Annual Report 2017

Department of Neonatology
Brighton & Sussex University Hospitals NHS Trust

This report can be found on the BSUH Neonatal website:
https://www.bsuh.nhs.uk/departments/neonatal-services/professionals/guidelines/

Abbreviations	
AABR	Auditory Acoustic Brainstem Responses
ANNP	Advanced Neonatal Nurse Practitioner
ATAIN	Avoiding Term Admissions into Neonatal Units
BAPM	British Association of Perinatal Medicine
BSUH	Brighton and Sussex University Hospitals
CA	Corrected age
CDC	Child Development Centre
MBRRACE	Mothers and Babies - Reducing Risk through Audits and Confidential Enquiries across the UK
CLD	Chronic Lung Disease
CPAP	Continuous Positive Airway Pressure
CVL	Central venous line
EBA	Early Birth Association
ETT	Endotracheal tube
EUT	Ex-utero transfer
GA	Gestational age
HD	High dependency
HHFNC	Humidified High Flow Nasal Cannula
HFOV	High Frequency Oscillatory Ventilation
HIE	Hypoxic Ischaemic Encephalopathy
IC	Intensive care
IUGR	Intrauterine Growth Restriction
IVH	Intraventricular Haemorrhage
KSS	Kent, Surrey and Sussex
LW	Labour Ward
MRSA	Methicillin Resistant Staphlococcus Aureus
MSSA	Methacillin Sensitive Staphlococcus Aureus
NEC	Necrotising Enterocolitis
NIPE	Newborn & Infant Physical Examination Programme
N/K	Not Known
NNU	Neonatal Unit
NTS	Neonatal Transport Service
OAE	Otoacoustic emissions
PDA	Patent Ductus Arteriosus
PRH	Princess Royal Hospital
PROM	Premature Rupture of Membranes
RACH	Royal Alexandra Children's Hospital
ROP	Retinopathy of Prematurity
RSCH	Royal Sussex County Hospital
SLT	Speech and Language Therapy
SC	Special Care
SCBU	Special Care Baby Unit
TOF	Tracheo-Oesophageal Fistula
TMBU	Trevor Mann Baby Unit
WTE	Whole time equivalent

Data used to compile this report has been collected from BadgerNet and Metavision. Thanks go to Patricia Walker for data management.

For enquiries please contact: philip.amess@bsuh.nhs.uk

Introduction

The Department of Neonatology is based on the Trevor Mann Baby Unit at the Royal Sussex County Hospital and the Special Care Baby Unit at Princess Royal Hospital. In 2017, there were 3110 deliveries at the Royal Sussex County Hospital and 2255 deliveries at the Princess Royal Hospital.

The Trevor Mann Baby Unit, Brighton:
The TMBU is one of the intensive care units in the Kent, Surrey and Sussex Neonatal Network. It provides a tertiary, neonatal medical and surgical service for Brighton, East and West Sussex and a special care service for Brighton and Mid-Sussex. The Sussex Neonatal Transport Service is based at the TMBU.

There are 27 cots on the TMBU of which 9 are staffed for intensive care, 8 for high dependency care and 10 for special care. Current cot levels in Brighton are set to provide sufficient medical and surgical intensive care facilities for Sussex babies. Transitional care is provided on the postnatal ward at RSCH. The Neonatal Outreach Service offers the opportunity for earlier, supported discharge. Length of stay for near term babies seems to have fallen over the last few years. A co-located midwifery led birthing unit in Brighton is awaited along with improvements to feto-maternal services.

The Special Care Baby Unit, Haywards Heath:
The SCBU at Princess Royal Hospital is staffed for 8 special care cots. Transitional care is provided on the postnatal ward. The baby unit is one of two in the UK led by a team of Advanced Neonatal Nurse Practitioners, supported by consultant neonatologists. Women likely to deliver at less than 34 weeks gestation or whose baby may require intensive or high dependency care are transferred to the RSCH. There are facilities at PRH for short term ventilation and stabilisation of infants prior to transfer. Infants requiring short periods of care on CPAP or HHFNC are routinely managed at PRH.

Further details can be found on the departmental website:
https://www.bsuh.nhs.uk/departments/neonatal-

Maternity Service:
The neonatal and maternity teams work together to provide joint antenatal care for local mothers and in-utero transfers to the maternity department at RSCH. There is a monthly fetal medicine clinic with neonatal and surgical input. Individual counselling is provided for parents on the labour ward expecting preterm babies or babies with other complications.

The neonatal team deliver care and resuscitation to new born babies on the labour ward as required. The team will routinely attend at-risk deliveries and those expected to need extra support such as preterm infants or those babies with complex antenatal diagnoses.

The neonatal department is responsible for NIPE screening for normal new born infants and those on Transitional Care.

The maternity and neonatal teams are actively improving new born pathways within the ATAIN programme. There are joint audit and clinical governance, perinatal and complex case planning meetings across RSCH and PRH sites.

Neonatal Surgery:
There is a high risk pregnancy unit for fetal assessment and referrals are accepted for perinatal care prior to neonatal surgery. All neonatal surgery is performed on site at the Royal Alexandra Children's Hospital with a team of dedicated paediatric surgeons and paediatric anaesthetists. There is sufficient IC and HD capacity across the TMBU and RACH for neonatal surgery to be referred from around Sussex and a proportion of the Kent, Surrey and Sussex Neonatal Network.

Support services and ongoing care:
We benefit from the developing tertiary services at the RACH, including respiratory medicine, cardiology and gastroenterology. Infants with ongoing medical or surgical needs beyond the neonatal period are transferred to the 'Alex' as soon as possible. Our department is supported by a team of paediatric radiologists providing a 24/7 on call service. MRI, spiral CT and nuclear medicine investigations are all available on site. The neurophysiology department provides a mobile EEG service. We also have access to paediatric dietetics, physiotherapy, pharmacy, speech and language therapy, audiology, ophthalmology, breast feeding advisor. The Respiratory and Community Paediatric Nursing Team help co-ordinate the discharge and follow-up of infants requiring home oxygen. There is a weekly multidisciplinary Family & Social Meeting. We have access to parent counselling and support from the chaplaincy team.

A perinatal pathology service is provided at St Thomas' Hospital, London, with visiting support from other tertiary specialists from the Evelina Children's Hospital including those from genetics, cardiology, nephrology and neurology.

Weekly neonatal follow-up clinics are held on both the RSCH and PRH sites. Monthly neurodevelopmental clinics are used to follow preterm and birth asphyxiated babies. We aim to provide comprehensive follow-up of high risk infants until two years corrected age. The Seaside View and Nightingale Child Development Centres provide multi-disciplinary care for those infants needing ongoing neurodevelopmental support. The weekly One-Stop Clinic cares for mothers and babies with problems of substance misuse.

Staffing

Medical Staff

Consultant Neonatologists:

Dr Neil Aiton	Interest in perinatal substance misuse (One Stop Clinic)
Dr Philip Amess	Lead Clinician, interest in neurology and developmental outcome
Dr Prashanth Bhat	Interest in neonatal ventilation and IT
Dr Robert Bomont	Paediatric College Tutor, Training Programme Director, interest in infectious diseases
Dr Ramon Fernandez	Lead for Clinical Governance, interest in nutrition, Senior Lecturer
Dr Cathy Garland	Transport Consultant, interest in simulation training
Dr Cassie Lawn	Transport Lead, interest in simulation training and human factors
PD Dr Heike Rabe	Lead for Research, Reader
Dr Ryan Watkins	Clinical Director of Children and Women's Services and Honorary Clinical Senior Lecturer.
Dr Nikolay Drenchev	Consultant Neonatologist, interest in cardiology
Dr Bettina Reulecke	Consultant Neonatologist, interest in neonatal neurology

Consultant Obstetricians:
Mr Salah Abdu
Mr Tosin Ajala (Clinical Director Women's Health)
Mr Rob Bradley (Fetal Medicine)
Miss Heather Brown (Deputy Medical Director)
Mr Ani Gayen
Mr Ehab Kelada
Mr Tony Kelly
Miss Jo Sinclair (Obstetric Lead)
Mr David Utting
Ms Win Khine (Fetal Medicine)

Consultant Paediatric Surgeons:
Miss Ruth Hallows
Mr Varadarajan Kalidasan
Miss Anouk van der Avoirt
Mr Bommaya Narayanaswamy
Mr Saravanakumar Paramalingam
Miss Jigna Sheth

Mr Subramanyam Maripuri, Mr Thomas Crompton, Mr Stefano Bolongaro (Orthopaedics)

Mr Simon Watts, Mr Prodip Das (ENT)

Consultant Radiologists: Dr Lorraine Moon, Dr Ima Moorthy, Dr Lavanya Vitta, Dr Kyriakos Iliadis, Dr Jacqueline DuToit

Consultant Ophthalmologists: Mr Dominic Heath, Miss Victoria Barrett

Consultant Audiologist: Mr Rob Low

Consultant Pathologist: Dr Mudher Al-Adnani (St Thomas' Hospital)

High Dependency Paediatric Consultant: Dr Kamal Patel

Cardiology Consultant: Dr P Venugopalan

Consultant Gastroenterologists: Dr Assad Butt, Dr Michael Hii

Respiratory Consultants: Dr Paul Seddon, Dr Krishne Chetty, Dr Akshat Kapur, Professor Somnath Mukhopadhyay

Endocrinology Consultants: Dr Shankar Kanumakala, Dr Dunil Ismail

Haematology Consultant: Dr Catherine Wynne

Oncology Consultant: Dr Ann Davidson

Neurology and Epilepsy Consultant: Dr Nikil Sudarasan

Visiting Consultants:

Dr Hannah Bellsham-Revell	Cardiology
Dr Shelagh Mohammed	Genetics
Dr Chris Reid	Nephrology
Dr Tammy Hedderly	Neurology
Dr Elaine Hughes	Epilepsy
Dr Charles Buchanan	Endocrinology
Dr Mike Champion	Metabolic medicine
Dr Jonathan Hind	Gastroenterology

Junior and Middle Grade Medical Staff:

Tier 1 (8 wte):
6 ST2/3 trainees
2 Trust Clinical Fellows
plus additional ANNP input

Tier 2 (11 wte):
Associate Specialist (Dr Michael Samaan)
Specialist Doctor (Dr Fatou Wadda)
4 Specialist Registrars
1 Trust Clinical Fellow
ANNPs (currently 3.25 wte)
1 Research Fellow (0.5 wte clinical)
2 Out of Programme Experience (1 wte clinical)
Consultant contribution (approximately 1.5 wte)

Neonatal Nurses

Senior Nursing Staff

Lorraine Tinker	Head of Paediatrics and Neonatal Nursing
Judith Simpson	Matron, Neonatology
Mrs Susanne Simmons	Senior Lecturer Child Health/Graduate Certificate in Acute Clinical Practice course leader/Neonatal Pathway lead

Band 7

Clare Morfoot (Clinical Practice Educator)
Clare Baker (Senior Sister, PRH)
Louise Watts (Transport)
Chrissie Leach (Transport)
Jackie Cherry (Risk management)
Sandra Hobbs (Rota and Leave)
Karen Marchant (Surgery and Patient Information)
Betina Jahnke (Infection Control)
Judy Edwards (Neonatal Outreach and Family Care)

Advanced Neonatal Nurse Practitioners

Jamie Blades	Maggie Bloom
Naomi Decap	Karen Hoover
Caroline McFerran	Simone van Eijck
Nicola McCarthy	Lisa Kaiser
Sandra Summers	Jonathan O'Keeffe
Rachel Burton (in training)	

There is a large team of Advanced Neonatal Nurse Practitioners who deliver the neonatal service at the SCBU PRH and contribute significantly to the Tier 1 and Tier 2 rota at the TMBU. Each ANNP has a consultant mentor, they are line managed by Lorraine Tinker, Head of Paediatrics and Neonatal Nursing.

Outreach Team:

Judy Edwards
Sarah Arief

The Neonatal Outreach team works to support the discharge of infants from the TMBU and the SCBU at PRH. The team comprises of a sister who works full time and a nursery nurse who works 22.5 hours per week.

Support Staff

Directorate Manager:	Jonathan Brooks
Unit Technician:	John Caisley
Pharmacist:	David Annandale
SALT:	Amanda Harvey
Physiotherapy:	Emma Pavitt
Dietician:	Carole Davidson
Counsellor:	Peter Wells and Julie Carroll
Secretarial support:	Jane Battersby, Emma Morris, Patricia Walker
Ward clerks:	Kim Baldry, Diana Ginn, Anthony Jackson-Leonard, Sasha Nye

Admissions, Activity and Mortality
Trevor Mann Baby Unit

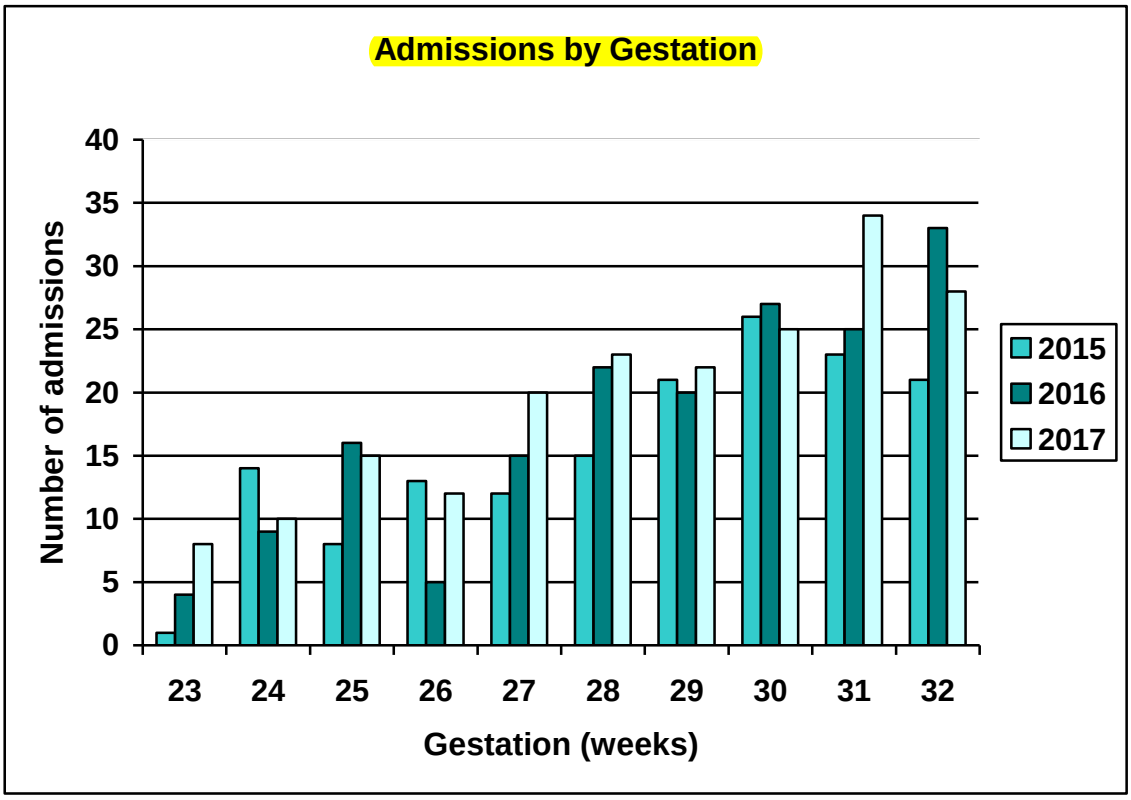
Admissions	Total Admissions per year
2005	444
2006	415
2007	465
2008	524
2009	456
2010	525
2011	562
2012	567
2013	528
2014	516
2015	534
2016	524
2017	**513**

Includes re-admissions

Admissions	2015	2016	2017
Total number of live births (RSCH)	3415	3380	3110
Total admissions (including re-admissions)	534	524	513
Inborn	357	356	369
Inborn booked RSCH	272	254	281
Inborn booked elsewhere	75	102	88
Outborn	146	141	126
Re-admissions	30	21	17
Admissions from home	1	6	1
Percentage of inborn births admitted to the TMBU	10	10	12

Admission details	2015		2016		2017	
Gestation (weeks)	**Babies**	%	**Babies**	%		
23	1	*<1*	4	*1*	8	*2*
24	14	*3*	9	*2*	10	*2*
25	8	*1.5*	16	*3*	15	*3*
26	13	*2.5*	5	*1*	12	*2*
27	12	*2*	15	*3*	20	*4*
28	15	*3*	22	*4*	23	*5*
29	21	*4*	20	*4*	22	*4*
30	26	*5*	27	*5*	25	*5*
31	23	*4.5*	25	*5*	34	*7*
32	21	*4*	33	*6.5*	28	*6*
33-36	137	27	144	*29*	119	*24*
37-41	205	41	180	*36*	175	*35*
>42	8	1.5	3	*<1*	5	*13*
Birth weight (g)						
<500	2	<1	2	*<1*	3	*<1*
<750	19	4	30	*6*	23	*5*
<1000	24	5	20	*4*	37	*7*
<1500	66	13	62	*12*	89	*18*
Multiple pregnancies (number of babies)						
Twins	101	20	85	*17*	99	*20*
Triplets	0	0	3	*<1*	6	*1*

Inborn and ex-utero admissions: does not include re-admissions

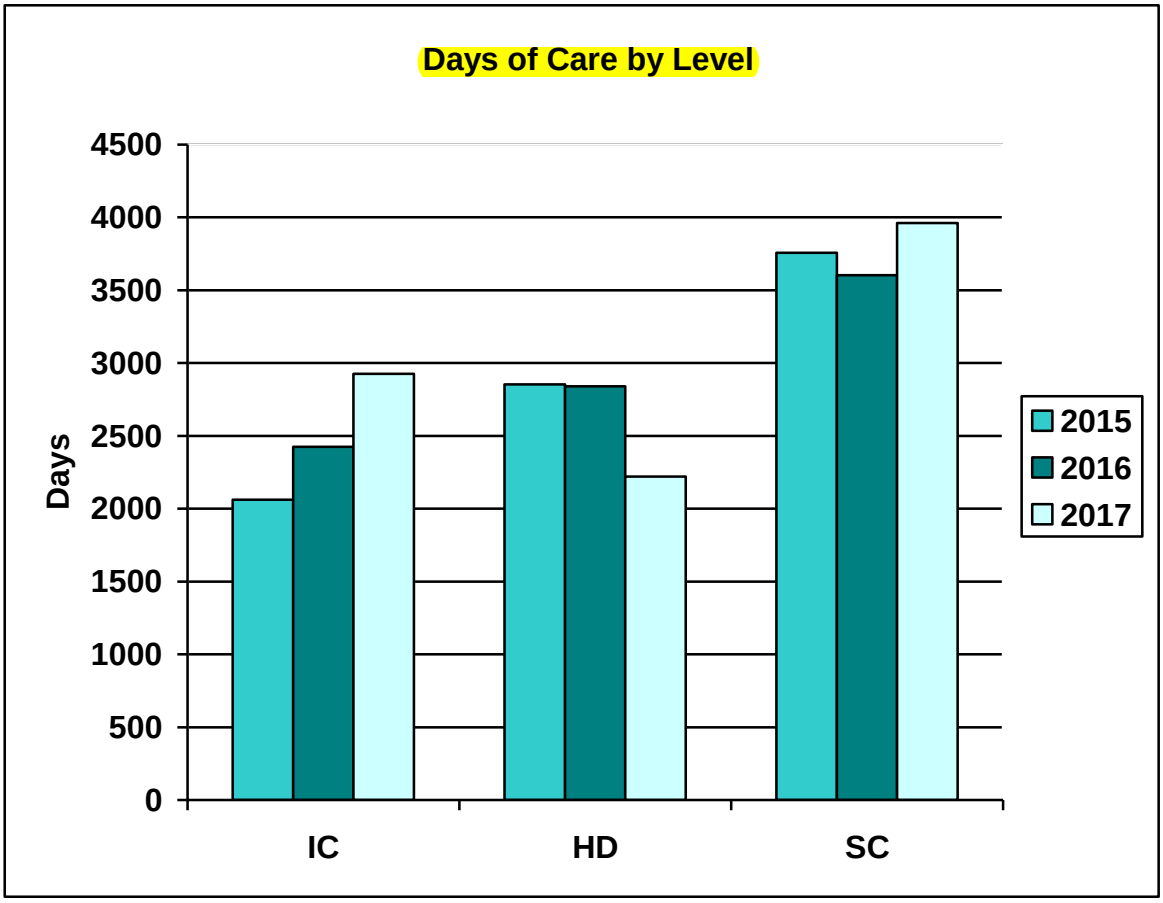


Transfers in	2015	2016	2017
In-Utero			
Babies booked elsewhere and admitted	75	102	88
Refused in-utero transfers Refused by maternity From outside KSS network	73	87 50 21	113 34 24
Ex-Utero	146	141	127
Princess Royal Hospital	31	31	20
East Sussex Hospitals	39	32	30
West Sussex Hospitals	21	16	14
Other Network Hospitals	43	36	43
Outside Network	34	26	20
Refused ex-utero transfers	11	19	69

Does not include re-admissions or home births

Cot occupancy	2015		2016		2017	
Cots	Days	*%*	Days	*%*	Days	*%*
IC	2061	*63*	2424	*74*	2925	89
HD	2853	*98*	2840	*97*	2221	76
IC & HD (total)	4914	*79*	5264	*85*	5146	83
SC	3756	*103*	3603	*99*	3962	109
Total	8670	*88*	8867	*90*	9108	92
Transitional Care	624		1334		1869	

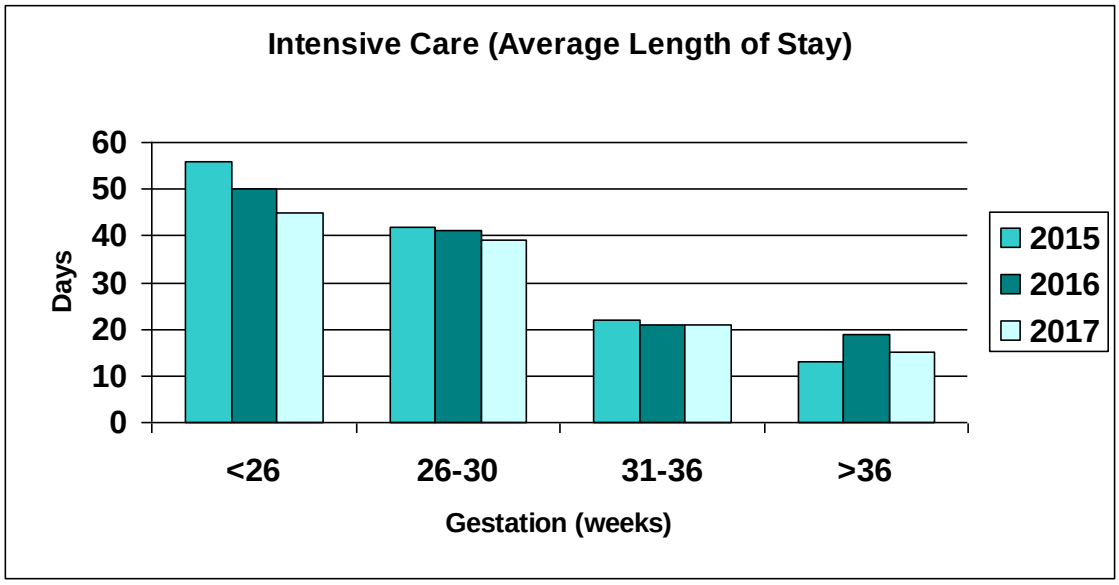
2011 BAPM definition for care levels (all babies receiving care during a 12 month period)



Care Categories for 2017						
Gestation at birth (weeks)	IC		HD		SC only	
	Babies	Days	Babies	Days	Babies	Days
< 23	**0**	0	0	0	-	-
23	**8**	241	2	43	-	-
24	**10**	324	7	142	-	-
25	**14**	450	12	252	-	-
26	**12**	307	11	231	-	-
27	**19**	402	16	194	-	-
28	**23**	284	21	223	-	-
29	**19**	179	17	128	-	-
30	**18**	170	23	207	1	27
31	**17**	76	28	173	5	47
32	**16**	63	21	78	3	59
33-36	**26**	90	57	249	52	427
37-41	**55**	182	65	207	82	339
>41	**1**	5	2	6	3	21

2011 BAPM definition for care levels

Average length of stay in days for all admissions by gestation			
	2015	2016	2017
Gestation	ITU		
<26	56	50	45
26-30	42	41	39
31-36	22	21	21
>36	13	19	15
Gestation	HDU		
<26	33	54	56
26-30	21	17	21
31-36	16	15	19
>36	9	8	10



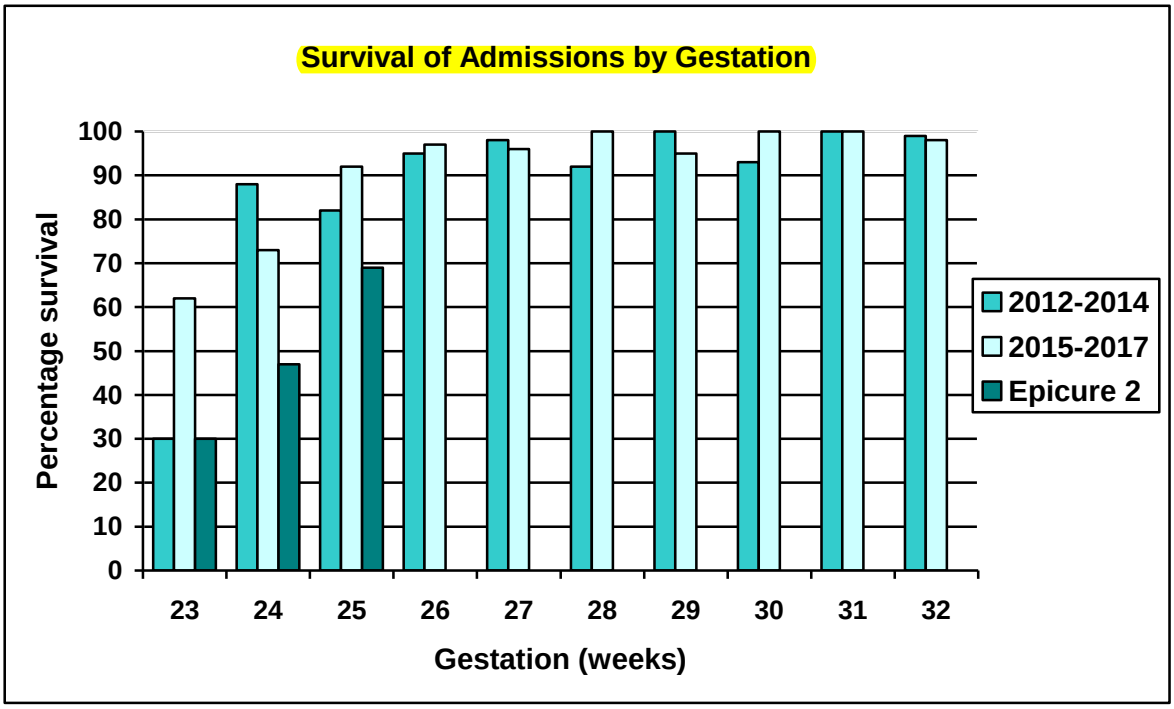
Transfers out	2015	2016	2017
Specialist medical care	4	18	13
Cardiac care	13	6 (1 ECMO)	8 (1 ECMO)
Discharges			
Home/Foster care	177	201	185
Postnatal ward	120	105	101
Local hospital care	192	183	189
Princess Royal Hospital	68	61	59
RACH	20	16	21
East Sussex Hospitals	39	34	29
West Sussex Hospitals	23	16	21
Other KSS Network hospitals	21	24	26
Other hospitals outside KSS Network	21	31	33

Survival of all inborn live births by gestation for 2017								
GA	**Live births**	**Admitted to TMBU***	**Died before admission**	**Died <7d**	**Died 7-28d**	**Died >28d**	**Total deaths**	**Admissions surviving to discharge**
23	6	**5**	1	2	0	0	3	**3**
24	5	**5**	0	1	0	0	1	**4**
25	8	**8**	0	0	0	0	0	**8**
26	9	**9**	0	0	0	0	0	**9**
27	11	**11**	0	0	0	0	0	**11**
28	17	**17**	0	1	0	0	1	**16**
29	9	**9**	0	1	0	0	1	**8**
30	19	**19**	0	0	0	0	0	**19**
31	25	**25**	0	0	0	0	0	**25**
32	20	**20**	0	1	0	0	1	**19**
33-36	176	**102**	0	0	0	0	0	**102**
37-42	2792	**137**	0	0	0	0	0	**137**
>42	14	**0**	0	0	0	0	0	**0**
Total	**3110**	**367**	**0**	**0**	**0**	**0**	**0**	**361**

Inborn (booked and unbooked) excluding lethal congenital abnormalities
Not including re-admissions

3 year rolling survival to discharge for extreme preterm admissions							
	2015		**2016**		**2017**		
GA	**Admitted**	**Died**	**Admitted**	**Died**	**Admitted**	**Died**	**Survival to discharge %**
23	1	1	4	1	8	3	62
24	14	5	9	2	10	2	73
25	8	1	16	1	14	1	92
26	13	0	5	1	12	0	97
27	12	0	15	0	19	2	96

Includes inborn and ex-utero transfers



Mortality Statistics (RSCH)	2012	2013	2014	2015	2016	2017
Total deliveries	3582	3303	3410	3428	3390	3184
Total livebirths	3569	3292	3400	3415	3380	3176
Total stillbirths	13	11	10	12	10	8
Deaths before admission*	0	0	2	2	0	1
Total neonatal deaths	23	19	14	11	9	17
Inborn	17	11	11	6	4	6
Outborn	6	8	3	5	5	11
Early neonatal deaths**	8	5	3	1	1	5
Late neonatal deaths**	4	5	3	2	0	0
Deaths >28 days**	5	0	1	3	3	1
Still birth rate	3.6	3.3	2.9	3.5	2.9	2.5
Perinatal mortality rate	5.9	4.8	4.4	4.4	3.2	3.8
Neonatal mortality rate**	3.4	3.0	1.8	0.9	0.3	1.9
Mortality Statistics (BSUH = RSCH + PRH)	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Total deliveries	6057	5841	5851	5915	5838	5445
Total livebirths	6035	5828	5729	5892	5823	5431
Total stillbirths	22	13	22	22	15	14
Deaths before admission*	0	0	1	2	0	1
Early neonatal deaths**	8	6	5	1	1	6
Late neonatal deaths**	4	5	4	3	0	0
Deaths >28 days**	5	0	1	3	3	1
Still birth rate	3.6	2.2	3.8	3.7	2.6	2.6
Perinatal mortality rate	5.0	3.3	4.6	3.9	2.7	3.5
Neonatal mortality rate**	2.0	1.9	1.7	0.8	0.2	0.9

* ***Terminations and deaths <23 weeks gestation not included.***

TMBU deaths (inborn and ex-utero transfers) 2017					
Delivered	**GA**	**BW**	**Age d**	**PM**	**Cause of death, related factors**
Deaths related to prematurity					
RSCH	29	449	4	N	Cerebral haemorrhagic infarction, IUGR
RSCH	24+3	340	2	N	Extreme prematurity, IUGR
RSCH	23+0	540	1	N	Extreme prematurity
Sepsis					
Darrent Valley	32+3	2105	6	Y	Sepsis
NEC					
RSCH	23+5	668	35	N	NEC
Conquest	27+1	960	14	N	NEC
Worthing	28+1	1095	39	Y	NEC
Frimley Park	24+5	680	13	N	NEC
Tunbridge Wells	27+6	940	21	Y	NEC
Chertsey	23+2	482	4	N	NEC
Deaths related to perinatal asphyxia					
PRH	36+3	2258	3	Y	HIE grade 3
Frimley Park	40+1	4400	6	N	HIE, seizures, macrosomia
Frimley Park	39+1	2775	8	Y	HIE grade 3
Congenital abnormality					
RSCH	28+0	1890	1	N	Hydrops secondary to Parvovirus
Conquest	32+3	2070	14	N	Complex congenital heart disease
Others					
RSCH	32+4	2143	6	Y	Subaponeurotic and subdural haemorrhages
East Surrey	25+6	780	1	N	Subdural haemorrhage, breech extraction

Post Mortems	**2015**	**2016**	**2017**
Total deaths	13	9	**18**
Post Mortems performed (% of deaths)	2 (15)	4(44)	**6 (33)**

Inborn (booked and unbooked) excluding lethal congenital abnormalities

All neonatal deaths within BSUH are routinely reported to the Coroner, logged on the Trust Datix system and reviewed contemporaneously by the clinical team. Further review is undertaken locally within Perinatal and Neonatal Clinical Governance Meetings and when appropriate at joint meetings with other baby units. Deaths are reported to the neonatal MBRRACE-UK database and the KSS Neonatal Network and are individually reviewed at the Sussex, Child Death Overview Panel.

4 year rolling mortality (all admissions)											
	Total Admissions:					Deaths					Survival to discharge
	2014	2015	2016	2017	Total	2014	2015	2016	2017	Total	(%)
Inborn	350	357	356	369	**1432**	11	6	3	6	**26**	**98**
Outborn	146	146	141	126	**559**	3	7	6	11	**27**	**95**
<26 weeks	30	23	29	33	**115**	4	7	4	6	**21**	**82**
<28 weeks	29	25	20	32	**106**	2	0	1	2	**5**	**95**
<31 weeks	63	62	69	70	**264**	2	0	1	4	**7**	**97**
31+ weeks	374	394	385	361	**1514**	6	5	3	5	**19**	**99**
<500g	4	2	2	3	**11**	0	1	0	3	**4**	**63**
<750g	22	19	30	23	**94**	2	5	5	3	**15**	**84**
<1000g	35	22	20	37	**114**	4	2	0	3	**9**	**92**
<1500g	65	66	62	89	**282**	2	0	1	1	**4**	**99**
>1500g	370	395	389	343	**1497**	6	5	3	7	**21**	**99**

Admissions, Activity and Mortality
Special Care Baby Unit, Princess Royal Hospital

Admissions	2015	2016	2017
Total number of livebirths	2477	2443	**2261**
Total number of stillbirths	10	5	**6**
Total admissions*	284 (24)	261 (18)	**242(23)**
Percentage of live births admitted	11%	11%	**11**

***(re-admissions)**

Admission details	2015		2016		2017	
	Babies	%		%		%
Total admissions	260		243		**219**	
Inborn	199	70	167	69	**157**	**72**
Outborn	61	21	75	31	**62**	**28**
Gestation ( ) = babies born elsewhere and back transferred to PRH						
23	0		1		**0**	
24	1(1)		1(1)		**0**	
25	0		2(2)		**0**	
26	0		2(2)		**3(3)**	
27	3(3)		1(1)		**6(6)**	
28	2(2)		4(4)		**4(2)**	
29	12(11)		6(6)		**2(2)**	
30	7(4)		10(10)		**6(6)**	
31	4(4)		7(5)		**10(10)**	
32	5(4)		11(10)		**7(4)**	
33-36	86(25)		91(24)		**75(15)**	
37-42	144(21)		120(9)		**112(17)**	
>42	0		0		**0**	
Birthweight (g)						
<500	0		0		**0**	
<750	0		4(3)		**0**	
<1000	1(1)		5(5)		**7(7)**	
<1500	17(17)		17(16)		**16(2)**	
Multiple births (number of babies)						
Twins	30		36		**35**	
Triplets	0		3		**3**	

Does not include re-admissions

Ex-utero Transfers	2015	2016	2017
Transfers out to Brighton	31	35	**26**
Transfers out to elsewhere	3	10	**1**
Transfers in from Brighton	65	67	**57**
Transfers in from elsewhere	5	7	**4**
Transfers in from home	11	18	**17**

Cot occupancy	2015		2016		2017	
Cots	**Days**	**% occ**	**Days**	**% occ**	**Days**	**% occ**
IC	45		21		**33**	
HD	184	**-**	207		**264**	
SC	1929	**-**	1778		**1735**	
Total	2158	**74**	2006	**69**	**2032**	**70**

Mortality Statistics (PRH)	2014	2015	2016	2017
Total deliveries	2441	2487	2448	**2261**
Total livebirths	2429	2477	2443	**2255**
Total stillbirths	12	10	5	**6**
Early neonatal deaths*****	2	0	0	**1**
Late neonatal deaths*****	1	1	0	**0**
Post neonatal deaths (>28 days)*****	0	0	0	**0**
Still birth rate	4.9	4.0	2.0	**2.7**
Perinatal mortality rate	5.7	4.0	2.0	**3.1**
Neonatal mortality rate*	1.2	0.4	0	**0.4**

****Inborn (booked) excluding lethal congenital abnormalities***

Transport

The Sussex Neonatal Transport Service, together with similar services in Kent and Surrey, provide 24 hour cover across the KSS Neonatal Network. There is a small team of drivers, a dedicated ambulance and provision of consultant cover for the Sussex service. A doctor and nurse are provided for each shift except for the nurse only second on service.

The Sussex team undertook 437 transfers in 2017:
18 transfers were not completed (either handed to another team, care withdrawn or cancelled as no longer required).

There were 332 medical transfers (18 cardiac), 46 surgical and 41 neurological.

Medical Transfers	Uplift of care	Repatriation	Capacity transfers
IC	68	25	
HD	7	46	11
SC	3	164	8

The Sussex NTS made the following cardiac related transfers.
Sussex babies:
5 IC babies from the TMBU to Southampton for ligation of the ductus arteriosus.
One IC baby from St Richards to The Royal Brompton
One HD baby moved electively from Worthing to The Royal Brompton
One SC outpatient from PRH to RACH.
Kent and Surrey babies:
6 IC babies, 1HD and 3 SC were transferred into London apart from one to Southampton

Surgical Transfers	Uplift of care	Outpatient Appointments
IC	16	
HD	8	1
SC	20	1

24 surgical transfers were to London (Evelina=12, Kings=5, St Georges=7)
19 transfers were to the TMBU and 3 to the RACH.

Neurological Transfers	Uplift of care	Outpatient Appointments	Repatriation
IC	33		
HD	1		
SC	3	3	1

5 neurological transfers were to London, 16 to St Peters Chertsey, 4 to Medway, 1 to Portsmouth, 12 to the TMBU (8 for cooling therapy) and 1 to RACH.
A total of 28 neurological transfers were for cooling therapy.

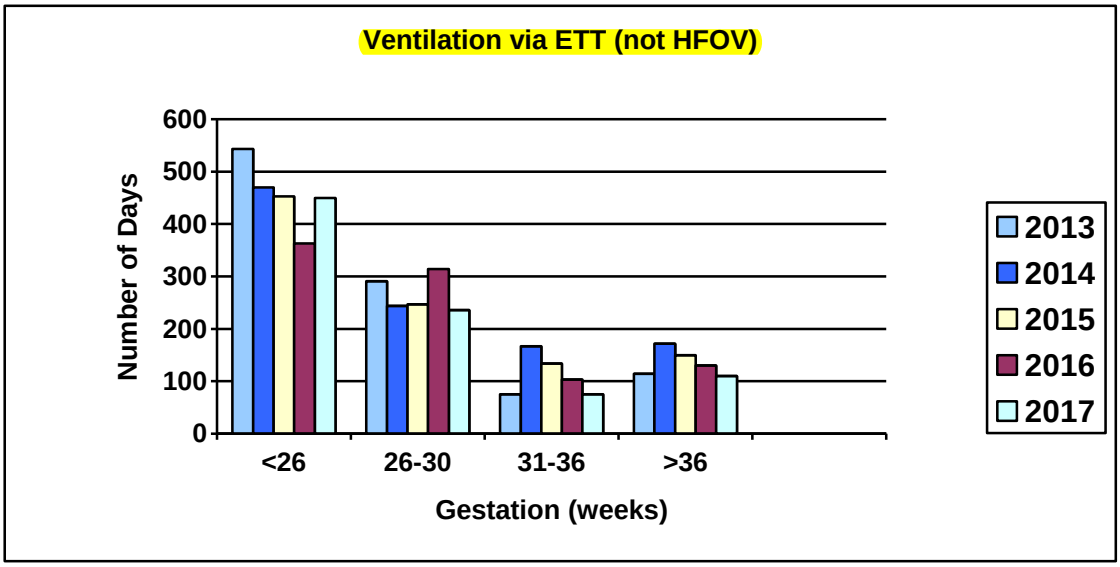
Summary of Clinical Activity
Trevor Mann Baby Unit

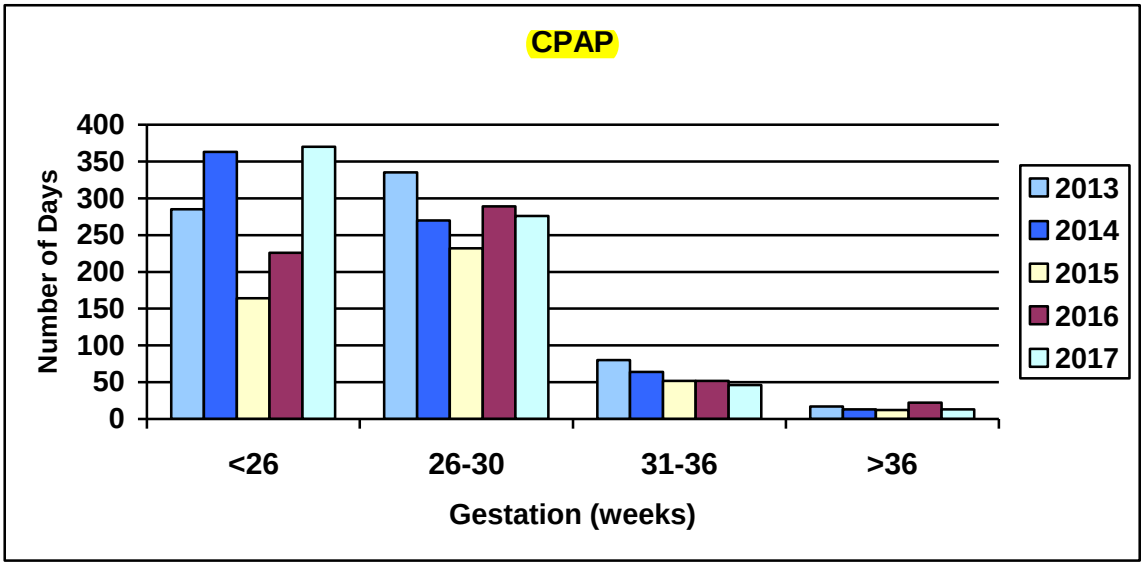
Respiratory Support	2015		2016		2017	
	Days	Babies	Days	Babies	Days	Babies
Ventilation via ETT	984	181	868	175	**871**	**164**
HFOV	46	17	42	17	**30**	**14**
CPAP	460	115	589	114	**705**	**127**
HHFNC	1721	222	1832	280	**2116**	**240**
Surfactant (doses)		100 (114)		83 (102)		**66 (76)**
Nitric Oxide	47	17	86	23	**112**	**27**

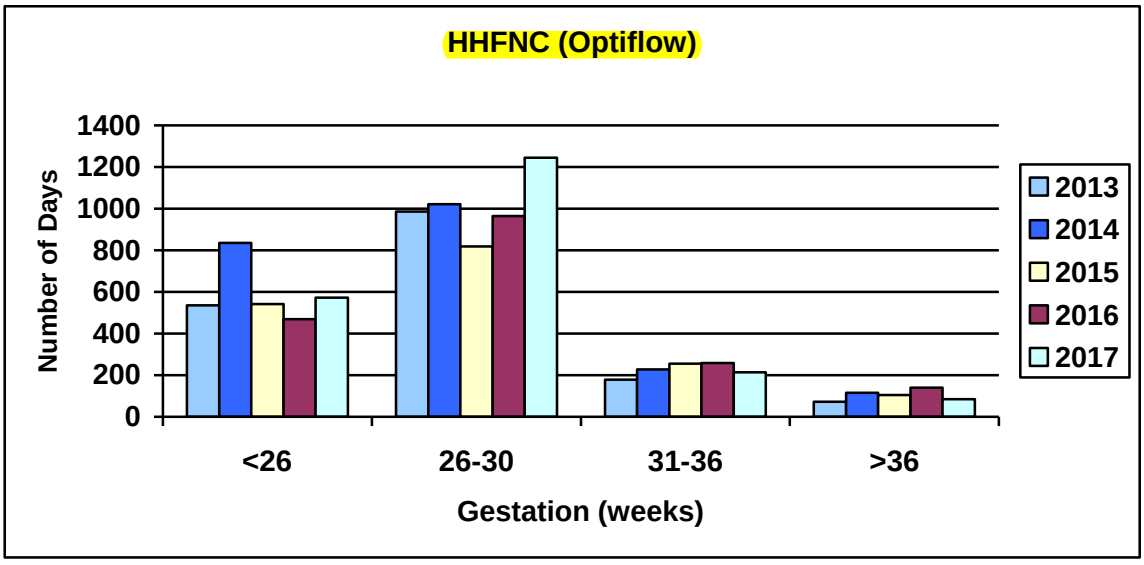
Respiratory diagnoses	Number of Babies		
	2015	2016	2017
Respiratory Distress Syndrome	129	158	**194**
Transient Tachypnoea	19	13	**15**
Signs of respiratory distress of the newborn	184	204	**230**
Persistent Pulmonary Hypertension	19	15	**15**
Meconium aspiration	10	13	**10**
Cystic Fibrosis	0	2	**1**

Respiratory Complications	2015	2016	2017
Pulmonary haemorrhage	10	7	**3**
Pulmonary air leak (drained)	24	33	**33 (5)**
Oxygen at 36 weeks CA	26	35	**33**
Oxygen at 28 days	59	70	**73**
Discharged with home oxygen	7	8	**11**

Management of PDA	2015	2016	2017
Patent Ductus Arteriosus	45	49	**65**
PDA treated medically	16	17	**21**
PDA ligated	5	6	**5**


Ventilation via ETT (not HFOV)
Number of Days
600
500
400
300
200
100
0
<26
26-30
31-36
>36
Gestation (weeks)
2013
2014
2015
2016
2017


CPAP
Number of Days
400
350
300
250
200
150
100
50
0
<26
26-30
31-36
>36
Gestation (weeks)
2013
2014
2015
2016
2017


HHFNC (Optiflow)
Number of Days
1400
1200
1000
800
600
400
200
0
<26
26-30
31-36
>36
Gestation (weeks)
2013
2014
2015
2016
2017

Infection	Positive Blood Cultures (episodes)		
	2015	2016	2017
Group B streptococcus	2	3	0
Non-haemolytic streptococcus	1	3	2
Alpha haemolytic streptococcus	0	0	0
Haemophilus	0	0	0
Coagulase-negative staphylococcus	42	31	32 (27)
MSSA	2	3	4
MRSA	0	0	0
Enterococcus faecalis	11	6	0
Listeria	0	0	0
Escherichia coli	5	4	3 (3)
Bacillus cereus	0	2	0
Klebsiella species	2	2	1
Serratia species	0	0	1
Enterobacter species	2	2	4 (3)
Pseudomonas species	1	0	0
Candida species	1	2	2 (1)
Acinetobacter species	1	0	1
Paenibacillus species	1	0	0
Corynebacterium striatum	0	1	0
Diphtheroid	0	1	0
Micrococcus lutens	0	1	0
TOTAL	**71**	**61**	**50 (43)**

Necrotising Enterocolitis	2015	2016	2017
NEC confirmed cases including perforations (EUT)	19 (9)	14 (5)	**18 (10)**
NEC suspected cases (EUT)	27	15 (8)	**19 (9)**
Confirmed NEC perforated (EUT)	7 (4)	6 (3)	**7 (4)**
NEC treated surgically (EUT)	18 (9)	11 (7)	**13 (7)**

Neonatal Surgical Cases (not NEC)	2015 Cases	2016 Cases	2017 Cases
Gastroschisis	7	4	**3**
Exomphalos	3	2	**0**
Hirschsprungs	1	1	**0**
Malrotation	0	5	**8**
Meconium ileus	3	7	**6**
Gut perforation (not NEC)	2	2	**2**
Oesophageal Atresia / TOF	8	6	**3**
Intestinal atresia/obstruction	5	2	**4**
Inguinal hernia repair	5	6	**3**
Imperforate anus/rectal anomaly	3	0	**6**
Lung cyst/sequestration	0	0	**1**
Diaphragmatic eventration	0	0	**0**
Diaphragmatic hernia	0	1	**1**
TOTAL	**37**	**36**	**37**

Cranial Ultrasound Diagnoses	Number of Babies		
	2015	2016	2017
IVH with parenchymal involvement (EUT)	14 (10)	8 (4)	**8 (3)**
Post haemorrhagic hydrocephalus (requiring surgical intervention)	4 (1)	5 (0)	**4 (0)**
Infarction without IVH	2	2	**0**
Periventricular ischaemic injury with cyst formation (EUT)	4	3 (1)	**1 (0)**

All babies <32 weeks gestation have routine cranial ultrasound examinations

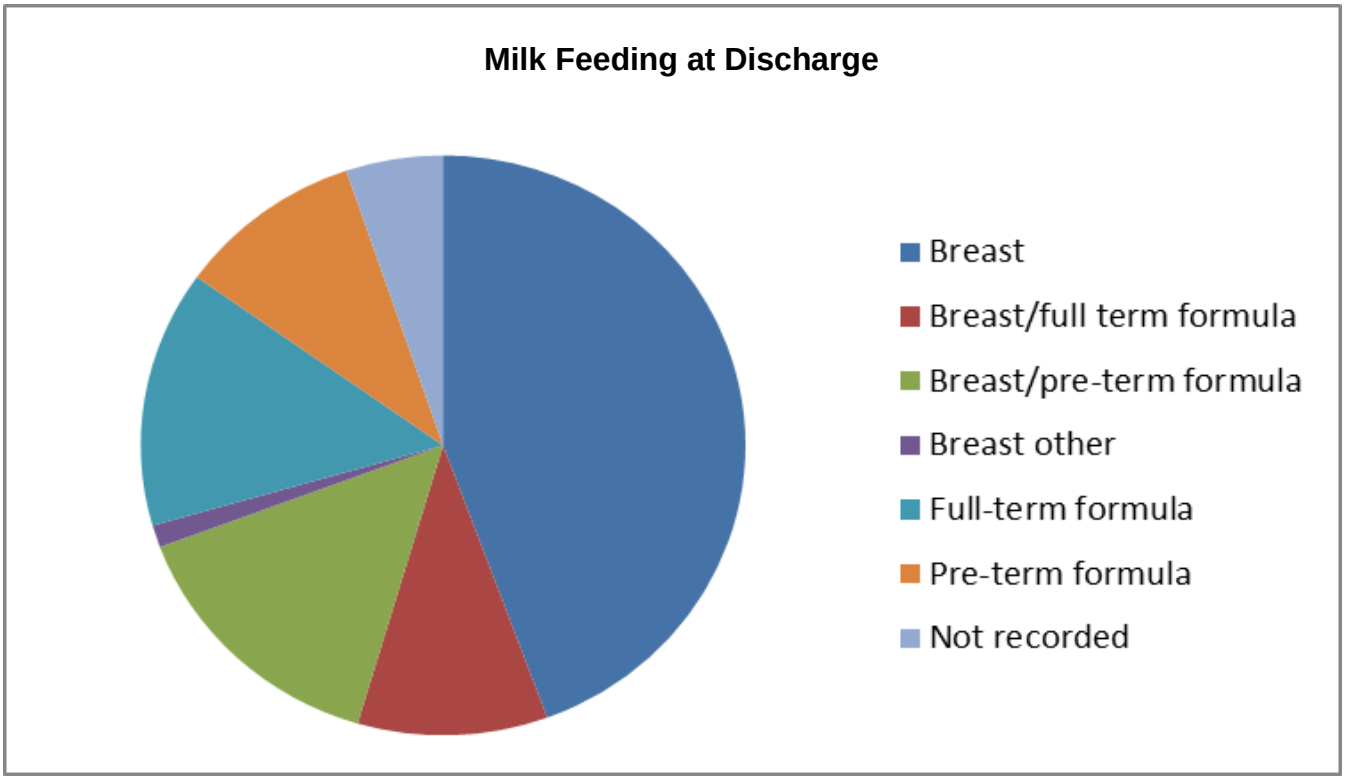
Hypoxic Ischaemic Encephalopathy	2015	2016	2017
HIE grade 1 (EUT)	10	16 (9)	**11 (9)**
HIE grade 2 (EUT)	18	15 (12)	**12 (8)**
HIE grade 3 (EUT)	6	3 (1)	**5 (4)**
Hypothermia therapy	28	23	**15**
- Inborn (BSUH)	11	11	**7**
- Outborn	17	12	**8**

Retinopathy of Prematurity	2015	2016	2017
ROP grades 3/4	5	2	**3**
ROP treated with laser therapy	3	1	**3**

Screening as per recommendations from Royal College of Ophthalmologists

Neonatal Dashboard	2017		
	Eligible	Result	%
Antenatal steroids given (24 – 34 weeks gestation)	155	141	91
Magnesium sulphate given	51	39	76
Temperature <36 ^{o}C on admission from LW (<32 weeks gestation at birth)	105	6	6
Parent seen within first 24 hours of admission (first admission to TMBU)	340	340	100
TPN commenced by day 2 (<29 weeks gestation, <1000g BW)	66	64	97
ROP screening completed on time (<32 weeks gestation and or <1500g BW)	98	97	99
Breast milk at discharge home (<33 weeks and first admission to TMBU)	59	40	68
Catheter related sepsis	3425 line days	7 +ve BC	2 per 1000 line days
BPD (<32 weeks gestation at birth)	114	No BPD 64	57
		Mild 11	10
		Significant 39	35

Feeding at Discharge	Babies
Breast	214
Breast/full-term formula	49
Breast/pre-term formula	71
Breast other	6
Full-term formula	69
Pre-term formula	48
Not recorded	25



Summary of Developmental Outcomes

Developmental follow-up takes place in baby clinic.

All babies who are likely to have developmental problems are referred to their local Child Development Centre.

Follow-up schedule for pre-term babies:

Prior to discharge / at term corrected age
- Physiotherapy and / or speech and language therapy assessment
- Audiology screening
- Screening for Retinopathy of Prematurity

At 3 months' corrected age
- Review of development and neurological assessment by consultant in baby clinic.
- Refer to specialist services as appropriate.

At 12 months' corrected age
- Review of development and neurological assessment by consultant in baby clinic.
- Refer to specialist services as appropriate.

At 24 months' corrected age
- Schedule of Growing Skills (2002 until 2006)
- Bayley Scales of Infant Development III (from September 2006 onwards)
- Health Status Questionnaire
- Refer to specialist services as appropriate or discharge if no concerns.

All preterm infants born at < 29 weeks gestation and/or <1000g and cared for on the TMBU during the first 24 hours of life have been entered into a formal neurodevelopmental follow-up programme from 1st October 2002.

Gestation at birth	23	24	25	26	27	28	>28	Total
Total admitted	22	71	72	73	99	122	13	472
Survived to discharge	9	31	53	55	85	98	24	355

For this report neurodevelopmental outcome is summarised as no disability, mild impairment or moderate and severe disability. Criteria for the level of neurodevelopmental outcome were defined according to the assessment undertaken.

Schedule of Growing Skills	Months behind corrected age	Bayley III	SD below mean for composite score
Normal	≤ 3 months	Normal	≥ 1SD below
Mild	> 3 to <6	Mild	> 1SD to ≤ 2SD
Moderate	≥ 6 to <9	Moderate	> 2SD to ≤ 3S
Severe	≥ 9	Severe	> 3SD

Of the 335 survivors eligible for follow-up, 289 infants had 24 month developmental assessments completed. 70 babies did not receive 24 month assessments. Of these 38 did not attend, 14 families had moved out of area, 8 attended for appointment but were too complex/difficult to assess, 3 follow-ups were missed, 4 follow-ups were undertaken at other hospitals, 1 parent cancelled as child had numerous problems, 2 were undertaken by the health visitor.

Outcome	23	24	25	26	27	28	>29	Total (%)
Cognitive								
Normal	4	12	23	33	45	70	13	200 (69)
Mild	2	5	8	4	12	15	3	49 (17)
Moderate	1	4	4	4	5	3	1	22 (8)
Severe	0	4	3	3	7	1	0	18 (6)
Communication								
Normal	2	10	21	17	30	61	10	151 (52)
Mild	3	5	6	18	15	15	5	67 (23)
Moderate	1	4	8	4	10	8	2	37 (13)
Severe	1	6	3	5	14	5	0	34 (12)
Motor								
Normal	3	14	24	23	32	61	13	170 (59)
Mild	3	2	7	12	20	15	3	62 (21)
Moderate	1	4	3	2	7	7	0	24 (8)
Severe	0	5	4	7	10	6	1	33 (12)
Combined outcomes								
Normal	2	10	17	13	25	49	10	126 (44)
Mild	3	4	8	19	15	24	5	78 (27)
Moderate	1	6	8	4	14	6	1	40 (14)
Severe	1	5	5	8	15	10	1	45 (15)
Total assessed	7	25	38	44	69	89	17	289

Outcome according to gestation was as follows:

23 and 24 weeks gestation (n=32)

Outcome (%)	Cognitive	Communication	Motor
Normal	16 (50)	12 (37)	17 (52)
Mild impairment	7 (22)	8 (25)	5 (16)
Moderate impairment	5 (16)	5 (16)	5 (16)
Severe disability	4 (12)	7 (22)	5 (16)

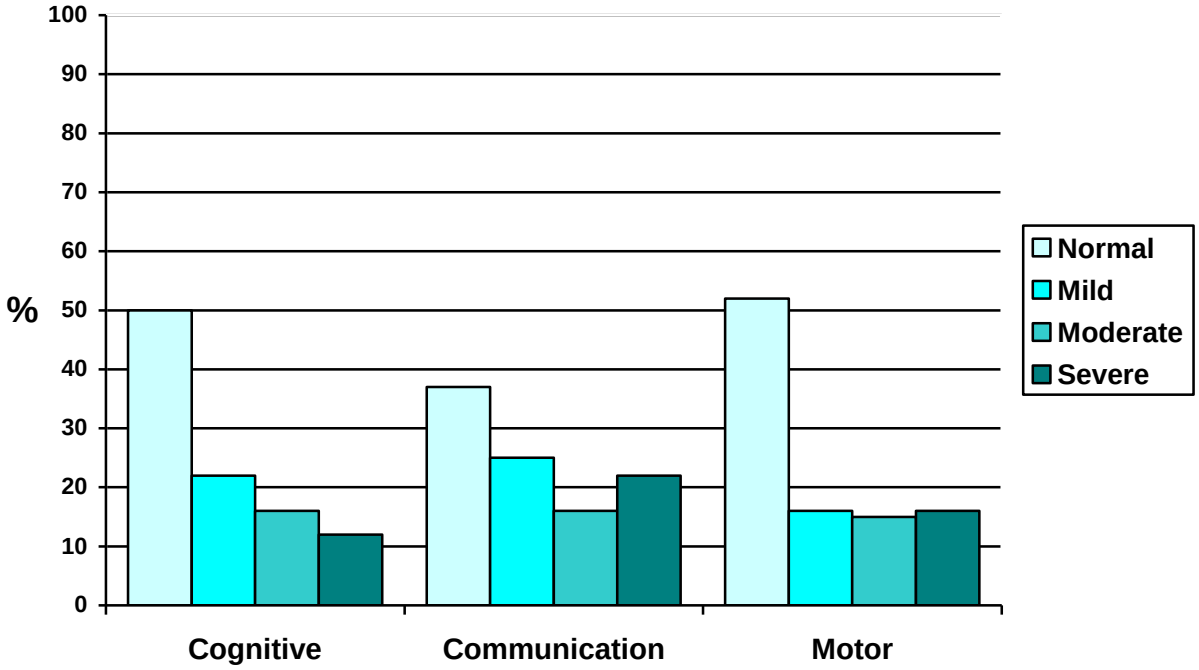
25 and 26 weeks gestation (n=82)

Outcome (%)	Cognitive	Communication	Motor
Normal	56 (68)	38 (46)	47 (57)
Mild impairment	12 (15)	24 (29)	19 (23)
Moderate impairment	8 (10)	12 (15)	5 (6)
Severe disability	6 (7)	8 (10)	11 (13)

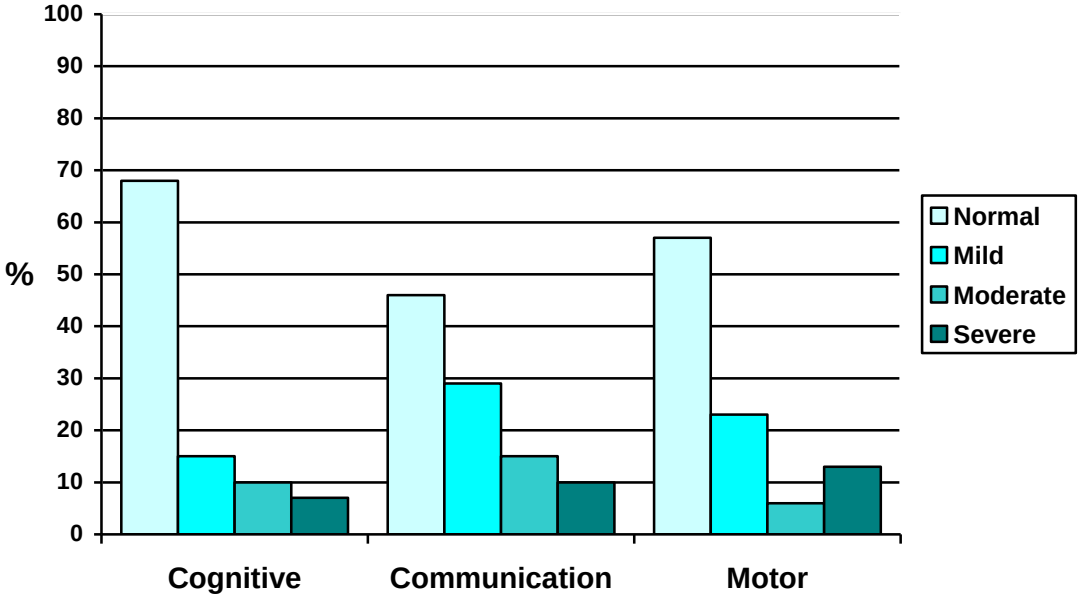
27 weeks gestation and above (n=175)

Outcome (%)	Cognitive	Communication	Motor
Normal	128 (73)	101 (58)	106 (60)
Mild impairment	30 (17)	35 (20)	38 (22)
Moderate impairment	9 (5)	20 (11)	14 (8)
Severe disability	8 (5)	19 (11)	17 (10)

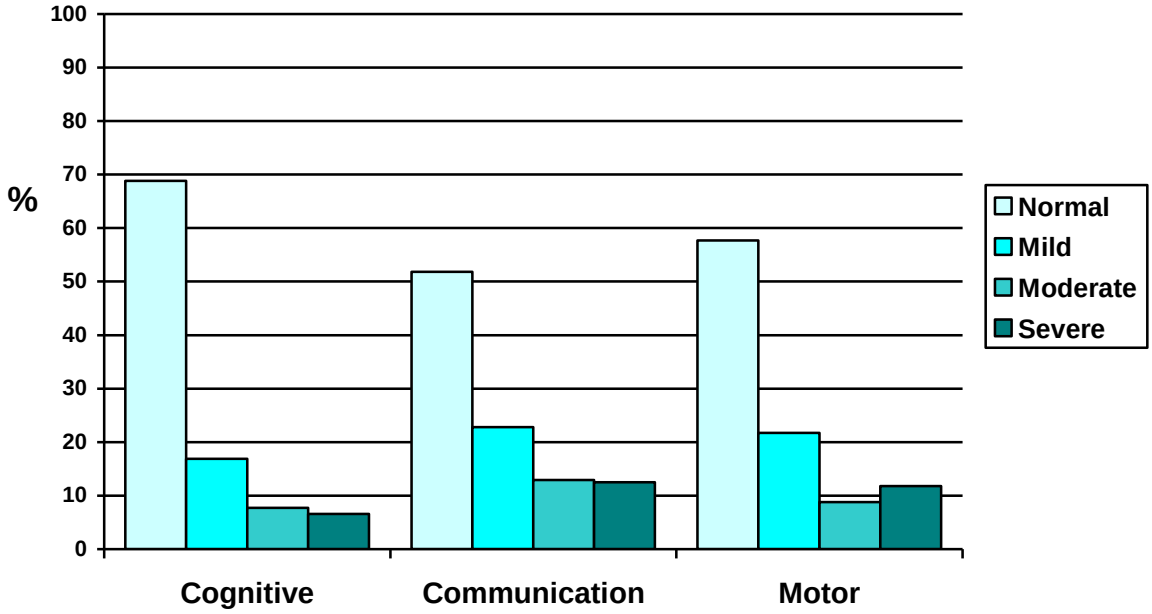
Neurodevelopmental Outcome of Pre-term Infants
23 & 24 weeks at 24 months CA
(n = 32)



Neurodevelopmental Outcome of Pre-term Infants
25 & 26 weeks at 24 months CA
(n = 82)



Neurodevelopmental Outcome of Pre-term Infants
27 weeks and above at 24 months CA
(n = 175)



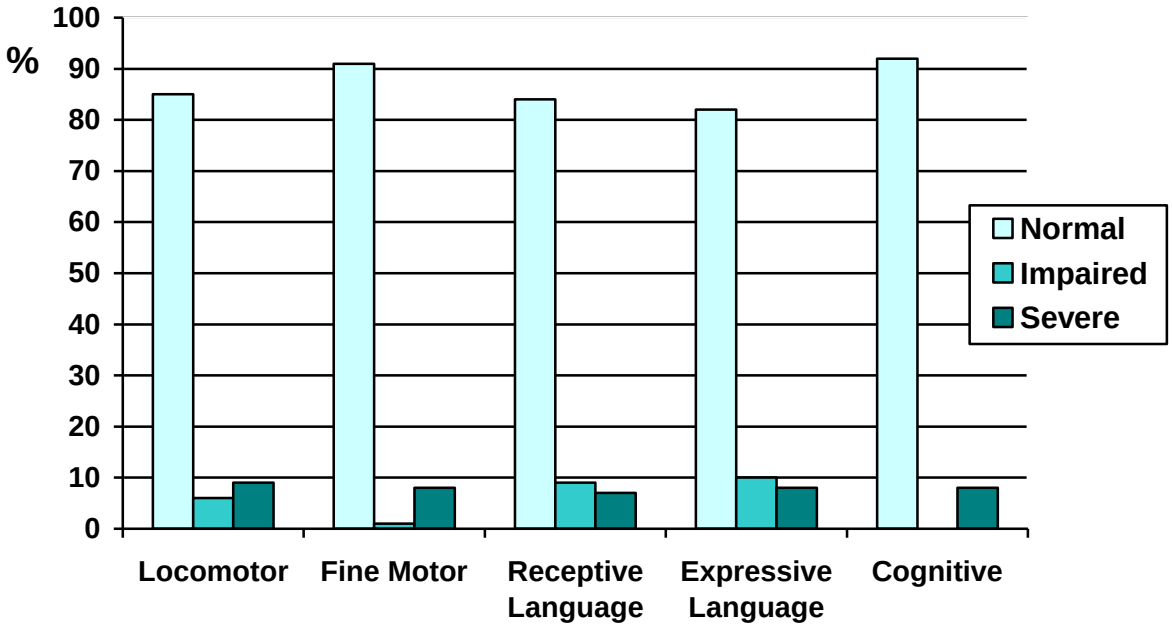
Neurodevelopmental Outcome for Babies with Hypoxic Ischaemic Encephalopathy

Since 2009 term babies who have received cooling therapy on the TMBU for hypoxic ischaemic encephalopathy have been assessed using Bayley III scales at 24 months.

Cooled babies from 2009	174
Assessments performed	99
Died	30
Did Not Attend	21
Outside network/moved away	21

Neurodevelopmental Outcome of Cooled Babies (n=99)

Outcome (%)	Locomotor	Fine Motor	Receptive Language	Expressive Language	Cognitive
Normal	84 (85)	90 (91)	83 (84)	81 (82)	91 (92)
Impaired	6 (6)	1 (1)	9 (9)	10 (10)	0
Severe disability	9 (9)	8 (8)	7 (7)	8 (8)	8 (8)



Clinical Governance

Risk Management

Staff members are encouraged to report clinical incidents on the Trust, Datix system. There are safety, clinical and transport triggers to guide reporting. The transport team reports incidents to the National Risk Register.
Clinical incidents are reviewed by the Neonatal Risk Panel and at the Children's Patient Safety and Quality Committee meetings with the aim of identifying common themes or trends and addressing issues of clinical risk. Findings are disseminated at clinical governance meetings and via the 'Baby Watch' newsletter.

Safety triggers:
Breach of safe delivery of care (insufficient staffing or other)
Failure or lack of equipment,
Poor communication or consent
Failure in documentation
Breach of confidentiality
Failure of child protection procedure.

Clinical Incident triggers:
Accidental extubation
Extravasation injury
Facial/nasal damage related to CPAP
Failure of infection policy
Cross infection
Medication and prescribing errors

Transport triggers:
Low temperature on arrival (<36 ^{0}C)
Accidental extubation
Delay – no discharge summary ready

Summary of Clinical Incidents:

Incident Category	2011	2012	2013	2014	2015	2016	2017
Access, admission, transfer, discharge	5	0	8	3	1	4	**9**
Clinical assessment (including diagnosis, scans, tests, assessments)	5	2	6	6	21	22	**10**
Consent, communication, confidentiality	8	7	7	12	9	5	**14**
Documentation (including records, identification)	18	9	11	15	30	19	**13**
Implementation of care and ongoing monitoring / review	5	5	12	8	10	15	**6**
Infection Control Incident	1	2	1	4	2	2	**5**
Infrastructure (including staffing, facilities, environment)	4	11	16	16	16	4	**11**
Medical device / equipment	19	9	11	11	15	10	**12**
Drugs and prescribing	80	53	58	59	56	51	**42**
Patient accident	1	0	1	0	1	2	**0**
Treatment, procedure	19	19	12	10	17	15	**17**
Other Incident	5	16	42	31	18	6	**31**
Total	**170**	**133**	**185**	**175**	**196**	**155**	**170**

Incident Grade	2011	2012	2013	2014	2015	2016	2017
No Harm: Impact Prevented	37	20	12	11	21	14	16
No Harm: Impact not Prevented	116	108	150	141	153	122	128
Low	16	12	18	18	19	18	26
Moderate	1	0	5	2	1	1	0
Severe	0	0	0	3	0	0	0
Total	**160**	**140**	**185**	**175**	**192**	**155**	**170**

Human Factors

The Human Factors workstream was started in 2017 and is led by Dr Lawn. Two registrars (Out of Program Experience) have been appointed with a remit to 'Human Factors' work. New innovations have been daily, morning safety meetings, after event safety pauses and introduction of a safety prompt for intubation and extubation. There has been an in-depth systematic review and improvement of resuscitation equipment and postnatal ward work patterns. Obstetric theatre temperature has been targeted as a way of ensuring improved admission temperatures for pre-term babies. A review of medical education is underway and the departmental simulation programme continues to be supported by the human factors team.

Multi-Disciplinary Meetings

- Morning safety meeting (daily)
- Monday handover (weekly)
- Nutrition meeting (weekly)
- Xray review (weekly)
- TuesdayTeaching and Journal Club (weekly)
- Respiratory review and planning (monthly and as needed)
- Wednesday Clinical Grand Round or Mortality Review (weekly)
- Consultant meeting (weekly, Business Meeting monthly)
- Echo peer review (monthly)
- Neonatal Risk Panel (every 2 weeks)
- Perinatal meeting (monthly)
- Neonatal and maternity matrons (monthly)
- Children's Directorate meeting (monthly)
- Children's Patient Safety and Quality Committee (monthly)
- Neonatal Clinical Governance (3 monthly and additional joint meetings with maternity and surgical/anaesthetic teams)
- Consultant outreach visits to Worthing and Hastings neonatal units (3 monthly to each site)
- Sussex Network Meeting (two meetings per year in Brighton)
- KSS Neonatal Network Meetings and Clinical Forum (3 monthly)

Attendance is recorded for meetings and minutes made where appropriate.

Guidelines and Audit
(Appendix 3)

There is an active programme of clinical governance within the department, including 3 monthly multidisciplinary clinical governance meetings and monthly perinatal mortality and morbidity meetings. Review of neonatal deaths occurs within departmental grand rounds, at Neonatal Network meetings and at the Child Death Overview Panel meetings. There are common medical, nursing and drug protocols for both units with a rolling programme of guideline review. Guidelines are available on the departmental website.

We have a well developed audit programme under the supervision of Dr Fernandez. The department complies with national and neonatal network audit programmes including NNAP, ATAIN, NHSE Dashboards and MBRRACE. The transport team provides data for the UK Neonatal Transport Dataset.

Screening Programmes

The department complies with national neonatal screening programmes including**:**

Newborn examination, NIPE

Newborn Blood Spot

Newborn Hearing

Retinopathy of Prematurity: Ophthalmologists attend weekly to examine babies according to national guidelines. On the TMBU there is a small team of nurses who are training to use RetCam for ROP screening. The theatre at the RACH is fully equipped to undertake laser treatments when necessary.

Information and Technology

Departmental information and all clinical and pharmacy guidelines are accessible on the Trust Intranet. The department has an electronic patient record system (Metavision) which includes facilities for prescribing and automatic collection of data from ventilators, monitors, the blood gas machine and from the laboratory. Laboratory results are also available electronically on ICE and imaging on PACS. Badger.net collects data for summary production, the National Neonatal Audit Program, Dashboards and occupancy. Daily data is automatically downloaded from Metavision to Badger.net.

Newborn examinations are recorded electronically on the NIPE system.

Research
(See appendix 4)

There is an active departmental research program. We have strong links with the Academic Department of Paediatrics, Brighton & Sussex Medical School.

There is an active team which supports the research portfolio:

Rebecca Ramsay	Lead research nurse
Cathy Olden	Research nurse
Vivien Richmond	Research nurse
Sonia Sobowiec Kouman	Research nurse
Liz Symes	Research nurse
Christine Laycock	Data Officer
Paul Frattarolli	Data officer
Hector Rojas	FP7 Project Manager

Liam Mahoney graduated with his PhD thesis in July 2017. We wish him well for his future career. John Bell left the research team at the end of 2017 to take up senior managerial posts in midwifery and we wish him success for his new roles. Dr Ramon Fernandez has been appointed as Senior Lecturer in Paediatrics from September 2017. Dr Paul Seddon was appointed Honorary Professor of Paediatrics by BSMS. The team congratulates him to this outstanding achievement.

In the past year we have continued to participate in multi-center studies as well as locally initiated projects.Dr Rabe, Dr Rojas, Dr Fernandez and the whole team have continued to work on the next stage to open a new clinical study NEO-CIRC 003, which will be performed as part of the European Commission's FP7 Health Research Project NEOCIRCULATION (NEO-CIRC €5.99m, 18 partners in 8 countries) (www.neocirculation.eu). Pending regulatory approvals the study will open soon.

Dr Bomont acts as local PI for the study testing Tapendalol in postoperative pain of newborn babies sponsored by Grünenthal and for the national multicenter OPTIPREM study looking into optimising neonatal care provision. Dr Bhat acts as local PI for the national SPRING study which examines the relationship between genetics of preterm birth and later neurodevelopment. Prof Seddon and Dr Fernandez are Co-PI for the MEDIMMUNE study (RCT on RSV vaccinations) which is currently following up the recruited patients.

The Department has been involved in several other studies which have completed recruitment. The Go-Child Study is in follow-up phase. The CMV registry will be open again in 2018. We are continuing care site for SIFT and BabyOSCAR.
Recruitment for neurodevelopmental follow-up studies led by Dr Phil Amess of pre-term infants is ongoing.

Joint multidisciplinary research meetings are held and links continued with various groups such as the Paediatric Respiratory Research Group at the RACH, the Obstetric team, the Department of Clinical Pathology, Department of Psychology (University of Sussex, City University of London) and with the School of Pharmacy & Biomolecular Sciences (University of Brighton). We are undertaking studies with Dr Bhavik Patel and on the safety of medicines. ANNP Lisa Kaiser is currently working on her MSc Research thesis with this team.

The research team has a track record in studying the benefits of enhanced placental transfusion at the birth of babies. The Rockinghorse Charity has kindly provided some start-up funds for the development of an online teaching package for health professionals to learn these techniques. BSMS Global health student Jennifer Hockey has completed a field study at hospitals in Nepal together with local collaborators from UNICEF later this year. Her Masters thesis was submitted and she graduated in January 2018.

BSMS year 4 students were involved in our studies as part of the Independent Research Project module in BSMS 404.

All studies are performed in close collaboration with the BSUH Research and Development department and we express our thanks to Scott Harfield, Dr David Crook and the R&D team for their ongoing support.

The department is an active member of the Surrey & Sussex Paediatric and Neonatal Research Network and hosted the Summer Meeting of the Neonatal Society 2017.

Education

Neonatal Nurse Pathway

The Neonatal Pathway was designed to acknowledge the recommendations from key documents relating to neonatal care, by offering nursing staff a qualification in the specialty. The aim is to address the significant shortfall in staff holding a neonatal qualification. The pathway promotes the opportunity for local neonatal units to develop highly skilled neonatal staff from among their current workforce.

The pathway is held at the University of Brighton and led by Senior Lecturer Susanne Simmons. It comprises two modules: a 20 credit work based learning module: Foundations in Neonatal Practice and a 30 credit taught module: Neonatal High Dependency and Intensive care. Mentors (approved by the unit manager and pathway leader) support, supervise and assess students in practice. They meet with the student at the beginning of each module; supervise the student's completion of skills; meet with the student mid-way through the module to discuss progress; liaise with the pathway leader on the student's progress; and meet with the student at the end of the module to check completion of clinical skills.

Practice is assessed using clinical skills inventories. Students from level 1 and 2 units have a practice placement in a level 3 unit to gain experience in neonatal high dependency and intensive care. Students on completion of the two neonatal modules receive a neonatal pathway certificate. They then have the opportunity to continue their studies to gain a degree in Acute Clinical Practice awarded by the University of Brighton.

Undergraduate Medical Education

The Department has continued its involvement in the delivery of module BSMS 402 Paediatrics and Child Health. During their time with us they learn to carry out a structured newborn examination. Online learning tools are available to complement this training. Consultants and registrars are involved in the student assessments at the end of the year OSCE's.

A number of students chose to undertake the independent research project in BSMS 404 in year 4 in Neonatology. During this module they learn research related skills e.g. how to complete a structured literature search and an appraisal on a focused topic or join in one of the ongoing research projects. Individual consultants have been supporting the Medical School in other tasks such as admission interviews, designing exam questions and online learning modules, organising and supervising elective placements and tutoring small groups. Dr Rabe, in her role of Reader in Neonatal Medicine continues as module leader for the module BSMS 404.

Postgraduate Education

The department continues its commitment to providing a high quality, structured training, assessment and appraisal programme for Neonatal Medical and Nursing Staff. In addition staff organise, host and deliver many additional educational sessions including Deanery simulation and PLEAT days. We host and direct the ALSG Neonatal Life Support and PaNSTAR courses, as well as the newer ARNI course.

We have an established Local Faculty Group which overseas educational governance. Dr Bomont is Paediatric Tutor and Training Programme Director for Paediatric Trainees within KSS.

Support Services

Speech & Language Therapy (SLT)

There are 2 speech and language therapists (1.2 wte).

The service is provided on a needs basis, with priority being given to inpatients both on the Trevor Mann Baby Unit and the Royal Alexandra Children's Hospital. Cover is also provided to various inpatient and outpatient clinics, including joint dietetics/SLT clinics and the Chronic Lung Disease Clinic. Support for neonatal follow up clinics can be arranged as required by contacting the department. Referrals are made to the team by phoning (ext 2527), emailing or writing to Amanda Harvey (Level 5 RACH).

The service provides assessment and management of feeding difficulties for all babies admitted to the TMBU. Feeding difficulties may occur for the following reasons and may be transient or life-long.

Other services provided include:

- videofluoroscopy swallow studies
- teaching for new staff
- liaison and advice for dysphagia therapists across Sussex.

Babies discharged home with feeding difficulties who live in Brighton and Hove or those who attend the Chronic Lung Disease Clinic will have ongoing input. Babies from outside of Brighton and Hove who continue to have significant feeding difficulties and are seen by a consultant and another professional at the hospital, may be seen as an outpatient if there is no appropriate local service for them to be transferred to.

Physiotherapy

TMBU has input from Emma Pavitt a band 7 physiotherapist for 8 hours per week.

She has provided support for the team for children with a variety of conditions from chest infections to orthopaedic issues and neurodevelopmental problems.

The service has improved patient care by increasing the clinical decision making in regards to chest physiotherapy. There are training sessions for doctors and nurses via in-service training, group teaching and 1:1 bedside training. Developmental care and chest physiotherapy is taught to NICU students at the University. Study days are regularly attended with other neonatal physiotherapists ensuring that the Team is kept up-to-date with the latest evidence.

Dietetic Service

The dietitian is funded to provide 0.2 wte to the neonatal service. This includes providing input to the weekly multidisciplinary Nutrition Meeting on the TMBU where nutritional management of more complex infants is discussed. There are weekly outpatient clinics for follow up of babies discharged from the TMBU and SCBU at PRH. This clinic runs alongside the neonatal clinic at RACH to allow joint consultations. Dietetic assessment and input is provided for infants attending the chronic lung disease clinic and those supported by the outreach neonatal nursing team. The service continues to provide input to infants who are transferred to the gastroenterology team at RACH. The dietitian attends regular meetings of the National Neonatal Nutrition Network and is involved in teaching on the neonatal unit and around the KSS neonatal network.

Donor Breast Milk

Support is given to mothers so they are able to provide their own breast milk to feed their baby as soon as possible. There are however some circumstances where use of donor breast milk may be useful in promoting good infant health. As supply is limited and cost is significant use of donor milk is restricted according to unit guidelines.

Outreach

The Neonatal Outreach team continues to work to support the discharge of infants from TMBU and the SCBU at PRH. The team comprises of a sister who works full time and a nursery nurse who works 22.5 hours per week. The nurses work with families and support them in feeding and caring for their baby prior to discharge home. Families may choose to feed babies by nasogastric tube at home.

Maternal Substance Misuse Clinic (One-Stop Clinic)

The One-Stop clinic is a multidisciplinary, multi-agency clinic which operates across both sites. No appointment is necessary and referrals can come from any source: health or social care professionals in the community, or clients themselves. The clinic was set up in January 2002 by Dr Aiton and representatives from other services to meet the increasing local need. The following staff contribute regularly to the clinic:

- 2 specialist midwives with responsibility for substance misuse
- A representative of the Substance Misuse service
- A representative of Brighton Oasis Project
- Liaison Health Visitor
- Social Worker from Dept, Social Care & Health
- Neonatal Nurse Practitioner
- Consultant Neonatologist

The aims of the clinic are:

- to offer an open-access service for advice on the wide variety of issues surrounding substance misuse in pregnancy
- to provide the level and degree of care and support appropriate to the client during their pregnancy and to the newborn baby

The clinic includes postnatal infants and their mothers with particular emphasis on babies prescribed medication to deal with symptoms of withdrawal.

Some mothers receive nearly all their antenatal and healthcare through the clinic, whereas others may only need to come for one appointment and continue to access routine services. A multi-disciplinary meeting takes place one hour before the RSCH clinic.

Clinics run on Thursday afternoons, week 1 at PRH and weeks 2,3 and 4 at RSCH.

In 2017 nine babies were admitted to Trevor Mann Baby Unit with Neonatal Abstinence Syndrome.

Counselling

Counselling is currently available from the Trust Chaplaincy Service at both the TMBU and SCBU at PRH. The Rev Peter Wells, is a qualified psychotherapist and relationship counsellor providing 5 hours per week to the department. He also attends staff meetings to give support. A new trained psychotherapist (Julie Carroll) has recently joined the chaplaincy team and she has provided counselling hours from mid-October 2017. The Early Birth Association has kindly funded The Mind Clinic since 2015. The Mind Clinic is a non-NHS organization that comes into the work place to help staff.
There are two members of nursing staff undertaking counselling courses.

Parent Information

A wide range of information for parents is available. Around the time of admission, parents are given a booklet about the TMBU or SCBU. In addition all parents receive a copy of the BLISS Parent Information Guide. Unfortunately both of these publications are only printed in English. However, we freely access the Trust funded Sussex Interpreting Service to facilitate communications with parents whose first language is not English.

A parent information area provides health promotion information leaflets on a variety of baby, maternal and family health issues. There is also Social Security benefits' information, and travel information for parents whose baby is transferred to London. Information on consent and how to access the hospital Patients Advocacy and Liaison Service (PALS) is displayed in the information area alongside parent support group information. Planned future developments for the information area include internet access to enable parents to do supported literature searches and the installation of a TV and video/DVD for health promotion information.

Main stream diagnostic specific information is available on the TMBU but more unusual diagnosis information is obtained as required ensuring that it is up to date and accurate. The Contact-A-Family Directory is used regularly to access accurate contact details for parent support organisations.

Information packs are available for Down Syndrome and other information packs are complied as required.

The Trust supports the hiring of registered sign language interpreters and two members of staff have a basic knowledge of British Sign Language.

Where parent information is available in languages other than English these are downloaded from the Internet as required e.g. Reducing the Risks of Cot Death leaflet.

A small but growing Parents Library contains a selection of books on premature babies and neonatal units. There are also some books specifically for children of Special Care Babies.

Training sessions for parents on infant resuscitation techniques are held regularly.

When a baby dies parents are given an 'Annabel Harwood' pack which contains books, leaflets and contact details of support organisations to help and support parents following the death of their baby. This pack is complemented by a 'Memories Folder'.

Parent Forum

The Parent Forum has now been established for over 8 years and meets quarterly. The group represents parents of babies who have been on the TMBU and Special Care Baby Unit at Princess Royal Hospital.

The group contributes to the design of regular parent feedback exercises which we now undertake using the Fabio the Frog platform. The results of these questionnaires are shared with the group which assists with the identification and prioritisation of actions to respond to feedback received.

The group assists with the development of parent information leaflets used in the service. This includes those written to support a range of local and international research studies in which we participate. Members of the group also kindly provide input into the design of new studies.

The forum has helped with the development and review of our unit guidelines and protocols, including proposed changes to the uniform policy and visiting policy.

We also share the Babywatch publication with the forum, seeking their views on how we can improve safety and quality in the service to further improve the experience of babies and their families and long term outcomes.

Early Birth Association

The Early Birth Association is a registered charity (286727) formed of a group of parents who have had premature or sick babies in BSUH special care units. They realised the need to talk to someone who has been in a similar situation at this time was a great way to help with anxiety and any problems that the parents were facing. The EBA was formed on TMBU 33 years ago and offers help and support to both units and new parents who are facing the same worrying experiences that they once faced.

Money raised and donated to the EBA is spent on items for TMBU and PRH SCBU, ranging from vital pieces of equipment such as the transport resuscitaire, incubators, cooling mats, shawls (some of these are for bereaved parents so they will have a keepsake), incubator bonnets, triangular pillows and the fabric for covers. The list is endless.

As many parents want to maintain close ties with TMBU & PRH SCBU, the EBA publish quarterly newsletters that keep members informed of the various fundraising activities, invitations to social events and general updates about the unit. More information about the EBA is available on their website (http://www.earlybirth.co.uk/).

Rockinghorse Children's Charity

The Rockinghorse Charity has celebrated its 59th anniversary this year. Established in 1967 by Dr Trevor Mann, the Rockinghorse charity continues to support the TMBU and SCBU at PRH generously. For the 50th anniversary, it has kindly agreed to sponsor a major development on SCBU at PRH on which we continue to work. It has also agreed to purchase for us a digital imaging facility on TMBU. In July, we hosted HRH Princess Alexandra in celebration of the 50th anniversary and the 10th anniversary of the new children's hospital. We are very grateful to the team at Rockinghorse for all their support and look forward to more success in 2018.

Appendix 1

BAPM Categories of Care 2011

INTENSIVE CARE

General principle
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
o Presence of an umbilical arterial line
o Presence of an umbilical venous line
o Presence of a peripheral arterial line
o Insulin infusion
o Presence of a chest drain
o Exchange transfusion
o Therapeutic hypothermia
o Prostaglandin infusion
o Presence of replogle tube
o Presence of epidural catheter
o Presence of silo for gastroschisis
o Presence of external ventricular drain
o Dialysis (any type)

HIGH DEPENDENCY CARE

General principle
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 fulfill 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:
o parenteral nutrition
o continuous infusion of drugs (except prostaglandin &/or insulin)
o presence of a central venous or long line (PICC)
o presence of a tracheostomy
o presence of a urethral or suprapubic catheter
BAPM - Categories of Care August 2011
o presence of trans-anastomotic tube following oesophageal atresia repair
o presence of NP airway/nasal stent
o observation of seizures / CF monitoring
o barrier nursing
o ventricular tap

SPECIAL CARE

General principle

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 fulfill the criteria for intensive or high dependency care and requires any of the following:

o oxygen by nasal cannula

o feeding by nasogastric, jejunal tube or gastrostomy

o 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

TRANSITIONAL CARE

General principle

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, babies who are on a stable reducing programme of opiate 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.

Appendix 2

Definitions according to MBRRACE	
Stillbirth	A baby delivered at or after 24+0 weeks gestational age showing no signs of life, irrespective of when the death occurred.
Early neonatal death	A liveborn baby (born at 20+0 weeks gestational age or later, or with a birthweight of 400g or more where an accurate estimate of gestation is not available) who died before 7 completed days after birth.
Late neonatal death	A liveborn baby (born at 20+0 weeks gestational age or later, or with a birthweight of 400g or more where an accurate estimate of gestation is not available) who died after 7 completed days but before 28 completed days after birth.
Stillbirth rate	Number of stillbirths per 1000 livebirths and stillbirths.
Perinatal mortality rate	Number of stillbirths and early neonatal deaths per 1000 livebirths and stillbirths.
Neonatal mortality rate	Number of neonatal deaths per 1000 livebirths.

Appendix 3

CLINICAL GOVERNANCE PERFORMANCE FOR NEONATOLOGY 2017

CLINICAL GOVERNANCE ELEMENT	COMPLETED/ IMPLEMENTED	PRESENTED	DATE	COMMENTS & ACTIONS	ACTIONS COMPLETED
International & National Guidance					
NICE Guidance Postnatal Care CG 37/NIPE Guidance	Yes	No new presentation last year.		• Site for NIPE • Guidelines revised to meet BFI and NICE standards • Saturation screening implemented as standard • All requirements according to NIPE fulfilled except for DDH screening (KP2) – process review with Paediatric Orthopaedic Team and Sonographers required • Midwife led NIPE clinic in place and plan to increase number of trained MW	Complete In progress
NICE Guidance Intrapartum Care CG 55/Antibiotics for Early-onset Neonatal Infection CG 149	Yes	No new presentation last year.		• All requirements fulfilled • Compliance with guideline generally good • Blood culture reporting system improved to 36 h	

				• Audit of Gentamicin dosing schedule	Required
Hypoglycaemia Guideline/NICE Guidance Diabetes in Pregnancy CG 63	Yes	No new presentation last year.		• Guideline amended for new WHO-UK growth charts • Guideline revised to meet BFI standards • All requirements fulfilled • Audit of updated guideline	In progress
Identification and Management of Neonatal Hypoglycaemia in the Full Term Infant – A Framework for Practice (2017)	No	No, internal review of guidance awaited		• Guideline suggests lowering glucose cut-off to 2mmol/l. This is controversial and not supported by international guidance • Produce a revised guidance taking into account all available evidence	In progress
NICE Guidance Neonatal Jaundice CG 98	Yes	No new presentation last year.		• All requirements fulfilled • Compliance with guideline generally good • Audit of updated guideline	Required
Therapeutic Hypothermia IPG 347	Yes	No, report awaited from Badgernet		• All requirements fulfilled • TOBY register data entry now included in NNAP database (Badgernet) • • Time=Brain Network Guidance implemented – ongoing audit • Local audit of practice	Completed Completed

NCEPOD – "A Mixed Bag"	Yes	No new presentation last year.		• Local standard to give TPN all babies <1500 g • Local audit of TPN practice • Adjustment of inclusion criteria required based on local audit	Completed In progress
The Provision of Parenteral Nutrition within Neonatal Services - A Framework for Practice (2016)	Yes	No new presentation last year.		• Guidance suggests cut-off for TPN at 1250 g birthweight • Review of current guidance	In progress
National Audits					
Maternal, Newborn and Infant Clinical Outcome Review Programme	Continuous	No new presentation last year. Adobe Acrobat Document		• Our adjusted neonatal mortality rate remains the 5th lowest amongst all surgical units in the UK. • Our overall mortality rate is 10% lower than the national average. • Continue work on improving survival at limit of viability	Ongoing
National Neonatal Audit Programme	Continuous	Yes, circulated via e-mail + discussed at senior staff meeting Adobe Acrobat Document		• Overall good performance and reporting quality – improved further since last year	
ATAIN - Avoiding Term Admissions Into Neonatal Units	Continuous	Yes, circulated via e-mail + discussed at senior staff		Conditions to be audited: • respiratory conditions • hypoglycaemia	

		meeting		• jaundice • asphyxia (perinatal hypoxia–ischaemia). • Low rate of admissions at moment	
NIPE Pilot Saturation Screening for Congenital Heart Diseases	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• In response to evolving research evidence in support of this tool • Pilot site for NIPE screening for congenital heart diseases • Implement screening as standard locally	Completed
National Training Survey	Continuous	No new presentation last year.  Adobe Acrobat Document		• Overall satisfaction highest in KSS Deanery • Continue efforts to improve in all areas of trainee education	In progress
BLISS Survey of Parental Experiences 2010 - 2011	Completed	No new presentation last year.		• TMBU scored in most areas above national average and in 5/7 areas above national average for similar units. • TMBU was never lower than national average in any area • Facilitate unit visits before delivery • Provide written/visual information about TMBU before birth • Provide written/visual network information about preterm birth	Completed Completed Completed

National Programmes & Projects					
Neonatal Hearing Screening	Continuous	No, reported separately by Audiology		• Compliant with national requirements	
Neurodevelopmental Outcome	Continuous	No, reported separately in departmental annual report		• Follow-up continued for preterm infants < 29 weeks gestation: ▪ Schedule of Growing Skills at 12 months CGA ▪ Bayley III Developmental Assessment at 24 moths CGA • Term newborns after cooling treatment: ▪ Bayley III Developmental Assessment at 24 moths CGA	
Neonatal Transport Service	Continuous	No, reported separately in departmental annual report		• Since September 2009 a 24/7 regional neonatal transport service in place, shared between the teams from Surrey, Kent and Sussex • Develop standard electronic activity database • Develop standard risk reporting system for KSS • Develop standard national incident reporting system	Completed Completed Completed
National HIV and Syphilis Surveillance	Continuous	No, reported separately by GUM		• Top antenatal screening centre in the UK	
Trust Identified Projects					

Perinatal Mortality & Morbidity Meeting	Ongoing	Yes, Circulated via e-mail + discussed at senior staff meeting	Monthly	• Joint mortality and morbidity meeting with Obstetrics & Gynaecology • Format under review	In progress
Neonatal Mortality & Morbidity Review	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting	Quarterly	• Presentation at Neonatal Clinical Governance Meeting • Summary report available in departmental annual report • Audit of waterbirth related neonatal complications	Deferred
Audit of Blood Cultures (Microbiology)	Ongoing	No, circulated via e-mail + discussed at senior staff meeting		• 6 monthly review not continued due to Microbiology staffing issues • Resume regular reviews • More detailed audit of available data • Audit of new infection prevention measures	In progress In progress In progress
Audit: Infection Control	Ongoing	No, circulated via intranet infection control dashboard  Adobe Acrobat Document		• Very good compliance generally including hand hygiene and care bundles • Documentation needs improvement	In progress
The Safety Thermometer	Ongoing	No, awaiting report		• National audit on nursing safety metrics, e.g. catheter care and pressure sores	

Review of Risks, Incidents, Complaints & Claims	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting		• Medication errors still featuring high, but static • No major incidents otherwise • Review risk panel structure and risk review process • Explore new ways of improving medication errors and communication	Completed Ongoing
Survey: Parent Satisfaction	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting		• Replaced by bespoke wireless real-time feedback system in 2015 – to be discontinued in 2018	
Specialty Identified Projects					
Audits					
Audit of Antibiotic Use on the Postnatal Wards	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• High rate of antibiotic use in newborns due to maternal fever • Scientific evidence inconclusive and NICE Guidance not helpful • Review literature further and amend guidance together with obstetric guidance	In progress
Review of Infants born at BSUH 32 – 33+6	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• PRH service very safe • Unexpected preterm births between 32 and 34 weeks were very well managed and did not require much ICU/HDU care • Explore options of safely reducing	

				the GA cut-off for planned births at PRH	In progress
Admission Temperature Audit (RSCH)	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Improvements in environmental temperature control in obstetric theatre required	In progress
Guidelines					
Neonatal Seizure Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting			Completed
Arterial Hypotension Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting			Completed
Enteral Nutrition Guideline Update	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Introduce protein fortifier • Purchase milk analyser to allow individualized protein fortification • Develop guidance	In progress In progress In progress
Powdered Infant Formula Preparation	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Explore options to ensure safe preparation without having to use cooled down boiled water • Develop preparation guidance	In progress In progress
Thyroid Disorder Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• In response to varying practices affecting overall management • Currently for editing and ratification	In progress
Red Cell Guideline	In progress	No		• Currently under review	In progress
Kangaroo Guideline	In progress	No		• Currently under review	In progress

HSV and VZV Guideline	In progress	No		• Currently under review	In progress
Other					
Safety Huddles	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Very well received and successfully implemented	Completed
Management of Preterm Infants at the Edge of Viability	In progress	Yes, circulated via e-mail + discussed at senior joint staff meeting with O&G Department		• Plans to improve management through joint efforts with O&G Department – guideline development, parent information and documentation	In progress

Appendix 4

List of Publications 2017

Peer reviewed papers

Raffe SF, Savage C, Perry LA, Patel A, Keith T, Howell R, Bradley R, Bomont R, Fidler K, Gilleece Y. The management of HIV in pregnancy: A 10-year experience. European Journal of Obstetrics & Gynecology and Reproductive Biology 210 (2017) 310–313. doi: 10.1016/j.ejogrb.2016.12.021

Mielgo VE; Valls-i-Soler A†; Lopez de Heredia JM; Rabe H; Rey-Santano C on behalf of NeoCirc Consortium. Hemodynamic and metabolic effects of a new pediatric dobutamine formulation in hypoxic newborn pigs. Pediatr Res. 20172017 81: 511-518; advance online publication, November 25, 2016; 10.1038/pr.2016.257

Rabe H, Rojas-Anaya H. Inotropes for preterm babies during the transition period after birth: friend or foe? Arch Dis Child Fetal Neonatal Ed. 2017 Nov;102(6):F547-F550. doi: 10.1136/archdischild-2016-311709. Epub 2017 Aug 17.

Kirupakan K, Mahoney L, Rabe H, Patel BA. Understanding the Stability of Dopamine and Dobutamine Over 24 h in Simulated Neonatal Ward Conditions. Paediatr Drugs. 2017 Oct;19(5):487-495. doi: 10.1007/s40272-017-0234-4

Reviews

Katheria A, Lakshminrusimha S, Rabe H, McAdams R, Mercer J. Placental transfusion – a review. J Perinatol. 2017 Feb;37(2):105-111. doi: 10.1038/jp.2016.151

Rojas-Anaya H, Ergenecon E, Mahoney L, Bravo M, Kotidis C, Rabe H. Inotropes and How to Assess their Effects in Neonates: Review of Pharmacodynamic Data. Curr Pharm Design 2017; 23, 1-15

Book chapter

Garland C. Neonatal Care. In Wells P (ed) Treating Body and Soul. Jessica Kingsley Publishers London, Philadelphia 2017 ISBN 9781785921483

Presentations at national and international meetings

Bhat P, Winderbank-Scott D, Garland C, Watts L, Leach C, Frame A, Bullimore G, Lawn C. Current parent feedback response rates and feedback methods in neonatal transport service across the UK.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060237

Bhat P, Garland C, Frame A, Bullimore G, Watss L, Leach C, Lawn C. Tablet based parental feedback in neonatal transport.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060237

Reulecke B, Fernandez R, Mills M, Pelling V, Rabe H, Harris L. Comparison of 1-Dimensional and 2-Dimensional Sonographic (US) and MRI Measurements of the Cerebellum in Term Newborns.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060237

Mills M, Pelling V, Harris L, Smith J, Rabe H, Fernandez R. Characterisation of the Neonatal Corpus Callosum (CC) Using Magnetic Resonance Imaging (MRI) and Cranial Ultrasound (US).
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060237

Mahoney L, Hunt T, Rabe H, Amess P, Aiton N, Bhat P, Bomont R, Drenchev N, Garland C, Lawn C, Reulecke B, Watkins R, Fernandez R. Consultant Presence at Delivery: a Retrospective Audit of Demographics and Outcomes in a Tertiary UK Centre
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060236

Kirupakaran K, Rabe H, Patel B. Understanding the relationship between Dopamine concentration and blood pressure in neonates: incubators versus cot.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine*2017;6(2):e060237

Kotidis C, Weindling M, Eleuteri A, Rabe H, Turner M. Patent ductus arteriosus, cerebral haemodynamics and intraventricular haemorrhage in preterm neonates: a causal pathway study.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060237

Zaharie GC, Drugan T, Muresan D, Matyas M, Rabe H on behalf of the NEO-CIRC, Hasmasanu M. Prognostic value of the value of superior vena cava flow during the first day in preterm infants <= weeks gestation.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017. *Journal of Pediatric and Neonatal Individualized Medicine* 2017;6(2):e060237

Hockey J, Rabe H. Changing behaviours using video content and a smartphone app: Delayed cord clamping and cord milking in Nepal.
BSMS Health Education Conference, University of Sussex, Brighton 8th Dec 2017

Invited Lectures

Rabe H. Cord Blood: Power of Life. Brighton & Sussex Medico-Chirurgical Society, Brighton 6.4.2017

Garland C. Neonatal Palliative Care.
Retrieval 2017 International Prehospital and Critical Care Conference, Glasgow, UK 16.-17.4.2017

Rabe H. Delayed Cord Clamping.
53rd Congress of Turkish Pediatric Association, Elexus Resort Hotel, Turkish Republic of Northern Cyprus, May 14 – 18, 2017

Rabe H. Late cord clamping: the right thing for every child?
Perinatal Symposium, Munich, Germany, 6.10.2017

Rabe H. The importance of delayed cord clamping or milking of the cord in the initial stabilisation of the neonate.
5. Neonatologie Symposium, Gießen, Germany, 14.10.2017

Rabe H. Challenges in neonatal drug development: Experiences from the NEO-CIRC trial.
2nd Congress of joint European Neonatal Societies (jENS 2017), 58th ESPR Annual Meeting, 7th International Congress of UENPS, 3rd International Congress of EFCNI, Venice, 31.10-4.11.2017.

Rabe H. Who owns the placental blood? The case for the preterm infant.
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