

Why you should read this article:

- To recognise the challenges involved in transporting children and neonates across large geographical distances
- To learn about the development of a nurse-led transport team and non-critical children's transport nurse role
- To understand the potential advantages of the transport nurse role and similar nurse-led services

Development of a nurse-led transport service for non-critical neonates and children in Northern Ireland

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Abstract

While the transport and retrieval of critically ill children has been extensively researched and audited, nurse-led repatriation and retrieval of non-critical children and neonates has only recently become a full-time nursing position in Northern Ireland. In January 2020, the Northern Ireland Specialist Transport and Retrieval (NISTAR) service developed a nurse-led transport team for this patient population and created a new role – the non-critical paediatric transport nurse – which incorporates the skills of a children's nurse.

The aim of the service is to transport children and neonates safely between the regional paediatric unit and local district general hospital paediatric wards in Northern Ireland. The nurse-led service also transfers children with non-critical complex cardiac conditions between paediatric wards in Northern Ireland and the national centre for paediatric cardiology and cardiothoracic surgery in Dublin, Ireland. This article describes the role of the nurse-led transport team and discusses clinical governance, training requirements and the safe transfer of children with complex cardiac conditions. The NISTAR team won the child health category at the 2021 RCN Nursing Awards.

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Keywords

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THE NORTHERN Ireland Specialist Transport and Retrieval (NISTAR) service has well-established nursing and medical teams for the transfer of critically ill adults, children and neonates. Transporting critically ill children has been extensively researched and audited, particularly by the Paediatric Intensive Care Audit Network (2021). However, the transport and retrieval of non-critical children (those aged up to 16 years) and neonates (those aged 0-4 weeks) (Glasper et al 2015) between a regional hospital and district general hospitals has only recently become a full-time nursing position in Northern Ireland.

In January 2020, NISTAR developed a nurse-led transport team for non-critical

children and neonates which incorporates the skills of a children's nurse into a new role – the non-critical paediatric transport nurse. Since there are a limited number of high-level critical care paediatric cots and beds in Northern Ireland, children who no longer require such care should be transferred closer to home where their medical treatment and nursing care can continue. The nurse-led transport team was set up to facilitate the safe transfer of these patients and is available for all neonatal and paediatric units and wards in Northern Ireland. The team also transports children between the Royal Belfast Hospital for Sick Children, which is the only regional paediatric service for Northern Ireland, and the specialist

paediatric cardiology centre for the island of Ireland in Dublin.

The team's nursing staff are employed through the Belfast Health and Social Care Trust and work with dedicated ambulance care attendants from the Northern Ireland Ambulance Service who manage and maintain three emergency ambulances provided solely for the NISTAR service. This means that NISTAR can undertake multiple transfers at one time.

The nurse-led transport team consists of three children's nurses who are trained in the safe transfer, assessment and treatment of children and neonates, one paediatric transport coordinator and one lead nurse, alongside the medical lead and service manager. The roles and responsibilities of the nurse-led transport team nurses are multifaceted as they care for patients with a range of medical, surgical and mental health needs.

Referrals to NISTAR are directed to the organisation's call handler through a specific point of contact telephone number and forwarded to the appropriate team. The NISTAR service's transport paediatric consultant is available for advice and support if a patient does not meet either nurse-led or critical care transport criteria. To NISTAR's knowledge there is no other nurse-led paediatric transport team in the UK or Ireland.

This article describes the role of the nurse-led transport team and discusses clinical governance, training requirements and the safe transfer of children with complex cardiac conditions.

Service development

At the time of writing, there were 12 critical care beds in the paediatric intensive care unit (PICU) in the Royal Belfast Hospital for Sick Children serving the hospital's general and specialist wards and six district general hospital paediatric wards. The nurse-led transport team is responsible for transferring non-critical children and neonates between these hospitals. The team also works alongside the All-Island Congenital Heart Disease Network to provide transport for children post-cardiac surgery from Children's Health Ireland, which is situated in Dublin, to the specialist cardiology ward at the Royal Belfast Hospital for Sick Children for rehabilitation under supervision of the child's consultant and with familiar nursing and medical staff. The All-Island Congenital Heart Disease Network was established in 2015 to provide a single paediatric cardiology service across Ireland, while Children's Health Ireland is an acute

paediatric teaching hospital in Dublin which includes the national centre for paediatric cardiology and cardiothoracic surgery.

Patients who no longer require critical care at Children's Health Ireland in Dublin or at the Royal Belfast Hospital for Sick Children can be transported to their local district general hospitals by the nurse-led transport team to continue their treatment and recovery closer to home.

Critical care transport has developed rapidly over the last two decades following the Bridge to the Future (Department of Health 1997) report which emphasised the importance of specifically trained medical and nursing retrieval teams working with PICUs. Building on this report, Neill and Hughes (2004) established a benchmarking group in Northern Ireland to improve standards of practice and care of children during transfers, as there was no dedicated paediatric transport team in Northern Ireland at that time. This led to the development and implementation of the Northern Ireland Paediatric Transfer Form (Neill and Hughes 2004) which aimed to encourage transport staff to focus on the essential information required for safe transfer of children. This form is still widely used for non-critical transport.

Nurses must keep clear and accurate records relevant to their practice (Nursing and Midwifery Council (NMC) 2018). Effective clinical nursing documentation enhances continuity of care and aids communication between transferring and accepting wards (Mathioudakis et al 2016). At the start of the new NISTAR nurse-led service, the transport coordinator and nursing team developed a nurse-led transport-specific transfer form in a checklist format to aid the transfer of information and avoid miscommunication. The form includes space for a patient summary and a record of investigations and clinical observations to ensure all details are handed over to the receiving hospital or ward in a structured, efficient manner (Harvey et al 2020).

Before the implementation of the nurse-led transport team, children were transported by the ward nurse allocated to their care and a Northern Ireland Ambulance Service paramedic team. This often led to anxiety among nurses about the responsibility of caring for a potentially sick child outside the ward environment, particularly for those with little or no experience of the complications associated with transporting such children (Alamanou and Brokalaki 2014). In the author's experience, there were also issues

Key points

- The Northern Ireland Specialist Transport and Retrieval (NISTAR) service has developed a nurse-led transport team for non-critical children and neonates and created the role of the non-critical paediatric transport nurse
- The nurse-led transport team facilitates the safe transfer of non-critical children and neonates between all neonatal and paediatric units/wards in Northern Ireland
- The role of the non-critical paediatric transport nurse is to assess patients, plan safe transfers, implement nursing interventions and evaluate outcomes while in transit
- Advantages of the NISTAR nurse-led transport team include smooth transition for patients, reduced risk to patients during transfer and reduced demands on ward staff

about the lack of training for nurses in transporting sick children, particularly the use of transport equipment. For example, the 'baby pod' – a device designed for the safe transport of sick infants – requires straps to secure it to a transport trolley and straps for the patient. At times these were not immediately available and looking for alternative solutions took the nurse away from the patient and distracted other staff who wanted to assist. In addition, the author found that reliance on the ambulance crew to record patients' vital signs and complete documentation during transfer meant the nurse acted as more of a chaperone than a clinician, which diminished the nursing role.

In contrast, it is common practice in parts of Europe for nurses to lead patient care in ambulances. For example, in Sweden since 2005 an ambulance team consists of one emergency medical technician and one registered or specialist nurse who has undergone further education in pre-hospital emergency care (National Association of Ambulance Nurses and Swedish Nurses' Association 2012). This advancement of nursing practice is becoming familiar in the UK, with some advanced paediatric nurse practitioners leading in critical care retrieval of children (Herring 2010, Stroud et al 2013). Much can be learned from the Swedish experience and from the UK advanced paediatric nurse practitioners critical care retrieval services and applied to nurse-led transport services.

From the start of the NISTAR nurse-led transport team service in January 2020 until 30 June 2021, 500 transfers have been completed. The team also won the child health category of the RCN Nursing Awards in 2021, in recognition of the value of the service.

Clinical governance

Safe standards of practice encourage transport nurses to maintain their competencies through ongoing quality improvement, which incorporates various aspects of clinical governance (Breathnach and Lane 2017). McSherry and Pearce (2011) described clinical governance as 'the system through which healthcare teams are accountable for the quality, safety and satisfaction of patients in the care they have delivered'.

Transitioning to a new specialty and service can leave nurses vulnerable to making mistakes (Saintsing et al 2011). Local governance arrangements and guidelines (Belfast Health and Social Care Trust 2016) are in place to support the NISTAR nurse-led transport team

in their transition from novice transport nurses to competent and proficient practitioners with the knowledge and skills required to undertake safe and successful transfers (Hörberg et al 2017).

In addition to local guidelines, the nursing team was encouraged by NISTAR management to draft standard operational procedures specific to the needs of neonates and children requiring nurse-led transport. This is in accordance with the Paediatric Critical Care Society (2021) staffing standards guidance, which recommends that staff should be responsible for developing guidelines and protocols and for ensuring governance is implemented to promote an effective service and positive patient outcomes.

Established paediatric critical care transport teams throughout the UK have had the benefit of benchmarking against similar teams, which can provide them with information and evidence on transport techniques and patient outcomes. In contrast, because it is a new development the NISTAR non-critical nurse-led transport service does not have this benchmarking in place. However, the nurse-led team has begun auditing and benchmarking processes. For example, data on areas such as time of referral, time the referral was accepted, time the team departed base, time the patient was safely secured and time of arrival at the referring hospital is collated, formatted and made accessible to relevant staff. This information enables the team to anticipate the length of time required for a transfer – for example, a transfer from Children's Health Ireland in Dublin to the regional centre in Belfast will take between five and six hours – which enables them to prioritise referrals efficiently. This data collection also provides the team with a method of measuring service performance and identifying issues or concerns, for example related to equipment, training or resources, while continuing to work towards service improvement (Ratnavel 2013).

Training requirements

Nurses in the UK are required to undertake ongoing education and training (NMC 2018). The Advanced Paediatric Life Support course accredited by the Resuscitation Council UK provides competency-based training for healthcare professionals to recognise and respond to potentially serious illness or injury in children. It is applicable to all staff working in paediatric settings and particularly in nurse-led transport where a nurse provides one-to-one care over a considerable geographical distance (Baker et al 2009).

At the time of writing, Advanced Paediatric Life Support training had restarted with coronavirus disease 2019 safety measures in place which enables NISTAR staff to take part in the demanding two-day course in pairs. This training opportunity promotes professional development for the nurses working in the new service, creates an environment that is conducive to learning and ensures nurses have the professional competence to promote patient safety and quality of care (Nilsson et al 2020).

The introduction of a NISTAR education lead has enabled the organisation to deliver simulation and critical thinking sessions for staff under the guidance and support of a highly experienced transport physician. A simulation clinical training programme can provide realistic patient demographics and feedback to enable teaching and assessment of knowledge, decision-making and communication skills in a safe environment and can promote staff competence and confidence in new roles (Peterson et al 2020)

Transporting children with cardiac conditions

Transporting children with cardiac conditions can be a challenge due to their complex circulatory physiology, particularly if they have undergone cardiac surgery or associated interventions (Ramnarayan et al 2017). Transport nurses need to be aware of the effects of travelling in an ambulance on the body; for example, the acceleration and deceleration of the vehicle can result in deterioration in the patient's condition if they are not haemodynamically stabilised pre-transfer (Ramnarayan et al 2017). The patient lies supine with their head towards the front of the vehicle and may feel the horizontal g-forces applied with acceleration. This can cause blood to be pulled towards the feet and extremities, potentially resulting in reduced venous return, reduced cardiac output and hypotension (Hurd and Jernigan 2003, American Academy of Paediatrics Section on Transport Medicine 2007). Deceleration has the opposite effect, forcing blood towards the head, causing increased venous return, increased cerebral blood volume and potentially increased intracranial pressure (Valente et al 2016). In addition, patients with pre-existing cardiac conditions are vulnerable to arrhythmias, pulmonary oedema and cardiac failure (Hale et al 2019).

On receiving a referral to NISTAR, the call handler will ask specific questions to identify which is the appropriate team to transport

a neonate or child with a cardiac condition.

Once the referral has been emailed to the appropriate team by the call handler, the team can undertake an initial pre-departure assessment from the referring ward using a systematic and structured approach, for example the airway, breathing, circulation, disability or dextrose, exposure and family (ABCDE) approach (Advanced Life Support Group 2019). If the team has concerns at any stage of the process they can share information with the transport consultant, transport coordinator or lead nurse using a communication tool such as the situation, background, assessment and recommendation (SBAR) framework (Haig et al 2006). Using a tool such as SBAR can clarify discussions and facilitate a safe and organised transfer, while reducing the risk of adverse incidents (Müller et al 2018). For example, if a child's condition has deteriorated from the initial time of referral to the arrival of the transport team the nurse can undertake an ABCDEF assessment and, if appropriate, refuse to transfer the patient or ask for a registrar to assist if the transfer is time critical. Advice can also be sought from senior NISTAR management.

Patient monitoring during transfers

The transport trolley enables portable monitoring of the patient's physiological parameters, including heart rate, respiratory rate and oxygen saturation levels, as well as non-invasive blood pressure measurement and continuous electrocardiogram (ECG) monitoring. A portable manual defibrillator is also attached to the trolley and can deliver synchronous and asynchronous direct current shocks, as well as transthoracic pacing, if required. This is useful for cardioversion in patients with supraventricular tachycardia (Ramnarayan et al 2017).

Transport nurses must be vigilant when moving infants, particularly premature neonates due to their vulnerability to cold. Heat loss through conduction, convection, radiation and evaporation can cause hypothermia leading to an increase in oxygen demand, which results in metabolic acidosis and a potentially suboptimal patient outcome (Knobel 2014). To avoid heat loss, infants >2kg and <8kg are transported in a baby pod with a patient warming system attached which enables consistent skin temperature monitoring, thereby reducing heat loss via radiation and conduction. Covering the baby pod with blankets and pre-warming the ambulance minimises convection heat loss.

Supporting children and their families

Considering the needs of the family before, during and after transferring a child is vital and communication is central to reducing the parent or child's concerns (Ford et al 2018). The transport nurse should introduce the service and the team when meeting the child and their family and provide a detailed description of the transfer process in a sensitive and direct manner.

Since the nurse-led transport team is based at the Royal Belfast Hospital for Sick Children, transfers from the hospital's PICU and specialist wards to district general hospitals enable the nurses to prepare the patient and their family directly and gives parents sufficient time to ask questions. The team has been involved in the creation of a video, *A Kid's Guide to Ambulance Transfer* – available at nistar.hscni.net/meet-the-teams/nurse-led-transport-team – which can be shown to children and their parents to reduce their anxieties about travelling in an ambulance. The team encourages ward staff to refer parents to the video.

Asking the child how they would like to travel, for example on the transport trolley or in an adapted five-point harness seat if age appropriate, is important to promote child-centred care. Carter et al (2014) described child-centred care as the child taking 'centre stage' in a family-centred care model, where the needs and interests of children are at the forefront of practice. This reflects the recommendations in *Facing the Future: Together for Child Health* (Royal College of Paediatrics and Child Health 2015), which expands the Royal College of Paediatrics and Child Health (2012) Standards for Children

and Young People in Emergency Care Settings into care outside the hospital.

Service user feedback is collected in written format via a booklet given to parents at the end of the journey, which enables them and their child to make suggestions and leave a review of the transport process if they wish. The lead nurse and service manager then evaluate the feedback and suggest changes where applicable.

Conclusion

The centralisation of specialist cardiac services on the island of Ireland has meant that neonates and children often require transport across large distances and these patients are at risk of deterioration. Employing children's nurses who specialise in transporting children with cardiac conditions can facilitate a safer journey and ensure the needs of the child and their family are at the forefront of every transfer.

The role of the non-critical paediatric transport nurse is to assess patients, plan safe transfers, implement nursing interventions and evaluate outcomes while in transit. They must also remain vigilant for unexpected adverse events and have the skills and competence required to manage these. Adhering to specific guidelines and standards of practice promotes safe and efficient patient care. Advantages of the NISTAR nurse-led transport team include smooth transition for patients, the facilitation of early discharge from PICU, reduced risk to patients during transfer and reduced demands on ward staff. Data collection enables the team to establish audit trails and ensure clinical governance aligns with local trust policies and guidelines.

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