

Annual Report-2015



Neonatal Intensive Care Unit
The James Cook University Hospital
Middlesbrough, UK.

CONTENTS

List of Abbreviations and Definitions	3-4
BAPM categories of care	4-5
Introduction	6
Staffing	7
Maternity Statistics	8
Unit Admissions and Clinical Activity	9-12
Neonatal Follow up	13
Mortality and Survival Rates	14-15
Key Morbidities	16-18
Publications, Presentations, Other Responsibilities	19-22
Clinical Governance	23
Education and Research	24
Nursing Development	25-26

Data for this report was extracted from BadgerNet, Transport database and other unit based resources.

For enquiries please contact:

Dr Shalabh Garg, Consultant Neonatologist

Shalabh.garg@stees.nhs.uk

Special thanks to:

Jane Hall, Neonatal Unit Manager (Transport data, cot occupancy data)

Dr Lynne Paterson, Nurse Consultant (Nursing Development Update)

Dr Helen Simpson, Consultant Obstetrician; Barbara Woodward, Obstetric Data Manager

Mr Qasim Mansoor, Consultant Ophthalmologist (Retinopathy Data)

LIST OF ABBREVIATIONS

ANNP	Advanced Neonatal Nurse Practitioner
BAPM	British Association of Perinatal Medicine
BPD (CLD)	Broncho-Pulmonary Dysplasia (Chronic Lung Disease)
CDOP	Child Death Overview Panel
CPAP	Continuous Positive Airway Pressure
FHN	Friarage Hospital Northallerton
HD	High Dependency Care
HFNC	High Flow Nasal Cannula
HFOV	High Frequency Oscillation Ventilation
HIE	Hypoxic Ischaemic Encephalopathy
IC	Intensive Care
IVH	Intra-ventricular Haemorrhage
JCUH	James Cook University Hospital
LSCS	Lower Segment Caesarean Section
NEC	Necrotising Enterocolitis
NICU	Neonatal Intensive Care Unit
ONS	Office of National Statistics
PDA	Patent Ductus Arteriosus
RCPCH	Royal College of Paediatrics and Child Health
RCT	Randomised Controlled Trial
ROP	Retinopathy of Prematurity
SC	Special Care
SCBU	Special Care Baby Unit
SVD	Spontaneous Vaginal Delivery
TC	Transitional Care

DEFINITIONS

Early neonatal death: Death of a live-born baby occurring less than 7 days from the time of birth.

Late neonatal death: Death of a live-born baby occurring after the 7th day and before 28 completed days from the time of birth.

Stillbirth rate: Number of stillbirths per 1000 total births.

Early neonatal mortality rate: Number of early neonatal deaths per 1000 live births.

Perinatal mortality rate: Number of stillbirths and early neonatal deaths per 1000 total births.

Neonatal mortality rate: Number of neonatal deaths per 1000 live-births.

NICU mortality rate: Percentage of total number of deaths until discharge out of total number of admissions in neonatal unit.

BAPM 2011 LEVELS OF CARE FOR WORKLOAD DEFINITION

1. **Intensive care** – This is care provided for babies who are the most unwell or unstable and have the greatest needs in relation to staff skills and staff to patient ratios.

Definition of Intensive Care Day

- Any day where a baby receives any form of mechanical respiratory support via a tracheal tube
- **BOTH** non-invasive ventilation (e.g. nasal CPAP, SIPAP, BIPAP, vapotherm) and PN
- Day of surgery (including laser therapy for ROP)
- Day of death
- Any day receiving any of the following
 - Presence of an umbilical arterial line or umbilical venous line
 - Presence of a peripheral arterial line
 - Insulin infusion
 - Presence of a chest drain
 - Exchange transfusion
 - Therapeutic hypothermia
 - Prostaglandin infusion
 - Presence of reple tube
 - Presence of epidural catheter
 - Presence of silo for gastroschisis
 - Presence of external ventricular drain
 - Dialysis (any type)

2. **High Dependency Care:** This is care provided for babies who require highly skilled staff but where the ratio of nurse to patient is less than intensive care.

Definition of High Dependency Care Day

Any day where a baby does not fulfil the criteria for intensive care where any of the following apply:

- Any day where a baby receives any form of non-invasive respiratory support (E.g. nasal CPAP, SIPAP, BIPAP, HHFNC)
- Any day receiving any of the following:
 - Parenteral nutrition
 - Continuous infusion of drugs (except prostaglandin &/or insulin)
 - Presence of a central venous or long line (PICC)
 - Presence of a tracheostomy
 - Presence of a urethral or suprapubic catheter
 - Presence of trans-anastomotic tube following oesophageal atresia repair
 - Presence of naso-pharyngeal airway/nasal stent
 - Observation of seizures / cerebral function monitoring
 - Barrier nursing
 - Ventricular tap

3. **Special Care:** special care is provided for babies who require additional care delivered by the neonatal service but do not require either Intensive or High Dependency care.

Definition of Special Care Day

Any day where a baby does not fulfil the criteria for intensive or high dependency care and requires any of the following:

- Oxygen by nasal cannula (low flow)
- Feeding by nasogastric, jejunal tube or gastrostomy
- Continuous physiological monitoring (excluding apnoea monitors only)
- Care of a stoma
- Presence of IV cannula
- Baby receiving phototherapy
- Special observation of physiological variables at least 4 hourly

4. **Transitional Care:** Transitional care can be delivered in two service models, within a dedicated transitional care ward or within a postnatal ward. In either case the mother
- **Must be resident with her baby and providing care.** Care above that needed normally is provided by the mother with support from a midwife/healthcare professional who needs no specialist neonatal training.

Examples include

- Low birth-weight babies
- Withdrawal for Neonatal Abstinence Syndrome and babies requiring a specific treatment that can be administered on a post-natal ward, such as antibiotics or phototherapy.
- Is provided for babies with no medical indication to be admitted to NICU.

INTRODUCTION

I am writing this report in the midst of a number of strategic changes that are happening in the department as well as in the region specific to the provision of neonatal services in Teesside. One of the main highlights of this year has been the completion of an independent review conducted by RCPCH that specifically provided its recommendations for the reconfiguration of neonatal services in North East and Cumbria. In the Teesside region, it means that the neonatal unit at JCUH will function as single largest intensive care unit. The plans are underway to implement these recommendations in collaboration with specialised commissioning group and northern neonatal network.

The amalgamation of the Special Care Baby Unit from Friarage Hospital is now successfully completed and established. This has helped us to provide the safe high standard neonatal services in a more cost effective way. A monthly multi-disciplinary neonatal high-risk follow up clinic has been started in Friarage Hospital to avoid babies from that area having to travel to JCUH. We are continuously working towards our aim of achieving nursing numbers as per the BAPM standards. Ten new whole time equivalent nurses have been employed towards that goal.

The number of deliveries has increased to almost 5000 per annum and this had an impact of our intensive care as well as postnatal ward workload. From the obstetric point of view, the feasibility of providing 24/7 obstetrician cover or increasing number of junior medical staff at night is being considered.

As part of Northern Neonatal Network, we continue to work hard to try keeping babies who need intensive care within the region. This is clearly evident by the significant increase in the number of ex-utero transfers to us from other neonatal units. This is further helped by our ongoing provision of the neonatal transport services in the region along with transport team from RVI, Newcastle.

We continue to face the pressures with the numbers of junior trainees that are available to provide day to day services. We at times need to rely on locum doctors (internally or agency locums) to fill these gaps in rota. This has been recognised as a long term issue and we are actively working with RCPCH as well as with our international contacts to try solve this problem. At the consultant level, trust has approved for another substantive consultant post to complement the existing pool of 5 neonatal consultants in line with the future needs of the department.

The Neonatal Unit at JCUH continue to provide good educational opportunities for nursing and medical staff on our unit. The unit is participating in several local, national and international clinical trials which are helping to improve the neonatal care in the country for future. The trust continues to support the post of research fellow which has been hugely beneficial in helping students complete their MD projects. Our consultant colleague, Dr Rob Tinnion, has successfully completed his MD from Newcastle University.

The annual international neonatal conference was successfully conducted for the 23rd year and plans are already being laid down for the Silver Jubilee Conference in 2017.

UNIT STAFFING

Neonatal Unit Manager

Jane Hall

Consultant Neonatologists:

Dr. Jonathan Wyllie

Clinical Director of Neonatal Services
Special Interest: Cardiology and Resuscitation

Prof Sunil Sinha

Conference Director
Special Interest: Neonatal Ventilation, Research

Prof Win Tin

Lead for Clinical Research
Special Interest: Neurodevelopment, Education

Dr Mithilesh Lal

Lead for BadgerNet
Special Interest: Neonatal Transport, Epidemiology

Dr Shalabh Garg

Lead for CDOP and Neonatal Follow-up
Special Interest: Neuro-development, Renal Diseases and Education

Dr Rob Tinnion

Lead for Clinical Governance
Special Interest: Neonatal Transport, Simulation, Palliative Care

Advanced Neonatal Nurse Practitioners (ANNP):

6 Full Time ANNPs: Sue Walker (Middle Grade), Kath Noble, Caroline Buckley, Sian Oldham, Caroline Cleaver, Danielle Morley

Specialist Nurses:

Dr Lynne Paterson

Nurse Consultant

Irene Redpath, Sarah Brooks

Community Nurse

Maureen Brydon

Lead Transport Nurse

Sue Thompson

BLISS Family Care Sister

Amanda Forster, Suzanne Bell

Research Nurses

Jackie Cook

Practise Development Nurse

Junior Doctors (Tier 1 and Tier 2):

Tier 1: 5 WTE as part of their paediatric training and 2 WTE from ANNPs

Tier 2: 6 WTE (ST3-ST5), 1 neonatal grid trainee (ST7-8), one research fellow

Neonatal Nurses:

Band 7- 2, Band 6- 22, Band 5- 48, Band 4- 2, Health Care Assistants 3, Auxiliaries- 4, Ward Clerks- 4

Pharmacist: Julie Pagan

Radiologist: Dr Henk Jongschaap

Ophthalmologists: Mr Qasim Mansoor

Obstetric Lead: Dr Helen Simpson

Fetal Medicine Lead: Dr Kumar Kumarendran

ENT: Mr Derek Bosman

MATERNITY STATISTICS-2015

Total number of deliveries: 5044 (↑ 12%)

Total number of babies born: 5118

Total Number of live Births: 5093

Total number of stillbirths: 25

Singleton: 4982

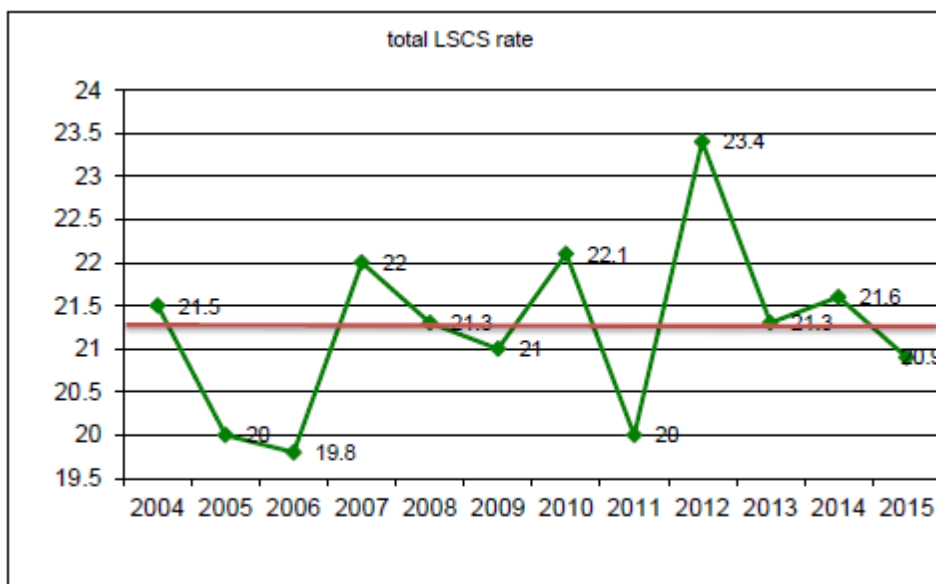
Twin Pregnancies: 64

Triplet Pregnancies: 3

Mode of Delivery:

Delivery Mode	% Rate (2013)	% Rate (2014)	% Rate (2015)
Emergency LSCS	13.3	13.8	11.9
Elective LSCS	8	7.8	9
Total LSCS	21.3	21.6	20.9
Operative vaginal	13.8	12.6	10.1
SVD/ Breech	64.9	65.8	69

Total LSCS Rate:



Average 21.3% over 12year period

Antenatal Steroid Rate in women delivered between 23 to 34 weeks gestation is 87%. This is an improvement from the last year's rate of 83%.

NEONATAL UNIT ADMISSIONS AND ACTIVITIES

Cot Occupancy

Cots	Days	% Occupancy
IC	1466	
HD	1580	
IC & HD (total)	3046	84%
SC- JCUH	3903	54%
Total for JCUH	6940	69%

Activity

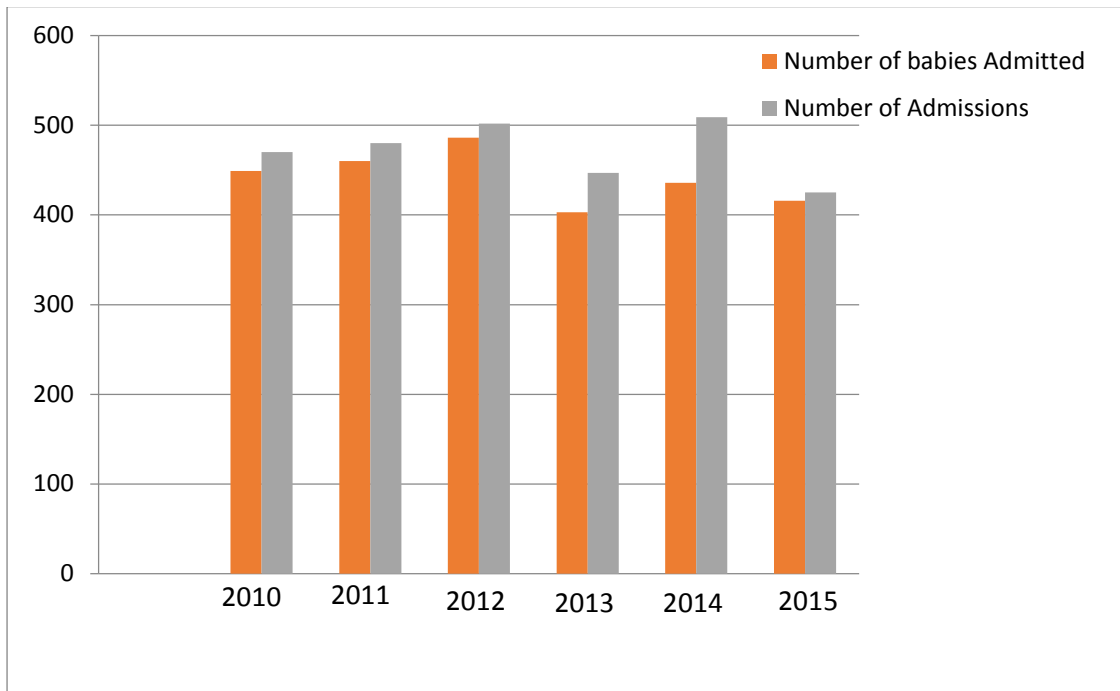
Neonatal Unit Admissions	2015 (2014)
Total Live Births	5093 (4330)
Total Admissions	416 (436)
Total In-born	336 (385)
Total Ex-utero	80 (51)
Total Booked in JCUH	286/69% (363/83%)
Booked Elsewhere (In-utero + Ex-utero Transfers)	50+80=130/31% (22+51=73/16.7%)
Percentage of Live Births	6.5% (8.8%)

Total Annual Admissions (Last 5 Years)

2011 - 2015	Total Annual Admissions	
	Babies	Admissions
2011	460	480
2012	486	502
2013	403	447
2014	436	509
2015	416	425

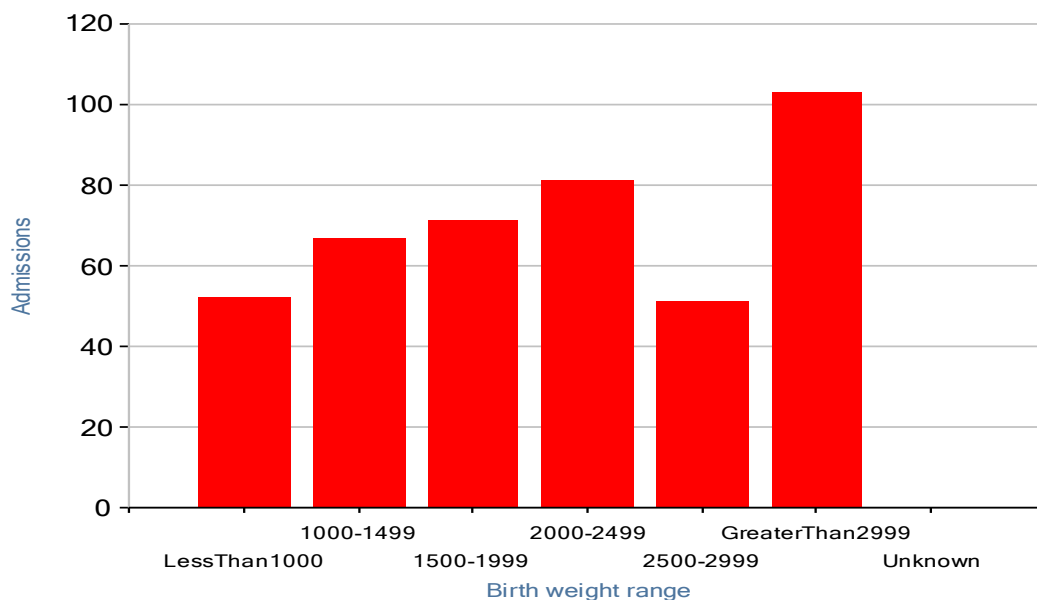
Multiple Births

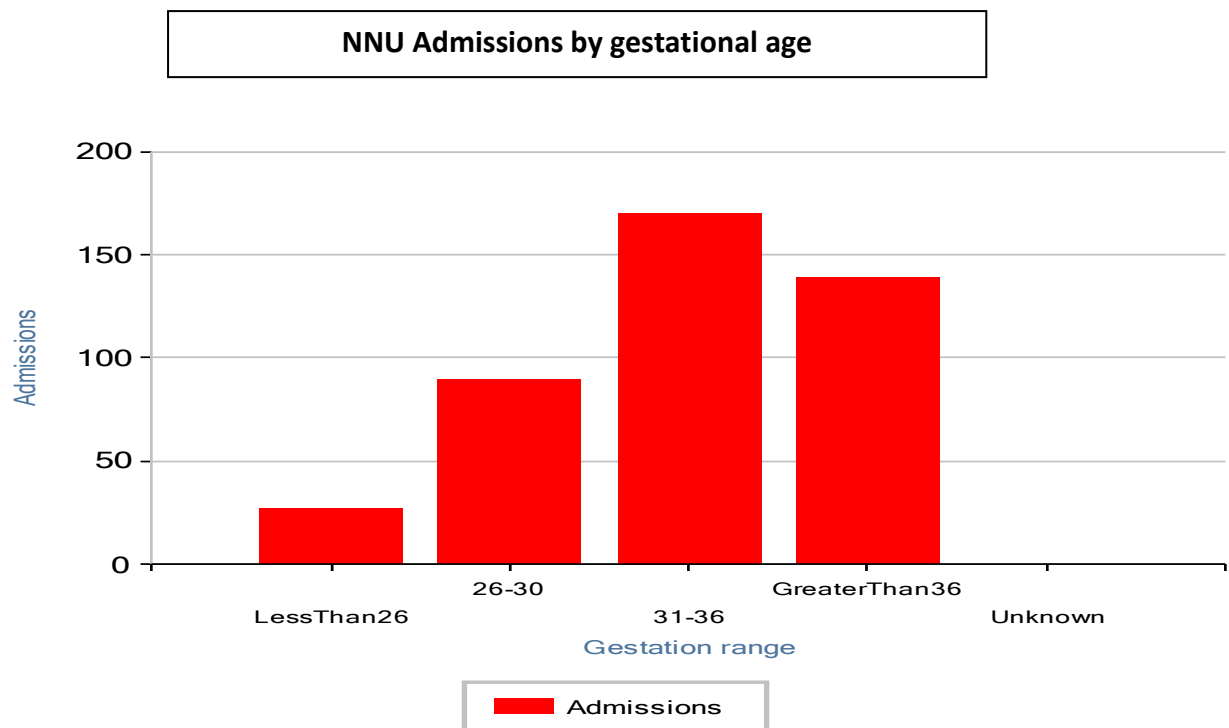
Plurality	Number	% of Total Admissions	% of Total Live Births
< 37 weeks		2015 (2014)	2015 (2014)
Twins	64 (32 sets)	15.3 % (13%)	1.2% (1.3%)
Triplets	9 (3 sets)	2.1 (4.1)	0.1% (0.4%)
<30 weeks			
Twins	32 (16 sets)	7.6 % (1.8%)	0.6 % (0.1%)
Triplets	6 (2 sets)	1.4 % (2 %)	0.1 % (0.2%)



The decrease in the number of admission this year could be a reflection of the fact that after amalgamation of Friarage Hospital neonatal services into JCUH, the babies who tend to be in SCBU in FHN are now being looked after in transitional care in the postnatal ward. This has further implications for the postnatal ward workload which is currently being monitored.

NNU Admissions by birth weight





Number of babies admitted as by gestational age:

Gestational Age	22	23	24	25	26	27	28-30	31-34	35-36	37-40	41-42	Total
Total Number	0	5	7	11	6	12	67	117	53	113	25	416
Stratified Gestation Groups	29 (7%) (23-26 weeks)					79 (19%) (27-30 weeks)		170 (41%) (31-36 weeks)		138 (33%) (37-42 weeks)		

Number of admissions where mothers were booked elsewhere

Booking Hospital	In-Utero (2015)	Transfers	Ex-utero (2015)	Transfers	Total (2014)
Cumbria (Carlisle/Whitehaven)	4		14		18 (3)
Royal Victoria Infirmary	11		21		32 (9)
Northumbria Emergency Care	3		3		6 (3)
Gateshead	3		3		6 (1)
Sunderland	3		1		4 (2)
Durham	5		11		16 (6)
Darlington	12		14		26 (20)
North Tees	1		5		6 (9)
Friarage	1		1		2
South Tyneside	1		1		2
Others (Out of Network)	4		5		9
Total	48 (22)		79 (51)		127 (73)

If we take into account the overall increase in in-utero and ex-utero transfers for intensive care provision to JCUH from Northern Units (Cumbria, Durham, RVI, Gateshead, Sunderland, Northumbria), there is a significant increase. As compared to 24 total transfers in 2014 from these units, this number has gone up to 82 in 2015 (increase by 30%).

Babies transferred out of JCUH due to unavailability of cots in JUCH: North Tees- 3

Monthly Activity (in days) according to Care Level as per BAPM 2011 standards:

In comparison to 2014, the intensive care activity has almost gone up by 15% in 2015. Although the total number of IC/HDU days remain similar, but the increase in IC activity despite numbers of admission being less than 2014 reflects the net increase in amount and intensity of the workload. Although the data for transitional care days is not available, the decrease in SCBU days is most likely the reflection of increased neonatal workload on postnatal ward.

Month	Intensive Care	High Dependency Care	Special Care	Transitional Care	Total
January	109	118	228		456
February	113	143	256		492
March	134	151	412		699
April	124	97	466		691
May	183	135	293		612
June	137	112	230		479
July	67	148	322		537
August	88	135	369		592
September	120	135	369		627
October	149	162	246		557
November	79	143	432		654
December	163	101	280		544
Total	1466	1580	3903		6940

TRANSPORT ACTIVITY:

Month	Neonatal Transfers (2013)	Neonatal Transfers (2014)	Neonatal Transfers (2015)
January	7	27	25
February	6	27	8
March	10	9	12
April	9	24	24
May	11	26	21
June	13	22	17
July	10	22	14
August	11	12	14
September	15	15	12
October	19	10	15
November	17	10	10
December	15	20	5
Total	143	224	177

Breast Feeding Rate at the time of Discharge in babies <33 weeks gestation:

Unit	% Receiving Breast Milk (2013)	% Receiving Breast Milk (2014)	% Receiving Breast Milk (2015)
James Cook Hospital	22	35	50
North Tees Hospital	31	39	44
Sunderland Royal Hospital	40	60	42
Royal Victoria Infirmary	49	50	42

We had two of our nurses working as breast feeding co-ordinator (1wte) within NICU supporting lactation and breastfeeding. The funding for this role was for a limited period only but given the clear, positive difference this service made to the babies and parents, we are actively exploring the options available to fund these posts on a permanent basis through 2016. Their role has helped us to achieve improved rates of breast milk at discharge on yearly basis.

Parenteral Nutrition (PN): In babies <29 weeks gestation and/or <1000 grams birth weight; 94% of the babies received parenteral nutrition by day 2. The total number of days the PN was used was 886 days over last year which is an increase of 33% from the previous year. This is also reflected in the increase in intensive care activity over last year.

Central line days: In 2015, there were a total of about 1201 days where there was an indwelling central catheter (UAC, UVC, PICC or surgical line) used for inotropes, invasive monitoring, fluids, antibiotics or parenteral nutrition. This is increase of about 8.4% from the 2014's central line days (1100). There were 149 (106 in 2014) babies who had these central line put in and there were 3 positive blood cultures with a central line in situ during this time (**Central Line Infection Rate: 2 per 1000 line days**)

NEONATAL FOLLOW-UP

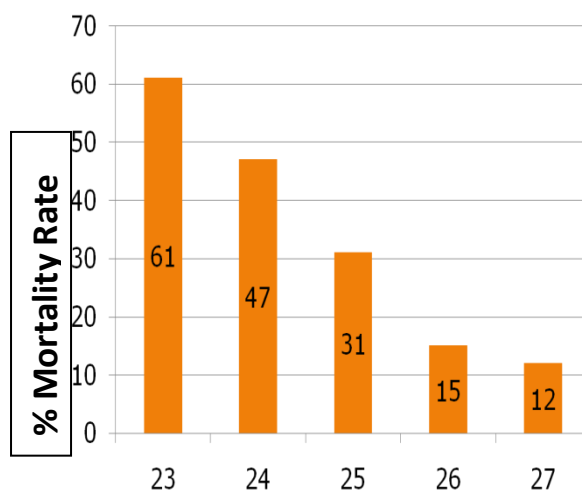
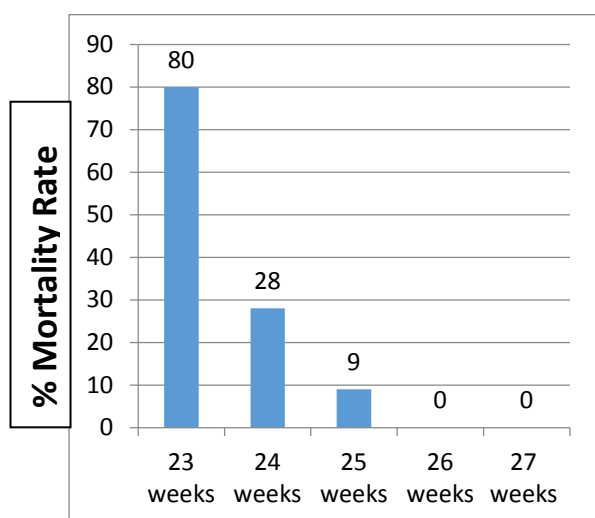
All neonates who are born prematurely (<32 weeks gestation) or have a complicated clinical course, are followed up in the high risk neonatal follow up clinic. This clinic is run once every week and is a multi-disciplinary clinic with involvement of neonatal consultants, registrars, physiotherapists, dieticians and health care assistants in the same clinic. Similar clinic is run monthly by Prof Sinha in Friarage Hospital as well. There is also a nurse led clinic (run by neonatal community sister) alongside for the babies who are discharged on special milk formulas or are still in home oxygen or fed through nasogastric tube at home.

From 2014, we have also expanded our services to conduct detailed neuro-developmental assessment (**Bayley Scales of Infant and Toddler Development, 3rd Ed**) at 2 years of corrected age for all babies who were born <30 weeks gestation or were diagnosed to have HIE, cared for at JCUH. For the babies born at less than 30 weeks gestation or had therapeutic hypothermia and are discharged home from our NICU, the follow up rate at 2 years corrected age has improved significantly over last 2 years. The current 2 year follow up rate for such babies is above 80%.

Mortality and Survival Statistics

Survival rate in extreme premature babies (after admission to NICU):

Gestation (weeks)	Total Number	Died	Mortality Rate (%)	Survival Rate to Discharge (%)
23-24	12	6	50	50
25-26	17	1	6	94
27-28	33	1	3	97
Total (23-28)	62	8	13	87



Network Mortality Rate 2006-2011

The aggregated mortality by gestation for northern neonatal network (2006 to 2011) is shown in the figure on the right. There is a general trend in improvement of mortality over the years. It emphasises the impact of gestational age on mortality. Also at 23 to 24 weeks gestation, the overall numbers of deaths are small so producing a three year rolling mortality rates are more informative than yearly numbers.

Admission and Survival by Gestational Age in 2015:

Gestation*	Total Admissions	Total Deaths	<7d	7-28 d	>28 d	Mortality (%)	Survival to Discharge (%)
23	5	4	2	2		80	20
24	7	2	2			28	72
25	11	1			1	9	91
26	6	0				0	100
27	12	0				0	100
28	21	1		1		5	95
29	19						100
30	27						100
31	29	1	1			3	97
32	20	1	1			5	95
33-42	259	2	2			0.7	99.3%

*Completed gestation weeks

Three Year Rolling Mortality:

Year	Total Admissions				Total Deaths				Survival
	2013	2014	2015	Total	2013	2014	2015	Total	%
23-25 weeks	32	22	29	83	8	7	7	22	73
<28 weeks	48	42	62	152	10	8	8	26	83
<31 weeks	105	94	137	336	10	8	9	27	92
32-42 weeks	298	391	279	968	5	3	3	11	99
Gestation	403	436	416	1255	15	11	12	38	97

Perinatal Statistics: 2015 (JCUH+FHN)

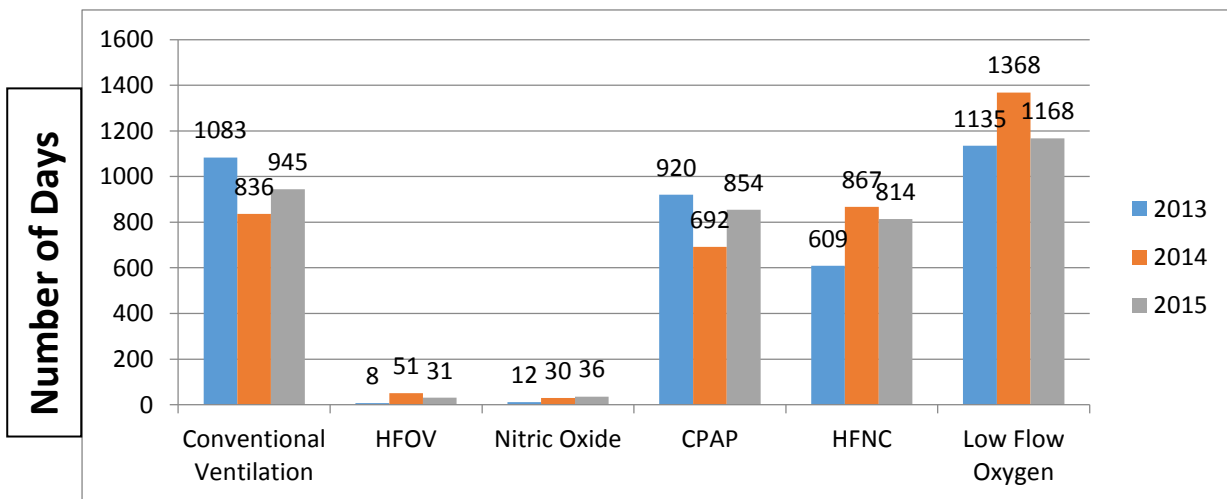
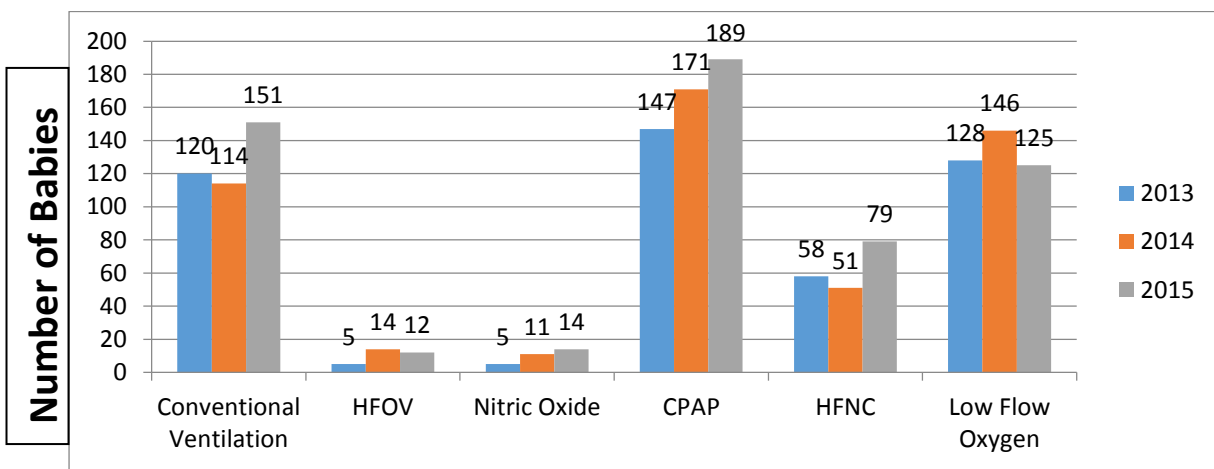
Perinatal Indicators	Total Number 2013	Total Number 2014	Total Numbers 2015	National Statistics 2013 (ONS)
Total Live Births	4120	4330	5093	698,512
Total Still Births	20	19	25	3284
Early Neonatal Deaths*	7	7	6	1423
Late Neonatal Deaths*	6	3	2	1871
		Rates		
Still Birth Rate	4.8	4.3	4.9	4.7
Early Neonatal Mortality Rate		1.6	1.2	2
Perinatal Mortality Rate	6.5	5.9	6	6.7
Neonatal Mortality Rate	3.1	2.3	1.5	2.7
NICU Mortality	3.7%	2.5%	2.8%	

*Excluded ex-utero transfers (not included in denominator data of local live births)

KEY MORBIDITIES

Respiratory Support Days during 2013:

Intervention (No of days)	Conventional Ventilation	HFOV	Nitric Oxide	CPAP	HFNC	Nasal Cannula O ₂
No of Babies	151	945				
	12	31				
	14		36			
	189			854		
	79				814	
	125					1168



The ventilation days in 2015 (conventional and HFOV) have remained more or less similar to that of 2014. Although more babies received HFNC in 2015 but the overall number of days of HFNC support is less than the previous year which is reflected in increase in CPAP days. Overall, non-invasive pressure support days (CPAP+HFNC) have gone up by almost 100 days (222 vs 268 babies in 2015).

The use of nitric oxide (NO) is slightly increased in 2015. There were 14 babies who received NO (minimum 1 day, maximum 8 days) out of which 9 babies were preterm babies (<37 weeks). 4 babies out of these were less than 30 weeks gestation.

BPD/CLD (oxygen requirement at ≥36 weeks) in babies born at <32 weeks gestation (Babies who had their major intensive care stay in JUCH) :

Gestation at Birth (weeks)	Total Number of Babies	Death (Rate)	Rate of BPD (amongst survivors)	Home Oxygen	Death + BPD (Rate)
23	5	4 (80%)	1/1 (100%)	1	5 (100%)
24	4	2 (50%)	2/2 (100%)	2	4 (100%)
25	6	1 (16%)	5/5 (100)	1	6 (100%)
26	4	0	4/4 (100%)	2	4 (100%)
27	8	0	4/8 (50%)	4	4 (50%)
28	11	1 (9%)	2/10 (20%)	2	3 (27%)
29	6	0	2/6 (33%)	2	2 (33%)
30	8	0	0	0	0
31	19	1 (5%)	1/18 (5%)	0	2 (10%)
Total	71	9/71 (12.5%)	21/54 (38%)	14	30/71 (42%)

Home Oxygen Rate in babies born less than 32 weeks gestation: These are the group of babies most vulnerable to develop BPD and some of them need to go home on oxygen. In year 2015, 14 babies (20% of the total number) were sent on home oxygen which means almost half of the babies who developed chronic lung disease needed to go home on oxygen.

Patent Ductus Arteriosus (PDA) in babies less than 30 weeks gestation (n=81):

	2013	2014	2015
Infants Diagnosed with PDA	35 (total babies <30 weeks=88)- 40%	23 (total number 56)- 41%	31 (Total babies 81)- 38%
PDA requiring medical treatment (Ibuprofen only)	14 (40% of babies with PDA; 16% of total babies)	5 (22% of babies with PDA; 9% of total babies)	13 (42% of the babies with PDA; 16% of the total babies)
PDA closed with Ibuprofen	8 (Success Rate-57%)	1 (Success Rate-20%)	6 (Success Rate- 46%)
PDA Ligation	6 (14% of babies with PDA; 7% of all babies less than 30 weeks)	8 (35% of babies with PDA; 14% of all babies less than 30 weeks)	4 (13% of babies with PDA; 5% of all babies <30 weeks)

The use of Ibuprofen and ligation rate has more or less remained same in 2013 and 2015. In 2014, lesser number of babies were treated with Ibuprofen (5 vs 14) and the ligation rate has significantly gone up in 2014 which has come down again in 2015. This is something that will need discussing in the future regarding the medical treatment of PDA. A national clinical trial, currently in planning stage, may help clarify the role of use of ibuprofen in early PDA management.

Necrotising Enterocolitis (NEC):

Total number of live births between 23 to 30 weeks gestation: 108 (2014- 74)

3 babies have died in 2015 where there was a suspicion of NEC- **all had confirmed NEC at surgery.**

NEC diagnosis and management	Number of Babies (%)	Gestation (n)
Clinically Suspected	11 (10%)	23 (1), 24 (4), 25 (1), 28 (3), 29 (1), 30 (1)
Clinical and Radiological	9 (8%)	7 had confirmed NEC at Surgery
Transfer to Surgical Centre	7 (6.4%)	Outcome of Babies transferred to surgical centre:
Surgery Required	7 (6.4%)	<ul style="list-style-type: none">▪ Resection, Stoma (28 weeks- Leeds)▪ NEC, Perforation, Stoma (25 weeks)▪ NEC, Perf, Died (23 weeks)▪ NEC, Perf, Stoma (24 weeks)▪ NEC, Surgery, Died soon after surgery (24 weeks)▪ NEC, Perforation (24 weeks)▪ Pan-NEC, Died (28 weeks)

Retinopathy of Prematurity (ROP):

Number of babies eligible to have ROP screening: 77

Number of babies with screening within the desired time window: 63 (82%)

Number of babies admitted at ≤ 28 weeks: 29 (≤ 30 weeks: 46)

Number of babies that developed any degree of ROP: 29

Number of babies needing **Laser therapy**: 5 (24 weeks-2; 25 weeks-1; 26 weeks-1; 27 weeks-1)

Rate of Laser Therapy in babies ≤ 28 weeks: 17% (≤ 30 weeks: 10.8%)

Hypoxic Ischaemic Encephalopathy and Therapeutic Hypothermia:

Gestational Age (Weeks)	Inborn	Out-born	Outcome
37		1	Discharged to local hospital and then home
38	1		Discharged Home
39		1	Discharged Home
40		1	Discharged Home
40	1		Discharged Home
41		1	Discharged Home
41		1	Discharged to local hospital and then home
41		1	Discharged to local hospital and then home
Total	2	6	Survival- 8 (100%)

PEER REVIEWED PUBLICATIONS (2015, in alphabetical order)

Chitty H, Agbeko R. Pediatric and Neonatal Mechanical Ventilation: From Basics to Clinical Practice. (Book Review). *Seminars in Fetal and Neonatal Medicine* 2015;20(5):373

Chitty H, Sinha S. Volume-targeted ventilation in newborn infants. *Infant* 2015;11(1):8-12.

Garg S, Sinha SK. Gastroenterology and Nutrition: Neonatology Questions and Controversies. (Book Review). *Seminars in Fetal and Neonatal Medicine* , 2015; 20 (3): 207.

Garg S, Tin W. Remington and Klein's Infectious Diseases of The Fetus and Newborn Infant. (Book Review). *Seminars in Fetal and Neonatal Medicine* , 2015; 20 (6): 442.

Garg S, Sinha S. General overview of non-invasive ventilation in neonates.

Lal M, Tin W, Sinha S. Automated control of inspired oxygen in ventilated preterm infants: crossover physiological study. *Acta Paediatr.* 2015 Nov;104(11):1084-9

van Kaam AH, Hummler HD, Wilinska M, Swietlinski J, **Lal MK**, te Pas AB, Lista G, Gupta S, Fajardo CA, Onland W, Waitz M, Warakomska M, Cavigioli F, Bancalari E, Claire N, Bachman TE. Automated versus Manual Oxygen Control with Different Saturation Targets and Modes of Respiratory Support in Preterm Infants. *J Pediatr.* 2015 Sep;167(3):545-50.

Donn SM, **Tin W**. *Semin Fetal Neonatal Med.* 2015 Jun;20(3):129.

Synnes A, Anderson PJ, Grunau RE, Dewey D, Moddemann D, **Tin W**, Davis PG, Doyle LW, Foster G, Khairy M, Nwaesei C, Schmidt B; CAP Trial Investigator group. Predicting severe motor impairment in preterm children at age 5 years. *Arch Dis Child.* 2015 Aug;100(8):748-53.

Tin W, Lal M. Principles of pulse oximetry and its clinical application in neonatal medicine. *Semin Fetal Neonatal Med.* 2015 Jun;20(3):192-7

Tin W. Emerging evidence of the forgotten babies. *Yearbook of the Neonatal and Perinatal Medicine* 2015 [Commentary]

Wyllie J. Neonatal Echocardiography. *Semin Fetal Neonatal Med.* 2015;20(3):173-80.

Peter T. Morley, Eddy Lang, Richard Aickin, John E. Billi, Brian Eigel, Jose Maria Ferrer, Judith C. Finn, Lana M. Gent, Russell E. Griffin, Mary Fran Hazinski, Ian K. Maconochie, William H. Montgomery, Laurie J. Morrison, Vinay M. Nadkarni, Nikolaos I. Nikolaou, Jerry P. Nolan, Gavin D. Perkins, Michael R. Sayre, Andrew H. Travers, **Jonathan Wyllie**, David A. Zideman. Part 2: Evidence evaluation and management of conflicts of interest 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Resuscitation.* 2015;95:e33-41.

Peter T. Morley, Eddy Lang, Richard Aickin, John E. Billi, Brian Eigel, Jose Maria Ferrer, Judith C. Finn, Lana M. Gent, Russell E. Griffin, Mary Fran Hazinski, Ian K. Maconochie, William H. Montgomery, Laurie J. Morrison, Vinay M. Nadkarni, Nikolaos I. Nikolaou, Jerry P. Nolan, Gavin D. Perkins, Michael R. Sayre, Andrew H. Travers, **Jonathan Wyllie**, David A. Zideman. Part 2: Evidence evaluation and management of conflicts of interest 2015 International Consensus on Cardiopulmonary

Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations. *Circulation*. 2015 Oct 20;132(16 Suppl 1):S40-50.

Part 7: Neonatal resuscitation 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations, **Jonathan Wyllie** (Co-Chair), Jeffrey M. Perlman (Co-Chair), John Kattwinkel, Myra H. Wyckoff, Khalid Aziz, Ruth Guinsburg, Han-Suk Kim, Helen G. Liley, Lindsay Mildenhall, Wendy M. Simon, Edgardo Szyld, Masanori Tamura, Sithembiso Velaphi, on behalf of the Neonatal Resuscitation Chapter Collaborators. *Resuscitation*. 2015;95:e169-201

Part 7: Neonatal resuscitation 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations, **Jonathan Wyllie** (Co-Chair), Jeffrey M. Perlman (Co-Chair), John Kattwinkel, Myra H. Wyckoff, Khalid Aziz, Ruth Guinsburg, Han-Suk Kim, Helen G. Liley, Lindsay Mildenhall, Wendy M. Simon, Edgardo Szyld, Masanori Tamura, Sithembiso Velaphi, on behalf of the Neonatal Resuscitation Chapter Collaborators. *Circulation*. 2015 Oct 20;132(16 Suppl 1):S204-41.

Perlman JM, **Wyllie J**, Kattwinkel J, Wyckoff MH, Aziz K, Guinsburg R, Kim HS, Liley HG, Mildenhall L, Simon WM, Szyld E, Tamura M, Velaphi S; Neonatal Resuscitation Chapter Collaborators. Part 7: Neonatal Resuscitation: 2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations (Reprint). *Pediatrics*. 2015;136 Suppl 2:S120-66

European Resuscitation Council Guidelines for Resuscitation 2015 Section 1. Executive summary. Koenraad G. Monsieurs, Jerry P. Nolan, Leo L. Bossaert, Robert Greif, Ian K. Maconochie, Nikolaos I. Nikolaou, Gavin D. Perkins, Jasmeet Soar, Anatolij Truhlář, **Jonathan Wyllie**, David A. Zideman, on behalf of the ERC Guidelines 2015 Writing Group. *Resuscitation* 2015;95:1-80

European Resuscitation Council Guidelines for Resuscitation 2015 Section 7. Resuscitation and support of transition of babies at birth. **Jonathan Wyllie**, Jos Bruinenberg, Charles Christoph Roehr, Mario Rüdiger, Daniele Trevisanuto, Berndt Urlsberger. *Resuscitation* 2015;95:249-63

Wyllie J, Ainsworth S, Tinnion R. Resuscitation and support of transition of babies at birth. <https://www.resus.org.uk/resuscitation-guidelines/resuscitation-and-support-of-transition-of-babies-at-birth/>

INTERNATIONAL PRESENTATIONS AND LECTURES (2015)

Jonathan Wyllie:

- REaSon Neonatal Conference, UK
- European Resuscitation Council AGM Brussels Belgium
- European Resuscitation Council – Guidelines 2015 Prague Czech Republic
- Resuscitation Council UK Guidelines conference UK
- Greek Resuscitation Conference Athens Greece
- Cypriot resuscitation Conference Nicosia Cyprus
- Neonatal ILCOR Meeting Washington USA
- Hot Topics Neonatal Resuscitation Meeting Washington USA

Win Tin:

- Society of Michigan Neonatology Conference, USA
- Arab International Neonatal Conference, Dubai
- REaSon Neonatal Conference, UK
- Van Schoick Memorial Lecture, University of Michigan, Ann Arbor, USA

Mithilesh Lal:

- CLiO2® investigator's meeting at PAS San Diego, USA
- European research collaborator's meeting, Tübingen, Germany Dec

Shalabh Garg:

- Workshop, Neonatal Chest Drain Insertion, Jaipur, India

OTHER RESPONSIBILITIES AND CONTRIBUTIONS

Jonathan Wyllie:

- Organising Faculty:
 - Annual International Neonatal Conference, Middlesbrough, UK
 - Teesside Neonatal Cardiology and Haemodynamic Conference, Stockton, UK
 - REaSon Meeting, Warwick, July 2014
 - Resuscitation, Bilbao (European Resuscitation Council), May 2014
- Chair, NLS Course Subcommittee
- Chair, Advanced Resuscitation of the Newborn Infant (ARNI) Working Group
- Chair, European Resuscitation Council NLS International Courses Committee
- Co-chair, ILCOR neonatal task force for the evidence evaluation process
- NLS Course Director, Middlesbrough

Win Tin:

- Vice Chair, MRCPCH Written Examination Board
- Member, MRCPCH Examination Board
- Senior and Overseas Examiner, MRCPCH and DCH Examination
- Member, PRE and Specialist Question Writing Group
- Course Director, Annual International Neonatal Conference, Middlesbrough , UK

Mithilesh Lal:

- Vice Chair, MRCPCH Written Examination Board
- Principal Regional Examiner, Northern Deanery, RCPCH
- Member, MRCPCH Examination Board
- Senior and Overseas Examiner, MCRPCH and DCH Examination
- Lead Examiner, PRE and Specialist Question Writing Group
- Organising Faculty, Annual International Neonatal Conference, Middlesbrough, UK

Sunil Sinha:

- Conference Director, Annual International Neonatal Conference, Middlesbrough, UK
- Organising Faculty, Teesside Neonatal Cardiology and Haemodynamic Conference, UK
- Senior Examiner, MRCPCH Clinical Examinations
- Chairman, International Academy of Neonatology (IAM), Kuala Lumpur, Malasia.

Rob Tinnion:

- Member, NLS Subcommittee of Resuscitation Council
- Neonatal Representative, North East Paediatric Palliative Care Network
- NLS Course Director, Sunderland
- Faculty, Neonatal Stabilisation Courses in Northern Neonatal Network (NNN)

Shalabh Garg:

- Member, Question Writing Group, RCPCH
- Member, Teesside Child Death Overview Panel
- Faculty, Neonatal Stabilisation Courses in Northern Neonatal Network (NNN)
- Member of the Guideline Group of Northern Neonatal Network (NNN)

CLINICAL GOVERNANCE

Audits 2014

Title	Audit Lead	Supervised by
Audit of Neonatal Care as per National Neonatal Audit Programme (NNAP)	M Lal	M Lal
Neonatal Palliative Care Audit	N Anderson	R Tinnion
Audit of Antibiotic Prescribing Practice on NNU (A.R.E.D)	R Tinnion	R Tinnion
Comparison of short term nutritional outcomes in preterm infants (30-31+6 weeks gestation) before and after introduction of a new fluid volume change in a Tertiary Neonatal Unit	K Noble	S Garg
Audit of screening for the prevention, detection and management of hypoglycaemia in the postnatal ward	S Majeed	S Garg
Are oxygen saturations of preterm infants born at <30 weeks maintained within a target range of 90-94% during the neonatal period when receiving respiratory support +/- supplemental oxygen: A retrospective audit	L Paterson	L Paterson
Infection in the neonatal unit: An audit of pure growth pathogens in blood and cerebrospinal fluid	S Walker	J Wyllie

Mortality Review and Risk Management

We conduct monthly death review meeting to critically review the medical care of the babies who die in the neonatal unit. This is a multi-disciplinary meeting involving neonatal and obstetric consultants, junior doctors, midwives, ward managers, pathologists, and nursing staff as well as colleagues from other hospitals. Any positive and negative points about the overall medical care of the babies are highlighted and issues identified. The recommendations are made and the action plans are implemented. The learning points are discussed in the Teesside Child Death Overview Panel. We aim to complete the whole process within 6 months of the death of the each baby. We have made the process more robust as compared to last year by getting these meetings chaired by the external independent neonatal consultant from another hospital.

Guidelines and Protocols:

There are medical, nursing and drug protocols in the department which covers wide clinical areas. Guidelines are readily accessible within the neonatal unit by all clinical staff. We aim to extend these guidelines to be available via trust intranet over next one to two years as well as introduce a rolling programme of guideline reviews and updates. Dr Rob Tinnion has taken lead on this and a number of clinical guidelines are formulated and previous ones are being updated. Dr Jonathan Wyllie contributes to the assessment and publication of evidence to guide neonatal resuscitation. He is one of the authors of neonatal guidelines for resuscitation at birth for both Europe and the UK. These guidelines form the basis for Newborn Life Support (NLS) and Advanced Resuscitation in the Newborn Infant (ARNI) courses.

EDUCATIONAL AND RESEARCH ACTIVITIES

Education and Training:

The department has developed a comprehensive induction programme for the new doctors and nursing staff.

Ours is an academically active department where other than regular bedside clinical teaching; there are various other teaching programmes delivered for fulfilling the educational needs of junior doctors and nursing staff. The medical teaching programme has been further extended and morning teaching occurs every day now (Mon-Fri). The teaching sessions include journal clubs, case presentations, X-ray meetings, grand rounds as well as expert lectures from guest speakers.

A chest drain workshop using animal model is conducted every 6 months with the change-over of junior doctors and is well appreciated amongst trainee.

Neonatal Simulation Training is being used more and more in neonatal skills training over last few years. In our department, we have established multi-disciplinary simulation training programme and under leadership of Dr R Tinnion, there are regular simulation session delivered for nurses and doctors. We have started to introduce more joint sessions with obstetrics and paediatric departments.

Neonatal Research:

Neonatal unit at JCUH is a department that is actively involved in neonatal research in various fields. Our unit participates in several NIHR portfolio trials as well as runs own unit based research projects. Every year, a number of papers are produced from this department to be published in prestigious journals as well as presented internationally in various meetings.

Nurses Education and Training:

There are monthly educational meetings for our nursing staff where specific training is delivered and regular staff meetings take place. Our nurses have well established links with Teesside University where specialist post registration courses in special and intensive care of the newborn are delivered. We are a centre for pre-registration education and regularly have student nurses and midwives rotating into the unit both as junior and senior students in order to gain valuable neonatal experience. We participate in the Trust 'work experience' agenda so that local students can gain valuable experience in anticipation of a career in the associated caring professions and we have recently had three former 'students' accepted onto a programme of pre-registration nursing training. The nursing team were nominated and successfully won a recent award as an 'Outstanding Practice Placement' area. A weekly teaching session is conducted for neonatal nurses led by Advanced Neonatal Nurse Practitioners with the help of neonatal consultants.

NURSING DEVELOPMENT ON THE NICU

Neonatal Community Nursing:

Our community nursing service has been streamlined but continues to function very successfully with two members. Some patients and their families are now invited to a nurse-led clinic appointment as opposed to a home visit. More telephone follow up calls are now in place. One neonatal community sister has also become a prescriber and so care episodes can be more effective for families. The plans are underway to start nurse-led clinics in Friarage Hospital too.

BLISS Family Care Nurse:

We have worked with the Northern Neonatal Network and BLISS to secure funding for a BLISS Family Care Nurse (Sue Thompson). This post is jointly funded and managed by South Tees NHS Hospitals Trust and BLISS. This is an important role which is solely for the support of parents and their families in order that family centred care can become embedded across our organisations and the parents are assisted on their journey through our units. This role will be funded for three years and impacts on the twelve units that make up the Northern Neonatal Network.

Advanced Neonatal Nurse Practitioners (ANNPs):

Whilst the role of the ANNPs is not a new one on our NICU, we continue to develop the team. We now have 6 fully trained nurse practitioners working in the department. One of the senior ANNPs has now been promoted to function at middle grade level. We are also looking into the development of a specific portfolio for appraisal and competencies for all our ANNPs.

Research Nurses:

In the last two years the role of the neonatal research nurses has become more cemented within the department. There are currently two nurses sharing one post. They have been instrumental in identifying babies eligible for trials, providing information to staff and parents, taking consent and generally maintaining data collection and monitoring both within the unit and in other areas when these babies are transferred or discharged. The plans to develop this into a permanent post are also being considered due to increasing research activities in the department.

Practice Development:

In 2015, Jackie Cooke in this role has helped to support students, new starters and also existing staff to maintain practice and to develop the skills that we require into the future. She also arranges and runs the monthly training days for nursing staff and coordinates mandatory training as well as maintaining staff training records.

Breast feeding facilitators

The NICU benefitted from a 12 month secondment of two breast feeding facilitators. They managed to achieve increased rates of expressing on the unit as well as an increase in the number of mothers who continued to breast feed when they were either discharged home or transferred to other units.

Volunteers on the NICU:

The role of the volunteer on the NICU has been developed over the last two years. The volunteers act as a resource for parents when they need someone to talk to and can support them in different ways from the neonatal team. One of our volunteers was instrumental in setting up weekly 'coffee mornings' for our parents. This is a weekly slot where tea, coffee and cake is available in our waiting

room and is attended by our volunteers and often by our chaplaincy team. Parents are invited to drop in for a chat and this in turn helps establish links with other parents on the unit.

Middlesbrough BLISS Family Group:

This group was jointly set up by our BLISS Family Care Sister and one of our Community Sisters. It was developed to provide peer group support for families once they leave the neonatal unit. It runs twice a month and there are between five and ten families accessing this group each time it runs. There are many more families who access the Facebook page associated with this group and as such it also provides support from a distance.

2015: The Highlights!

- *Full Integration of Friarage Neonatal SCBU in James Cook University Hospital*
- *Expansion plan for the NICU in place after the RCPCH review of neonatal services in North East*
- *<1% of babies need to be transferred to another hospital (within our region only) due to unavailability of beds*
- *Dr R Tinnion successfully completed his MD from Newcastle University*
- *Dr S Garg received 'Greenshoots Award' (for research activities) from NIHR CRN North East*
- *Excellent feedback from external and internal review team(Director of Nursing)*
- *Our commitment to achieve BAPM nurse staffing is further consolidated by appointment of 10 whole time equivalent nurses*
- *Increased capacity: Unit is now fully functional for 35 cots (14 HDU/ITU and 21 SCBU beds); staffed for 30 cots (10 ITU/HDU +20 SCBU)*
- *New larger resource room for trainees with more IT facilities*