CenTre Neonatal Transport

Annual Report 2015 / 16

University Hospitals of Leicester NHS
NHS Trust
Caring at its best

Nottingham University Hospitals NHS
NHS Trust

University Hospitals Coventry and Warwickshire NHS
NHS Trust

Contents

Highlight of the year

After months of planning and lots of help from the web team at UHL our website finally went live earlier this year.

www.centreneonataltransport.nhs.uk

This site provides information not only for professionals but also for parents and families. There are links to previous annual reports, job opportunities, educational and research updates as well as useful information on how to refer babies for planned and unplanned transfers.

If there are any comments on what you think would be useful to be included on the web-site please do get in touch with either Andy Leslie or Nicky Davey

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Introduction

It's hard to believe this our sixth annual report. Our launch day was 19th April 2010 and with the passing of time the memory fades of how difficult it often was to get a neonatal transport done before Centre was set-up. I'm determined that we mustn't go back to the bad old days of patchy availability, delays and frustration that characterised the pre-CenTre period, but there are risks to CenTre's continuing efficiency and this report highlights the key one – workload.

Workload

When CenTre was commissioned the estimate was that we might undertake 1000-1200 transfers each year. The total now is 1662 an increase of 28% since 2010-11. Nicky Davey details the CenTre workload in this report and you can see some of the key trends laid-out there. Our workload has increased each year since we started but our staffing, funding and team availability is the same today as it was in 2010.

Networks' Capacity

What's behind the increased activity? The most important factor is capacity in our two networks. Compared to 2011, in 2016 we did 28% more transfers while at the same time the proportion of infants transferred following their network pathway has fallen from 79% to 63%

A larger number of our transfers in 2016 are of infants who simply shouldn't need to be moved at all, but who are referred to us because their unit is beyond manageable capacity. The end-result of this lack of capacity is infants having to be moved further than optimal, often out of the networks. For CenTre this is a key factor in why our service is under considerable strain. For example, if we take an infant from Lincoln to Sheffield because there's no bed in Nottingham, this is a round-trip of 145 miles, compared to 84 miles if the lead centre had a bed.

In the first 3 months of 2016 our total mileage was 34,928 miles, compared to 25,309 miles in the first 3 months of 2011. This increase, equivalent to an extra 38,000 miles a year, is unsustainable. Infants are being transferred an estimated 20,000 miles per year over and above what should be necessary if referral pathways were working well. There's a lot more detail about all of this work in appendix 1, our report to the network about these issues.

In normal circumstances when a service is under workload pressure the strategy is to bid for greater resources for the service. Perversely I don't believe that greater funding for CenTre is the best solution to these problems. Instead I'd like to see clinicians, managers, networks and commissioners come together to address the capacity problems and reduce the demand for transport. But if no solution is forthcoming, the trajectory of workload for CenTre means that within the next two years your transport service will often be unable to meet your transport requests in a timely way. We all want to avoid a return to those days.

Andy Leslie

Nurse Consultant & Service Lead.

Medical Review

Medical Review

This year we have welcomed back Anneli Wynn-Davies from maternity leave after the birth of her daughter in January 2015. We would like to thank Dush Batra and Julia Edwards for stepping in whilst she was away. Out of hours we are still reliant on consultant transport cover from the respective tertiary neonatal units and acknowledge that at times this can be challenging, but would like to thank our consultant colleagues for their continued support of the transport service.

Having joined the Royal College of Paediatrics and Child Health Medical Training Initiative Scheme in 2015 we have our first cohort of fellows. We have had successful recruitment from overseas for standalone fellow posts with doctors from Jamaica and Spain. We continue to have excellent feedback on the post from our fellows both in terms of clinical transport experience and provision of opportunities to enhance career development. We are grateful for the support of our tertiary neonatal services in contributing to advanced nurse practitioners and medical staff to middle-grade rotas.

Following successful fundraising we purchased two CritiCool machines and started delivering active cooling since June 2015. Following a review of transfers in this area we are pleased to say that the majority of babies are now in the target temperature range at the end of the transport. We have also purchased equipment to deliver high flow so that infants who are already on this respiratory support can be transferred without the need of CPAP for transfer. We aim to go live in the next couple of months.

We continue to be active with publishing our quality improvement work. Recent work includes developing a cooling registry to benchmark our progress with delivery of active cooling and reviewing the safety and efficiency of cardiac transfers. Our projects have been presented as posters and presentations at regional (network meetings), national (National Transport Group meeting, Brighton, November 2015) and international (2nd Joint European conference of transport of high risk neonates, Copenhagen, September 2016) meetings.

Following on from our work with our PIC colleagues there has been a successful business case for development of an East-Midlands PIC transport service.

We have worked with IT to develop a website which we hope will be of benefit to our stakeholders. The web address is: http://www.centreneonataltransport.nhs.uk/ . We would welcome your feedback regarding areas of this website to develop in the future.

We continue to provide support to Julie Gallagher with in-house nurse education and also outreach provision. We will continue to support this and run several multidisciplinary simulation sessions.

Ongoing projects for 2016/17

- We continue to work closely with IT to develop our website
- Work is underway to review and improve the quality of transport handovers
- We are trying to improve the ventilation and monitoring of CO_2 available for transport and are looking at options for new ventilators and transcutaneous CO_2 monitors
- Review of PDA ligation pathway
- We work closely as a consultant team to review options for more sustainable solutions for middle-grade medical cover.

Jo Behrsin
Puneet Nath
Anneli Wynn-Davies

Nursing Review

Building on our success at recruitment and retention since 2010 we have had a positive year during which several new team members joined us and following a well supported induction period we were able to sign them all off as competent transport nurses. We also welcomed back the majority of our maternity leavers this year who also benefitted from having some supported time on their return to CenTre.

At times providing a full daytime service has been a challenge despite these two positives . Long term sickness for several team members primarily in our north base has unfortunately had an impact at times and I would personally like to thank those team members who have stepped up to the mark to ensure that the service from our users point of view appeared to run without any hint of a problem. In particular to our team leaders, Lorraine, Richard and Sue, and our educator, Julie, without whose flexibility at times we could not have continued to provide a service.

By offering taster observation days to interested nurses we hope this may in turn lead us to recruit replacements for hose team members who have moved on to different career paths.

Nicky Davey
Matron

Fundraising Review

We have had a very successful year of fundraising with the continued support of Leicester Hospitals Charity, in particular Sue Stephenson. Exceptionally generous donations from the staff at Barclays Bank, the John Lewis's Community Matters scheme, as well as members of our own ambulance, nursing and medical teams running half marathons and cycling all the way from Leicester to Skegness plus donations from several families have ensured that our Little Lives Big Journeys fund has regularly been topped up.

This has allowed us to purchase our second therapeutic cooling machine as well as the jackets required to keep those babies who may have suffered a hypoxic insult at or around the time of their birth cool.

Other purchases have included:

- Noise attenuating ear defenders for our smallest babies
- Four Tom Tom satellite navigation systems for our ambulances
- We were also able to support sending two of our transport nurses to the National Transport Group annual meeting in a very windy Brighton last November

Future plans include:

- Purchasing equipment to enable our teams to deliver high flow oxygen therapy and to monitor levels of carbon dioxide in all babies receiving respiratory support more closely,
- Improved hearing protection
- Supporting staff to attend advanced training courses
- Attendance at national and international conferences

www.justgiving.com/LittleLivesBigJourneys

Nicky Davey
Matron

Activity 1

Table 1 Total CenTre workload

All transfers where the team were dispatched are shown. Subset data for paediatric transfers are infants transferred where the journey neither started nor finished at a neonatal unit. Figures in brackets show infants not moved but team despatched from base

	2011-12	2012-13	2013 - 14	**2014-15**	**2015 - 16**
Total CenTre transfers	1298 (11) 1287 moved	1406 (17) 1389 moved	1518 (8) 1510 moved	**1582 (28)** **1554 moved**	**1662 (43)** **1619 moved**
Neonatal	1292	1401	1515	**1568**	**1610**
Paediatric	6	5	3	**14**	**9**

Table 2 Trends over time

There has been a year-on-year increase in the workload for CenTre. This table compares 2011-12 data with 2014-15 for completed transfers only.

	2011 - 12	**2015-16**	Difference n=
Total Transfers (n=)	1287	**1619**	+332 (26%)
Repatriation n= (%)	456 (35%)	**650 (40%)**	+194 (15%)
Uplift n= (%)	498 (39%)	**617 (38%)**	+119 (9%)
Capacity n= (%)	279 (22%)	**307 (19%)**	+31 (2%)
OPA n= (%)	54 (4%)	**45 (3%)**	-9 (-0.7)
Support			
Ventilated n= (%)	310 (24%)	**377 (23%)**	+67 (5%)
CPAP n= (%)	123 (10%)	**179 (11%)**	+56 (4%)
Inotropes n= (%)	76 (6%)	**83 (5%)**	+7 (0.5%)
Transfers done by			
North team n= (%)	627 (49%)	**794 (49%)**	+167 (13%)
South team n= (%)	660 (51%)	**825 (51%)**	+165 (13%)
In-city transfers			
Leicester to Leicester n= (%)	167 (13%)	**210 (13%)**	+43 (3%)
Nottingham to Nottingham n= (%)	124 (10%)	**149 (9%)**	+25 (2%)
Capacity & Networks			
Capacity, ventilated n= (%)	64(5%)	**68**	+4 (6%)
Capacity, ventilated, moved out of level 3 unit n= (%)	58 (4%)	**41**	-17 (-29%)

Activity 2

Table 3 Activity classified by clinical and operational reason 2011-12 compared to 2015-16

	Medical		Surgical		Cardiac		Neurological		TOTAL		Diff
	2011 / 12	**2015 / 16**	2011 / 12	**2015 / 16**	2011 / 12	**2015 / 16**	2011 / 12	**2015 / 16**	2011 / 12	**2015 / 16**	
Uplift	214	**238**	159	**222**	99	**95**	12	**62**	484	**617**	**133**
Repatriation	457	**648**	0	**1**	0	**1**	0	**0**	457	**650**	**193**
Resource	279	**301**	24	**5**	0	**0**	0	**1**	303	**307**	**4**
OPA	9	**16**	9	**6**	39	**20**	0	**3**	54	**45**	**-9**
TOTAL	959	**1203**	189	**234**	138	**116**	12	**66**	129	**1619**	**321**
Difference	**244**		**45**		**-22**		**54**		**321**		

Table 4 Despatch time for time critical transfers (n=20)

	2010—11	2011—12	2012—13	2013 –14	2014 –15	**2015—16**
Median despatch time shown in minutes (IQR)	64 (40,111)	65 (46,87)	52 (30,86)	50 (30,86)	40 (25,55)	**46 (33,67)**

Despatch time = time from call receipt at CenTre to team leaving office en-route to referring unit.

Nationally agreed criteria for time critical transfers are:

- Gastroschisis
- Ventilated infant with TOF +/- Atresia
- Intestinal perforation
- Suspected duct dependant lesion not responding to Prostin infusion

Unstable respiratory or cardiac failure not responding to appropriate management

Activity 3

Table 5 Transfers done by other teams/units

Quantifying the amount of work that other transport teams undertake on behalf of CenTre has always been inherently difficult. The table below shows only those transfers that Centre was made aware were completed by another service.

Reasons for CenTre not being able to complete the transfer may include not being made aware the transfer was required (i.e. the referring team arranged the transfer directly with their local team rather instead of contacting Centre) or the referring unit were unable to wait for Centre to become free to do the transfer. It is 's important to emphasise that these are not "refusals" - CenTre appropriate referrals are not refused

2010 – 11	2011 – 12	2012 - 13	2013 - 14	2014 - 15	2015—16
34	50	62	**26**	**33**	**20**

The data in this table are of occasions where we know patients started or finished their journey at a CNN or TPN unit but where CenTre did not undertake the transfer. In all cases the decision that another team will undertake the transfer has resulted from a discussion between referring unit, CenTre and other clinical teams. The end result of those discussions is that it is best for clinical or logistic reasons for another team to undertake the transfer.

Table 6 Transfers into or out of a PICU

These are transfers completed by CenTre that a PICU transport team might have undertaken that either started or ended in a PICU. All round trip transfers from a neonatal unit to a PICU, primarily cardiac, that involve the return journey back to the neonatal unit have been excluded.

2010 – 11	2011 – 12	2012 - 13	2013 - 14	2014 - 15	2015—16
58	60	44	46	9	**4**

Governance

Clinical Governance, the process that aims to monitor and improve the quality of patient care within a healthcare environment, has challenges for a service that operates out of two different bases 30 miles apart that provides transport for many different units across a wide geographical area. It is a challenge to ensure that high quality care is provided and any untoward incidents are learnt from.

Both UHL and NUH use the Datix system as a method of highlighting when there are things that happen within a service that need to be looked at more closely and where others may benefit from such reviews. The business of transferring infants is often a solitary experience and any lessons learnt can easily stay within the small team involved. By sharing such things amongst the team we are better placed to ensure the whole team can share in the learning.

CenTre has a trigger list which identifies specific occurrences where a Datix should be submitted, for example clinical incidents such as an end of transfer CO2 less than 4kPa in infants requiring either CPAP or full ventilator support or end of transfer temperature below 36.5C in an uncooled infant. All Datix are reviewed by one of the Centre team leaders and if necessary further discussions involve a member of the senior team. A resume of each months' Datix are shared with the team by means of our quality dashboard and any specific learning issues are addressed by the education team.

Below is a numerical review of the 71 Datix forms that were submitted between April 2015 and March 2016.

Ambulance Datix = 9

Handbrake failed
Broken winch
Vehicle not starting
Vehicle Service—reduction in vehicle availability
Power Reset Button—staff not aware of its use
Battery going flat

Drug Datix = 1

IV infusion running at the wrong rate

Governance—cont'd

Staff & Call Centre Datix = 16

Lack of medical cover
Call centre team connecting transport nurse to the wrong hospital
Call centre team calling the wrong telephone number
Long waits in MRI Department with a ventilated baby
FFP sprayed into the transport nurse's face

Low CO_2 Datix = 18

It is current practice to report all end of transfer CO2 levels below 4KPa in all instances the appropriate actions were taken
Ventilator settings were reviewed and changed (reduced rates and/or pressures).

Equipment Datix = 8

Equipment either misused and/or damaged
Water leaking from the Criticool
Staff difficulty when connecting new ventilation circuits to the ETT
Broken infusion pump
Problem with the transport system powering up
Inability to keep a baby warm

Other reasons for Datix = 19

Ambulance stopping to allow for intervention
Patient not fit for transport (transport abandoned)
Various delays including lack of radiology cover – continuing issue
Delay in getting FFP ordered by referring unit
Delay in referral by referring unit resulting in a delayed transfer
A slipped UVC when the baby was put in the transport system
A telephone line failure from Virgin Media.

Education Review

The transport educator and the medical team continue to provide education throughout the network as and when requested. The period April 2015 – March 2016 has seen the training of 2 new transport nurses as well as supporting 2 transport nurses returning to work after maternity leave and illness.

In-house education

The transport team continue to receive 5 education days per year alternating between North and South base. These days are attended by the transport nurses, transport fellows, ANNP's and ambulance crew. They consist of equipment training, professional issues, clinical governance, case reviews, common neonatal conditions and their stabilisation and preparation for transport and simulation training.

Outreach education

The transport educator and the medical team are still being invited to present stabilisation sessions, and remain happy to continue if this the preferred way for your unit. However this year has seen a change in the way outreach education is being delivered throughout the networks. The transport educator now has regular sessions planned into units' mandatory training days for nursing staff on many units throughout the network. These sessions consists of the stabilisation of neonates with a variety of conditions and are currently being received well. If you are interested in the Transport Education team taking part in any upcoming days you have arranged for your unit please contact julie.gallagher@nuh.nhs.uk.

The transport educator has also delivered sessions in conjunction with De Montfort University for the Neonatal Intensive course.

The Transport Team recently hosted a network study day with the leads for CNN and TPN. "Stabilisation for transport and what happens next" took place on Thursday 26th May at Hollywell Park. The day was fully subscribed and was a very enjoyable, successful day. CenTre would like to thank Tony Dinning, Linda Hunn and Linsay Hill for all their support with the venue and their invaluable experience ensuring the day ran smoothly.

The period (2015-16) has also seen the Transport Educator completing a BSc in Health and Professional Practice and graduating from De Montfort University. I would like to say a very big thank you to University Hospitals of Leicester for providing the funding to allow me to complete the course and for CenTre for allowing me the study time to attend.

Julie Gallagher

Transport Educator

Publications, Presentations & Posters

National Presentations

Neonatal Transport Group annual meeting, Brighton 2015

Leslie, A. **National Neonatal Transport Group data trends and Chairman's presentation.**

Posters

Neonatal Transport Group annual meeting, Brighton 2015

Avinash Jinadatha , Andy Leslie, Nicky Davey, Julie Gallagher, Joanna Behrsin, **UK Neonatal Database needs improved data points for cooling infants**.

Cecilia Hanny-Harry, Andy Leslie, Jo Behrsin **Provision for managing difficult neonatal airways during transport across the United Kingdom**

P.Guddeti, J.Behrsin, N.Davey, A.Leslie **Challenges in obtaining parent feedback on neonatal transport service –CenTre experience**

Appendix

Evaluation of transport mileage and the effects of limited capacity in Trent Perinatal & Central Newborn Networks.

Andrew Leslie, Nurse Consultant & Service Lead, CenTre Neonatal Transport.

Sept 2016

SUMMARY

- The number of transfers undertaken annually by CenTre Neonatal Transport has increased each year since the service started, from 1263 to 1662 transfers.
- Transfers undertaken for capacity reasons, transferring infants from units that would normally be able to care for them, have increased by 272% between 2011 and 2016.
- CenTre is driving an estimated additional 35 - 40,000 miles per year as a consequence of these changes.
- The proportion of infants transferred following their network pathway has fallen from 79% to 63%.
- Fifty-three infants in 3 months in 2016 were transferred out of TPN/CNN for care they could have received in the networks.
- Infants were transferred an estimated excess of 4997 miles in 3 months.
- All capacity indices in this evaluation show a deteriorating trend from 2011 to 2016.
- CenTre Neonatal Transport response-time KPIs are beginning to deteriorate due to these changes. CenTre will prefer solutions to these issues that focus on network capacity improvement, rather than expanding the transport service, but if network capacity does not improve there will be a pressing need within the next 18-24 months to revisit transport resourcing.

Background

CenTre Neonatal Transport is separately commissioned to provide neonatal transport services for the fourteen neonatal units in Trent Perinatal Network (TPN) and CenTral Newborn Network (CNN), CenTre launched in 2010 with a commissioning expectation that around 1200 transfers would be undertaken each year by the new service. CenTre was, and continues to be, contracted to provide four teams in each 24 hour period, comprising one team at night and three during the day (one planned transfer team and two acute teams).

CenTre undertook the expected 1200 transfers in the first year of operation and the number has risen each year since (Table 1). This additional work, an increase of 32% in numbers over 6 years, has been absorbed without extra resources, representing exceptional value for the commissioning investment but also raising transport capacity concerns.

Appendix

Table 1. CenTre annual workload, transfers attended/year

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total CenTre transfers	1263	1298	1406	1518	1582	1662

Alongside the increase in numbers of transfers there has also been a developing set of concerns at CenTre regarding an apparent rise in two problem areas, related to neonatal capacity:

infants travelling further than necessary due to their closest appropriate neonatal unit having no bed.

infants being transferred out of units that should be able to provide the care they need because the unit lacks capacity.

For CenTre the effect of these issues is to create an additional workload which is hidden when just numbers of transports are evaluated. For example, if an unwell infant presents at Lincoln and requires a NICU bed the network pathway is to Nottingham. If CenTre despatches a Nottingham-based team the journey required is simply an outbound and an inbound journey to and from Lincoln, approximately 42 miles each way. For the infant there's a single 42 mile journey. If there's no capacity in Nottingham and a bed is secured in Sheffield, after trying other closer options, then the transport team has a round trip of Nottingham to Lincoln, then Lincoln to Sheffield and finally Sheffield back to base in Nottingham, a total of 145 miles for CenTre, compared to 84 miles if the network pathway was followed. For the infant the journey is 58 miles instead of 42. CenTre has travelled an additional 61 miles over the optimal journey and the infant an additional 16 miles.

In the second problem area, that of capacity transfers out of a unit that should be able to care for the infant in question, then the ideal mileage for both team and infant is zero miles.

A similar set of problems and concerns also apply to repatriation transfers when the infant is returned to a local unit. In the example given above, when the infant is ready to return to Lincoln from Sheffield the whole journey is repeated in reverse, with the same inefficiencies and additional workload.

Objectives

1. To estimate the mileage travelled on CenTre activity
2. To estimate the additional mileage travelled as a consequence of networks' capacity problems.
3. To make visible the additional miles transferred by infants.
4. To make visible the workload lost to units and the region.

Appendix

Methods.

Retrospective review of transport records for two time epochs, Jan-Mar 2011 & Jan-Mar 2016.

Out-patient/planned procedure transfers were excluded, as these are usually to/from a pre-determined no-choice destination.

The real mileage driven on transfers is not recorded, so determination of mileage was pragmatic for this evaluation. Google Maps was used to determine distance between hospitals. The shortest journey option was used.

For determination of ideal miles travelled, for uplift transfers the journey to the designated network path-way unit was used and for capacity transfers the ideal mileage was zero.

Repatriation transfers were also included in the evaluation. Following an uplift outward transfer, the ideal miles for the repatriation are based on the infant receiving care at their local tertiary centre. Following an outward transfer for capacity reasons the ideal miles for CenTre & infant for the repatriation are zero.

Results.

1. Workload

A total of 335 transfers were undertaken by CenTre in the period Jan-Mar 2011, and 405 transfers in the same period in 2016, an increase in 21% in the number of transfers undertaken (Table 1). Number of uplift & capacity transfers have increased but the increase is most in the capacity transfers, an extra 49 transfers in 3 months (+272%).

The number of repatriation transfers fell slightly, with the largest drop being repatriations from NICUs.

Table 1. Workload: Transfers undertaken by CenTre, total and operational reasons by level of referring unit.

	Jan-Mar 2011 n=	Jan-Mar 2016 n=	Difference n= (%)
Total transfers	**335**	**405**	**70 (21)**
Uplift	132	154	22 (17)
From LNU	72	80	8 (11)
From SCU	26	35	9 (35)
From NICU	34	39	5 (14)
Capacity	18	67	49 (272)
From LNU	0	6	6
From SCU	3	13	10 (333)
From NICU	15	48	33(220)
Repatriation	176	171	-5 (-3)
From LNU	13	19	6 (46)
From SCU	17	28	11 (41)
From NICU	146	124	-22 (-15)
OPA	9	13	4 (50)

Appendix

2. Estimated CenTre mileage undetaken

The total estimated number of miles driven by CenTre (Table 2) in the study periods increased by 9619 miles (38%). This proportional increase is substantially larger than the increase in number of transfers (21%), reflecting the longer journeys undertaken in the later period. All categories of operational reason for transfer (uplift, capacity, repatriation) increased in mileage, but the largest proportional increase was capacity transfers (+232%; 3556 miles).

Table 2. Estimated mileage undertaken, total & by operational reason, Jan-Mar 2011 & Jan-Mar 2016.

	Jan-Mar 2011 (miles)	Jan-Mar 2016 (miles)	Difference miles(%)
Total transfer miles	25,309	34,928	9619 (38)
Uplift	10,070	13,816	3746 (37)
Capacity	1,533	5,089	3556 (232)
Repatriation	13,121	14,939	1818 (14)

There was a sixteen percent reduction in the number of transfers following their network pathway in the more recent period (Table 3). There was an increase in transfers where the infant was taken out of both TPN & CNN, 61% increase for uplift transfers and 157% for capacity. Table 4 shows where those transfers ended. There were more where the transfer originated in TPN (n=40) than CNN (n=13)

Table 3. Adherence to network pathway and number of transfers leaving TPN/CNN.

	Jan-Mar 2011 n=132	Jan-Mar 2016 n=153	Difference n= (%)
Uplift transfers following pathway n= (%)	104 (79)	97 (63)	-7 (-16)
Uplift transfers leaving TPN/ CNN n= (%)	25 (19)	41 (27)	16 (61)
From LNU	15	21	6 (40)
From SCU	7	14	7 (100)
From NICU	3	6	3 (100)
Capacity transfers leaving TPN/CNN	7 (38)	18 (27)	11 (157)
From LNU	0	0	0
From SCU	2	7	5 (250)
From NICU	5	11	6 (120)

Appendix

Table 4. 2016 infants transferred out of TPN/CNN (uplift & capacity transfers that finished their journey out of either network). This table excludes transfers where the destination unit was the preferred receiving unit, for example infants with rare congenital abnormality to GOSH. The table includes only infants who could have received their care in TPN/CNN.

TPN	CNN
From NICU Sheffield Children's Hospital: 2 Sheffield Jessop Hospital: 2 Rotherham Hospital: 4 Royal Chesterfield: 2	From NICU Birmingham Children's Hospital: 1 St Thomas's Hospital, London: 1 Peterborough Hospital: 2
From SCU Sheffield Jessop Hospital: 5 Sheffield Children's Hospital: 1 Birmingham Children's Hospital: 2 Doncaster Hospital: 2 Rotherham Hospital: 1 Russells Hall Hospital: 1 Macclesfield Hospital: 1 Peterborough Hospital: 2	From SCU Birmingham Heartlands: 1 Oxford JR: 1 Peterborough Hospital: 1
From LNU Kings Lynn Hospital: 2 Hull RI: 3 Sheffield Jessop Hospital: 3 Sheffield Children's Hospital: 2 Grimsby Hospital: 1 Addenbrookes Hospital: 1 Peterborough Hospital: 1 Leeds General: 1 Wolverhampton Hospital: 1	From LNU Birmingham Children's Hospital: 1 Birmingham Women's Hospital: 1 Worcester Hospital: 1 Peterborough Hospital: 1 Sheffield Jessop Hospital: 1 Luton & Dunstable: 1

Table 5 shows estimations of actual and ideal miles for infant and for CenTre and compares these for the two periods. This suggests that the situation in 2011 in respect of infants following network pathways was sub-optimal, with an excess estimated mileage of 2852 miles for infants and 6823 miles for CenTre. The 2016 data shows the estimated excess mileage to have increased substantially, with an excess estimated mileage of 4997 miles for infants and 13974 miles for CenTre.

Appendix

Table 5. Estimated mileage for the actual journey undertaken and for the journey if the network pathway were followed.

	Jan-Mar 2011			Jan-Mar 2016		
	Ideal miles	Actual Journey	Diff	Ideal miles	Actual journey	Diff
Baby miles	6467	9319	+2852	7272	12269	+4997
Uplift	3227	3788	+561	3479	4801	+1322
Capacity	0	570	+570	0	1774	+1774
Repatriation	3058	4779	+1721	3304	5205	+1901
CenTre miles	18486	25309	+6823	20954	34928	+13974
Uplift	8870	10070	+1200	10186	13816	+3630
Capacity	0	1533	+1533	0	5089	+5089
Repatriation	9012	13121	+4109	9684	14939	+5255

Discussion

CenTre workload has increased substantially between the two periods evaluated, not only in absolute number of transfers but also in the distances travelled. It appears that the prospects for infants to receive their care at the nearest appropriate unit, or to remain on a unit that should be able to care for them, has declined between the two periods.

The transport service has a core role in trying to ensure that infants remain as close to home as possible if they have to be transferred, so there is a carefully codified procedure for each type of referral from each of the 14 units that sets-out the order in which receiving units will be contacted for a bed. These algorithms mean that we can sure that there was an attempt to follow the network pathway for every referral.

These data suggest that the existing capacity in the networks is insufficient for demand, and that the trend is for the gap between supply and demand to increase . This paper is concerned with the effects of this deficiency on infants, families & the transport service, not with how or why the deficit came to exist, nor with why it appears to be worsening.

For infants and their families this is a new perspective on the scale & nature of the problems that arise as a consequence of capacity issues. If we assume that this 3 month period is representative of patterns over the whole year, then infants are being transferred by around 20,000 miles in excess of the distance they would in a perfect system in a year. Around 5000 excess miles a year are of infants who are unwell and requiring transfer for uplift of care and almost 7000 miles are the excess travelled by infants in a year who should be able to stay on their referring unit for care but cannot, for capacity reasons.

The effects of the capacity deficit on the transport service are important too. Whenever CenTre is engaged in a capacity transfer of an infant who ought to stay on their referring unit that resource is unavailable for other work. Similarly, when an uplift transfer involves CenTre travelling many more miles than ideal then transport is tied-up and unavailable while that happens, as it is when doing repatriation transfers that shouldn't have needed doing, or were longer than ideal. This has an additional toll in many aspects of CenTre's operational abilities.

Appendix

- Longer transfers means greater likelihood of late finishing for the team. We can't pay overtime for these, so every late finish means a gap in the rota in the future.
- CenTre's key performance indicator (KPI) for response time (transport team arrives with the patient (uplift & ICU transfers) within 3.5hrs of the start of the referring call) is 69% for Jan-Jun 2016, becoming slightly worse each year and well below the national average (83%). This is a key measure as it reflects the ability of transport teams to respond to a broad swathe of their core work – transferring infants who are unwell (receiving intensive care) and need an uplift transfer for specialist care they cannot receive locally.
- Our KPI for time critical transfers (team despatched within 60 minutes of the start of the referring call stands at 79% for Jan-Jun 2016, below the national average and at a time when the best-performing teams are achieving 100%.

There are some limitations in this evaluation. Using estimated mileage from Google Maps means we don't know the real miles travelled on these transfers. Given that in general the shortest mileage given by Google Maps was used it is likely that the real miles were more. Miles are a proxy for time in this evaluation. What we really want to know is how much extra time is spent by infants and teams in transit as this would tell us more about the time commitment and lost resource. Time data might be possible to collect prospectively for transfers undertaken, but mileage is a more objective measure when it comes to a comparison with an ideal journey. This is snapshot data comparing two periods chosen simply because Jan-Mar 2016 was at hand when the data started to be collated. While it may be argued that the periods are unrepresentative, this seems unlikely given the year-on-year trends in CenTre activity.

Conclusion

Because of network capacity CenTre is operating beyond commissioned workload and dealing with a burden of additional transport work that is responsible for a set of avoidable potential clinical risks

- Risks to unwell infants transferred additional distance beyond their local unit
- Risks to infants undergoing transfer because their local unit who should be able to care for them cannot, for capacity reasons.
- Risks to infants who require urgent transfer but for whom transfer is delayed due to the extra transport work described in this paper.
- An evolving risk that CenTre will be regularly unable to cope with demand for transport if these workload trends continue.

The solution to the set of concerns and risks outlined in this paper is to address the issue of networks' capacity. Expanding transport capacity is not the desire or intention of raising these concerns, though will be a necessity within 18-24 months if the trends outlined here continue.