HSE National Ambulance Service to request the use of the IRCG helicopter – this would suggest it was not aware of the IRCG helicopter travel times from Sligo to London. This is a critical point in this process. The decision to cancel the OLCHC private fixed-wing air charter and accept the IRCG Sligo helicopter was made based on an assumption that the helicopter travel time from Sligo to London was one and a half hours. This was not a correct assumption. A fixed-wing State asset had subsequently become available and was in Baldonnel at 22:30. The steps in this process were consistent with the multi-agency SLA because the multi-agency SLA involved single request steps that were not revisited once the confirmation of a lack of available State asset had been made. Consequently, the decision to cancel was in the absence of this new information.

Timeline	Activity
22:00 – 22:15	■ The HSE National Ambulance Service contacted OLCHC with an update and to reaffirm that the patient was stable and would not require a nursing escort. ■ The HSE National Ambulance Service contacted the EMSS, requesting information on the travel time in minutes from the McGivern's home to Sligo and Knock Airport and the GPS coordinates of the local football pitch near to the McGiverns' family home. Names of those travelling were also confirmed. ■ EMSS contacted the McGiverns requesting confirmation on their travel time estimate to reach Sligo Airport. The McGiverns advised that it would take approximately 40 minutes. ■ The HSE National Ambulance Service contacted the Irish Coast Guard (the IRCG had transferred the mission to the Malin Head IRCG base) to advise of the number of people travelling and that no emergency medical equipment was required and advised that it was an emergency liver transplant. It also advised of the GPS coordinates of the local football pitch. The HSE National Ambulance Service agreed to revert back with the patient's age and the travel times to Knock and Sligo airport. ■ EMSS contacted the HSE National Ambulance Service and advised of an estimated travel time of 40 minutes for the McGiverns to reach Sligo. The HSE National Ambulance Service advised that they should proceed to Sligo Airport. ■ EMSS phoned the McGiverns back and advised that the Coast Guard helicopter was available in Sligo and asked them to travel immediately to Sligo airport. ■ The McGiverns commenced their journey to Sligo Airport. ■ The HSE National Ambulance Service contacted the IRCG to advise that it would take the McGiverns 40 minutes to reach Sligo Airport. ■ EMSS contacted the HSE National Ambulance Service and OLCHC to advise them that the McGiverns were en route to Sligo airport.

Timeline	Activity
22:15 – 22:30	■ The McGiverns were en route to Sligo Airport with a Garda Síochána escort. ■ KCH on-call Transplant Coordinator contacted the McGiverns, who advised the Coordinator that they were en route to Sligo Airport. KCH on-call Transplant Coordinator indicated that she would look forward to seeing them all when they reached KCH. ■ The HSE National Ambulance Service contacted OLCHC to advise that the family were en route and advise provisional timings to be confirmed as follows: that the aircraft would be ready to leave before 23:00 with an hour-and-a-half flying time into London. ■ EMSS contacted its UK air ambulance broker to stand down the RAF request and to confirm transfer arrangements from Heathrow to KCH. ■ The IRCG contacted the HSE National Ambulance Service to advise that the fax information had not arrived. The HSE National Ambulance Service advised that the fax was about to be sent and requested estimated time of arrival (ETA) in London. The IRCG was unable to provide an ETA. ■ The HSE National Ambulance Service contacted EMSS to arrange road transfer from Heathrow to KCH and to request a copy of the passport details. ■ OLCHC contacted KCH on-call Transplant Coordinator that the patient was en route and that the estimated arrival time in London was 01:30 with an estimated arrival time at KCH of 02:00. ■ The HSE National Ambulance Service again contacted the IRCG requesting estimated time of arrival (ETA) in London. The IRCG was unable to provide an ETA.
22:30 – 22:45	■ The McGiverns were en route to Sligo Airport with a Garda Síochána escort. ■ EMSS contacted the McGiverns requesting details of estimated time of arrival.

Timeline	Activity
22:45 – 23:00	■ The McGiverns arrived at Sligo Airport. ■ The HSE National Ambulance Service contacted the IRCG requesting ETA in London. The IRCG advised that it would be unable to provide an ETA until the helicopter was airborne. ■ KCH on-call Transplant Coordinator contacted the transplant surgeon on-call and advised that the estimated arrival time of the patient to KCH was 02:00. The transplant surgeon was satisfied with these arrangements. The liver retrieval team at KCH was mobilised by the KCH on-call Transplant Coordinator. ■ The HSE National Ambulance Service contacted EMSS to confirm road transfer of the patient from the London airport to KCH. ■ OLCHC contacted the HSE National Ambulance Service for an update. ■ EMSS contacted the McGiverns requesting information in relation to an estimated time of departure (ETD) and an ETA in London.
23:00 – 23:15	■ The McGiverns spoke with the IRCG personnel who advised that: they were finalising their air plans which were that there would be two stop offs for fuel, a drop off in Heathrow with a subsequent road transfer to KCH and an estimated total travel time of four hours. ■ Joe McGivern contacted EMSS to advise of the estimated time of departure (ETD) of 23:30 and ETA in London at 03:30.
23:15 – 23:30	■ EMSS contacted the KCH on-call Transplant Coordinator to advise of travel time of four hours. The KCH on-call Transplant Coordinator asked EMSS to request the family to await confirmation that the timeline was still okay before take off to London. ■ The KCH on-call Transplant Coordinator contacted the KCH transplant surgeon on call to advise of the estimated time of arrival. The KCH transplant surgeon on call decided that this timeline was unsuitable and that the organ should be offered to someone else otherwise it would risk being wasted. ■ EMSS contacted the McGiverns and advised them that the transfer was not to go ahead as KCH required Meadhbh to be there before 02:00.

Timeline	Activity
	Comment: There was no contact made to advise the HSE National Ambulance Service that the mission had been aborted. This is a critical point and without this information the HSE National Ambulance Service was unable to revert to the Air Corps to check the availability of the fixed-wing aircraft.
23:30 - 00:00	■ EMSS contacted the HSE National Ambulance Service and informed it that the transfer did not go ahead because of the four-hour travel time

There have been conflicting and contradictory accounts regarding OLCHC's role in relation to a delay in authorising the booking of a private aircraft on the night of 2 July. The Authority has examined this matter in detail and did not find any evidence to substantiate this. However, a further detailed chronology of this matter is outlined as follows:

- At 20:30, when advised by EMSS that it was unable to source a private aircraft and the HSE National Ambulance Service confirmed that there was no State asset available, the OLCHC Nursing Site Manager contacted its air ambulance provider to book an aircraft.
- At 20:45, OLCHC were advised by its air ambulance provider that it had sourced a jet but was yet to source a crew.
- At 21:30, OLCHC's air ambulance provider confirmed that it had sourced an aircraft and crew from outside of Ireland which was available with an earliest approximate departure time of 23:30 from Ireland. The air ambulance provider confirmed this to the Authority.
- At 21:57 the HSE National Ambulance Service contacted OLCHC to confirm the availability of the IRCG Sligo helicopter.
- At 21:58 OLCHC cancelled the private aircraft. OLCHC's air ambulance provider confirmed to the Authority that OLCHC had booked the aircraft at 20:30 and subsequently cancelled this booking at 21:58 when the IRCG asset became available.

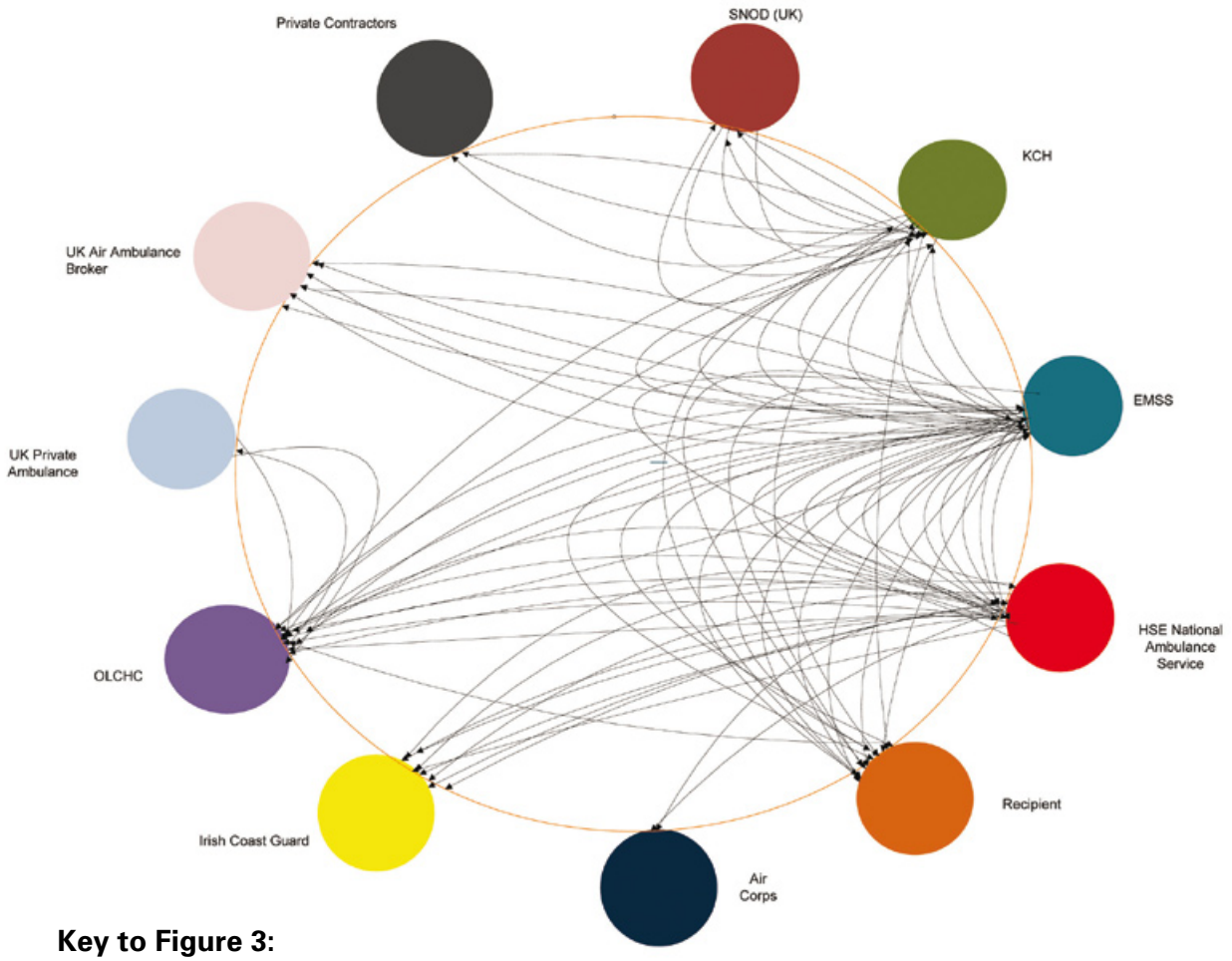
EMSS was unable to source a private air charter. Accordingly, it was reported to the Authority by OLCHC that therefore there was no need for the Nursing Site Manager to authorise an EMSS booking.

In July 2010, OLCHC had authorised Nursing Site Managers to approve the booking of private aircrafts for the transfer of children outside the jurisdiction; this was confirmed in documentation and at interview.

7.3.3 Telephone interactions

The Authority, using a hand-off diagram (Figure 3 below) also mapped the calls made between 19:15 and 23:41 on 2 July 2011, and between the various agencies involved in the attempts to coordinate the transplant arrangements and organise the transfer of Meadhbh from her home in Ballinamore to KCH. Each line in the diagram represents a call between the two respective parties.

Figure 3. Telephone calls made between 19:15 and 23:41 on 2 July 2011 between the various agencies involved in the attempts to coordinate the transport and transfer arrangements



Key to Figure 3:

National Ambulance Service	Air Corp
EMSS	UK Private Ambulance
Specialist Nurse for Organ Donation (SNOD, UK)	Coast Guard
KCH	UK Air Ambulance Broker
Recipient	Private Contractors
OLCHC	

Over that period of time, there were 76 telephone calls noted and demonstrated in Figure 3. This figure excludes further interactions that may have taken place including calls from the KCH Transport Coordinator to the on-call transplant surgeon, internal calls, mobile-to-mobile calls, text exchanges and any unlogged calls. It was clear to the Authority that the people involved in attempting to get Meadhbh to KCH for her transplant on that night entered into desperate means to try to do so. The records show that as time passed there was an intensity of calls, with numerous attempts made by the Nurse Site Managers at OLCHC, the National Ambulance Service's Emergency Medical Controller and EMSS to source air transport for Meadhbh.

7.4 Overall findings of what happened on the night of 2 July 2011

The overall findings detailed in this section in relation to the chronology of events on the night of 2 July 2011 should be taken together with the findings of the pre-existing process that was in place at that time and should have been followed on the night. The findings in relation to the pre-existing process are outlined in Section 6.5.

There were three key pieces of information that were not provided on the night of 2 July 2011, these were the:

- fact that this was a liver from a non-heartbeating donor and therefore meant that the timeframe to transplantation was shorter
- required arrival time at KCH for viable transplant surgery
- provision of the earliest estimated time of arrival of the Sligo Irish Coast Guard helicopter into London at the point at which the Sligo helicopter was deemed to be a viable means of transportation.

Similarly, and in the absence of the key pieces of information as outlined above, there were four critical decisions made during the process that contributed to the failure of the successful transportation of Meadhbh to KCH. These were:

- the decision made at 19:45 for Meadhbh and her family to remain at home in Ballinamore and not to travel to Dublin
- the decision made between 21:45 and 22:00 to cancel the private air charter organised by OLCHC and accept the offer of the IRCG helicopter. (The protocol stated that if a State asset was available in the timeframe required then it must be utilised.) This decision to cancel the private air charter and accept the IRCG helicopter was made based on an assumption that the helicopter travel time from Sligo to London was an hour and a half. This was not a correct assumption.

- at 21:45 the HSE National Ambulance Service did not consider reverting to the Air Corps to check the status of the fixed-wing aircraft. However, this was consistent with the multi-agency SLA which outlined single request steps that were not re-visited once the confirmation that a State asset was not available and therefore a decision not to accept a mission had been made.
- at 23:15, when the four-hour transfer time using the IRCG helicopter was confirmed, there was no contact made to advise the HSE National Ambulance Service. Consequently, the HSE National Ambulance Service was unable to revert to the Air Corps to check the availability of the fixed-wing aircraft. The Air Corps fixed-wing aircraft was in Baldonnel at 22:30. (However, the availability for departure would have been subject to flight planning, weather confirmation, destination aerodrome availability and other planning details being met.)

The absence of knowledge about aeromedical logistics, precise timelines, clear processes with revisit protocols, a single accountable person and agency in charge, multiple communication hand-offs and the lack of effective contingency planning also exacerbated the situation and led to the final outcome.

During the course of the Inquiry, and through interviews with the relevant agencies, it also became apparent to the Authority that the care and transportation arrangements for the aeromedical transportation of patients requiring emergency assistance in the form of an 'air ambulance' resource was not coordinated. This included the coordination of aeronautical and land assets to provide such a service.

As a result of this finding, and by agreement with the relevant agencies involved, the Authority also makes recommendations to improve the quality and safety of patients requiring such assistance through an overall managed and led coordination of the aeronautical and land assets available in the case of an emergency.

8. Improvements made in the arrangements for the transportation of patients requiring transplant surgery outside of Ireland since 2 July 2011

In view of the serious risks that appeared to exist in the arrangements that were present at the time of 2 July 2011, the Authority reviewed the relevant documentation and met with key personnel from the relevant organisations involved. This included the health agencies, EMSS, the Air Corps and Irish Coast Guard. This was with the view to working, as a priority, with these agencies promptly in order to develop an effective and robust operational protocol for such events. As a result of these interactions a number of risks were identified, which the Authority considered required immediate remedial actions to be taken in advance of the Authority finalising its report.

At an inter-agency meeting on 21 July 2011 and during the individual meetings with the relevant agencies, collective agreement was reached on a number of remedial actions. The responsible agencies confirmed to the Authority, prior to the publication of this Report, that these actions had been implemented.

The risks identified and the remedial actions taken are outlined in the following Table 3 and classified under the main headings of a well governed, safe service:

Table 3. Risks identified by the Authority and the remedial actions taken by relevant agencies

8.1 Governance, Leadership and Management

Risks identified	Remedial actions taken since 2 July 2011
1. The roles and responsibilities of those involved in the transfer of care were unclear. OLCHC saw its role for the clinical care of the patient, with limited role in organising transport logistics, which it considered the role of the HSE National Ambulance Service. The HSE considered that its role was as a communication agent between the State agencies, but that responsibility for coordinating transport logistics was with OLCHC.	■ Greater clarity has been attained * ■ Inter-agency engagement in relation to specific areas of responsibility is ongoing.*

Further recommendations in relation to these areas are made in Section 12

Risks identified	Remedial actions taken since 2 July 2011
2. No transport logistics plan existed for potential organ recipients on the transplant list in OLCHC at the time of interviews.	■ A transport logistics plan has been put in place for each patient on the transplant list. This was developed with input from OLCHC, the HSE National Ambulance Service, the Air Corps and the IRCG.
3. Following the cessation of the contract with EMSS, the arrangements for contracting private air transport companies were not clear and neither OLCHC nor the HSE had any formal service level agreement in place at the time of interviews.	■ OLCHC has established a formal written arrangement with two commercial air transport companies, one based in Ireland and one based in the United Kingdom.*
4. Inadequate processes were in place for the transportation of transplant patients.	■ OLCHC has undertaken a review of processes for the transportation of transplant patients.* ■ A number of new documents have been established and/or reviewed and updated by OLCHC which include: – Guidelines for nursing administration staff in relation to patient transport abroad – Guidelines for nursing administration staff in the event of no available assistance of State assets sourced by the HSE – Logistics plan checklist has been developed and a patient information leaflet updated.
5. OLCHC did not have a formalised arrangement for its Nursing Site Managers to access the Hospital's senior management team.	■ OLOCH has implemented an out-of-hours on-call rota for the senior executive. There is now a 24/7 rostered member of the senior management team available to the Nursing Site Manager on duty.

**Further recommendations in relation to these areas are made in Section 12*

8.2 Person-centred care

Risks identified	Remedial actions taken since 2 July 2011
6. There was no transport logistics plan for individual patients on the transplant list in OLCHC communicated to the individual patient and their family.	■ A transport logistics plan has been put in place for each patient on the transplant list. OLCHC has communicated this plan to each patient/family who is at home awaiting transplantation.*

**Further recommendations in relation to these areas are made in Section 12*

8.3 Safe care

Risks identified	Remedial actions taken since 2 July 2011
7. Limited information and lack of appreciation of the competencies required by those involved in coordinating transplant transportations regarding air transport logistics.	■ Briefing documents have been circulated by the Air Corps and Irish Coast Guard to OLCHC and the HSE National Ambulance Service outlining distances and travel times to main United Kingdom airports for each of their respective aircrafts, from specific locations in Ireland.*
8. Use of different terminology across each of the agencies.	■ It was agreed that a 'Priority Level 1 Call' would be the term used by each of the agencies for all transplant calls. A 'Priority Level 1 Call' means that an aircraft must be scrambled within a maximum of 60 minutes. (However, it was agreed that the allocation of an aircraft must be appropriate to the mission.)

**Further recommendations in relation to these areas are made in Section 12*

Risks identified	Remedial actions taken since 2 July 2011
9. The availability of all State assets in real time was not readily accessible to the HSE National Ambulance Service.	■ The Air Corps and the Irish Coast Guard agreed to provide information on State assets availability, travel times, capacity and ranges to the HSE National Ambulance Service by email at 09:00 and 17:00 daily. Any change in the availability of assets is advised immediately to the HSE National Ambulance Service. This is in place on an interim basis and will continue for two months from the publication of this report at which stage a 'live' information management system is to be put in place. *
10. No classification system was in place to categorise the availability of State assets.	■ A classification system has been developed and agreed by each of the agencies with the following descriptor: – **Green** for any aircraft available within 1 hour – **Orange** for any aircraft available within 1 to 4 hours – **Red** for any aircraft available within 5 or more hours. ■ The Air Corps and Irish Coast Guard agreed that they will now advise the Ambulance Control Centre immediately when their availability classification status for their respective assets changes. (However, it was agreed that the allocation of an aircraft must be appropriate to the mission.)

**Further recommendations in relation to these areas are made in Section 12*

Risks identified	Remedial actions taken since 2 July 2011
11.There had been limited consideration as to whether a 'non-heartbeating organ' was a suitable option for all patients on the transplant in Ireland list based on travel logistics.	■ OLCHC and KCH have agreed to meet to discuss whether a 'non-heartbeating liver' would always be a suitable option for each patient on the transplant list given their location and travel logistics, including travel time, without relocation of the patient.*
12. There had been limited consideration as to the appropriateness of the use of commercial airlines in such circumstances.	■ Agreement was reached by all agencies that commercial airlines should not be used for the transfer of patients requiring transplant surgery.

**Further recommendations in relation to these areas are made in Section 12*

8.4 Information Management

Risks identified	Remedial actions taken since 2 July 2011
13. The timeline for the HSE National Ambulance Service to revert back to OLCHC regarding the availability of State assets was variable.	■ Agreement was reached that the Ambulance Control Centre would revert back to advise OLCHC of the availability of State assets within 15 minutes of the time of the initial call from OLCHC (in accordance with the SLA).*

**Further recommendations in relation to these areas are made in Section 12*

Risks identified	Remedial actions taken since 2 July 2011
14. Inadequate communication of travel time information.	■ It was agreed that the Air Corps and Irish Coast Guard would provide the HSE National Ambulance Service a minimum estimate of the expected time of departure, travel time and time of arrival on request for all potential transfers. ■ Briefing documents circulated by the Air Corps and Irish Coast Guard to OLCHC and the HSE National Ambulance Service outlining distances and travel times to main United Kingdom airports for each of their respective aircrafts, from specific locations in Ireland.
15. Limited and inadequate understanding and communication of critical time information for a 'non-heartbeating organ' transplant.	■ KCH agreed to review whether the use of non-heartbeating donor livers is always suitable for patients who have a long distance to travel. ■ KCH to advise OLCHC if a non-heartbeating donor liver is being offered and to stipulate the required arrival time for the patient to arrive at KCH for a viable transplantation. ■ Relevant staff at OLCHC, have been briefed on the different timelines for a non-heartbeating versus a 'heartbeating' organ.* ■ OLCHC has developed Guidelines for Nursing Administration in relation to transport abroad which clearly states that 'Time limitations are made known to Nursing Administration'. ■ OLCHC have engaged with KCH in discussions in order to establish sustainable arrangements.*

**Further recommendations in relation to these areas are made in Section 12*

Risks identified	Remedial actions taken since 2 July 2011
16. There was ambiguity as to whether a medical escort for patients living at home who require to be transported by the Air Corps is required.	■ The Air Corps has advised OLCHC that a medical escort is not routinely required for patients being transferred from home, once OLCHC considers the patient is well and being accompanied by a parent / guardian as part of their pre-planned assessment care plan.*

**Further recommendations in relation to these areas are made in Section 12*

9. New process for the transportation of children requiring transplant surgery outside of Ireland

The inter-agency and individual meetings have informed a new high-level process (see Figure 4 on the next page) for the transfer of children from home to KCH for liver transplantation. This process incorporates the Authority's recommendations that the National Aeromedical Coordination Centre within the HSE National Ambulance Control Centre becomes the single point of accountability for coordinating all types of aeromedical assistance for patients requiring transportation for transplant surgery outside of Ireland (see also Section 10).

The key steps in the process are that:

- every patient has a pre-planned patient transport logistics plan in place
- the required arrival time in KCH is stipulated by KCH at the initial contact
- the patient is requested to make progress to a pre-determined designated pick-up point when a donor organ is confirmed
- the coordination and securing of **all** land and air assets is undertaken by the National Aeromedical Coordination Centre by suitably skilled individuals with a full understanding of land and air travel times for various assets
- there is ongoing review and revisiting by the National Aeromedical Coordination Centre of any change in availability of State assets during the event and also of private charter assets if required.

It was agreed by the relevant agencies that this process would be implemented within two months of the publication of this Report. The process needs to be continually evaluated and reviewed to ensure the effective safe transfer of children to KCH for liver transplantation.

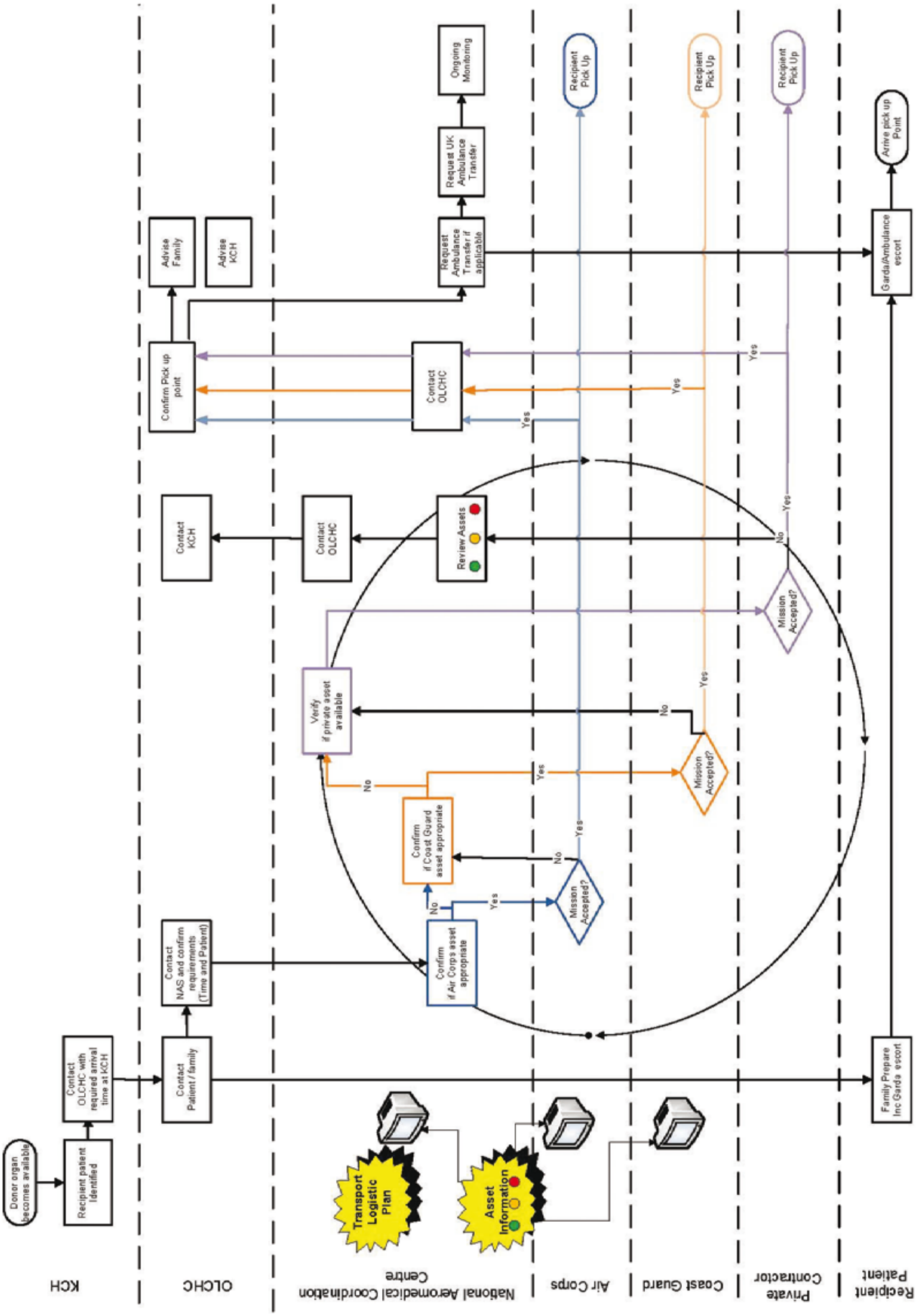


Figure 4. New high-level process for transfer and transport for children at home to KCH for liver transportation. Process: recipient patient identified - arrival at departure point

10. Conclusions

These conclusions are in two parts, firstly the summary of findings in relation to the circumstances that led to the failed transportation of Meadhbh McGivern for a liver transplant and secondly the findings in relation to the existing inter-agency arrangements in place to support such transfer of care and transportation.

10.1 Summary of findings in relation to the circumstances that led to the failed transportation of Meadhbh McGivern for a liver transplant

The night of 2 July 2011 resulted in a devastating outcome for Meadhbh – a failed transportation for a liver transplant. It was clear from the findings of the Authority's Inquiry that the people involved in attempting to get Meadhbh to King's College Hospital, London, for her transplant on that night entered into desperate means to try to do so. However, this was in the absence of any organised processes or managed system, or the requisite knowledge of logistics to adequately do so. It is at times of extreme challenge that a process is really tested and any weaknesses in the process will be exposed, and may result in a much higher risk of an unsuccessful outcome to the process – this is what happened to Meadhbh on the night of 2 July 2011.

In relation to the process, there was no evidence that checklists were developed, considered or used for minimising error and optimising patient safety and outcomes. Each organisation involved in this process relied on the individual experience of the people involved in a process that was inherently risky and logistically challenging because of its complexity and the consequences for patients if it went wrong. Consequently, the system was not designed to be reliable.

There were three key pieces of information that were not provided on the night, these were the:

- fact that this was a liver from a non-heartbeating donor and therefore meant that the timeframe to transplantation was shorter
- required arrival time at KCH for viable transplant surgery
- provision of the earliest estimated time of arrival of the Sligo Irish Coast Guard helicopter into London at the point at which the Sligo helicopter was deemed to be a viable means of transportation.

Similarly, and in the absence of the key pieces of information as outlined above, there were four critical decisions made during the process that contributed to the failure of the successful transportation of Meadhbh to KCH. These were:

- the decision made at 19:45 for Meadhbh and her family to remain at home in Ballinamore and not to travel to Dublin

- the decision made between 21:45 and 22:00 to cancel the private air charter organised by OLCHC and accept the offer of the IRCG helicopter. (The protocol stated that if a State asset was available in the timeframe required then it must be utilised.) This decision to cancel the private air charter and accept the IRCG helicopter was made based on an assumption that the helicopter travel time from Sligo to London was an hour and a half. This was not a correct assumption.
- at 21:45 the HSE National Ambulance Service did not consider reverting to the Air Corps to check the status of the fixed-wing aircraft. However, this was consistent with the multi-agency SLA which outlined single request steps that were not re-visited once the confirmation that a State asset was not available and therefore a decision not to accept a mission had been made.
- at 23:15, when the four-hour transfer time using the IRCG helicopter was confirmed, there was no contact made to advise the HSE National Ambulance Service. Consequently, the HSE National Ambulance Service was unable to revert to the Air Corps to check the availability of the fixed wing aircraft. The Air Corps fixed-wing aircraft was in Baldonnel at 22:30. (However, the availability for departure would have been subject to flight planning, weather confirmation, destination aerodrome availability and other planning details being met.)

The absence of knowledge about aeromedical logistics, precise timelines, clear processes with revisit protocols, a single accountable person and agency in charge, multiple communication handoffs and the lack of effective contingency plans exacerbated the situation and led to the final outcome.

Consequently, up to and including the night of 2 July 2011, the single point of responsibility, accountability and oversight to ensure robust and effective governance, planning and coordination of the arrangements for people requiring care and transportation for transplant surgery outside of Ireland was absent.

Concluding remarks in relation to the circumstances that led to the failed transportation of Meadhbh McGivern for a liver transplant

The overriding finding on the night of 2 July 2011 that contributed to Meadhbh's failed transportation, was that no one person or agency was in charge or accountable for the overall process of care and transportation. This resulted in the absence of a single, managed or cohesive approach to a complex logistical process.

It is impossible to predict what might have happened for Meadhbh on the night if the key pieces of information had been provided, if Meadhbh had made progress towards Dublin and if the National Ambulance Service had become aware that a fixed-wing aircraft was in Baldonnel at 22:30. However, the culmination of

these factors meant that, on 2 July, any opportunities for the successful transfer of Meadhbh were greatly diminished as time passed.

It is imperative that we learn from Meadhbh's experience and put in place the actions that we need to as a State, together with our colleagues in King's College Hospital, London, in order to reduce the likelihood of such an incident, where a patient transportation is feasible, from occurring again. All of the agencies involved on the night have already made changes to improve the process prior to the publication of this report.

10.2 Findings in relation to the existing inter-agency arrangements in place to support the transfer of care and transportation.

Organ donation and transplantation have seen tremendous success in Ireland over the years and for many patients transplantation is now the treatment of choice for end-stage organ failure. Transplantation adds years of life as well as quality of life to patients who receive organs.[1]

Treatment Abroad Scheme

The Authority found that there was no evidence of the overall governance of the Treatment Abroad Scheme service model including the transport and transfer arrangements for patients. The decision to treat a child abroad, that is following referral of the child to KCH, London for assessment and transplantation, is in line with the service model. The overly administrative focus on the funding and reimbursement of travel and transport diverted attention from the safe and timely transfer of care for these children. There was no information provided to the Authority that indicated that the HSE had evaluated the broader welfare, psychosocial and financial impacts of needs associated with this model of care or put in place structures or processes to provide the necessary supports to patients and their families.

Transfer and transport of patients

Time is of the essence when transferring and transporting any patients to transplant centres for transplant surgery. However, when donor livers are from non-heartbeating donor, there is a shorter window before transplantation. It is therefore critical that careful logistical pre-planning for patient transfers and transport is carried out and that this information is available to those coordinating and managing patient transfers in these circumstances. When a donor becomes available and a patient requires urgent transport for transplant surgery outside of the jurisdiction then the most appropriate available asset to transport the patient within the required timeframe should be deployed.

Careful consideration is given by some transplant teams when making decisions

about the allocation of non-heartbeating donor livers to potential patients who live more than three hours' travel time for the hospital where the transplantation will take place. However, the use of non-heartbeating donor livers is increasing and, as KCH has advised the Authority, a decision to not offer these organs to patients with greater distances to travel could result in much longer waits for these patients and may also result in some available organs not being utilised. It is therefore fundamental that this information must be provided to parents and patients to ensure that they can consider the implications, contribute to decisions at an early stage of transplant planning and make informed decisions in relation to possible relocation.

National Aeromedical Coordination

At the time of the Inquiry, the aeromedical resources in Ireland were provided by a combination of State and private providers. However, these providers are subject to other priorities and contractual obligations and therefore the availability of their assets is not guaranteed at any given time.

During the Inquiry, additional findings in relation to the overall coordination of aeromedical assistance for emergency patients were also identified as requiring significant improvement, and the recommendations made by the Authority have taken this into account through the establishment of a *National Aeromedical Coordination Centre*. This should be established and managed by the HSE, with suitably qualified and experienced staff in transport logistics 24 hours a day, in a National Ambulance Control Centre. The HSE, through this Centre, will become the single point of accountability in care and logistics for such patients. It will work closely and in collaboration with the Air Corps and Irish Coast Guard, and other service providers, in coordinating all types of aeromedical assistance for patients requiring care and transportation for transplant surgery outside of Ireland, such as Meadhbh, and for all emergency patients requiring aeromedical assistance.

In order to ensure that the governance and arrangements of the process for patients requiring transportation for transplant surgery, and all patients requiring aeromedical assistance in an emergency situation, are robust, effective and subject to ongoing monitoring and review, the Authority proposes that the HSE should establish a National Aeromedical Coordination Group. The Group should be comprised of the main agencies and providers involved in aeromedical patient transportation for transplant surgery and emergency patient episodes, and include a service-user representative. The Group should meet within four weeks of the publication of this report and should, as a minimum, meet every two months for the first year, develop, audit and monitor a series of key performance indicators for the provision of aeromedical and land logistics for patients, undertake root cause analyses of adverse events and near misses and continually review the quality and safety of the provision of the national aeromedical service for Ireland.

Concluding remarks

The provision of an optimum aeromedical service for Ireland, coordinated by a central accountable agency with the requisite aeromedical logistics skills – in the form of the National Aeromedical Coordination Centre in the HSE, and with the full collaboration and assistance from the respective State agencies, other providers and Government Departments, is imperative for patients like Meadhbh and for people who require emergency aeromedical assistance on a daily basis.

The Authority, with input from the relevant agencies, has made 17 recommendations that not only address the required improvements that were identified by this Inquiry as a result of the review of the circumstances that led to the failed transportation of Meadhbh McGivern on 2 July 2011, but also recommend a series of actions that, when implemented, the Authority believes will put in place the necessary means to coordinate an optimum aeromedical service for Ireland. This includes the establishment of a National Aeromedical Coordination Group that will be a means of integrating the skills and expertise across the State in order to ensure that these changes are sustainable.

The recommendations particularly require the three main State agencies – the HSE, Air Corps and the Irish Coast Guard, and the three Government Departments – Health, Defence and Transport, to continue to work in close collaboration and provide the necessary commitment and leadership to bring about the improvement changes required. The Authority looks forward to continuing to engage with these agencies and monitoring the progress of the implementation of these recommendations as outlined in the Next Steps section.

11. Next Steps

The risks that are identified in Section 8 of this report outline the immediate actions that have been taken by the relevant agencies and service providers to mitigate any risk of the events that happened to Meadhbh recurring in the immediate future.

The establishment of the National Aeromedical Coordination Centre in the HSE National Ambulance Control Centre within two months of the publication of this report, by establishing a single point of accountability for the process with the requisite skills sets and competencies in aeromedical logistics 24 hours day, will be a key enabler to improving the overall quality, safety and reliability of the process for children and adults requiring care and transportation for transplant surgery outside of Ireland, when transport is feasible, and for all patients requiring emergency aeromedical assistance in Ireland.

The National Aeromedical Coordination Centre, as part of the HSE's National Ambulance Service, will be required to be compliant with the Authority's National Standards for Safer Better Healthcare when mandated by the Minister for Health and, in the future, may be subject to licensing of the service by the Authority as part of the National Ambulance Service provision.

The recommendations made in the Inquiry will need to be considered and implemented by the respective government agencies – including the Departments of Health, Transport and Defence, the HSE, OLCHC and other relevant service providers in Ireland and King's College Hospital, NHS Foundation Trust.

Given the need to provide high quality and safe services for our patients in Ireland, the Authority requests that each relevant agency and provider develops an implementation plan for these recommendations and recommends that the HSE should coordinate an overall National Implementation Plan for the recommendations within one month, which is signed off by the Authority. Progress made against its implementation should be monitored by the National Aeromedical Coordination Group and periodic updates should be provided to the Minister for Health and the Authority and also made publicly available.

12. Recommendations

The following are the recommendations arising from the Inquiry.

Governance

G1 The HSE should, as a priority, review the governance and systems in place for the funding of travel and transport arrangements for treatment abroad including the welfare, psychosocial and financial needs and supports for the patient and their families and implement the findings.

G2 In advance of the findings of the review (G1) the HSE should put in place clear governance arrangements to ensure the pre-authorised and emergency funding of transport and travel arrangements for treatments not available in Ireland. Appropriate support arrangements should be put in place for families which also consider welfare and social support requirements.

G3 The HSE should ensure that service level agreements are in place with all providers, State and private, for the provision of aeromedical services. These agreements must be revised to clearly stipulate the roles and responsibilities of each party and take into account the recommendations of this Report.

G4 The HSE should establish a National Aeromedical Coordination Centre within the National Ambulance Service, with the support of the Air Corps and Irish Coast Guard, within the next two months. The Centre should be accountable for the implementation of the agreed process as outlined in Figure 4 and the overall coordination of land and air logistics (including all State assets and private charters) for patients requiring transportation outside of Ireland for transplant surgery (including the logistics plans for each patient) and also for patients requiring emergency aeromedical transportation within and outside of Ireland. This should be provided on a 24-hour basis with the appropriately skilled staff trained in aeromedical logistics.

G5 In advance of the establishment of the National Aeromedical Coordination Centre, the HSE should liaise with all of the respective providers to plan for the implementation of the new agreed process as outlined in Figure 4.

G6 As part of the National Aeromedical Coordination Centre, the HSE should establish a 'live' information management system which interfaces with each State provider of aeromedical assets. This system should provide real time information in relation to the availability of each asset. The accountability and management of this system should rest with the National Aeromedical Coordination Centre with support and input from the Air Corps, Irish Coast Guard and any other relevant service provider.

G7 The HSE should establish a National Aeromedical Coordination Group with the relevant State agencies and service providers. This Group should oversee and evaluate the implementation of the agreed process (Figure 4) to ensure its effectiveness on an ongoing basis. It should develop, audit and monitor a series of key performance indicators for the provision of aeromedical and land logistics for patients, review the effectiveness of the information management systems, undertake root cause analyses of adverse events and continually review the quality and safety of the provision of the service. This Group should meet within four weeks from the publication of this report and then at a minimum every two months for the first year.

G8 The National Aeromedical Coordination Group, together with the relevant Government departments, should undertake a review of the aeromedical assets in Ireland, including the consideration of an additional dedicated resource.

G9 Service providers should ensure that up-to-date transport logistics plans for all patients awaiting organ transplantation are developed in conjunction with the National Aeromedical Coordination Centre and communicated with the relevant parties. These plans should be detailed, flexible, adaptable and subject to regular review and should include a number of travel options for each individual including contingency arrangements and requirements for medical escorts.

G10 The HSE, with the advice of King's College Hospital (KCH), should review the processes in place for the transition of adolescent children on the transplant list to the adult services transplant list in Ireland. The review should include the establishment of an integrated care plan for children to ensure that any risks to such a transition are managed effectively and safely.

G11 The HSE should ensure that there are formalised senior manager on-call arrangements in place at all times for ambulance services including Ambulance Control.

G12 The HSE should coordinate an overall National Implementation Plan for these recommendations, which is signed off by the Authority. Progress made against its implementation should be monitored by the National Aeromedical Coordination Group and periodic updates should be provided to the Minister for Health and the Authority and be made publicly available.

10.2 Person-centred care

PCC1 Service providers should ensure that clear communication processes are put in place for providing parents with information on the specific details of their child's transport logistics plan.

PCC2 The HSE, in conjunction with OLCHC and KCH, should ensure that processes are in place to involve parents of potential liver transplant recipients in discussions regarding the logistical suitability of allocating a 'non-heartbeating' liver to their child. Particularly if the potential recipient is living more than three hours' travel time from the UK hospital where the transplant operation is proposed to be undertaken. This information should be provided to parents and patients to ensure they consider the implications, contribute to the decisions at an early stage of transplant planning and make informed decisions in relation to their possible relocation.

PCC 3 The HSE, in collaboration with OLCHC and KCH, should discuss with the parents/guardians of children who are escalated on to the KCH priority transplant list the consideration of relocation of the patient and their parents/guardians to Dublin or London. If this is deemed to be appropriate, and requested by the parents/guardian, then the HSE should, in conjunction with OLCHC and KCH, facilitate this.

10.3 Safe care

SC1 A checklist, similar to the surgical checklist*, should be developed by all the agencies involved in the transfer and transport process to ensure that the possibility of errors at critical points are reduced or prevented. (This should incorporate mandatory information, including the required time of arrival at KCH.) The implementation of this should be audited for compliance by the National Aeromedical Coordination Group.

SC2 The National Aeromedical Coordination Group should develop an agreed terminology for use by all agencies involved in liver transplant transportation.

** World Health Organization. Surgical Safety Checklist, 2009. Available from: http://whqlibdoc.who.int/publications/2009/9789241598590_eng_Checklist.pdf*

13. References

1. Health Service Executive. *Audit of Potential Organ Donors Republic of Ireland 2009*. Dublin: Health Service Executive; 2009.

2. Devlin J, O'Grady J. *Indications for referral and assessment in adult liver transplantation: a clinical guideline*. London: British Society of Gastroenterology; 2000.

3. Otte JB. History of paediatric liver transplantation. Where are we coming from? Where do we stand? *Paediatric Transplant 2002* Oct;6(5):378-87.

4. Ridley S, Bonner S, Bray K, Falvey S, Mackay J, Manara A & The Intensive Care Society's Working Group on Organ and Tissue Donation. UK guidance for non-heartbeating donation. *British Journal of Anaesthesia.* 2005;95(5):pp.592-5.

5. Medical Royal Colleges. A code of practice for the diagnosis and confirmation of death, Academy of October 2008.

6. Pomfret E, Fryer J, Sima S, Lake J, Merion R. Liver and Intestine Transplantation in the United States, 1996-2005. *American Journal of Transplantation*. 2007;7(5):1376-1389.

7. Stahl J, Kreke J, Malek F, Schaefer A. Consequences of Cold-Ischemia Time on primary Nonfunction and patient and Graft survival in Liver Transplantation: A Meta-analysis. PLoS One. 2008;3(6).

8. Steinbrook R. Organ Donation after Cardiac Death. *The New England Journal of Medicine*. 2007; July 19th.

9. The UK Transplant Unit. UK Transplant Sharing Scheme Operating Procedures for Liver Transplant Units in the UK and Republic of Ireland. Ist Published 1999, Revised 2007.

10. Department of Health. Legal issues relevant to non-heartbeating organ donation. London: Department of Health; 2009.

11. Ridley S, Bonner S, Bray K, Falvey S, Mackay J, Manara A & The Intensive Care Society's Working Group on Organ and Tissue Donation. UK guidance for non-heartbeating donation. *British Journal of Anaesthesia*. 2005;95(5):pp.592-5.

12. St Vincent's University Hospital. *Liver Transplant Unit*. Available from: http://www.stvincents.ie/Departments/Liver_Transplant_Unit/Transplantation.htm. Accessed: 26 July 2011.

13. St Vincent's University Hospital. *Annual review 2008*. Available from: http://www.stvincents.ie/dynamic/File/AnnualReview2008.pdf. Accessed: 26 July 2011.

14. Dáil Eireann. Volume 472. Written Answers – Paediatric Liver Transplant Programme. 4 December 1996.

15. National Health Services Blood and Liver Transplant Advisory Group. *Protocols*

and Guidelines for Adults Undergoing Deceased Donor Liver Transplantations in the UK, London: NHS Blood and Transplant; 2009.

16. Council Regulation (EC) No 1408/71. On the application of social security schemes to employed persons, self employed persons and to members of their families moving within the Community. (8) (9) (10) (11) June 1971.

17. Council Regulation (EEC) No 574/72. Fixing the procedure for implementing Regulation (EEC) No 1408/71 on the application of social security schemes to employed persons and their families moving within the community. 21 March 1972.

18. Health Service Executive. About E112. *Receiving healthcare outside of the Republic of Ireland* [Online]. Available from: http://www.hse.ie/eng/services/Find_a_Service/entitlements/E112/E112%20information.html

19. King's College Hospital, NHS Trust Foundation. *Liver Transplantation, General Information, What we do* [Online]. Available from: www.kch.nhs.uk/service/a-z/liver-transplant.

14. Glossary of terms and abbreviations

Accountability: accountability is demonstrated by the service provider accepting responsibility for their decisions and behaviours as a service provider and for the consequences for service users, families and carers

Air ambulance: an aircraft used for emergency medical assistance

Air Corps: is the air component of the Irish Defence Forces, who provide support to the Army and Naval Service together with non-military air services

Bilary Atresia: congenital condition in which the common bile duct between the liver and small intestines is blocked or absent

CEO: Chief Executive Officer

Chronic liver disease: is a disease process of the liver that involves a process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis

Consultant: a consultant is a registered medical practitioner in hospital practice who, by reason of his/her training, skill and experience in a designated specialty, is consulted by other registered medical practitioners and undertakes full clinical responsibility for patients in his/her care, or that aspect of care on which he or she has been consulted, without supervision in professional matters by any other person. Consultants include surgeons, physicians, anesthetists, pathologists, radiologists, oncologists and others

E112 form: application form for the HSE's Treatment Abroad Scheme

EMSS: Emergency Medical Support Services

End organ damage: of or relating to an organ (such as the liver or kidney) that is ultimately affected by chronic or progressive disease

Evidence-based practice: practice which incorporates the use of best available and appropriate evidence arising from research and other sources

Gastroenterology: a branch of medicine concerned with the structures, diseases and pathology of the stomach and intestines

GP: General practitioner

Governance: the function of determining the organisation's direction, setting objectives and developing policy to guide the organisation in achieving its objectives and stated purpose

Heartbeating livers: are livers donated from patients who have been certified dead after brainstem testing[4]

Hepatobilary: refers to the liver, gall bladder and or bile ducts

HSE: Health Service Executive

Immunocompromised: following transplant surgery patients are susceptible to bacterial, fungal, and viral infections that healthy immune systems usually conquer.

Integrated care: coordinated care delivered by combining various different types of health services in a coordinated and seamless manner

Irish Coast Guard: is part of the Department of Transport and has a number of responsibilities including search and rescue

KCH: King's College Hospital

Key performance indicator(KPI): a specific and measurable element of practice that can be used to assess the quality of care

Liver: a large lobed glandular organ located in the right portion of the abdominal cavity. It has a wide range of functions, including detoxification, protein synthesis and production of biochemical's necessary for digestion

Liver transplantation: is the replacement of a diseased liver with a healthy liver allograft

Neuro-development impairment: is an impairment of the growth and development of the brain or central nervous system

Non-heartbeating livers: livers donated by patients when death has been established following irreversible cessation of the heart (that is, following cardio-respiratory arrest) and further active treatment for these patients is futile.[5]

OLCHC: Our Lady's Children Hospital, Crumlin, a paediatric hospital in Dublin

On call: someone working outside of the core working hours (9am to 5pm, Monday to Friday)

Organ donation: is the donation of a biological tissue or an organ of the human body from a living or dead person to a living recipient in need of a transplantation

Organ transplantation: an operation moving an organ from one organism (the donor) to another (the recipient)

Paediatric: of or relating o the medical care of children

Service level agreement (SLA): is part of a service agreement or contract where the level of service is formally defined

SNOD: Specialist Nurse for Organ Donation

Terms of reference: a set of terms that describe the purpose and structure of a project, committee or meeting

The Authority: the Health Information and Quality Authority.

Appendices

Appendix 1
Desired outcomes of inquiry

The parents of Meadhbh, Joe and Assumpta McGivern, outlined their desired outcomes of the inquiry as follows

Not to assign blame to any person or persons.
To identify inefficiencies, duplication of processes and inappropriate use of resources with remedial actions taken.
Coordinated safe system for any adult and or child awaiting transplantation with clear processes.
For a set of measures, protocols and plans to be put in place for them and any other families in similar positions, which would ensure that the same scenario would not happen again.
Transport protocols to include determination of timelines and descriptor of all arrangement which should be in place. This should then be clearly communicated to all involved in transport and care of transplant recipient.
A written protocol and detailed algorithm or flow chart of transport arrangements to be provided to families.
A central care and transport coordinator to be put in place.
An individual care plan to be put in place, with details of each individual's own specific travel plan with transplant details especially for those families who don't have easy access to airport, etc.
Support and reassurance from someone with a clinical background to be point of contact for transport arrangements.
Promotion of need for organ donations.
Financial and other support for transplant patients and their families who travel to the UK for treatment.
Review of support and transport home arrangements for patients who travel to the UK for treatment.

Appendix 2
HSE National Ambulance Service
Patient Transplant Transportation Protocol

HSE
NATIONAL AMBULANCE SERVICE

Patient Transplant Transportation Protocol

Priority One Category Patients

June 2010.

AMBULANCE CONTROL

Transplant Patient SOP

This air ambulance transport protocol sets out the process for accessing air ambulance services from the Irish Air Corps and the Irish Coast Guard Service through HSE Ambulance Control. While this protocol specifically refers to transplant patients it is equally the protocol for accessing air ambulance for all other patients who may require air ambulance transport.

N.B. In cases where HSE Ambulance Control confirm to the Irish Hospital Contact Person that neither the Irish Air Corps nor the Irish Coast Guard Service are available for a specific call, it then becomes the responsibility of the Irish Hospital Contact Person to organise alternative air ambulance transport.

1. A small number of Adult and Paediatric transplant patient are currently resident within the community. These patients are time critical once the transplant process has been activated. Upon placement on the transplant list patients and/or a responsible relative/guardian will provide details of their home address and family passport numbers to Ambulance Control, Townsend St, the Irish Air Corps (IAC) and the Irish Coast Guard Service (ICGS) who will maintain a record of these patients' home addresses and family passport numbers.

2. The transplant process will be initiated from a Hospital within the UK. The UK Hospital will inform both the Irish Hospital's Transplant Co-ordinator (or nominated contact person) and the Patient. The Irish Hospital's Transplant Co-ordinator (or nominated contact person) will contact Ambulance Control at tel: 01 6709111.

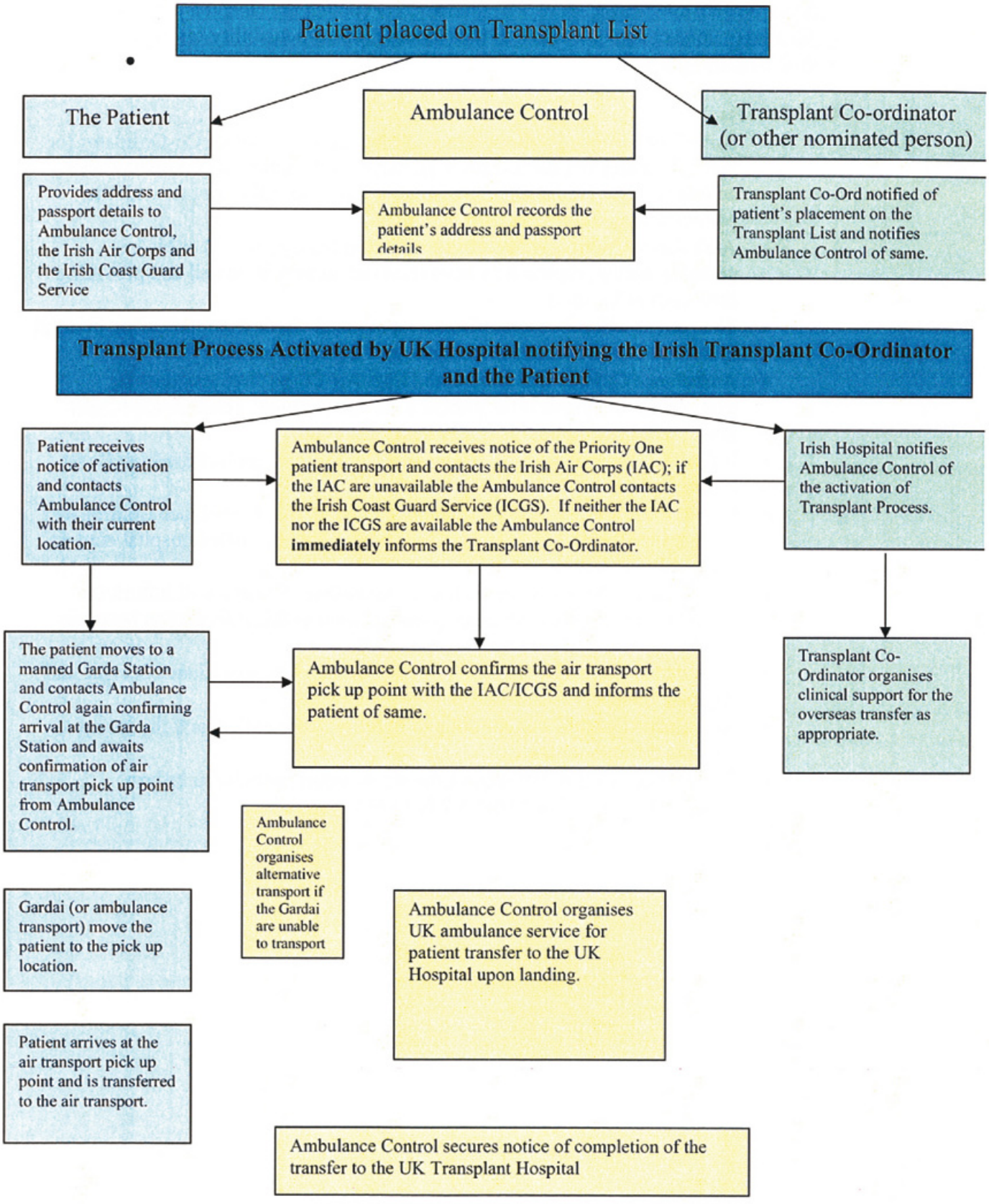
3. When Ambulance Control receives notice of the call, the Emergency Medical Controller (EMC) booking the Air Ambulance will contact the air transport provider specifying that this is a **PRIORITY ONE** Patient.

4. Should the Irish Air Corps be unavailable, the EMC will then contact the Irish Coast Guard Service (01 6620922) immediately. Should both these emergency air transport

services be unavailable, the EMC will immediately contact the Hospital's Transplant Co-ordinator (or contact person) who will then assume full responsibility for organising alternate air transport.

Call Process:

- Ambulance Control will receive a call from the Transplant Co-Ordinator (or nominated hospital contact person), that the transplant procedure has been activated. The Transplant Co-Ordinator will also make contact with the patient and/or his/her parent or guardian.
- Ambulance Control will receive a call from the patient and or his/her parent/guardian, stating they have received an activation call and providing their current location.
- The patient will move towards nearest manned Garda Station bearing in mind that some Garda Stations are not manned 24 hours per day.
- Ambulance Control will contact the Irish Air Corps (IAC) requesting availability and provide the patient's current location. The IAC (or ICGS) must be informed that this is a **Priority One** call.
- If the IAC are unavailable, Ambulance Control will contact the Irish Coast Guard Service.
- If both these air transport providers are unavailable, Ambulance Control will contact the Hospital Transplant Co-ordinator (or nominated hospital contact person) immediately.
- If the IAC or the ICGS are available, Ambulance Control will inform the patient of aircraft transportation point, as soon as this information becomes available.
- Ambulance Control will contact the appropriate UK Ambulance Service and organise transport from the airport to the hospital.
- Ambulance Control will continue to liaise with the patient and the transport services throughout the call.
- Ambulance Control will request the air transport provider to inform Ambulance Control once the call has been completed.



Ambulance Control : Tel 01 670 9111 Hospital Transplant Co-Ordinator : Tel _____

PATIENT ACTION CARD

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Upon Activation Call from Hospital

- Contact Ambulance Control and provide current location [**01 6709111**]
- Provide Ambulance Control with Names and Passport numbers of those travelling
- Move to nearest manned Garda Station and dvise Ambulance Control of same
- Ambulance Control will call patient as soon as Aircraft Transportation Point has been arranged
- Upon receipt of call confirming Aircraft Transportation Point, An Garda Siochana will transport patient and family member to that location
- If An Garda Siochana are unavailable, Ambulance Control will organise alternative transport and will inform patient

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

PATIENT ACTION CARD

Published by the Health Information and Quality Authority

For further information please contact:

Health Information and Quality Authority
George's Court
George's Lane
Dublin 7

Phone: +353 (0)1 814 7400
Email: info@hiqa.ie
URL: www.hiqa.ie