

Children's Acute Transport Service CATS



Annual Report 2013/14



Highlights of the year

CATS expanded the outreach education program to referring hospitals by delivering more frequent sessions and using simulation-based teaching. CATS has increased the use of telemedicine for the rapid debrief of complex or challenging cases between the referring hospital and CATS multidisciplinary teams.

The Children's Acute Transport Service (CATS) is in its twelfth year of providing dedicated specialist paediatric intensive care transport services for the North Thames region.

In 2013/14, the CATS service handled 2289 clinical calls and mobilized an expert team on 1206 patient transports.

This represents an average of 6 calls for assistance and 3 patient transports on every day of the year and is more than in any previous year.

CATS offers an outreach simulation programme for referring hospitals, as well as a variety of one day study days. The next Situation Critical study day is 17th October 2014 at RCPCH.

CATS engaged in joint aeromedical crew resource management training between CATS and CEGA, involving simulation, emergency scenarios and aircraft environment.

CATS engaged in joint Children's Air Ambulance Partner Team Training with STRS, Embrace, NEWTS and WATCH transport teams.

CATS submits data to the Paediatric Intensive Care Audit Network (PICANet), the national audit of paediatric intensive care activity. Reports from PICANet will provide the ability to benchmark the CATS service against other PIC retrieval services in the UK.

CATS staff published several peer-reviewed research articles and presented at various national and international conferences.



Single point of contact

CATS provide a single point of contact for advice, bed finding, and a paediatric intensive care retrieval team for critically ill children

0800 085 0003

EXECUTIVE SUMMARY

In 2013/14

REFERRALS: n= 2289

Referral outcome	Number (%)
CATS team mobilised	1206 (53%)
Advice/consultation only	523 (23%)
Refused - within scope of care	86 (4%)
Refused – outside scope of care (HDU transport etc.)	245 (11%)
Cancelled by referrer	142 (6%)
Bed finding request	52 (2%)
Courtesy call	21 (1%)

More than 20% of referrals are resolved with advice/consultation without the need for patient transport. Advice calls are an important part of CATS activity because early discussion may, in some cases, avert the need for PICU admission. Referrers have repeatedly highlighted this aspect of CATS activity as an important role of the service.

Specialist transports n=1165

Destination hospital	Number (%)
Great Ormond Street Hospital	470 (40%)
St Mary's Hospital	234 (20%)
Royal Brompton Hospital	118 (10%)
Addenbrooke's Hospital	148 (13%)
Royal London Hospital PCCU	70 (6%)
South Thames PICUs	66 (6%)
Other units	59 (5%)

76% of the patients were transported to PICUs in North Thames (Great Ormond Street Hospital, St Mary's Hospital, Royal Brompton Hospital and the Royal London Hospital), while 13% of patients were transported to Addenbrooke's Hospital in Cambridge.

CATS also undertook transports for supra-regional services such as burns (5 children to St Andrews Burns Centre, Chelmsford), extra-corporeal membrane oxygenation (5 children to ECMO centres other than Great Ormond Street Hospital).

CATS provides the highest quality paediatric intensive care for patients and their families from the point of referral to the handover of care at the receiving paediatric intensive care unit

BACKGROUND

The Children's Acute Transport Service is a specialised service designed to make intensive care rapidly available to critically ill children in North Thames and East Anglia.

Most hospitals do not have a Paediatric Intensive Care Unit (PICU) - paediatric intensive care is only provided in a small number of specialist units. However, most critically ill children initially present to hospitals without a PICU. The Children's Acute Transport Service (CATS) facilitates the safe and speedy transfer of these children to a PICU.

CATS deploys a specialist paediatric intensive care team to assist in the treatment and transport of critically ill children. We offer telephone consultation, liaison with sub-specialists and skilled inter-hospital transport within one service.

The CATS team has been assessed and internationally accredited by the Commission on Accreditation of Medical Transport Services (CAMTS) for helicopter, aircraft and ground paediatric critical care transport (<http://www.camts.org/International.html>).

Members of the CATS team have led the development of national standards for paediatric intensive care transport within the UK via the Paediatric Intensive Care Society Acute Transport Group (PICS- ATG).

MISSION STATEMENT

The Children's Acute Transport Service aims to provide the highest quality paediatric intensive care for patients and their families from the point of referral to the handover of care at the receiving paediatric intensive care unit.

- *Single regional focus for provision of paediatric critical care for patients presenting as an emergency*
- *Provides 24 hour, 365 day, Consultant led telephone advice and a triaging facility for all referrals*
- *Committed to improving and developing the provision of critical care and critical care transport for all patients within its scope of care.*

SERVICE STANDARDS

A complete copy can be found on the CATS website:

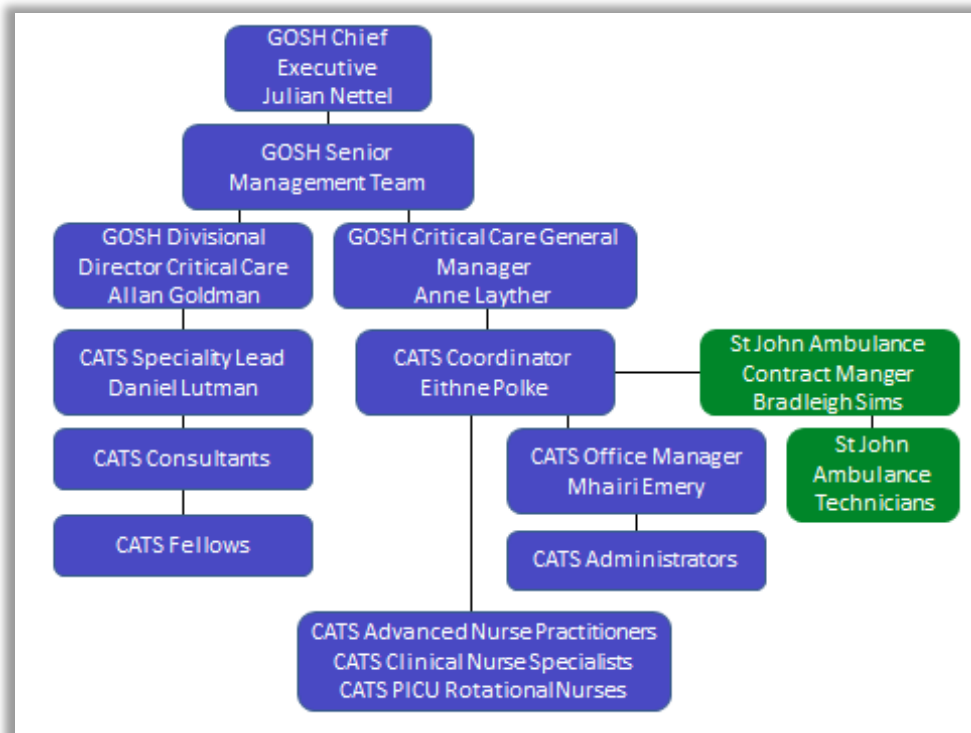
http://site.cats.nhs.uk/wp-content/uploads/2014/06/cats_service_standards_2014_15.pdf

The following core standards apply:

1. The CATS service will meet the Standards for the 'Retrieval and Transfer of the Most Critically Ill Children' identified by the Paediatric Intensive Care Society 4th edition of the document 'Standards for the Care of Critically Ill Children' 2010.
2. Any child within North Thames within CATS scope of care can expect the retrieval team to be mobilised within 20 minutes from decision to retrieve.
3. Any child within East Anglia requiring paediatric intensive care can usually expect the retrieval team to be mobilised within 1 hour from decision to retrieve, depending on transport mode.
4. When the capacity of the CATS service is exceeded, referrals will be prioritised according to clinical need.
5. Early expert clinical advice and management by Consultants trained in Paediatric Intensive Care is available to referring hospitals at all times.
6. Education and training of the CATS staff is a fundamental part of the service.
7. An Outreach Program will be offered by CATS to referring institutions.
8. Written protocols and guidelines are in place for the management of the most frequently retrieved patient groups.
9. Rigorous audit is undertaken and presented to both East Anglia and North Thames provider units on a regular basis not exceeding yearly.
10. At times of paediatric intensive care bed shortage, all patients within CATS scope of care will be transported to the nearest appropriate paediatric intensive care bed unless the risk of doing so is deemed greater than providing care at the referring institution.

CATS Organisation Structure

The CATS service is part of the management structure at Great Ormond Street Hospital for Children NHS Foundation Trust



THE TEAM 2014

Divisional Director: Dr Allan Goldman

General Manager: Anne Layther

Speciality Lead: Dr Daniel Lutman

CATS Co-ordinator: Eithne Polke

CATS Consultants

Dr Daniel Lutman

Dr Padmanabhan Ramnarayan

Dr Richard Paget

Dr Sandra Walsh

Dr Samiran Ray (Locum)

From GOSH

Dr. Andy Petros, Dr. Joe Brierley, Dr. Sanjiv Sharma, Dr. Mark Peters.

From SMH

Dr. David Inwald and Dr. Parviz Habibi

CATS Fellows

Dr. Jill Sparrow

Dr. Raul Montero

Dr. Anna Brough

Dr. Bogdana Zoica

Dr. Salman Siddiqi

Dr. Bedangshu Saikia

Dr. Mireia Garcia

Dr. Pranav Kukreja

Advanced Nurse Practitioners

Lynn Shields

Mark Clement

Darren Darby (Left Jan 2014)

Trainee Advanced Nurse Practitioners

Cathy Roberts

Emma Sturgess

Retrieval Nurse Specialists

Beverly Halverson-Steele

Ali Clayton Payne

Leanne Branighan

Carole Jones (Left Feb 2014)

CATS Office Manager:

Mhairi Emery

CATS Administrators

Marissa Willock

Joan Joseph

Roger Mc Gee

Jeuntelle Stapleton

Laurie Hayes

Lucy Marsh

Carly Williamson

CATS/St John Ambulance

Mr. Brad Sims (Commercial Transport Manager)

Richard Green, Albert Rapacioli, Richard Levy, David Morton Ian Michaels, Phil Bartholomew, Dave Warren, Mark Bourne, Chris White, Louis Roberts, Lyn Burgess

Rotational Nurses

GOSH PICU/NICU

Alison Taberner Stokes, Josephine Jim, Helen Drennan, Claire Fraser, Simon Mansfield Sturgess, Emma Sharpe, Jason Pritchard, Gamal Hutton, Sharon Chalkley, Nikki Pearson, Claire Steele, Lorraine Highe, Monika Sedbauer, Gail Murphy, Mary Sellings, Jo Garwood

GOSH CCC

Jo Broadhurst, Catherine O'Hagan, Chantelle Reid-McLeod, Sheryl Snowball, Christy Packham

St Mary's Hospital PICU

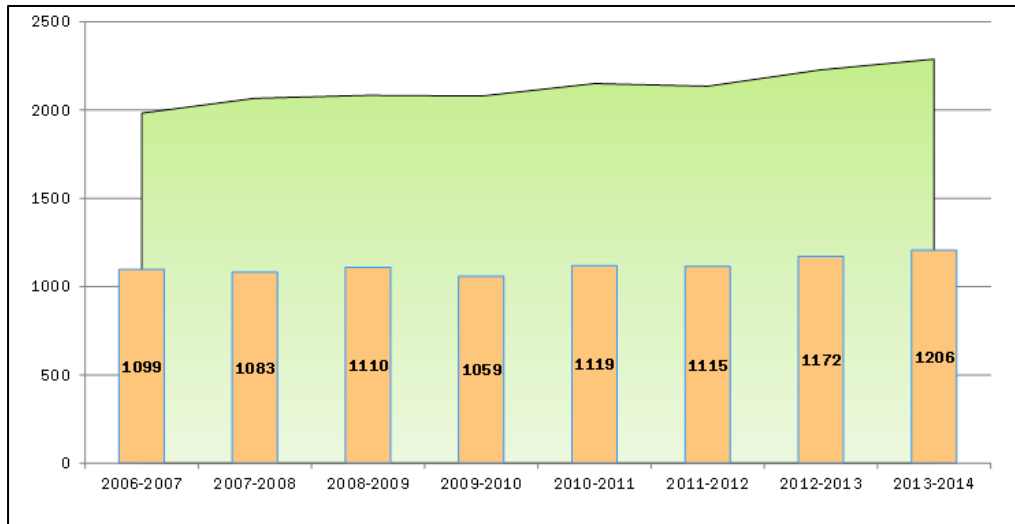
Debbie Lee, Anne Dowson, Carly Croyman, Vikki Norman, Sarah Brice, Cally Feather, Carey Corrigan

Royal Brompton PICU

Claire Buckle, Rhiannon Burdge, Jill McGee, Sarah Bacon

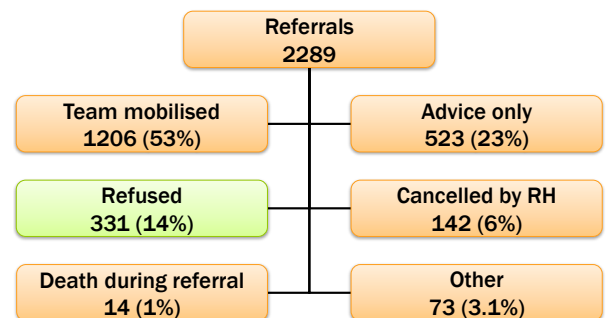
CATS CLINICAL ACTIVITY Referrals

Since 2006 there has been a gradual increase in referrals (green area). Transports delivered are in orange. More transports were delivered by the teams this year than in any other. Vertical axis = number of transports, Horizontal = financial year.



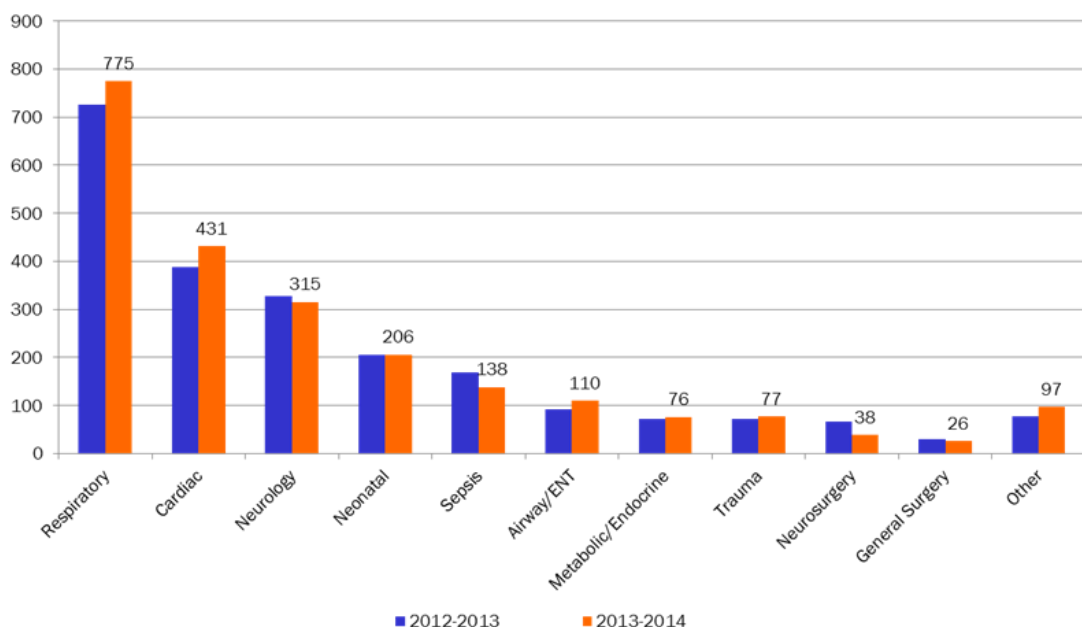
Some transport requests cannot be fulfilled - these are classified as refusals. Most refusals are not within CATS agreed scope of care (n=245).

In 2013- 2014 n = 86 transports were refused because both CATS teams were already tasked.



Clinical category at referral is broadly similar year on year:

Vertical axis = number of referrals, Horizontal axis = Diagnostic category



DETAILED CLINICAL ACTIVITY

Retrievals

The CATS team was mobilised on 1206 occasions which is more than on any previous year. The outcome of all team mobilisations is illustrated below:

Retrieval outcome	Number (%)
Transferred	1165 (97%)
Patient improved – with the CATS team	15
Patient died – team on route	3
Patient died – with team at DGH	10
Retrieval cancelled	13

The majority of children were transferred to one of the 4 PICU providers in North Thames (76%).

North Thames PICU's	Number
Great Ormond Street Hospital	470
St Mary's Hospital	234
Royal Brompton Hospital	118
Royal London Hospital	70
Evelina Children's Hospital	23
King's College Hospital	17
St George's Hospital	17
Destinations outside London	Number
Addenbrookes Hospital	148
St Andrews's Burns Centre	5
ECMO centre (non GOSH)	5
John Radcliffe Oxford	3
Southampton	5
Other	27

The CATS team continues to work in close co-operation with the other regional transport services such as the London Neonatal Transport Service (NTS), the South Thames Retrieval Service (STRS) and the Anglia Neonatal Transport Service (ANTS). During busy periods, these teams cross-cover to utilise existing PICU/NICU beds efficiently. The team interactions and their outcome are depicted below:

Referral from	Requests	Accepted	Refused
STRS	20	7	6
NTS	28	16	4
ANTS	6	2	4
SORT	4	1	3

Patient acuity of CATS transfers was high – the majority of patients were invasively ventilated, and a significant number needed inotrope support and inhaled nitric oxide during transport.

Invasive ventilation rate	76%
Vasoactive agent use	27%
Inhaled NO	4%
Median PIM-2 score	6.9%

The majority of transfers were undertaken by road, using dedicated CATS ambulances (98%). 30 transfers were performed using helicopters or fixed-wing aircraft (2%).

Team composition in the majority of retrievals was PICU Fellow + PICU Nurse. ANP's led 8% and CATS Consultants were present on retrieval in 10% of transports.

QUALITY AND SAFETY Performance indicators

As part of our ongoing quality and safety program, a number of performance indicators are continuously audited at CATS.

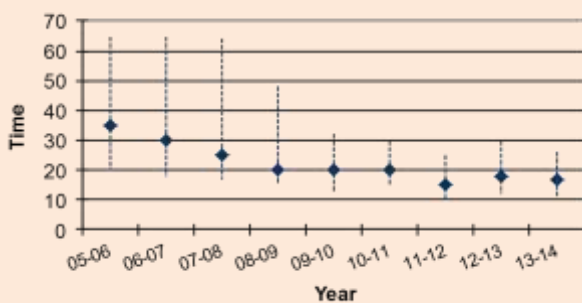
Mobilisation and stabilisation times

One of the service standards, and an accurate indicator of the agility of the service, is the time taken to mobilise a team once the decision to accept the patient has been made. As part of our quality improvement programme, the CATS team aims to mobilise a team within 20 minutes of acceptance.

In addition, the CATS team aims to provide the same level of intensive care at the referring institution as at the receiving PICU – this often necessitates a period of stabilisation and assessment of stability for transfer.

Time	Median (min)	IQR (min)
Mobilisation time	17	11-26
Stabilisation time	108	80-165
Total retrieval time	275	215-350

As a result of a continuous quality improvement effort, mobilisation times have improved year on year at CATS.



Time to reach patient bedside

One of the PICS standards states that the retrieval team should reach the critically ill child within 3 hours of referral acceptance (4 hours for geographically isolated regions). CATS met this target in 82% of cases.

Out of region transfers

CATS continues to monitor the flow of patients from North Thames and reports directly to the commissioner for PIC services on a monthly basis. Last winter, a number of children were transferred from the London region to other regional PICUs.

This graph shows number of transports out of London (vertical axis) by calendar month (horizontal axis).

Blue line is for 2012-2013 and the orange 2013-2014.

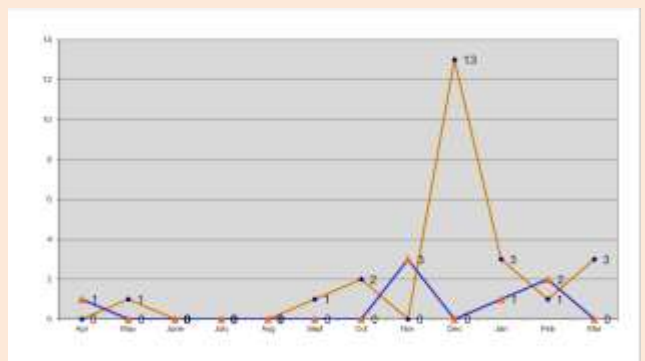


Waiting for the CATS team > 8 hr

Some children were cared for by the District General Hospital for >8 hours. This related to a lack of PICU capacity. These children were managed locally in collaboration with the CATS team, and once a bed became available, were transferred in to PICU.

This graph displays the number of patients waiting (vertical axis) by calendar month (horizontal axis).

The blue line is 2012-2013 the orange 2013- 2014.



CLINICAL GOVERNANCE

Risk Management and Adverse Event Reporting

CATS Risk Action Group (RAG)

The Group's aim is to ensure consistency in the quality and access to the service across the region and continue to work in partnership across the multi-disciplinary paediatric critical care teams, specialised commissioners, St John's Ambulance Service and, where possible, with patients and their careers in planning the future of CATS. The scope of the group is to provide a forum, which promotes care to the highest standard through open dialogue, teamwork and knowledge where lessons are learned and risk is minimised and where change is continuous and rapid.

The RAG membership is made up of CATS consultants, nurses, office manager, Transport manager, PICU consultants from across North Thames units, a Consultant Paediatrician from a district general hospital and members of the Risk Management team at GOSH.

- Monitor and oversee all clinical activities
- Maintain processes for assuring quality of clinical care
- Provide up to date guidelines on clinical practice and procedures
- Develop and monitor implementation of National Standards
- Monitor all research and development activities within CATS Team
- Proactively manage clinical risk assessment processes including incident reporting
- Manage complaints, critical incidents and audit
- Ensure that CATS Mortality and Morbidity meetings are held across the PICUs
- Health & Safety Standards
- Use of Information
- Education & Training Standards

All governance meetings are informed by the 3 monthly Risk Action Group meetings.

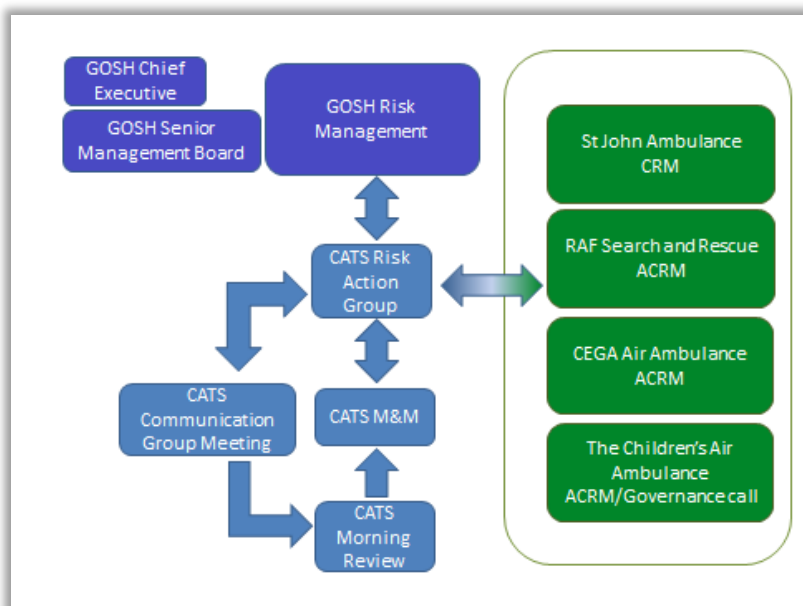
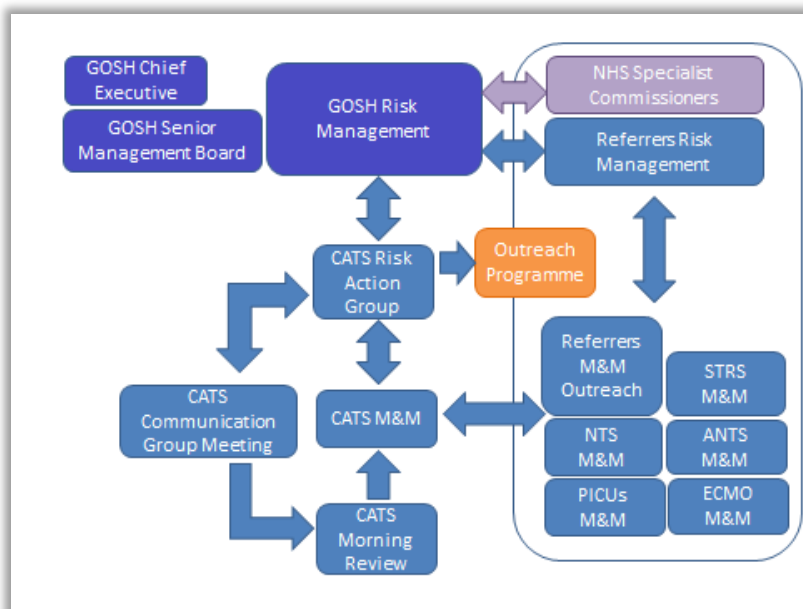
- Specialty Board at GOSH
- 3 monthly clinical excellence meeting (RAG)
- Separate 6 month Morbidity & Mortality meetings (or as required) with the 4 PICUs across the region
- Monthly (3rd Wednesday of every month) CATS Morbidity & Mortality meetings
- Daily review of referral/retrieval activity
- Annual review of service delivery
- Outreach education packages available bi-annually to the DGH which incorporates an element of discussion on difficult cases and service improvement.
- Extraordinary meeting which can be called by any of the users/co-opted members.

Adverse event reporting

The CATS team records adverse events and near misses during the course of the transfer relating to ambulance, equipment, and patient-related activity. Adverse event reporting is encouraged to facilitate an active approach to risk reduction. Each adverse event is analysed during the daily team meeting where clinical activity from the previous 24 hours is discussed.

Organisational Maps :

Incident Reporting and Incident Management



CATS Education and Training

There is a comprehensive in-service education program at CATS, which includes:

- **Staff mandatory update days:** In 2013/14, 3 sessions were held, where all staff members working for the service attend.
- **Fellows Induction:** 10 one-day local induction programs were run over the past year.
- **Nurses induction:** 3 two-day sessions attended by all new starters to CATS, who then go on to work in a supervised capacity on retrieval.
- **SIM Training:** CATS ANP & Consultant team facilitated on a number of SIM courses including 3 HENCEL days.
- **APLS / EPLS Courses:** CATS Core Nursing Team facilitated on 3 courses over the last year.
- **Advanced Nurse Practitioner study days:** One ANP day was run by the CATS consultants with didactic teaching, reflective practice and research paper discussion as well as review of clinical skills stations.
- **Ambulance Technician update days:** Annually

- **Core Curriculum Teaching Days:** Undertaken at GOSH, which complements the modular teaching for the ICTPICM syllabus.
- **Mortality & Morbidity:** A monthly M&M is undertaken at CATS on the third Wednesday of every month.
- **Daily Morning Review/Teaching:** Every morning CATS reviews its previous 24 hours work with a focus on encouraging clinical problem based discussions.
- **Weekly Teaching:** A timetable is in place for all staff to participate in presenting an interesting paper, review a guideline, or present an interesting case in which they have participated in the retrieval process.
- **Supervised Retrievals:** Nursing and medical staff formed part of the retrieval team to be trained on a number of occasions.
- **Observer shifts:** Observers from referring institutions (PICU outreach facilitators, registrars, and consultants) accompanied the team on a number of retrievals, spending anything from a day to a week



ADVANCED NURSE PRACTITIONERS

The aim of the advanced nursing posts is to create a flexible team that can respond to the needs of the service and the referring centers through education, outreach, stabilisation and transportation of the critically ill child. The ANP job plan is divided into 65% clinical, 25% education & training and 15% research & audit.

Currently there are 3 Advanced Nurse Practitioners (ANP's) for the Children's Acute Transport Service with 1 in training and 1 about to start her training. The ANP/trainee ANP's have participated in 25% of our total retrieval activity as both lead clinicians and in a training/supervisory role.

HIGH-FIDELITY SIMULATION

CATS successfully bid for the HENCEL funding for a dedicated simulation programme commencing Oct 2013. This post funded a 0.5 WTE ANP to coordinate and deliver mobile SIM training to the North Central District General Hospitals.

This type of training, where the manikin patient closely mimics the responses of a real patient, can greatly enable the candidates' suspension of disbelief during the clinical scenario. The manikins are authentic in regard to voice, airway, breathing pattern, breathing sounds, pulses and interactive monitoring. They are easily transported in a small light suitcase. Running the scenario authentically in real time not only gives an opportunity to better apply one's clinical skills, but also practice one's leadership, communication and prioritisation skills.

This is something that we would hope to offer to all our hospitals in the coming financial year.

CATS Outreach Education

CATS play a pivotal role in helping referring hospitals to manage the critically ill patient and stabilise them while waiting for the transport team. This is done through regular outreach visits to facilitate case discussions as well as lectures, workshops and tutorials. In addition, the CATS website serves as a single point of high quality information including guidelines, prescriptions for drug infusions and parent information.

In 2013/14, 21 outreach sessions were organised with the DGH teams, covering over 20 of the main referrers to the service which included mobile insitu simulation, day courses and teleconferencing.

Clinical Network

Outreach activity is integral to the development and maintenance of the clinical network. The CATS teams have made themselves known to key members of staff in the hospitals that use the service.

They are therefore easily accessible on an informal basis to bring up issues regarding the service, ask clinical questions and receive immediate feedback on children that have been retrieved.

Outreach sessions allow full engagement between CATS and all those who look after seriously ill children, in order to fulfill some of the recommendations made in the Tanner report (2006). The service has made a huge effort in contacting colleagues in anaesthetics, adult ICU and accident and emergency; however, due to time constraints, it is not always possible to facilitate bi-annual sessions for all the District General Hospitals.

NETWORK LINKS

Retrieval Co-ordinator: Eithne Polke

North-West Sector: P Ramnarayan (CATS Consultant) and Mark Clement (ANP)

North-Central Sector: Richard Paget and Sandra Walsh (CATS Consultants) and Lynn Shields (ANP)

North-East Sector and Essex: Daniel Lutman and Sandra Walsh (CATS Consultants) and Cathy Roberts (Trainee ANP)

Network links can be contacted via CATS: 020 74305850

Research & Audit

There are excellent opportunities for CATS trainees to perform research and audit as part of the clinical service.

Research themes

1. Use of biomarkers in early critical illness (cardiac troponin)
2. Epidemiology of retrievals and service organisation (effect of stabilisation time on outcome; effect of source of admission on outcome)
3. Early intervention during retrievals (use of ultrasound guided vascular access)

Clinical trial completed

CATCH study: multi-centre study of standard versus heparin coated versus antibiotic coated central venous catheters, Institute of Child Health

Publications in 2013/14

- 1) The predictive value of the NICE "red traffic lights" in acutely ill children. Kerkhof E, Lakhanpaul M, Ray S, Verbakel JY, Van den Bruel A, Thompson M, Berger MY, Moll HA, Oostenbrink R; European Research Network on recognising serious InfEctions (ERNIE) members.
PLoS One. 2014 Mar 14;9(3):e90847. doi: 10.1371/journal.pone.0090847. eCollection 2014.

2) A randomized trial of hyperglycemic control in pediatric intensive care. Macrae D, Grieve R, Allen E, Sadique Z, Morris K, Pappachan J, Parslow R, Tasker RC, Elbourne D; CHiP Investigators

.N Engl J Med. 2014 Jan 9;370(2):107-18. doi: 10.1056/NEJMoa1302564. Erratum in: N Engl J Med. 2014 Apr 10;370(15):1469

3) Comparison of three different timeframes for pediatric index of mortality data collection in transported intensive care admissions*. Rahiman S, Sadasivam K, Ridout DA, Tasker RC, Ramnarayan P.

Pediatr Crit Care Med. 2014 Mar;15(3):e120-7. doi: 10.1097/PCC.0000000000000058.

List of regular/dashboard audits

- Use of exemptions (lights & sirens) during retrieval
- Adverse events occurring on transfer
- Neurosurgical emergency transfers audit
- Intubation Audit
- Mobilisation times
- Medical documentation audit
- Flight Retrievals
- Child Protection Paperwork audit
- Drug Prescribing errors

Information technology and use of information



Several service improvement projects are ongoing at CATS that relate to the use of information technology.

CATS WEBSITE

The CATS website (www.cats.nhs.uk) is a vital source of information for the referring hospital. The website has been updated to a new user-friendly format, and contains links to all CATS Guidelines, Operational Guidelines and a new electronic drug infusion calculator.

PICU ELECTRONIC INFORMATION SYSTEM

CATS are part of the GOSH PICU Information System procurement process. Implementation of this system at CATS will allow the team to record data electronically on retrieval, just as on a PICU, giving the team the ability to store vital patient data in real time, and query retrieval information in the future for education, training, audit and clinical governance purposes.

PICANET RETRIEVAL DATASET

CATS staff have been instrumental in the development of the PICANet national audit dataset for retrievals. CATS submitted data to PICANet in 2012/13. Submitted data can be used to benchmark CATS against other UK retrieval services.

VIDEOCONFERENCING

Videoconferencing has become an integral part of the CATS workflow.

Short notice debriefs can be arranged for referring hospital and CATS teams to discuss challenging or complex cases.

Please contact your network lead for more details:

Network links can be contacted via CATS: 020 74305850



Continuing Professional Development and External Work

Mark Clement (CATS Advanced Nurse Practitioner) is an elected committee member of Royal College of Nursing's Critical Care and Inflight Nursing Forum and member of PICS ATG.

Daniel Lutman (CATS Consultant and Speciality Lead) has completed a PG Diploma AeroRT with Distinction, Otago NZ. He is also a member of the PICS Acute Transport Group (ATG) aero-medical working group and the Chapter XB Working Group on HRGs. He is a CAMTS site surveyor. He is a member of Children's Strategic Clinical Leadership Group and Critical Care Pathway Group at NHS London.

Richard Paget (CATS Consultant) Successful HENCEL bid and Lead for the CATS Simulation Programme.

Eithne Polke (CATS Coordinator) is the elected chair of the PICS ATG, Invited Member PCC Review for Midlands & East of England Project Jan 2014, Invited member East Midlands PIC Transport Review Project.

P Ramnarayan (CATS Consultant) is a lead for the Transport at PICS Study Group and the lead for the Informatics Group of PICS. He is an elected Medical Member of PICS council and represents the Acute Transport Group on the PICANet Clinical Advisory Group. Ram has recently completed a Harvard Medical School Research Training Program Graduate with Distinction.

Lynn Shields (CATS Advanced Nurse Practitioner) PG Cert in Clinical Education (KSS Deanery)

Sandra Walsh (CATS Consultant) Masters in Medical Law (LLM) Northumbria University

**About our cover photo:**

Henry Lowe was transported by CATS Team with the assistance of the Royal Air Force from the Queen Elizabeth Hospital, Kings Lynn to GOSH PICU, aged 5 months old in 2005.

Henry was diagnosed with an underlying immune deficiency, but was well enough to be discharged from GOSH within 6 weeks and continues to thrive and successfully manage his condition and treatment at home.

With thanks to the Lowe family.

Children's Acute Transport Service

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020 74305850

www.cats.nhs.uk