

Northern Neonatal Transport Service (NNeTS)

Annual Report

2016-2017



Contents

Foreword.....	2
Executive Summary.....	3
Service model and establishment.....	4
Activity	6
Co-location and call handling.....	7
Governance	8
Northern Neonatal Network regional reconfiguration.....	12
Education and learning	12
Specialist Transport Nurse and ANNP role: establishment and development	13
Liaison with other transport teams	14
NNeTS Charitable Fund.....	15
NNeTS in the News	15
NNeTS: The next 12 months	16
Acknowledgments and thanks.....	18
Appendix 1: NNeTS Staff list 2016-2017	20
Appendix 2: NNeTS - Origin and evolution of the service	21

Foreword

We are pleased to present the first Annual Report for the Northern Neonatal Transport Service (NNeTS) following its establishment in October 2016. The first year of service has seen NNeTS establish itself as a credible and effective transport service within the Northern Region and serving the Northern Neonatal Network. During this time we have reinforced the strong and collaborative links that already existed between our partners across the Northern Neonatal Network and the two transport services that amalgamated to form NNeTS. NNeTS has also established robust governance links with its host Trust, Newcastle Hospitals NHS Foundation Trust, and co-location alongside the NICU at the Royal Victoria Infirmary has allowed the team to refine and maintain their skills and expertise at the highest level.

This report covers the first full year of service delivered by the Northern Neonatal Transport Service (from 1st October 2016 to 30th September 2017). As well as outlining the current state of the service and its activity, we have included information about the origins of the service and plans for the future.

In coming years, we at NNeTS look forward to developing the service further and consolidating the excellent progress to date.

Robert Tinnion

Neonatologist and Medical Lead for NNeTS

Beverley Forshaw

Specialist Nurse Team Lead for NNeTS

Executive Summary

NNeTS Transport Activity (pp 7 - 8)

- 637 babies transported across the region in one year
- 49% intensive care transports
- 6% time critical transfers: completed within required national target time
- No serious incidents occurred during the first year of service delivery

Governance (pp 10 - 12)

- Formal governance structures established and dovetailed with host Trust's processes, giving robust accountability for practice locally
- Working established in partnership with the Northern Neonatal Network members
- Benchmarking against National Standards (NTG) continued with annual data submission
- Learning shared in collaboration with referring units and contributions made to case reviews in centres across the region

Staffing (pp 4, 13 - 14)

- Fully recruited to Specialist Transport Nurse establishment

Future challenges (pp 16 - 18)

- Review and replacement of transport equipment
- Complete recruitment to designated service delivery model
- Progressing capability and expertise within NNeTS (including ANNP training)

Service model and establishment

NNeTS moved just under 640 babies in its first full year of activity for intensive care, surgical and cardiac care, repatriation closer to home, and outpatient review. However, it is still in the process of establishment and consolidation towards the model of delivery outlined in the original, single-service, Neonatal Transport team plan proposed in 2015. The staffing target for the NNeTS delivery model is to provide:

- 24 hour-a-day access to a Consultant Neonatologist for clinical advice
- Two Specialist Transport Nurses on duty 24 hours-a-day (to provide nurse-delivered, non-acute transport and be part of the team delivering acute/intensive care transports)
- Advanced Neonatal Nurse Practitioner (ANNP) on duty 24 hours-a-day to deliver ANNP-led acute uplift/intensive care transports.

This staffing will provide one team to deliver intensive care transports 24 hours-a-day (as required) and one team to provide non-acute transports 24 hours-a-day (with capability to upgrade the second team to deliver intensive care transport if required). In addition NNeTS' service model aims to have a 24 hour-a-day hotline referral service handling clinical advice and transport referral calls, as well as coordinating intrauterine transfers to obstetrics services with the required level of NICU cover for the referred case. This hotline aims to provide call conferencing to allow appropriate specialists to contribute to ongoing care and call recording for governance and quality purposes.

In the first year, the following aspects of the service model have been fulfilled:

- Recruitment to full nursing establishment (11 WTE)
 - Includes three Band 5 nurses who are currently in training to achieve Band 6 Specialist Transport Nurse status
- 24 hour-a-day provision of an intensive care Neonatal Transport Team
- 24 hour-a-day hotline, with call conferencing, and access to Consultant Neonatologist advice
- Coordination of Intrauterine Transport across the Northern Region

The following intermediate steps towards the final service-delivery model have been achieved:

- 2 Specialist Transport Nurses on duty 0800-2030hrs and *at least* one on duty 2000-0830hrs
- 3 ANNPs recruited to NNeTS
 - 1x fully trained ANNP being upskilled in surgical NICU and apprenticed into Transport role
 - 2x ANNPs in training
- Establishment of time within the nursing rota to allow 1 month in 11 back in the NICU (Ward 35, RVI) to consolidate intensive care nursing skills.



Activity

October 2016 – September 2017 (inclusive)

Total Transports: 637

BAPM category at referral:

Intensive care*	212
High dependency	57
Special care	368

Clinical reason for transport:

Medical	492
Cardiac	77
Surgical	54
Neurological**	14

*includes 17 episodes for PDA ligation (*not* counted as 2 journeys)

**includes both transport to NICU for therapeutic hypothermia and 3 outpatient transports for EEG

NNeTS activity for the first year has shown a level of activity in line with the combined activity seen in the years when two teams were in operation. During the October 2016- March 2017 period the Middlesbrough team completed a number of transports as the NNeTS team came on line and moved towards full Specialist Nursing establishment. The annual transport activity completed by NNeTS is anticipated to remain in the region of 600-700 transports a year in coming years, though this total may vary as regional reconfiguration currently ongoing, and refinement of intrauterine transports, progresses.

Operational category of transport:

Intensive care uplift (n= time critical)	310 (38)
Repatriation	234
Capacity/resource	78
Outpatient	15

Respiratory support during transport:

Ventilated	182
CPAP	57
High flow*	1
Ambient/low flow O ₂	98
None	295

Gestation and weight:

	Corrected Gestational Age at transport (weeks)	Weight at transport (g)
Median (IQR)	33 (29-37)	1821 (1305-2910)
Minimum	23	500
Maximum	42	5100

*High flow was not routinely available as a modality for transport during year 1. Of the babies transported, 14 were reported as being on high flow humidified nasal cannula gases *at the time the referral* was made. Based on clinical assessment, the modality used in transport was (n): ventilation (3), CPAP (9), High flow (1), ambient oxygen (1) as appropriate.

NNeTS was involved in moving a total of 5 babies *out of region* including repatriating 4 babies born at a NNN unit (but booked out of region), and one baby who went to Leeds for quaternary hepatology assessment. A total of 6 babies were repatriated back into region by NNeTS including babies born elsewhere while families were on holiday and one set of twins who had been moved whilst intrauterine to Glasgow due to lack of cot space across the Northern region.

In the next year, data will be collected in a slightly different way to reflect more accurately the *total* activity completed by NNeTS which includes the roles of providing advice by telephone to our colleagues across the Network if required, and coordination service for requests for intrauterine transfer. Both of these roles take time and resources, and we need to better capture this in the same way that other services do (for example Embrace classify *all* calls as 'referrals' then stratify these according to the service provided for each referral).

The NNeTS data for this year of service is in line with the predicted volume based combined totals seen in previous years from the previous 'two-hub' regional model, in number, type and acuity of work. There have been no reported incidents of inability to respond to referrals from the south of the region and this should reassure NNeTS' Network colleagues that the service has been able to deliver the same as the previous teams did in both quality and quantity, whilst having the benefits of working as a single team and a unified approach underlying all transport activity.

Co-location and call handling

The NNeTS team are based in the NNeTS Transport Hub, co-located within Ward 35 NICU at the RVI. The transport hub consists of independent office space within the NICU in which the team can work and in which the call handling facility is housed. The NNeTS transport equipment is housed in a transport store in the NICU easily accessible for rapid deployment. The office space allows undisturbed NNeTS activity such as the morning team meetings to take place in a confidential way, encouraging open discussion and reflection on practice, as well as making the NNeTS team approachable and accessible in their work alongside and in collaboration with the NICU staff. This arrangement has been beneficial during the first year of the service as it has allowed NNeTS to provide support, education and training to staff on Ward35 during the periods in between active transport activity. Reciprocally, this activity also allows the NNeTS staff to maintain their clinical skills and credibility (in neonatal ITU, HDU and SCBU practice) and team-working skills above that which would be possible if not co-located. Close working with the NICU team in the RVI, which is the quaternary centre for paediatric surgery, fetal medicine and complex cardiac deliveries, also ensures that the NNeTS team are both expert and experienced in dealing with these extremely sick babies when they deliver unexpectedly away from the quaternary centre.

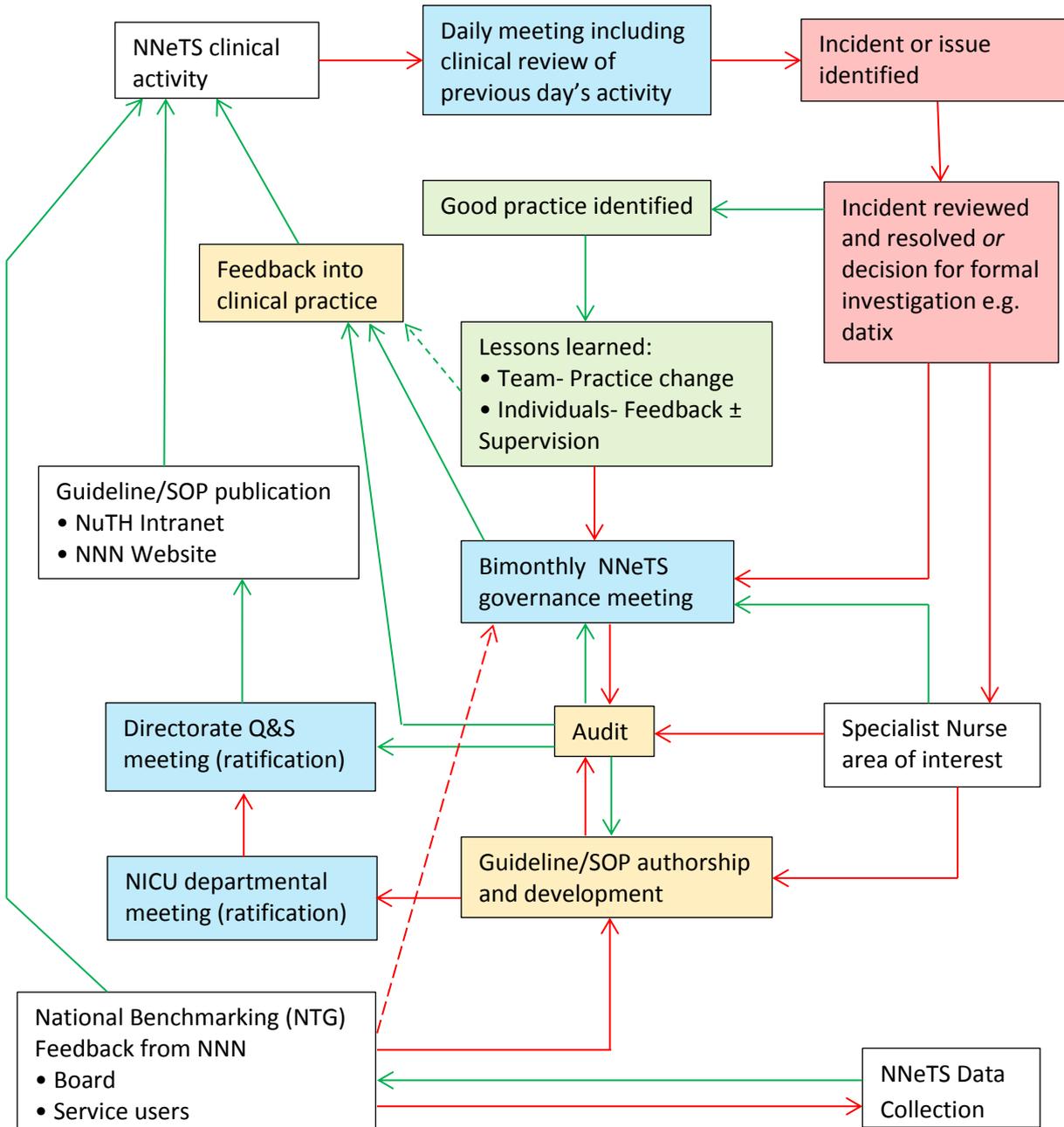
Co-location has also been essential to developing the service quickly as it has provided concentrated, rapid feedback on clinical practice as the service has established itself in this first year, which would have been less readily available if the team worked out of a distant location.

The call handling facility has evolved over the course of the year and NNeTS now have the ability to conference calls to include relevant specialities into a discussion about babies who require transport. This also facilitates the access through the hotline to Consultant Neonatologist advice 24 hours-a-day as required. NNeTS has also been proactive in working with units around the Network with a twice-daily ring-round to keep abreast of current NICU/SCBU cot status in the region as well as plan work to optimise efficiency of use of transport resources and assets. A good example of this is proactively planning repatriation or outpatient work to maximise work done for minimised time on the road. Similarly, flexibility within the team allows coordination of repatriation work with acute uplifts where opportunity arises (allowing two transports within a return journey) as well as dispatching two acute teams if required.

Governance

The NNeTS service is the Northern Neonatal Network Transport team, commissioned by Specialist commissioning at NHS England and hosted by the Women's Services Directorate at Newcastle Hospitals NHS Foundation Trust. A major part of the work done in this first year has been establishing a clinical governance structure for the team which minimises harm and maximises excellence throughout all levels of interaction at team, regional and national level.

The framework used is outlined below:



The governance framework hinges around key meetings (shaded blue in the flowchart).

Daily team meetings include:

- Review of all the previous day's activity (or weekend activity on Monday)
- Issues raised about practice, logistics, or any other aspects of the transport episodes from referral to return to base
- Intrauterine transfer requests review and the outcomes documented (either admission ± delivery, or discharge home)
- Review of any formal incidents (including Datix submissions)
- Assessment of team capability for the day and planned work for the coming days

Issues raised may then be reviewed in more detail, and either simple resolution achieved (such as feedback on a one-to-one basis) or an RCA-type investigation carried out (for some Datix reports or anything thought to approach the serious incident (SI) threshold).

There have been no occurrences of 'never events' or serious incidents during a transport episode over the last year at NNeTS. This highlights the importance of providing a Specialist Transport Service to do a Specialist job: the continued success against national benchmarking and safe transport relies on using a staff which is appropriately trained, skilled and updated (therefore credible) using the correct equipment for moving some of the most vulnerable patients across the region. NNeTS provides this specialist staff and maintains their expertise through use of co-location, education and specific time back in the NICU honing skills.

Any good practice identified is disseminated to the wider team to encourage similar good practice.

The bi-monthly NNeTS governance meeting is a forum where learning is shared more broadly. This can also include: case presentations with open discussion; presentation of audit; and work on guidelines/processes. Here the whole team to benefits from their colleagues' experiences. Output from the bi-monthly can include work streams to improve the service or examine aspects of process more closely. It is generally allocated to the Specialist Nurse whose area of interest most closely matches the area requiring scrutiny.

Formal output of the governance process, for example a guideline, is monitored and/or ratified using the existing host Trust processes. All key work is taken to the Directorate Quality and Safety meeting for oversight at the highest level within the directorate. The medical lead for NNeTS sits on the directorate Q&S committee.

Sharing outcomes and good practice with the wider Neonatal Network is done via the quarterly Network meetings and Network officer report. The NNeTS team leads (medical and nursing) also take part in risk, incident and case/death reviews in units across the Northern Neonatal Network when these involve babies that have been transported by NNeTS.

NNeTS submits data to the NTG (national Neonatal Transport Group) and is benchmarked on performance through this process annually. In addition to these mechanisms, the Network website will also be used to make available NNeTS policies, procedures and guidance to all of our service users.

The process of national benchmarking in 2016-2017 showed that since establishing the NNeTS as a single regional service there has been no drop-off in performance from the previous Newcastle

and Middlesbrough services' performance, with all time-critical and ITU uplifts attended within the required "call-to-cotside" benchmark time of 3.5 hours. Active cooling on transport and respiratory care met the same standards for care delivered as other national teams. See: <http://ukntq.net/annual-reports/> for more information. The single-hub service provided by NNeTS is, reassuringly, as clinically effective as previously seen with the two-hub model.

NNeTS uses the 'Tell Us' card reporting system pioneered within Women's Services at the RVI to gather feedback about performance from the parents of the babies moved by the team. This is then used to inform practice changes and enhance and improve the experience for families.

The NNeTS Service Leads also visit all Network units for face-to-face meetings with clinical colleagues working in these units within the year. These meetings allow discussion of the clinical staff's experience of having the NNeTS team visit to transport a baby. Reciprocally they are also an opportunity to share and reinforce the operative principles and procedures used by the NNeTS team.

Meeting with colleagues in units around the region and direct feedback from the parents of babies moved by the team are part of the overall ethos of NNeTS to be open and transparent in practice, and reflective and responsive in how well the team performs. This allows NNeTS to continually improve practice.

Learning and reflection from transport episodes (via the governance process) has been used to:

- Improve the coordination of repatriation with acute uplift episodes (resulting in a more time- and resource-efficient service)
- Improve the parent experience by promoting parent travel with babies in both acute and repatriation transports whenever possible
- Ensure that NNeTS teams work effectively with referring and receiving teams, and support delivery of care locally where transport is not appropriate (specifically supporting decision for, and delivery of, end of life care locally in two cases)
- Improve the call-conferencing process
- Modify and streamline the equipment carried on transport

Guidelines and Policies published 2016-2017

- NNeTS General Service SOP
- SOP: triage and prioritisation of simultaneous transports
- NNeTS daily routine guideline
- Consultant delivered transport
- Consultant involvement in telephone conferencing
- NNeTS internal Governance SOP
- NEC and Surgical transfers management guideline (NNN guidance)

Audit:

Three internal audits are in progress currently:

- Assessment of use and accuracy of end-tidal CO₂ measurements (in comparison with capillary or arterial blood gas sampling)
- Comparison of skin-temperature probe systems
- Assessment of patient temperature before and after ligation of patent ductus arteriosus



Northern Neonatal Network regional reconfiguration

NNeTS has been involved in the ongoing discussions and changes seen across the Northern Neonatal Network as part of reconfiguration processes which are taking place under a variety of programs of change. This ensures that NNeTS as a service can support clinical working between teams on different sites. The introduction of a gestational age cut-off (no babies <27 weeks) at University Hospital North Tees (UHNT) is the first of these changes to have been enacted and changes in the coming year are anticipated to include further reduction in preterm and intensive care admission to UHNT. There is ongoing public consultation (since July 2017) regarding potential re-structuring of maternity services at South Tyneside General Hospital (STGH) with two options proposed, neither of which contain SCBU provision at the STGH site. NNeTS will continue to work closely with units across the Network to ensure changes do not disadvantage babies requiring transport, and with intrauterine transfer coordination try to ensure that vulnerable babies are born wherever possible in the right place at the right time. Wider LMS projects are looking at the viability of current maternity services in locations across the region and provision of neonatal services for the corresponding population. NNeTS will be involved in these changes as required to ensure it can continue to provide support for the Network as the configuration of units in the region evolves.

Education and learning

NNeTS sent several staff to the INFANT neonatal transport conference in Oxford this year (which included the NTG leads meeting and was in place of the usual annual NTG Meeting). The meeting allowed opportunities for the staff to meet and hear talks from transport services, both UK- and overseas-based, and see how other teams overcame problems they faced in their own regions. This conference also included sessions on family centred/integrated care and these concepts have been brought back to NNeTS by the specialist nursing team who are looking into ways of enhancing the parent experience (including action on direct feedback).

The Northern Neonatal Network runs a regional stabilisation course (the SCARI course) whose aim is to provide good alignment between the practices leading to stabilisation of babies at the local level and the care then delivered by the NNeTS team on arrival. This alignment and anticipation allows the care for the baby to be as seamless as possible and minimise the time 'on scene' at the referring hospital, thus enhancing speed of access to definitive care. NNeTS staff contributes to the faculty and the teaching material is aligned to current NNeTS practice so that the course is as up-to-date and accurate as possible with respect to how NNeTS move babies.

In-house the NNeTS educator, Laura Robson, has been working closely with the team, Team Lead and NICU Matron. Learning packages (e.g. interpretation of radiographs) have been developed to enhance learning opportunities, as well as ensuring tailored preceptorship support for nursing staff new to the team. Other course based learning will also continue to be made available to the team (such as NLS, ARNI) and as appropriate courses pertinent to each nurse's area of special interest.

Specialist Transport Nurse and ANNP role: establishment and development

The service delivery model for NNeTS, as outlined, requires a cadre of both Specialist Transport Nurses *and* Advanced Neonatal Nurse Practitioners (ANNPs) working as Transport Nurse Practitioners to deliver acute/ITU transports. The Specialist Transport Nurses are also independently deployed on lower-acuity, nurse-led transport activity such as repatriation transports.

In the first year of activity, NNeTS successfully recruited to full Specialist Transport Nurse establishment. This comprises 10 WTE fully trained Band 6 nurses and 1 WTE Band 5 nurse who is upskilling and training towards becoming established at Band 6. Generally, at the time of appointment, the nurses at Band 5 have (comparatively) less transport experience and no *surgical* NICU experience. They therefore spend 3 months upskilling in NICU at the RVI by looking after surgical neonates at the start of their appointment, followed by a period of preceptorship in NNeTS (on transport) to attain the required level of skill.

For all posts in the service, training needs analysis (TNA) has been completed in this first year. The analysis defined the core skills, qualifications and ongoing training required to operate at the appropriate level for each post, and forms the template for demonstrating maintained credibility in post. The TNA is used by our Nurse Educator and Specialist Nurse Team Lead to tailor the development needs and opportunities for individual nurses within the team, with progress assessed at annual appraisal and as part of the NMC revalidation process.

In addition to this, there has been mapping of the needs of the service in terms of areas for development and governance. Each Specialist Nurse has been assigned an area of 'special interest' within the sphere of neonatal transport relating to these development and governance needs of the service. Examples include health and safety, infection control, governance, family integrated care and surgical transport. The areas of interest map closely with those found in the NICU, giving the Specialist nurses chance to link with the RVI NICU special interest groups and, more widely, into the Northern Neonatal Network. The aim of giving the nursing team specialist interests is to promote development of clinical best transport practice in the NNeTS team as well as allowing the nurses opportunity to develop their own skills and interests as Specialist Nurses. It is anticipated that in each specific area, guidance around best practice will be drawn up, audit and review completed by the relevant Specialist Nurse, and evolution of practice seen. This approach will also give the Specialist Nursing Team opportunity to liaise with services across the country and potentially (in the future) allow them opportunities to identify areas where formal research and development are needed. By empowering the core team to develop the service, it will also encourage ownership of the service at 'grass roots' and so improve the resilience of the team.

The ANNP team in post currently includes one fully qualified ANNP and two who are in their second year of training (to Master's degree level, University of Sheffield). Our two trainee ANNPs (Katie and Karen) have done brilliantly in successfully completing their first year of studies and are now officially Neonatal Nurse Practitioners. They currently divide their time between University study modules and clinical shifts working alongside medics on the NICU. Working on NICU gives them valuable experience in both essential practical skills and the logistic, decision-making and team working skills which they will require as they move towards Advanced Neonatal Nurse Practice in Transport. Danielle, who joined NNeTS from her role as an ANNP at James Cook University Hospital, is in post alongside medics on the NICU consolidating her specific experience in medical, cardiac and

surgical neonatal intensive care. As with her NNP colleagues, Danielle has been developing her clinical decision making and management skills, and is due to begin time in transport (equivalent to preceptorship) in the next year. Danielle has also developed a guideline for parents travelling with their baby in the ambulance, including written information to be given to parents. This has supported the overall change in practice to routinely (where possible and appropriate) offer parents the opportunity to travel with their baby. All of our nurse practitioners have regular expert clinical supervision from Neonatal Consultants (with a lead supervisor for each practitioner) to ensure their clinical experience is appropriately tailored to their future role and their progress is as required.

There are three ANNP posts remaining which have, as yet, garnered interest but no applicants who meet the criteria for appointment. An 'open day' event is due to be held in January 2018 to raise the profile of this job opportunity and encourage applicants for the three remaining posts (at either fully-qualified or trainee ANNP level). If this is not successful in recruiting to these posts, then a revision of the proposed service delivery model will be undertaken in order to maintain the momentum gained in developing the service to date.



Liaison with other transport teams

NNeTS liaise with our neighbouring neonatal transport teams (most notably Embrace) to provide seamless care where required for both intrauterine and extra uterine transport, in line with the clinical requirements of neighbouring teams to do so set out by NHS England. In this last year we have also moved babies further afield and in doing so worked collaboratively with neonatal teams in the south of the UK and ScotSTAR to the north. Locally, we work closely with NECTaR (paediatric Transport Service) for the occasions where there is some overlap between the services, both in delivery of appropriate expertise to the cotside and when either of the respective services is unable to respond to a request for transport. On occasions where a NNeTS receives a referral more suited to, or needs assistance from, NECTaR this is done by direct contact team-to-team so that the referring centre only has to make one referral telephone call.

NNeTS Charitable Fund

NNeTS moves babies between many different centres and while the NHS funds key and necessary equipment, to try to ensure we provide the best service possible for both the babies and their families, NNeTS has set up a charitable fund (under the Newcastle Hospitals Charity Trust) so that funds can be raised for any activities, equipment or training that enhance the experience of NNeTS' patients and families.

NNeTS in the News

NNeTS' work was showcased by Tyne Tees Television as one of a 3-day series of short news items outlining the work of Neonatal Services and Research in Newcastle (on air 23-25th October 2017).

NNeTS first year of service was marked with a short article on the history, establishment and current practice of NNeTS in the Great North Children's Hospital monthly magazine for staff and parents.



NNeTS: The next 12 months

The first 12 months of activity the single regional Neonatal Transport service has been one of evolving and growing into the role, strengthening our links with our Network colleagues, and formalising our internal processes with efficiency and effectiveness in providing the best care to the babies who need our help.

Progress over the next 12 months will involve review and replacement of equipment, continued recruitment to posts, and progressing capability and expertise within NNeTS.

Equipment review/replacement:

As part of the process of developing a business continuity plan for NNeTS as a service (in line with best practice requirements for all NHS services) the current physical assets available to NNeTS to complete transport were reviewed and risk assessments carried out to identify areas of concern. Specifically, the following risks were found with respect to transport equipment (where they have been addressed this is noted):

- 1) Restraint systems used were not in line with the standard of patient restraints used in other neonatal transport teams. This was addressed immediately as a patient safety risk and NNeTS now uses the neorestraint system in both its incubators which is to the same standard as transport teams across the UK (who almost universally use the same system).
- 2) The two trolley systems were found to be difficult to manoeuvre manually due to the choice of drag handles, and application of trolley brakes (key for safety on the road) required use of a mallet. These two issues were identified as moving and handling risks, and the latter a latent risk to patient safety (potentially unsecured trolley). NNeTS have ordered corner poles for both trolleys which should ensure optimum manoeuvrability while moving the trolleys with an upright posture. In addition, a manual application/release system for the brakes has been ordered.
- 3) Patient monitoring systems: the Propaq encore monitors which are used on the two NNeTS trolleys currently are no longer in commercial production and so are reliant on in-house electrical engineering for maintenance. They also lack the capacity to provide some of the advanced monitoring which can improve care delivered such as dual channel saturations monitoring. Incidents reports have also outlined concerns that issues internally to the monitor have compromised accuracy of blood-pressure measurement and temperature monitoring (skin probes) has been unreliable due to skin adhesion issues. The cause of faults with blood pressure cuff monitoring has been identified and is being remedied. We are currently trialling a different temperature probe which would be a cost-neutral switch but with hopefully better reliability in skin adhesion. We are actively trialling and appraising different monitor systems suitable to transport and plan to retire the current monitors after a suitable replacement has been identified.
- 4) Ventilators/humidified gases/Non-Invasive Ventilation: The current babyPAC/pneuPAC ventilators are of a similar age to the Propaq monitors and provide gas driven respiratory support (i.e. require both air and oxygen gas supplies to provide the full range of respiratory support). They can provide positive pressure ventilation (mandatory, non-triggered, pressure mode) and CPAP support. However, they do not provide any patient-triggered support, any

high flow humidified nasal gases (HFNC) or volume-targeted ventilation, all of which have become standard of care in neonatal respiratory management of preterm and term babies in NICUs. Therefore, it was assessed that these are not providing an adequate standard of care nor allowing appropriate continuity of care in transport e.g. in the case where a baby has to be changed from HFNC in a NICU to CPAP for transfer as HFNC is not available on the pneuPAC. NNeTS are therefore trialling a Hamilton T1 ventilator which is able to do all of the modes documented and also has a compressor meaning it is not reliant on needing cylinder air to function (though as with the pneuPAC higher levels of oxygen require cylinder supplementation). Other transport services nationally have moved to providing similar levels of ventilation as standard of care and so to match this quality of care, NNeTS will need to replace the current pneuPAC system with the Hamilton T1 or equivalent.

- 5) Current trolley ergonomics: there have been several issues, identified by NNeTS staff, with the current trolley layout (position of equipment on the frame/chassis), which are latent risks to patient safety that would require trolley redesign to be remedied. Firstly the monitors are not easily visible in their current position on the trolley when staff members are correctly seated in the ambulance. Secondly the positioning of the transport kit bags can limit emergency access into the incubator at the baby's head-end via the port and tray integral to the incubator. This has potential to delay intervention if there is compromise to the airway whilst a baby is in the incubator.
- 6) Number of trolleys for regional coverage: it has been noted that the region was previously served by two teams running up to three teams simultaneously. Centralisation of resources has not affected response times but it was noted that if critical equipment on one or both of the current NNeTS trolleys fails, then the capacity of the service to respond is halved or stopped. In terms of continuity of delivery of service, this might reduce or stop operational activity significantly for as long as it takes to service or replace the failed device.

The logical solution to items 3-6 above is a redesign of the trolley layout (an initial draft of which has been completed with Paraid) and staggered replacement of the current equipment with three modernised transport systems to future-proof NNeTS capability. This is being discussed with the Host Trust.

- 7) Documentation: the current documentation for referrals (the 'red book') is soon to reach a decision point about whether to commence another print run and so in early 2018 there will be a review of this and possibly a redesign of internal documentation. The transport ('yellow') sheet will also be reviewed in the next 12 months and potentially modified.

Continued recruitment to posts:

The NNeTS team is proactively focussing recruitment efforts towards the completion of recruitment to the three currently unfilled ANNP posts and the final administrative staff posts. It is hoped that these will be filled in the first half of 2018.

Progressing capability and expertise within NNeTS

Over the next 12 months, as the Specialist Nurses become completely settled in role, it is anticipated that there will be an increase in review of NNeTS practice, specifically linking into practice development areas seen in NICUs, to improve the patient experience when NNeTS are involved in

moving babies. This will be moderated via the established governance framework. Additionally our Nurse Practitioners in training will move through year 2 into 3 of their Master's Degree program and clinically into the transport environment. It is also anticipated that the team will begin to develop their use of simulation to improve and finesse transport skills as well as begin to explore and enhance expertise in human factors in and around the transport setting.

The other clinical area in which NNeTS is looking to expand our service abilities is transport for neonatal palliative, or end-of-life, care to non-NICU locations. We are fortunate that one of the medics working with the NNeTS team, Dr Dixon, has an interest in this field. Also, within the wider Northern Children's Palliative Care Network, there is increasing interest in links being forged between NICUs and Hospices. NNeTS has a key role to play in supporting this and it is expected that this will become better defined and more regularly accessed through the course of 2017 into 2018.

Acknowledgments and thanks

The data in this report was provided by Dr Alan Fenton who maintains and administers the Transport database. Without his tenacity this data would not be available to the level of completeness or accuracy it is.

The report was written in draft by RT and checked by BF, with helpful input from Yve Collingwood (Matron), Mrs Claire Pinder (Directorate Manager, Women's services) and Dr Richard Hearn (Neonatologist and NNeTS Consultant on call).

The progress and evolution of the NNeTS service has been in no small part due to the generosity of NNeTS' colleagues working on Ward 35 NICU RVI in giving advice, support and time to the NNeTS team while setting up the service during its first year of delivery. In particular thanks go to Claire Pinder, Yve Collingwood, Richard Hearn, Alan Fenton and Sundeep Harigopal, as well as the Consultant Team and Senior Nursing (Band 7) team on Ward 35 for their support and encouragement.

NNeTS works closely with our colleagues in NEAS in delivering Neonatal Transport. NNeTS could not deliver the level of care and service that it does without the expertise and skill of the paramedics and technicians who man the frontline ambulances that carry our babies to definitive care. For this NNeTS offers thanks to the many NEAS crew members that we have worked with this year, and we look forward to continuing our links with NEAS in the coming years.



Appendix 1: NNeTS Staff list 2016-2017

Medical Lead: Dr Rob Tinnion Consultant Neonatologist	Specialist Nurse Team Lead: Beverley Forshaw Band 7
NNeTS Consultants	Dr Alan Fenton Dr Richard Hearn Dr Janet Berrington Dr Nicholas Embleton Dr Sundeep Harigopal Dr Martin Ward-Platt Dr Sri Ramaiah Dr Naveen Athiraman
NNeTS Transport Medics	Dr Jenny Dixon Dr Zheyi Liew Dr Tom Skeath Dr Tom Sproat Dr Andreas Roukas Dr Amitoj Chhina Dr Anup Gupta Dr Jenna Gillone Dr Stefan Zalewski
Advanced Neonatal Nurse Practitioner:	Danielle Richardson
Neonatal Nurse Practitioners:	Katie Patterson Karen Stanforth
Specialist Transport Nurses (Band 6):	Angela Hutchinson Sue Davies Mel Beattie Lindsay Hedley Stacey Walker Diane Morrison Lesley Walker Aimee Dornan Laura McEwan Matt Cray
Specialist Transport Nurses (Band 5):	Debbie Noble
NNeTS Team educator:	Laura Robson
NNeTS Administrative support:	Pauline Jackson Ronda Dawson
Neonatal Matron Ward 35 RVI:	Yve Collingwood

Appendix 2: NNeTS - Origin and evolution of the service

The Northern Region, in 1989, was one of the first regions in the country to have a clinical Neonatal Network to provide coordinated care for babies between hospitals. With this came the recognition that transporting babies safely within this Network was important. While significant, unit-based expertise in transporting babies was developed over the years that followed, the region fell behind the rest of the country where stand-alone, high-volume, regional and supra-regional services had become the established standard to provide highly-specialised neonatal transport.

The Northern Neonatal Transport Service (NNeTS) was established in 2016 after being commissioned by NHS England to provide the region with a single, highly-specialised transport service for babies across the Northern Region. This commission met one of the key recommendations of an external review into Neonatal Intensive Care in the Northern Region by RCPCH, as requested by the Northern Neonatal Network.

The NNeTS team has replaced the two, previously-existing transport teams which served the region working out of James Cook University Hospital and The Royal Victoria Infirmary (RVI) respectively. NNeTS is hosted at the RVI, working alongside the team on Ward 35 (Neonatal Intensive Care Unit). The NNeTS team is made up of Specialist, Neonatal Intensive Care-Trained, Transport Nurses working with Medics and Nurse Practitioners (who also work in Neonatal Intensive Care) to deliver the transport service.

NNeTS provides: access to Consultant Neonatologist advice 24 hours a day; a hotline to take referrals for transport of babies; and coordination of intrauterine transport across the Northern Region. Just under 640 babies have been transported by NNeTS in its first full year of activity for intensive care, surgical and cardiac care, repatriation closer to home, and outpatient review.

Northern Neonatal Transport Service

NNeTS

In partnership with: **Northern Neonatal Network**



Hosted by:



The Newcastle upon Tyne Hospitals
NHS Foundation Trust

Hotline Number: 0191 2303020

Telephone NNeTS for:

- Consultant Neonatologist Advice *24 hours a day*
- Referral for transport of babies within the Northern Region
- Coordination of intrauterine transport

NNeTS is a specialist transport team hosted at the RVI in Newcastle, consisting of:

- Specialist, Neonatal-Trained, Transport Nurses
- Medics and Nurse Practitioners working in Neonatal Intensive Care.

NNeTS is commissioned by NHS England to provide specialised transport services for babies across the Northern Region and the Northern Neonatal Network.

We are happy to receive referral requests for *any* baby requiring transport from any hospital location in the Northern Region, including from units which are part of the Northern Neonatal Network (with the exception of Midwifery-Led Units; MLUs) for medical, surgical, cardiac or repatriation reasons.

If you are not sure whether NNeTS could move the baby you need moved, please check the exclusion criteria (below). If in doubt, please ring the hotline for a discussion.

NNeTS have ONLY THREE exclusion criteria precluding transport:

- Weight >6kg*
- Age >6 months old*
- Reason for transport outwith the scope of Neonatal Care (e.g. poly-trauma following NAI; community acquired meningococcal septicaemia)[†]

All other babies are suitable for transport by NNeTS

For general enquiries please contact: Dr. Rob Tinnion 0191 2139860 or Sr. Beverley Forshaw 0191 2829971

*These relate to the size restriction of using incubators for transport

[†]If you are unsure whether the baby you wish to refer meets this criteria please ring the hotline for a discussion in the first instance