

# Annual Report 2019



**Department of Neonatology  
Brighton & Sussex University Hospitals  
NHS Trust**

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**This report can be found on the BSUH Neonatal website.**

Data used to compile this report has been collected from BadgerNet and Metavision.

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

## Introduction

During 2019 building works on the new 3Ts hospital of the BSUH Trust has continued. The new hospital will provide state of the art facilities for medical and surgical patients including trauma and neurosurgery. The building works within the Trevor Mann Baby Unit have been completed. These included improvements to the High Dependency Care nursery and extended facilities for the Special Care nursery. These changes have improved clinical care, have provided more space for admissions and discharges and a much needed quiet room for conversations with parents.

This project was funded in its entirety by charity donations to the sum of £350,000. The Early Birth Association has made a major contribution to this sum. Many thanks go to the EBA and to all our donors and fundraisers who have given so generously. The amazing support from parents, family and friends of babies we have cared for remains vital to our progress.

Claire Hunt was appointed a neonatal matron for both the Trevor Mann Baby Unit and the Special Care Baby Unit at PRH since January 2019. Dr Philip Amess stepped down from his role as clinical lead which he has held for more than 15 years. We would like to thank him for all his hard work and the dedication he has shown to the service during these years. He very much shaped the services to the high quality we would all like to continue. Dr Cassie Lawn and Dr Robert Bomont are now sharing the role as lead clinicians. In May Dr Heike Rabe was promoted to Professor of Perinatal Medicine by the University of Sussex.

Improving the standard of care on the baby units is always the department's prime aim. The team is very keen to start a new initiative called Family Integrated Care. This entails engaging and incorporating parents actively in the care of their babies whilst they are still in hospital. In 2019 we have seen further progress with revision of important clinical guidelines, research and development of human factors' work and education. The educational and training program has continued to receive excellent feedback from medical and nursing students, medical trainees and trainee advanced nurse practitioners.

Our unit's mortality rate is captured in the national MBRRACE reports. During 2016-2019 our unit had the lowest mortality rate compared with all neonatal tertiary care units in KSS (2019:1.2/1000 births). The National neonatal statistics reported the lowest mortality rate for our unit out of 28 neonatal surgical units in England for 2017(0.9/1000births). The neonatal dashboard and neurodevelopmental outcomes published in those reports suggest that we are performing well when compared to national statistics. However we also recognize that this same data tells us where we should be improving. In 2019 the department signed up and started entering our data to the Vermont Oxford Neonatal Database. This will help us compare and track our local clinical outcomes for preterm babies with units around the world and focus our quality improvement plans. Hopefully we will be able to share some of this data in the annual report in the years to come.

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 2019, there were 2797 deliveries at the Royal Sussex County Hospital and 2128 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. The units within the South East Coast Operational Delivery Network continue to strive to provide care as close to home as

possible, and we work with our colleagues in neighbouring transport services to ensure this can happen.

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 and more supported discharge. A co-located midwifery led birthing unit in Brighton is awaited along with improvements to fetomaternal 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. Plans are in place and charity funding has been pledged to improve facilities on the SCBU. It is hoped that delivery of more preterm babies might be possible once these changes are completed.

Further details can be found on the departmental website: <https://www.bsuh.nhs.uk/tmbu/>

#### **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 newborn 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 newborn infants and those on Transitional Care.

The maternity and neonatal teams are actively improving newborn pathways within the ATAIN programme. There are joint audit and clinical governance and perinatal 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, gastroenterology and endocrinology. Infants with ongoing medical or surgical needs beyond the neonatal period are transferred to the 'Alex' as soon as possible and we have particularly close links with the paediatric HDU which helps support the smooth transfer of babies with complex respiratory and surgical problems. 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,

breastfeeding 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 (until August 2019), interest in neurology and developmental outcome
Dr Prashanth Bhat	Interest in neonatal ventilation and IT
Dr Robert Bomont	Lead Clinician, Paediatric College Tutor, Training Programme Director, interest in infectious diseases
Dr Nikolay Drenchev	Consultant Neonatologist, interest in cardiology
Dr Ramon Fernandez	Senior Clinical Lecturer in Paediatrics, Lead for Clinical Governance, interest in nutrition,
Dr Cathy Garland	Transport Lead, interest in simulation training
Dr Cassie Lawn	Lead Clinician, Transport Lead, interest in human factors
Professor Dr Heike Rabe	Professor of Perinatal Medicine, Lead for Research
Dr Bettina Reulecke	Consultant Neonatologist, interest in neonatal neurology
Dr Ryan Watkins	Clinical Director, Children and Women's Services and Honorary Senior Clinical Lecturer.

#### **Consultant Obstetricians:**

Mr Salah Abdu  
Mr Tosin Ajala (Clinical Director Women's Health)  
Miss Heather Brown (Deputy Medical Director)  
Miss Katherine Fraser  
Mr Ani Gayen  
Mr Ehab Kelada  
Mr Tony Kelly  
Miss Rebecca Mallick  
Miss Jo Sinclair (Obstetric Lead)  
Miss Tasneem Singhal  
Mr Francis Usifo  
Mr David Utting  
Ms Win Khine (Fetal Medicine)  
Mr Vuivun Wong

#### **Consultant Paediatric Surgeons:**

Miss Ruth Hallows (Clinical Lead)  
Mr Varadarajan Kalidasan (Director of Medical Education)  
Miss Anouk van der Avoirt  
Mr Bommaya Narayanaswamy  
Mr Saravanakumar Paramalingam  
Miss Jigna Sheth

#### **Orthopaedic Surgeons**

Mr Subramanyam Maripuri, Mr Thomas Crompton, Mr Stefano Bolongaro

#### **ENT Surgeons**

Mr Simon Watts, Mr Prodip Das

#### **Consultant Radiologists:**

Dr Lorraine Moon, Dr Ima Moorthy, Dr Lavanya Vitta, Dr Kyriakos Iliadis (Clinical Lead), Dr Jacqueline DuToit, Dr Arlen Urquia

#### **Consultant Ophthalmologists:**

Mr Dominic Heath, Miss Victoria Barrett

#### **Consultant Audiologist:**

Mr Rob Low

<b>Consultant Pathologist:</b>	Dr Mudher Al-Adnani (St Thomas' Hospital)	
<b>HD Paediatric Consultant:</b>	Dr Kamal Patel	
<b>Cardiology Consultant:</b>	Dr P Venugopalan	
<b>Consultant Gastroenterologists:</b>	Dr Assad Butt, Dr Michael Hii	
<b>Respiratory Consultants:</b>	Dr Paul Seddon, Dr Krishne Chetty, Dr Akshat Kapur, Professor Somnath Mukhopadhyay	
<b>Endocrinology Consultants:</b>	Dr Shankar Kanumakala, Dr Dunil Ismail	
<b>Haematology Consultant:</b>	Dr Catherine Wynne	
<b>Oncology Consultant:</b>	Dr Ann Davidson	
<b>Neurology and Epilepsy Consultant:</b>	Dr Nikil Sudarasan	
<b>Visiting Consultants:</b>	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:**

<b>Tier 1 (8 wte):</b>	6 ST2/3 trainees 1 Trust Clinical Fellow Additional ANNP contribution
<b>Tier 2 (11 wte):</b>	Associate Specialist (Dr Michael Samaan) Specialist Doctors (Dr Fatou Wadda, Dr Sireesha Battenini) 4 Specialist Registrars 1 Grid Trainee 1 Trust Clinical Fellow 2 Research Fellows (1 wte clinical) 1 Human Factors OOPE (0.5 wte clinical) ANNP contribution (approximately 1.25 wte) Consultant contribution (approximately 2 wte)



## **Neonatal Nurses**

### **Senior Nursing Staff**

Lorraine Tinker	Head of Paediatrics and Neonatal Nursing
Claire Hunt	Matron, Neonatology
Dr 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)  
Jacqueline Cherry (Risk management)  
Sandra Hobbs (Rota and Leave)  
Karen Marchant (Surgery and Patient Information)  
Judy Edwards (Neonatal Outreach and Family Care)  
Monika Suci (Human Factors)

### **Advanced Neonatal Nurse Practitioners**

Jamie Blades	Naomi Decap
Rachel Burton	Caroline McFerran
Karen Hoover	Simone van Eijck
Nicola McCarthy	

### **Newly qualified ANNPs**

Alyx Marsh  
Elena Gonzale  
Elli Hampton

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  
Sarah Stillwell

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 senior staff nurse and nursery nurse who each work 13 hours per week.

### **Transport Ambulance Team:**

Andy Frame  
Graham Bullimore

### **Support Staff**

<b>Directorate Manager:</b>	Jonathan Brooks
<b>Unit Technician:</b>	John Caisley
<b>Pharmacist:</b>	David Annandale
<b>SLT:</b>	Amanda Harvey, Katie James
<b>Physiotherapy:</b>	Emma Pavitt
<b>Dietician:</b>	Carole Davidson
<b>Counsellor:</b>	Julie Carroll
<b>Secretarial support:</b>	Jane Battersby, Emma Morris, Patricia Walker
<b>Ward clerks:</b>	Anthony Jackson-Leonard, Sasha Nye, Lucy Hopkins (PRH)

## Admissions, Activity and Mortality Trevor Mann Baby Unit

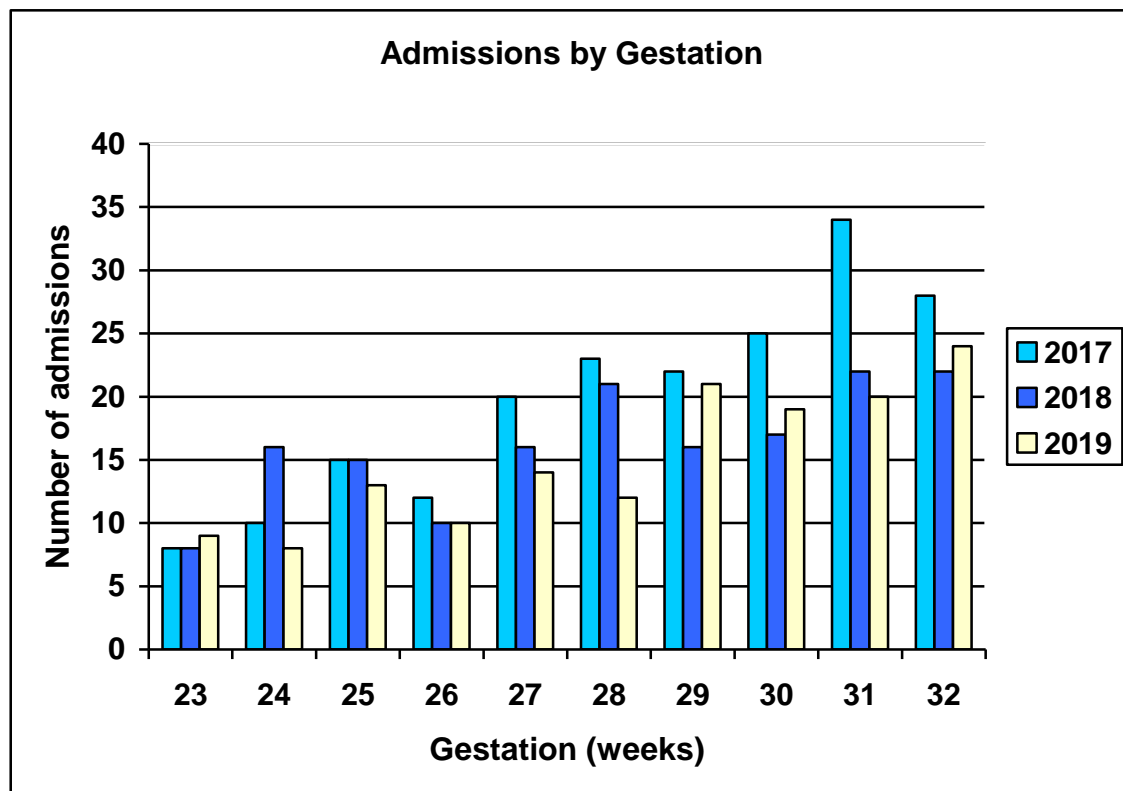
Admissions	Total Admissions per year
2010	525
2011	562
2012	567
2013	528
2014	516
2015	534
2016	524
2017	513
2018	529
2019	451

*Includes re-admissions*

Admissions	2017	2018	2019
Total number of live births (RSCH)	3110	2890	2797
Total admissions (including re-admissions)	513	529	451
Inborn	369	335	304
Inborn booked RSCH	281	245	209
Inborn booked elsewhere	88	90	95
Outborn	126	151	118
Re-admissions	17	43	27
Admissions from home	1	2	2
Percentage of inborn births admitted to the TMBU (%)	12	11	12

Admission details	2017		2018		2019	
Gestation (weeks)	Babies	%	Babies	%	Babies	%
23	8	2	8	2	9	2
24	10	2	16	3	8	2
25	15	3	15	3	13	3
26	12	2	10	2	10	2
27	20	4	16	3	14	3
28	23	5	21	4	12	3
29	22	4	16	3	21	5
30	25	5	17	3	19	4
31	34	7	22	4	20	5
32	28	6	22	4	24	5
33-36	119	24	130	27	109	25
37-42	175	35	197	40	164	38
>42	5	2	9	2	1	<1
<500	3	<1	3	<1	3	7
<750	23	5	23	4	25	6
<1000	37	7	30	6	25	6
<1500	89	18	57	12	66	15
Twins	99	20	82	17	73	17
Triplets	6	1	4	<1	3	<1

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

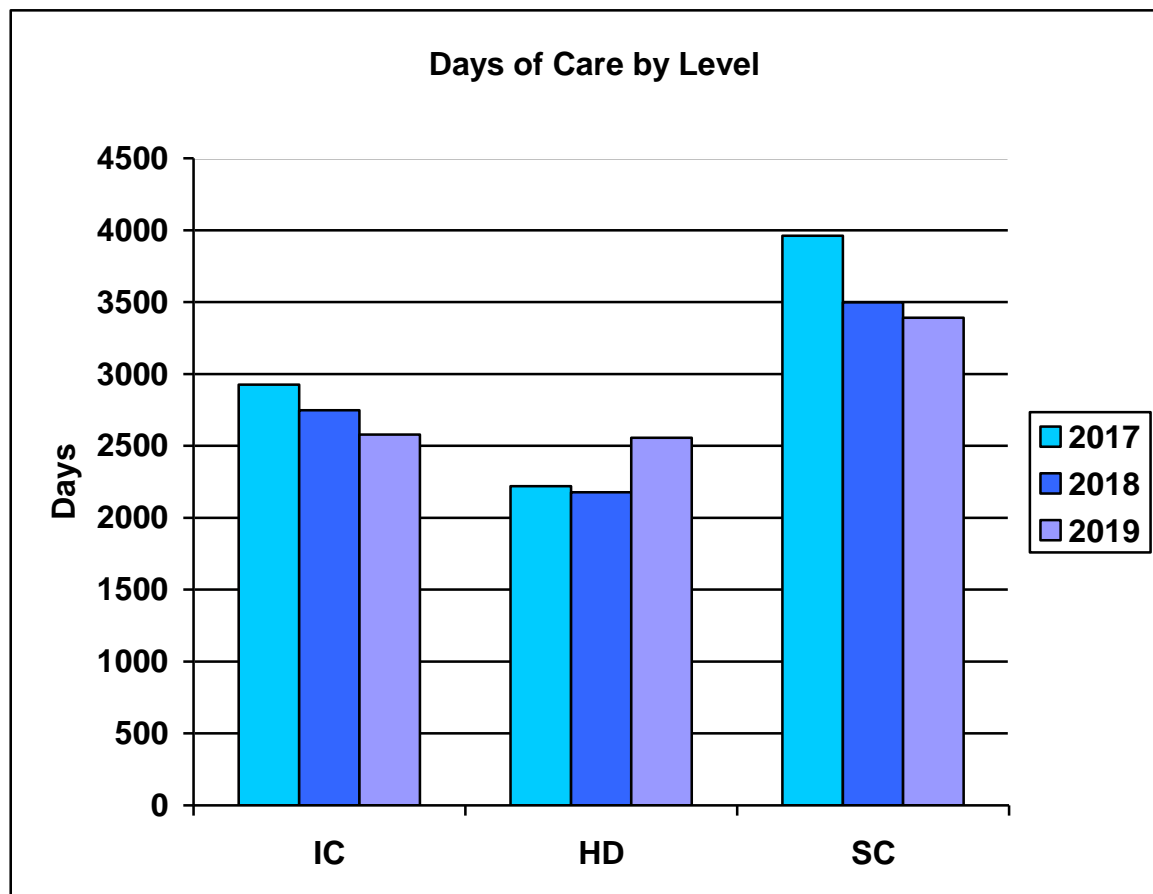


Transfers in	2017	2018	2019
<b>In-Utero</b>			
Babies booked elsewhere and admitted	88	89	95
Refused in-utero transfers	113	78	35
Refused by maternity	34	41	N/A
From outside SEC ODN	24	12	8
<b>Ex-Utero</b>			
Princess Royal Hospital	20	37	31
East Sussex Hospitals	30	32	23
West Sussex Hospitals	14	31	20
Other Network Hospitals	43	37	24
Outside SEC ODN	20	26	20
Refused ex-utero transfers	69	33	28

*Does not include re-admissions or home births*

Cot occupancy	2017		2018		2019	
Cots	Days	%	Days	%	Days	%
IC	2925	89	2747	84	2578	<b>78</b>
HD	2221	76	2178	75	2556	<b>87</b>
IC & HD (total)	5146	83	4925	79	<b>5134</b>	<b>83</b>
SC	3962	109	3499	96	<b>3392</b>	<b>93</b>
<b>Total</b>	9108	92	8424	85	<b>8592</b>	<b>87</b>
Transitional Care	1869		1550		<b>1654</b>	

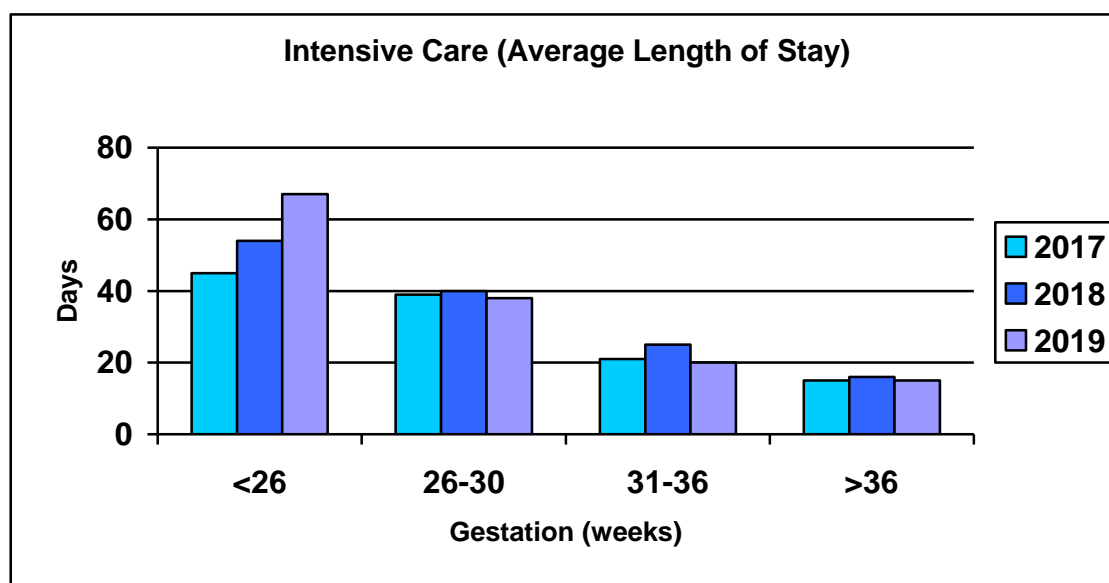
*2011 BAPM definition for care levels (all babies receiving care during a 12 month period)*



Care Categories for 2019				
Gestation at birth (weeks)				
	Babies	IC Days	HD Days	SC (only) Days
< 23	0			
23	9	362	156	-
24	8	407	174	-
25	13	492	379	-
26	10	249	258	-
27	14	192	119	-
28	12	163	112	-
29	21	140	190	61
30	19	91	148	5
31	20	36	82	-
32	24	18	97	54
33-36	109	158	285	406
37-41	164	143	287	343
>41	1	4	7	15

*2011 BAPM definition for care levels  
Includes ongoing care for babies born in 2018*

Average length of stay in days for all admissions by gestation			
	2017	2018	2019
Gestation	ITU		
<26	45	54	67
26-30	39	40	38
31-36	21	25	20
>36	15	16	15
Gestation	HDU		
<26	56	19	-
26-30	21	8	23
31-36	19	18	19
>36	10	9	11



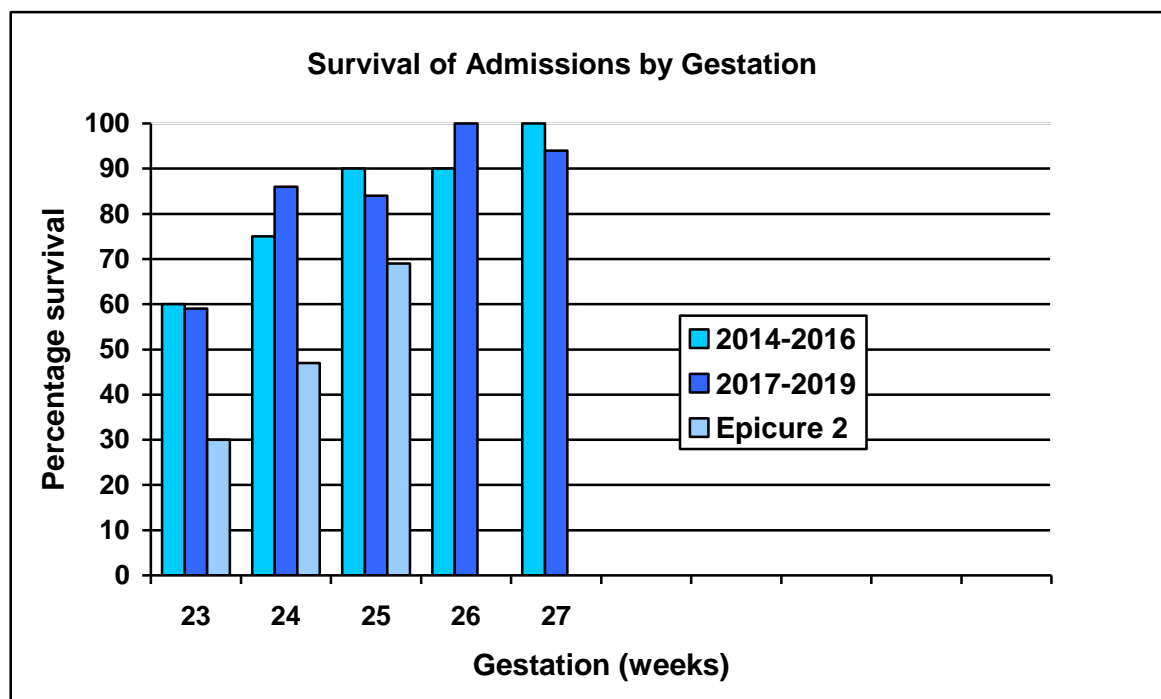
Transfers out	2017	2018	2019
Specialist medical care	13	23	N/A
Cardiac care (ECMO)	8 (1)	6(2)	11(0)
Discharges			
Home/Foster care	185	209	180
Postnatal ward	101	118	93
Princess Royal Hospital	59	42	45
RACH	21	11	8
East Sussex Hospitals	29	31	25
West Sussex Hospitals	21	25	24
Other SEC ODN hospitals	26	26	22
Other hospitals outside SEC ODN	33	21	17

Survival of all inborn live births by gestation for 2019								
GA	Live births	Admitted to TMBU*	Died before admission	Died <7d	Died 7-28d	Died >28d	Total deaths	Admissions surviving to discharge
23	8	7	1	1			1	6
24	6	5	1				0	5
25	10	10		1		1	2	8
26	6	6					0	6
27	12	12					0	12
28	6	4					0	4
29	15	15					0	15
30	11	11					0	11
31	16	16					0	16
32	20	19	1				0	19
33-36	187	92	2	1			1	91
37-42	2416	122					0	122
>42	17	1					0	1
<b>Total</b>		<b>320</b>	<b>5</b>	<b>3</b>		<b>1</b>	<b>4</b>	<b>316</b>

\*Inborn (booked and unbooked RSCH) excluding lethal congenital abnormalities admitted in 2018  
Not including re-admissions

3 year rolling survival to discharge for extreme preterm admissions							
GA	2017		2018		2019		Survival to discharge %
	Admitted	Died	Admitted	Died	Admitted	Died	
23	8	3	7	5	9	2	59
24	10	2	11	2	8	0	86
25	14	1	11	1	13	4	84
26	12	0	9	0	10	0	100
27	19	3	15	0	14	0	94

Includes inborn and ex-utero transfers



<b>Mortality Statistics (RSCH)</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Total deliveries	3303	3410	3428	3390	3184	2902	<b>2804</b>
Total livebirths	3292	3400	3415	3380	3176	2890	<b>2797</b>
Total stillbirths	11	10	12	10	8	12	<b>7</b>
Deaths before admission*	0	2	2	0	1	0	<b>5</b>
Total neonatal deaths	19	14	11	9	17	13	<b>8</b>
Inborn	11	11	6	4	6	9	<b>4</b>
Outborn	8	3	5	5	11	4	<b>4</b>
Early neonatal deaths**	5	3	1	1	5	6	<b>3</b>
Late neonatal deaths**	5	3	2	0	0	2	<b>0</b>
Deaths >28 days**	0	1	3	3	2	0	<b>1</b>
Still birth rate	3.3	2.9	3.5	2.9	2.5	4.1	<b>2.4</b>
Perinatal mortality rate	4.8	4.4	4.4	3.2	4.4	6.2	<b>5.7</b>
Neonatal mortality rate**	3.0	1.8	0.9	0.3	1.9	2.8	<b>3.2</b>
<b>Mortality Statistics (BSUH = RSCH + PRH)</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Total deliveries	5841	5851	5915	5838	5445	5192	<b>4937</b>
Total livebirths	5828	5729	5892	5823	5431	5174	<b>4925</b>
Total stillbirths	13	22	22	15	14	18	<b>12</b>
Deaths before admission*	0	1	2	0	1	0	<b>5</b>
Early neonatal deaths**	6	5	1	1	6	7	<b>4</b>
Late neonatal deaths**	5	4	3	0	0	2	<b>1</b>
Deaths >28 days**	0	1	3	3	2	0	<b>1</b>
Still birth rate	2.2	3.8	3.7	2.6	2.6	3.5	<b>2.4</b>
Perinatal mortality rate	3.3	4.6	3.9	2.7	3.5	4.8	<b>4.6</b>
Neonatal mortality rate**	1.9	1.7	0.8	0.2	0.9	1.7	<b>2.2</b>

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

\*\**Inborn (booked and unbooked) excluding lethal congenital abnormalities*

TMBU deaths (inborn and ex-utero transfers) 2019					
Delivered	GA	BW (g)	Age d	PM	Cause of death, related factors
<b>Deaths related to prematurity</b>					
RSCH	23	535	0	yes	Fetal hydrops, lung hypoplasia, acute chorioamnionitis
RSCH	23	595	5	no	Prematurity, pre-eclampsia, RDS, recurrent pneumothoraces, IVH IV
RSCH	25	645	6	no	Prematurity, IUGR, pre-eclampsia, bilateral IVH IV
PRH	25	415	15	no	Prematurity, PPHN, spontaneous gastric perforation, IUGR
<b>Sepsis</b>					
RSCH	25	700	34	no	Severe pulmonary hemorrhage, gram negative sepsis with pneumonia, extreme prematurity, IVH IV
<b>NEC</b>					
Chertsey	23	566	17	yes	Gastric perforation complicated by hepatic hemorrhage, extreme prematurity
Medway	26	850	5	no	Perforated NEC, PDA, IVH III, prematurity
<b>Congenital abnormality</b>					
RSCH	29	1262	19	yes	Multi-organ failure, right pulmonary artery arising from aorta, bilateral choanal atresia, died at GOSH after cardiac surgery
RSCH	33	2000	1	yes	Pulmonary hypoplasia, congenital myopathy
RSCH	34	3060	1	no	Pulmonary hypoplasia, megacystis-megaureter syndrome
RSCH	37	2135	95	yes	Multiple dysmorphic features including laryngomalacia, microgranthia, cyanotic episodes, pulmonary branch stenosis, malabsorption, died at Evelina's
RSCH	32	1665	0	no	Trisomy 13
<b>Others</b>					
PRH	41	3221	1	yes	HIE II, acute chorioamnionitis, Meconium aspiration syndrome, PPHN

Post Mortems	2017	2018	2019
Total deaths	18	13	8
Post Mortems performed (% of deaths)	6(33)	2(15)	2(25)



All neonatal deaths within BSUH are routinely reported to the Coroner, logged on the Trust, Datix system and Perinatal Mortality Review Tool (PMRT). Cases are reviewed contemporaneously by the clinical team with 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
	2016	2017	2018	2019	Total	2016	2017	2018	2019	Total	(%)
Inborn	356	369	335	310	<b>1370</b>	3	7	8	4	<b>22</b>	<b>98</b>
Outborn	141	126	151	114	<b>532</b>	6	11	4	4	<b>25</b>	<b>95</b>
<26 weeks	29	33	39	30	<b>131</b>	4	6	8	5	<b>23</b>	<b>83</b>
<28 weeks	20	32	26	24	<b>102</b>	1	2	1	1	<b>5</b>	<b>95</b>
<31 weeks	69	70	54	52	<b>245</b>	1	4	3	0	<b>8</b>	<b>97</b>
31+ weeks	385	361	380	318	<b>1444</b>	3	5	1	2	<b>11</b>	<b>99</b>
<500g	2	3	3	3	<b>11</b>	0	3	2	0	<b>5</b>	<b>55</b>
<750g	30	23	23	25	<b>101</b>	5	3	6	5	<b>19</b>	<b>81</b>
<1000g	20	37	30	25	<b>112</b>	0	3	0	1	<b>4</b>	<b>97</b>
<1500g	62	89	57	66	<b>274</b>	1	1	4	0	<b>6</b>	<b>98</b>
>1500g	389	343	387	305	<b>1424</b>	3	7	1	2	<b>13</b>	<b>99</b>

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

Admissions	2017	2018	2019
Total number of livebirths	2261	2284	<b>2128</b>
Total number of stillbirths	6	6	<b>5</b>
Total admissions <sup>(no of re-admissions)</sup>	242 <sup>(23)</sup>	224 <sup>(12)</sup>	<b>209<sup>(18)</sup></b>
Percentage of live births admitted	11%	10%	<b>9%</b>

Admission details	2017		2018		2019	
		% of total admissions		% of total admissions		% of total admissions
Total admissions (1st admission)	219		212		<b>191</b>	<b>9</b>
Transitional care babies	-		-		<b>288</b>	<b>13</b>
Inborn	157	72	159	75	<b>133</b>	<b>70</b>
Outborn	62	28	53	25	<b>58</b>	<b>32</b>
<b>Gestation ( ) = born elsewhere and back transferred to PRH</b>						
23	0		0		1 <sup>(1)</sup>	
24	0		3 <sup>(2)</sup>		0	
25	0		0		4 <sup>(3)</sup>	
26	3 <sup>(3)</sup>		2 <sup>(2)</sup>		3 <sup>(3)</sup>	
27	6 <sup>(6)</sup>		2 <sup>(2)</sup>		2 <sup>(2)</sup>	
28	4 <sup>(2)</sup>		4 <sup>(3)</sup>		1 <sup>(1)</sup>	
29	2 <sup>(2)</sup>		3 <sup>(3)</sup>		5 <sup>(5)</sup>	
30	6 <sup>(6)</sup>		3 <sup>(3)</sup>		4 <sup>(2)</sup>	
31	10 <sup>(10)</sup>		5 <sup>(4)</sup>		3 <sup>(2)</sup>	
32	7 <sup>(4)</sup>		11 <sup>(9)</sup>		9 <sup>(8)</sup>	
33-36	75 <sup>(15)</sup>		66 <sup>(14)</sup>		47 <sup>(7)</sup>	
37-42	112 <sup>(17)</sup>		125 <sup>(10)</sup>		112 <sup>(6)</sup>	
>42	0		0		0	
<b>Birthweight (g)</b>						
<500	0		0		1	
<750	0		4 <sup>(3)</sup>		2 <sup>(2)</sup>	
<1000	7 <sup>(7)</sup>		5 <sup>(5)</sup>		5 <sup>(5)</sup>	
<1500	16 <sup>(2)</sup>		9 <sup>(8)</sup>		12 <sup>(9)</sup>	
Twins	35		38		18	
Triplets	3		0		0	

**Does not include re-admissions**

Ex-utero Transfers	2017	2018	2019
Transfers out to the TMBU	26	35	33
Transfers out to elsewhere	1	3	4
Transfers in from the TMBU	57	44	46
Transfers in from elsewhere	4	9	2
Transfers in from home*	17	18	17

*\* includes babies who were admitted directly to transitional care*

Cot occupancy	2017		2018		2019	
Cots	Days	% occ	Days	% occ	Days	% occ
IC	33		21		13	
HD	264		227		168	
SC	1735	59	1533	52	1514	51
<b>Total</b>	<b>2032</b>	<b>69</b>	<b>1781</b>	<b>61</b>	<b>1695</b>	<b>58</b>

Mortality Statistics (PRH)	2016	2017	2018	2019
Total deliveries	2448	2261	2290	<b>2133</b>
Total livebirths	2443	2255	2284	<b>2128</b>
Total stillbirths	5	6	6	<b>5</b>
Early neonatal deaths*	0	1	1	<b>1</b>
Late neonatal deaths*	0	0	0	<b>1</b>
Post neonatal deaths (>28 days)*	0	0	0	<b>0</b>
Still birth rate	2.0	2.7	2.6	<b>2.3</b>
Perinatal mortality rate	2.0	3.1	3.1	<b>3.2</b>
Neonatal mortality rate*	0	0.4	0.4	<b>0.9</b>

*\*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 weekends.

The Sussex team undertook 394 transfers in 2019: 147 intensive care transfers, 48 high dependency transfers and 199 low dependency transfers.

19 of these transfers were not completed as, either diverted to an emergency, handed to another team, or cancelled as no longer required.

The transfers were categorised into:

Medical	Surgical	Neuro	Cardiac
268	76	27	23

Uplift of care	Repatriation	Outpatient Appointments	Resources/ Capacity
193	183	6	12

National Time Critical: 16 transfers were undertaken:

Gastroschisis (1)

Ventilated with Tracheo-oesophageal fistula +/- atresia (4)

Intestinal perforation (3)

Suspected duct-dependent cardiac lesion (not responding to prostin) (2)

Unstable respiratory or cardiovascular failure (not responding to appropriate management) (6)

Local Time Critical: 18 infants received therapeutic hypothermia during transfer.

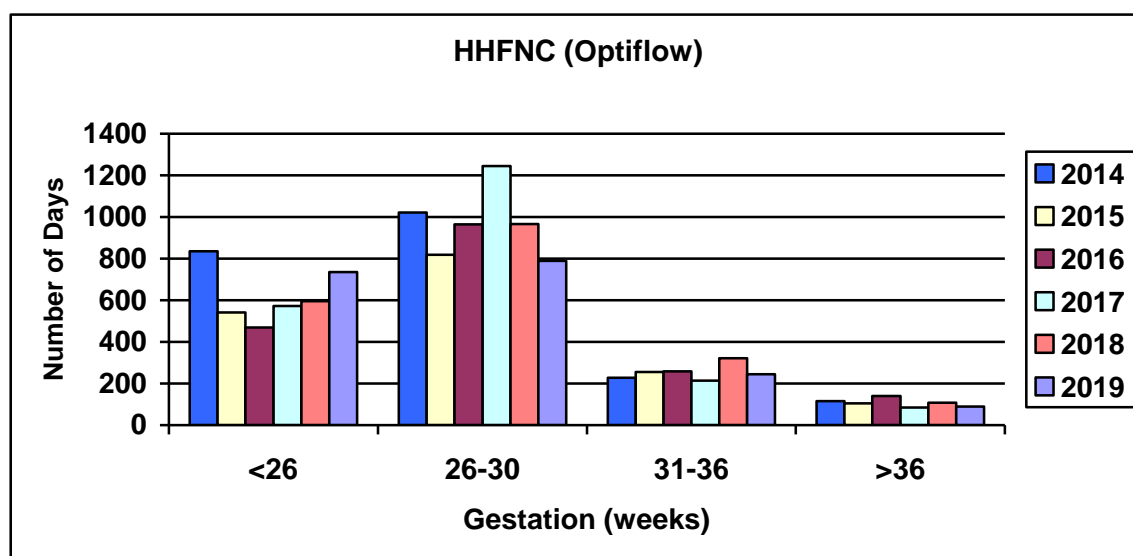
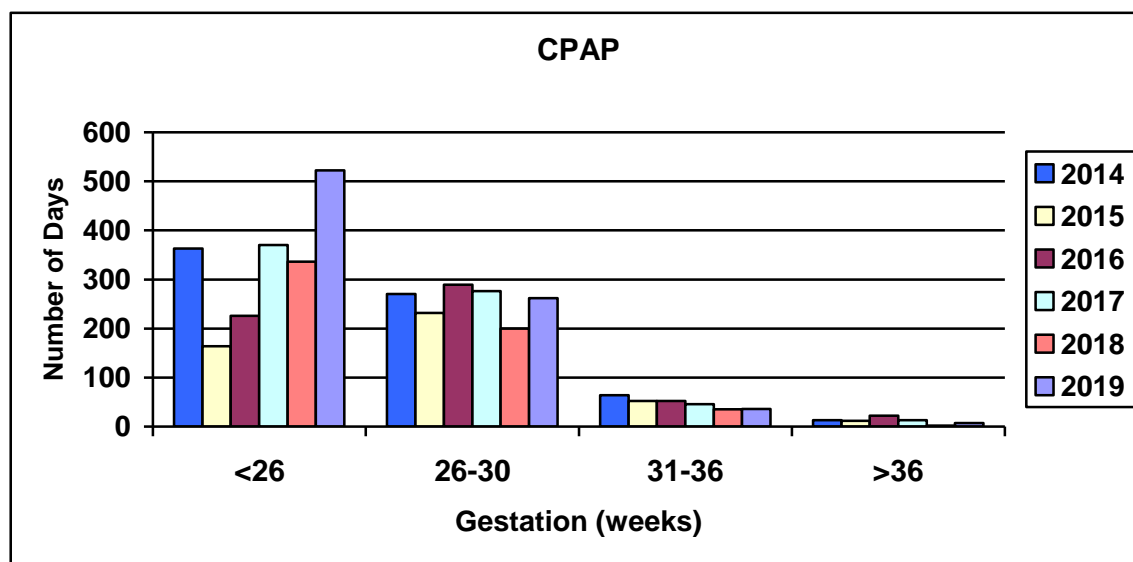
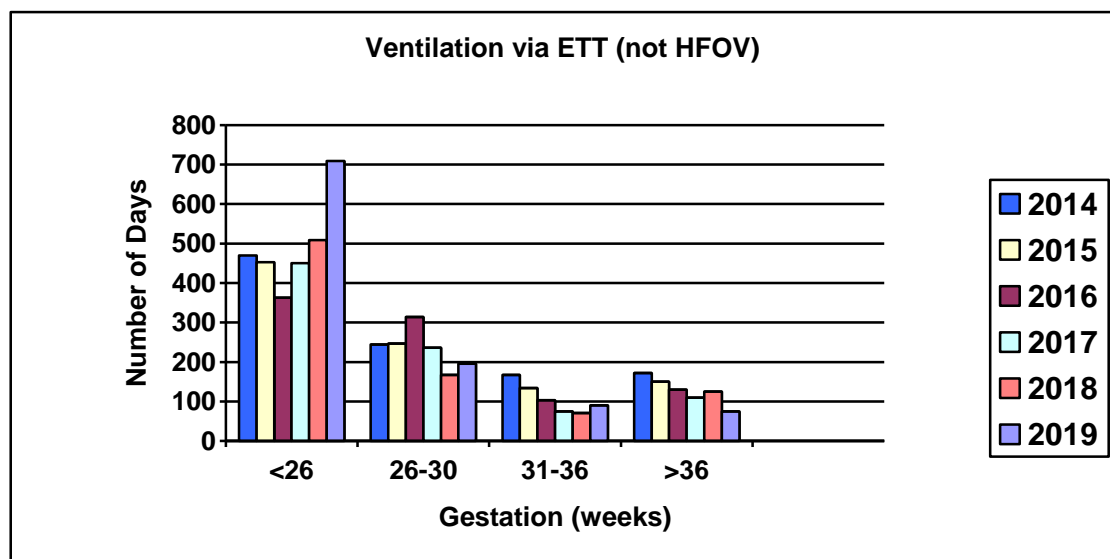
## Summary of Clinical Activity Trevor Mann Baby Unit

Respiratory Support	2017		2018		2019	
	Days	Babies	Days	Babies	Days	Babies
Conventional ventilation	871	164	872	144	1071	145
HFOV	30	14	26	18	25	17
CPAP	705	127	573	97	827	105
HHFNC (optiflow)	2116	240	1992	244	1859	230
Surfactant (doses)		66 (76)		67 (97)		64 (74)
Nitric Oxide	112	27	73	24	53	17

Respiratory diagnoses	Number of Babies		
	2017	2018	2019
Respiratory Distress Syndrome	194	146	173
Transient Tachypnoea	15	20	17
Signs of respiratory distress of the newborn	230	165	158
Persistent Pulmonary Hypertension	15	12	13
Meconium aspiration	10	12	5
Cystic Fibrosis	1	0	2

Respiratory Complications	2017	2018	2019
Pulmonary haemorrhage	3	13	10
Pulmonary air leak (drained)	33 (5)	24 (10)	19(10)
Oxygen at 36 weeks CA	33	26	29
Oxygen at 28 days	73	59	60
Discharged with home oxygen	11	6	6

Management of PDA	2017	2018	2019
Patent Ductus Arteriosus	65	40	50
Indomethacin / Ibuprofen	21	12 / 4	12/10
PDA ligated	5	8	10



Infection	Positive Blood Cultures (episodes)		
	2017	2018	2019
Group B streptococcus	0	0	2
Non-haemolytic streptococcus	2	0	0
Alpha haemolytic streptococcus	0	0	0
Haemophilus	0	0	0
Staphylococcus Coagulase negative	32 (27)	43 (39) 3 mixed growth	17(17)
MSSA	4	0	0
MRSA	0	0	0
<i>Enterococcus faecalis</i>	0	5 (2)	8(1 Faecium)
Listeria	0	2 (1)	0
<i>Escherichia coli</i>	3 (3)	2 (2)	5
<i>Bacillus cereus</i>	0	0	0
Klebsiella species	1	0	2
Serratia species	1	3 (2)	0
Enterobacter species	4 (3)	3 (3)	2
Pseudomonas species	0	2 (1)	0
Acinetobacter species	1	0	0
Corynebacterium	0	1	1
Diphtheroid	0	0	0
Micrococcus lutens	0	0	1
Actinomyces	0	1	0
Candida species	2 (1)	0	2
<b>Total</b>	<b>50 (43)</b>	<b>62 (52)</b>	<b>40(18)</b>

Necrotising Enterocolitis	2017	2018	2019
NEC confirmed cases including perforations (EUT)	18 (10)	7 (4)	8 (6)
NEC suspected cases (EUT)	19 (9)	12 (6)	18 (14)
Confirmed NEC perforated (EUT)	7 (4)	4 (2)	2 (1)
NEC treated surgically (EUT)	13 (7)	5 (2)	5 (3)

Neonatal Surgical Cases (not NEC)	2017	2018	2019
	Cases	Cases	Cases
Gastroschisis	3	4	3
Exomphalos	0	0	3
Hirschsprungs	0	2	1
Malrotation confirmed	8	1	2
Meconium ileus (surgery)	5 (2)	4 (0)	3 (3)
Gut perforation (not NEC)	2	1	2
Oesophageal Atresia / TOF	3	3	4
Intestinal atresia/obstruction	4	8	3
Inguinal hernia repair	3	3	4
Imperforate anus/rectal anomaly	6	5	3
Lung cyst/sequestration	1	1	1
Diaphragmatic eventration	0	0	0
Diaphragmatic hernia	1	1	0



Cranial Ultrasound Diagnoses	Number of Babies		
	2017	2018	2019
IVH with parenchymal involvement (EUT)	8 (3)	6 (4)	5 (2)
Post haemorrhagic hydrocephalus (requiring surgical intervention)	4 (0)	5 (1)	4 (0)
Infarction without IVH	0	1 (1)	0
Periventricular ischaemic injury with cyst formation (EUT)	1	2 (2)	0

*All babies <32 weeks gestation have routine cranial ultrasound examinations*

Hypoxic Ischaemic Encephalopathy	2017	2018	2019
HIE grade 1 (EUT)	11 (9)	17 (12)	10(3)
HIE grade 2 (EUT)	12 (8)	13(10)	8(7)
HIE grade 3 (EUT)	5 (4)	5(4)	1(1)
Hypothermia therapy	15	28	13
- Inborn (BSUH)	7	8	5
- Outborn	8	21	8

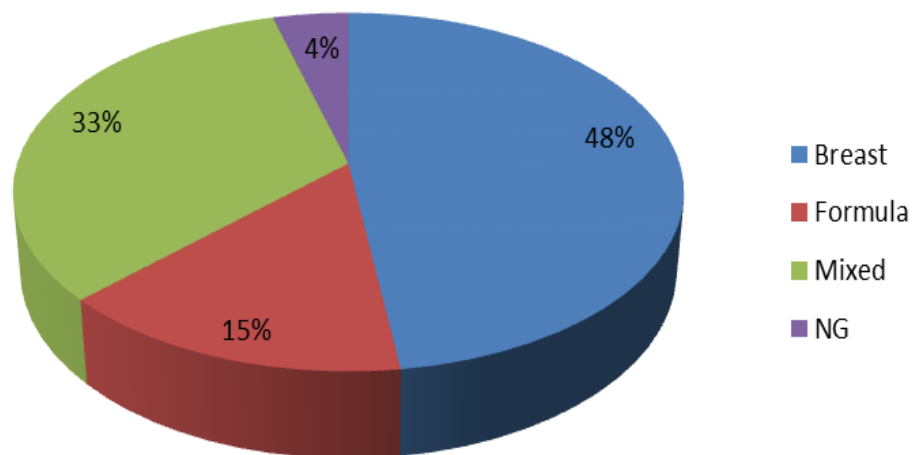
Retinopathy of Prematurity	2017	2018	2019
ROP grades 3/4	3	5	3
ROP treated with laser therapy	3	5	3

*Screening as per recommendations from Royal College of Ophthalmologists*

Neonatal Dashboard	2019			
	Eligible babies	Result	%	National Ave % (2018)
Antenatal steroids given (24 – 34 weeks gestation at birth)	113	107	95	91
Magnesium sulphate given	55	48	87	72
Temperature 36.5 to 37.5 on admission from LW. (<32 weeks gestation at birth)	84	60	71	67
Parent seen within first 24 hours of admission. (first admission to the TMBU)	308	307	100	96
Parents present on ward round	430	365	85	82.7
ROP screening completed on time (<32 weeks and or <1500g at birth)	78	75	96	96
Breast milk (all or some) at discharge home. (<33 weeks and first admission)	29	15	52	60
NEC (<32 weeks gestation at birth)	118	3	3	2
Catheter related sepsis, per 1000 line days		6.9		5.0
BPD (<32 weeks gestation at birth)	83	28	34	25

Feeding at Discharge	Babies
Breast	202
Mixed (Breast/formula)	142
Formula	63
Nasogastric	14

**DISCHARGE FEEDING (total discharges 451)**



## 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 within the Brighton catchment area at <30 weeks gestation (and/or <1000g) are offered a formal Bayley III assessment as part of our neurodevelopmental follow-up programme.

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 433 babies eligible for follow-up, 341 infants have had 24 month developmental assessments completed. 92 babies did not receive full Bayley 24 month assessments. Of these 50 did not attend, 15 families had moved out of area, 10 attended for appointment but were too complex/difficult to assess, 5 had only TRPG assessments, 3 follow-ups were missed, 5 follow-ups were undertaken at other hospitals, 1 parent cancelled as child had numerous problems, 3 were undertaken by the health visitor.

Outcome	23	24	25	26	27	28	>29	Total (%)
Cognitive								
Normal	4	14	28	36	52	79	27	240 (70)
Mild	2	5	8	5	13	15	3	54 (16)
Moderate	1	4	5	4	5	3	2	27 (8)
Severe	0	4	3	3	7	1	0	20 (6)
Communication								
Normal	2	12	22	20	34	68	21	179 (52)
Mild	3	5	10	20	18	17	7	80 (24)
Moderate	1	4	9	4	12	8	6	44 (13)
Severe	1	6	4	5	14	5	1	38 (11)
Motor								
Normal	3	16	27	25	38	69	22	200 (59)
Mild	3	2	9	15	22	15	7	73 (21)
Moderate	1	4	4	3	8	7	3	30 (9)
Severe	0	5	5	7	10	7	4	38 (11)
Combined outcomes								
Normal	2	12	19	15	28	55	18	149 (44)
Mild	3	4	10	22	18	26	7	90 (26)
Moderate	1	6	9	4	17	6	6	49 (14)
Severe	1	5	7	9	15	11	4	54 (16)
<b>Total assessed</b>	<b>7</b>	<b>27</b>	<b>45</b>	<b>50</b>	<b>78</b>	<b>98</b>	<b>36</b>	<b>341</b>

Outcomes according to gestation were as follows:

#### 23 and 24 weeks gestation (n=34)

Outcome (%)	Cognitive	Communication	Motor
Normal	18 (53)	14 (41)	19 (55)
Mild impairment	7 (21)	8 (23)	5 (15)
Moderate impairment	5 (15)	5 (15)	5 (15)
Severe disability	4 (11)	7 (21)	5 (15)

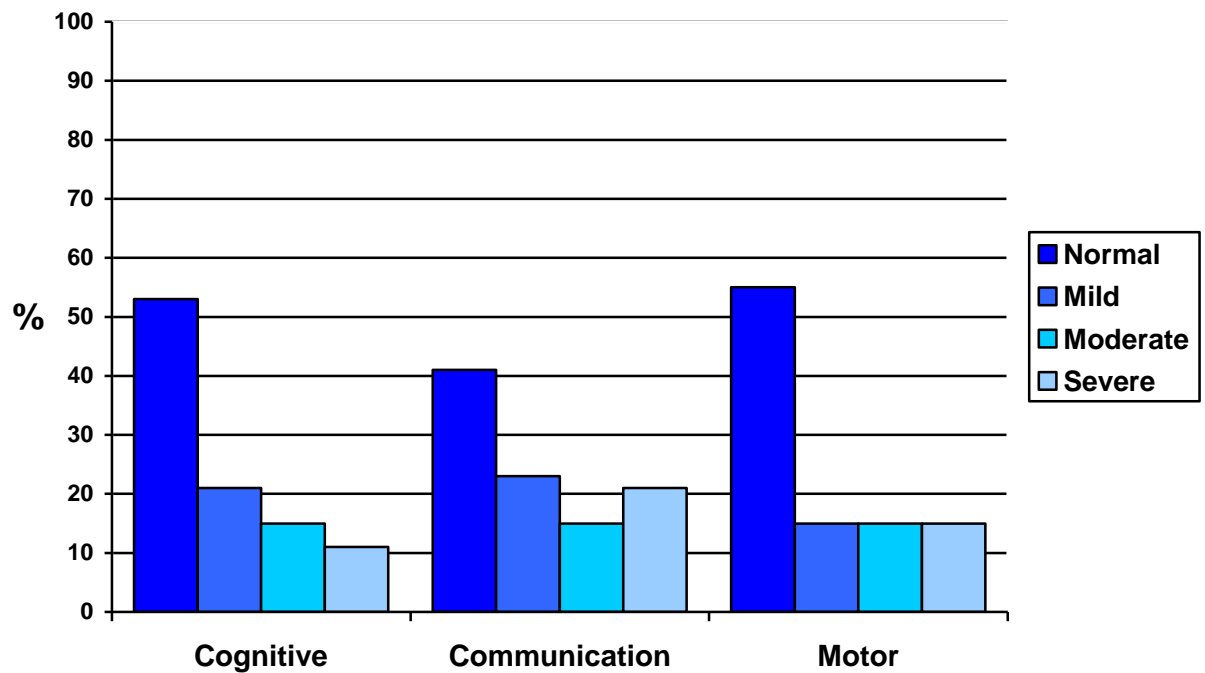
#### 25 and 26 weeks gestation (n=95)

Outcome (%)	Cognitive	Communication	Motor
Normal	64 (67)	42 (44)	52 (55)
Mild impairment	14 (15)	30 (31)	24 (25)
Moderate impairment	10 (11)	13 (14)	6 (6)
Severe disability	7 (7)	10 (11)	13 (14)

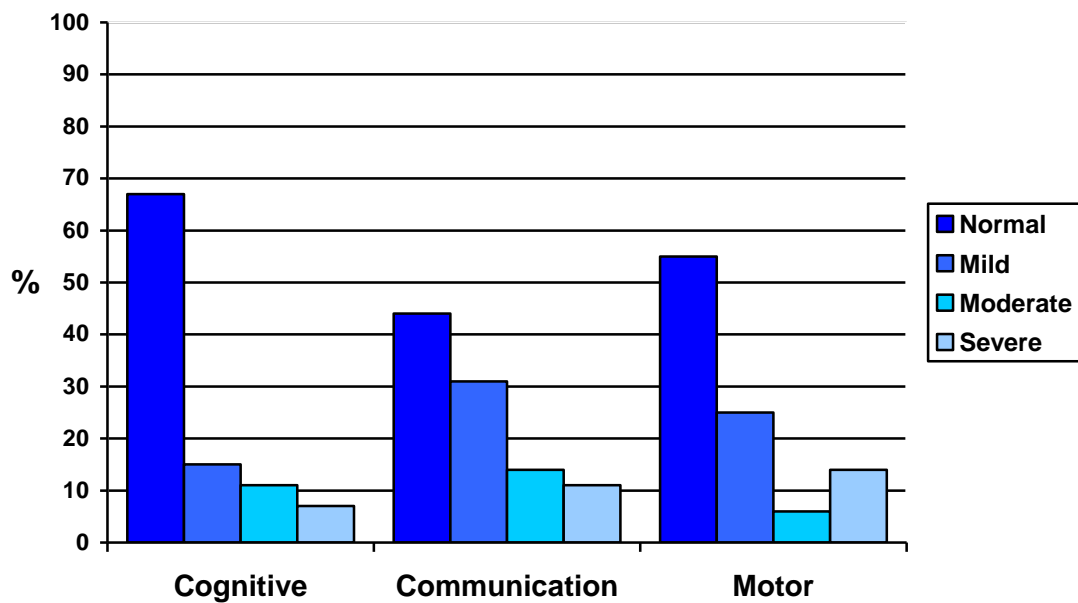
#### 27 weeks gestation and above (n=212)

Outcome (%)	Cognitive	Communication	Motor
Normal	158 (75)	123 (58)	129 (61)
Mild impairment	33 (16)	42 (20)	44 (21)
Moderate impairment	12 (5)	26 (12)	18 (8)
Severe disability	9 (4)	21 (10)	21 (10)

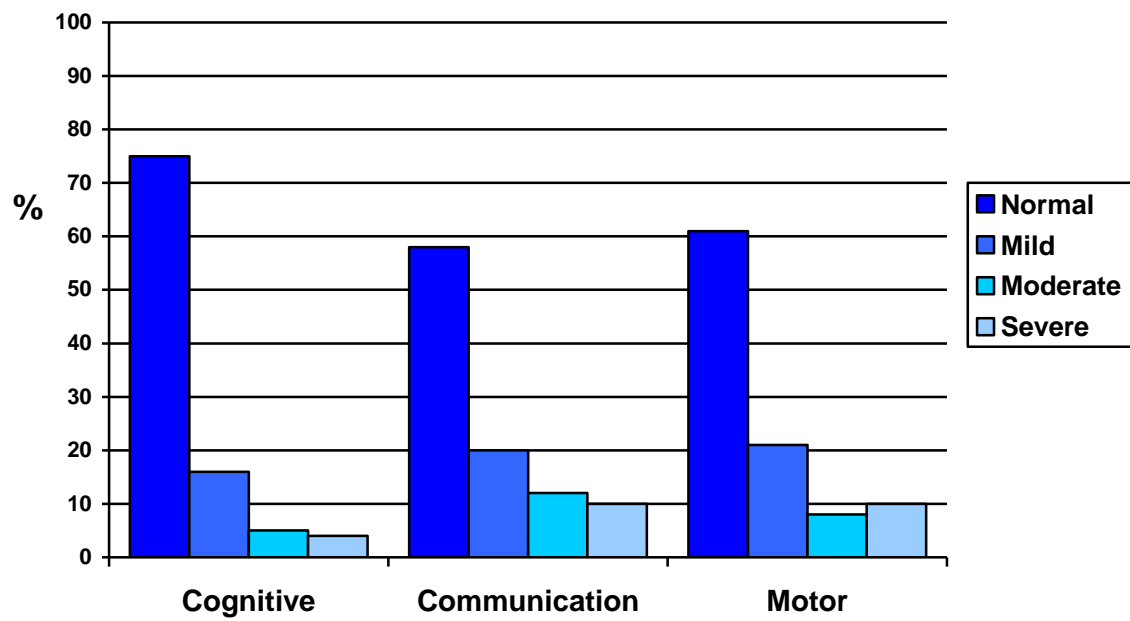
**Neurodevelopmental Outcome of Pre-term Infants  
23 & 24 weeks at 24 months CA  
(n = 34)**



**Neurodevelopmental Outcome of Pre-term Infants  
25 & 26 weeks at 24 months CA  
(n = 95)**



**Neurodevelopmental Outcome of Pre-term Infants  
27 weeks and above at 24 months CA  
(n = 212)**



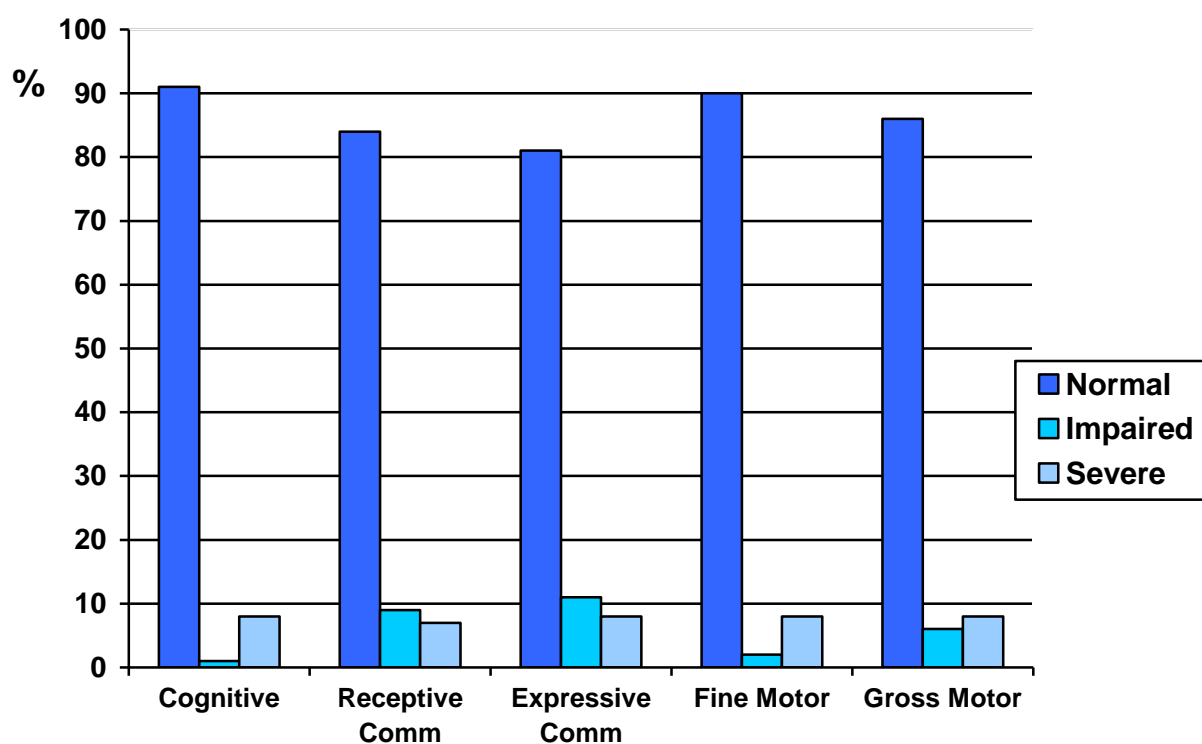
## Neurodevelopmental Outcome for Babies with Hypoxic Ischaemic Encephalopathy

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.

Total cooled babies from 2009	213
Total assessments performed	119
Total babies cooled in 2017	15
Assessments performed in 2019 (including one baby cooled elsewhere)	11
Died	1
Attended but did not co-operate	1
Did Not Attend	3

### Neurodevelopmental Outcome of Cooled Babies (n=119)

Outcome (%)	Cognitive	Receptive Communication	Expressive Communication	Fine Motor	Gross Motor
Normal	108 (91)	100 (84)	96 (81)	107 (90)	102 (86)
Impaired	2 (1)	11 (9)	14 (11)	3 (2)	7 (6)
Severe disability	9 (8)	8 (7)	9 (8)	9 (8)	10 (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 °C)

Accidental extubation

Delay – no discharge summary ready

### **Summary of Clinical Incidents (TMBU and SCBU):**

<b>Incident Category</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Access, admission, transfer, discharge	0	8	3	1	4	9	3	5
Clinical assessment (diagnosis, scans, tests, assessments)	2	6	6	21	22	10	19	21
Consent, communication, confidentiality	7	7	12	9	5	14	10	2
Documentation (records, identification)	9	11	15	30	19	13	13	10
Implementation of care and ongoing monitoring / review	5	12	8	10	15	6	12	12
Infection Control Incident	2	1	4	2	2	5	1	2
Infrastructure (staffing, facilities, environment)	11	16	16	16	4	11	9	8
Medical device / equipment	9	11	11	15	10	12	9	8
Drugs and prescribing	53	58	59	56	51	42	54	29
Patient accident	0	1	0	1	2	0	2	0
Treatment, procedure	19	12	10	17	15	17	16	13
Other Incident	16	42	31	18	6	31	12	19
<b>Total</b>	<b>133</b>	<b>185</b>	<b>175</b>	<b>196</b>	<b>155</b>	<b>170</b>	<b>160</b>	<b>129</b>



## **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 clinical handover (weekly)
- Nutrition meeting (weekly)
- Xray review (weekly)
- Tuesday and Thursday Teaching 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 & 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. 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, 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
Christine Laycock	Data Officer
Paul Frattaroli	Data officer

Prof Rabe continued her collaboration with Dr Rendon Morales from the University of Sussex Institute for Sensor Technology. The NEOSENSE project aims at testing a new non-stick sensor for detecting babies' heart rate after birth within a few seconds. The clinical research fellow Dr Oana Anton is kindly supported by grant from Rockinghorse Appeal and the Early Birth Association

Dr Aiton is UK PI for the multi-center study on FAS Fetal Alcohol Syndrome funded by the NIH in USA. He was able to recruit a record number of more than 752 mother and baby pairs to the study. The study compared 2D and 3D photography with computerised analysis for earlier detection of craniofacial changes of Fetal Alcohol Spectrum Disorder in newborn infants with and without Prenatal Alcohol Exposure. The results will contribute to novel ways of diagnosing FAS more accurately.

Dr Bomont acted as local PI for the national multicenter OPTIPREM study looking into optimizing neonatal care provision. Prof Seddon and Dr Fernandez are Co-PI for the MEDIMMUNE study (RCT on RSV vaccinations) which has completed following up of the recruited patients. Dr Fernandez and Dr Bhat are local PIs for the CURONEB study which is a trial of nebulized surfactant for preterm infants and AZTEC, a randomized controlled trial on the role of prophylactic antibiotics in the development of BPD:.

The Department has been involved in several other studies which have completed recruitment. The GO-Child Study has completed the follow-up phase. The CMV registry has opened for recruitment again in 2018. We are continuing care site for SIFT and BabyOSCAR.

Recruitment for neurodevelopmental follow-up studies of pre-term infants and those who were treated with total body cooling is led by Dr Phil Amess.

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 Brighton) and with the School of Pharmacy & Biomolecular Sciences (University of Brighton). We are undertaking studies with Dr Bhavik Patel on the safety of medicines.

The research team has a track record in studying the benefits of enhanced placental transfusion at the birth of babies. With funding support from the University of Sussex and Prof Melanie Newport from BSMS Global Health and Infectious Diseases Prof Rabe organized a multi-professional international workshop with Prof Mary Ngoma, prof Anitha Menon and Prof Bellington Vwalika at the University of Zambia Medical School and University Teaching Hospital in Lusaka in February 2019. The workshop founded the basis for collaborative projects in the field of maternal and child health.

Later in the year Dr Bornwell Sikateyo travelled to Brighton for an exchange visit from the University of Zambia to prepare future grant applications.

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 Annual KSS Paediatric and Neonatal Research Day 2019. The planning for the research day in 2020 is currently on hold due to the current Covid-19 Pandemic situation. Further information might be available later in the year.

## **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. Dr Ramon Fernandez, Senior Clinical Lecturer, leads on the provision of online learning tools to complement their training in newborn physical examination. 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, organizing and supervising elective placements and tutoring small groups. Professor Rabe 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 organize, 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 oversees educational governance. Dr Bomont is Paediatric Tutor.

The TMBU offers fellow posts in Human Factors which are proving very popular with doctors in training.

## **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 given to inpatients both on the Trevor Mann Baby Unit and at 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 attend the Chronic Lung Disease Clinic will have ongoing input. Babies from outside of Brighton and Hove who continue to have significant feeding difficulties are referred on to local services or may be seen as an outpatient in Brighton if no appropriate local service is available.

### **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 opportunities for doctors and nurses to request training as they feel necessary, and she is about to start a project alongside doctors and nurses for helping develop a neurodevelopmental pathway. 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 supports infants and parents at home when they are discharged from TMBU or SCBU at PRH. The team is comprised of a team leader who works full time, a senior staff nurse and a nursery nurse who both work part time.

Visits are made in the community to advise on the continued care of babies that may have been, premature, sick or have additional needs. The team is a link for families between themselves and the neonatal unit or neonatal follow up clinic. The care and support each family requires is tailored to them as individuals, the length of time the outreach team visit for can vary from a few days to many weeks.

In 2019 139 babies were followed up by the Outreach Team across both sites (approximately 25% of all TMBU inborn admissions and 45% of PRH admissions), this was an overall increase of 35 babies from the year before. Although most visits were within the local catchment area, babies from Eastbourne and other outlying areas were also followed-up (including mobile and text support). Most babies required 1-3 visits from the Team, although for some babies 6-8+ visits were undertaken.

### **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 2019 eight babies were admitted to the TMBU and SCBU with Neonatal Abstinence Syndrome.

A total of 22 babies were seen for follow-up in the One Stop Clinic (including antenatal referrals not requiring treatment on TMBU).

### **Counselling**

Counselling is currently available from the Trust Chaplaincy Service at both the TMBU and SCBU at PRH. Julie Carroll is a qualified psychotherapist providing 10 hours per week to the department. In addition the chaplaincy team provide support to staff on an ad hoc basis as needed. 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.

Two members of nursing staff have recently completed 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 and a Parent Passport. 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 compiled 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 9 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 Baby Watch 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 formed of a group of parents/grandparents that have all experienced having a premature or a very sick baby treated at the Trevor Mann Baby Unit in Brighton or the Special Care Baby Unit in Haywards Heath.

The charity works in partnership with the units to help make a difference and support the outstanding neonatal care for babies and their families

In the last year, through donations raised from supporters, committee members and their own fundraising events, the EBA have contributed £60k towards the refurbishment of TMBU, been instrumental in the design and launch of the new 'quiet room', funded the purchase of various vital pieces of equipment including incubators and feeding chairs as well as ongoing funding of the 'Mind Clinic' staff counselling service and the 'Wishing Well' music programme for babies.

The EBA also provides an ongoing supply of comfort items such as blankets, refreshments and toiletry packs for parents and supports families through their regular coffee mornings on both units.

The EBA is run solely by volunteers with 100% of all money raised going directly to these units. More information about the EBA is available on their website: [www.earlybirth.co.uk](http://www.earlybirth.co.uk)

### **Rockinghorse Children's Charity**

The Rockinghorse Charity celebrated its 50<sup>th</sup> anniversary in 2017. Established in 1967 by Dr Trevor Mann, the charity continues to support the TMBU and SCBU at PRH generously. In 2019, we took delivery of a new digital imaging facility for the TMBU. Rockinghorse continues to fund counselling for staff and a wide range of equipment purchases. We are very grateful to the team at Rockinghorse for all their support and look forward to more success in 2020.

## 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 repleg 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)
  - o care of a stoma
  - o presence of IV cannula
  - o baby receiving phototherapy
  - o 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	
<b>Stillbirth</b>	A baby delivered at or after 24+0 weeks gestational age showing no signs of life, irrespective of when the death occurred.
<b>Early neonatal death</b>	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.
<b>Late neonatal death</b>	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.
<b>Stillbirth rate</b>	Number of stillbirths per 1000 livebirths and stillbirths.
<b>Perinatal mortality rate</b>	Number of stillbirths and early neonatal deaths per 1000 livebirths and stillbirths.
<b>Neonatal mortality rate</b>	Number of neonatal deaths per 1000 livebirths.

### APPENDIX 3


## CLINICAL GOVERNANCE PERFORMANCE FOR NEONATOLOGY 2019


CLINICAL GOVERNANCE ELEMENT	COMPLETED/IMPLEMENTED	PRESENTED	DATE	COMMENTS & ACTIONS	ACTIONS COMPLETED
<b>International &amp; National Guidance</b>					
NICE Guidance Postnatal Care CG 37/NIPE Guidance	Yes	No new presentation last year.		<ul style="list-style-type: none"> <li>• Site for NIPE</li> <li>• Guidelines revised to meet BFI and NICE standards</li> <li>• Saturation screening implemented as standard</li> <li>• All requirements according to NIPE fulfilled; DDH screening (KP2) markedly improved since last year</li> <li>• University course to train MW developed – continue plan to increase number of trained MW</li> </ul>	<p>Completed</p> <p>In progress</p>
NICE Guidance Intrapartum Care CG 55/Antibiotics for Early-onset Neonatal Infection CG 149	Yes	No new presentation last year.		<ul style="list-style-type: none"> <li>• All requirements fulfilled</li> <li>• Local guideline updated in line with the Obstetrics Department</li> <li>• Audit of Gentamicin dosing schedule</li> </ul>	Required

<u>Hypoglycaemia Guideline/NICE Guidance Diabetes in Pregnancy CG 63</u>	Yes	No new presentation last year.		<ul style="list-style-type: none"> <li>Guideline amended for new WHO-UK growth charts</li> <li>Guideline revised to meet BFI standards</li> <li>Update of guideline in view of conflicting recommendations from BAPM and AAP guidance</li> </ul>	Required
Identification and Management of Neonatal Hypoglycaemia in the Full Term Infant – A Framework for Practice (2017)	No	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>Publicly documented concerns regarding new BAPM guidance</li> <li>New TMBU guideline to be based on international best practice recommendations providing the safest approach that is possible without compromising mother-child bonding</li> <li>Update guideline (see above)</li> </ul>	Required
NICE Guidance Neonatal Jaundice CG 98	Yes	No new presentation last year.		<ul style="list-style-type: none"> <li>All requirements fulfilled</li> <li>Compliance with guideline generally good</li> <li>Audit of updated guideline</li> </ul>	Required
Therapeutic Hypothermia IPG 347	Yes	No, report awaited from Badgernet		<ul style="list-style-type: none"> <li>All requirements fulfilled</li> <li>TOBY register data entry now included in NNAP database (Badgernet)</li> <li>Audit of Network Guidance Time=Brain</li> <li>Local audit of practice</li> </ul>	Completed Completed

NCEPOD – “A Mixed Bag”	Yes	No new presentation last year.		<ul style="list-style-type: none"> <li>Local standard to give TPN all babies &lt; 1500 g</li> <li>Local audit of TPN practice</li> <li>Adjustment of inclusion criteria required based on local audit</li> </ul>	Completed Completed
The Provision of Parenteral Nutrition within Neonatal Services - A Framework for Practice (2016)	Yes	No new presentation last year.		<ul style="list-style-type: none"> <li>Guidance suggests cut-off for TPN at 1250 g birthweight</li> <li>Update guideline</li> </ul>	Completed
NICE Guidance Developmental Follow-Up Of Children And Young People Born Preterm NG72	No	No, internal review of guidance awaited		<ul style="list-style-type: none"> <li>Current practice almost completely in line with NICE guidance</li> <li>Update guideline (minor)</li> <li>Implement practice change</li> </ul>	Completed In progress
Specialist Neonatal Respiratory Care For Babies Born Preterm NG124	Yes	No		<ul style="list-style-type: none"> <li>Current local guidance in line with recommendations</li> </ul>	Completed
<b>National Audits</b>					
Maternal, Newborn and Infant Clinical Outcome Review Programme	Continuous	No new presentation last year.  Adobe Acrobat Document		<ul style="list-style-type: none"> <li>There are 26 surgical neonatal units and 54 level 3 neonatal units altogether</li> <li>Our adjusted neonatal mortality rate was the 2<sup>nd</sup> lowest amongst all surgical units and the 3<sup>rd</sup> lowest amongst all level 3 neonatal units in the UK in the last report in 2017 (including congenital anomalies) and the 7<sup>th</sup> lowest amongst all surgical and</li> </ul>	



				<p>non-surgical level 3 units when excluding congenital anomalies</p> <ul style="list-style-type: none"> <li>Continue work on improving survival at limit of viability and focus more on BPD and other long-term morbidities</li> </ul>	In progress
National Neonatal Audit Programme	Continuous	<p>Yes, circulated via e-mail + discussed at senior staff meeting</p>  <p>Adobe Acrobat Document</p>		<ul style="list-style-type: none"> <li>Overall good performance and reporting quality</li> </ul>	
ATAIN - Avoiding Term Admissions Into Neonatal Units	Continuous	<p>Yes, circulated via e-mail + discussed at senior staff meeting</p>		<p>Conditions to be audited:</p> <ul style="list-style-type: none"> <li>respiratory conditions</li> <li>hypoglycaemia</li> <li>jaundice</li> <li>asphyxia (perinatal hypoxia–ischaemia)</li> <li>low rate of admissions at moment, most common one respiratory</li> </ul>	
NIPE Pilot Saturation Screening for Congenital Heart Diseases	Completed	<p>Yes, circulated via e-mail + discussed at senior staff meeting</p>		<ul style="list-style-type: none"> <li>In response to evolving research evidence in support of this tool</li> <li>Pilot site for NIPE screening for congenital heart diseases</li> </ul>	

				<ul style="list-style-type: none"> <li>Implement screening as standard locally</li> </ul>	Completed
National Training Survey	Continuous	No new presentation last year.  Adobe Acrobat Document		<ul style="list-style-type: none"> <li>Overall satisfaction high – above national average</li> <li>Continue efforts to improve in all areas of trainee education</li> </ul>	In progress
BLISS Survey of Parental Experiences 2010 - 2011	Completed	No new presentation last year.		<ul style="list-style-type: none"> <li>TMBU scored in most areas above national average and in 5/7 areas above national average for similar units.</li> <li>TMBU was never lower than national average in any area</li> <li>Facilitate unit visits before delivery</li> <li>Provide written/visual information about TMBU before birth</li> <li>Provide written/visual network information about preterm birth</li> </ul>	Completed Completed Completed
<b>National Programmes &amp; Projects</b>					
Neonatal Hearing Screening	Continuous	No, reported separately by Audiology		<ul style="list-style-type: none"> <li>Compliant with national requirements</li> </ul>	
Neurodevelopmental Outcome	Continuous	No, reported separately in departmental annual report		<ul style="list-style-type: none"> <li>Follow-up continued for preterm infants &lt; 29 weeks gestation:               <ul style="list-style-type: none"> <li>Schedule of Growing Skills at 12 months CGA</li> <li>Bayley III Developmental Assessment at 24 moths CGA</li> </ul> </li> </ul>	

				<ul style="list-style-type: none"> <li>Term newborns after cooling treatment: <ul style="list-style-type: none"> <li>Bayley III Developmental Assessment at 24 moths CGA</li> </ul> </li> </ul>	
Neonatal Transport Service	Continuous	No, reported separately in departmental annual report		<ul style="list-style-type: none"> <li>Since September 2009 a 24/7 regional neonatal transport service in place, shared between the teams from Surrey, Kent and Sussex</li> <li>Develop standard electronic activity database</li> <li>Develop standard risk reporting system for KSS</li> <li>Develop standard national incident reporting system</li> </ul>	Completed Completed Completed
National HIV and Syphilis Surveillance	Continuous	No, reported separately by GUM		<ul style="list-style-type: none"> <li>Top antenatal screening centre in the UK</li> </ul>	
<b>Trust Identified Projects</b>					
Perinatal Mortality & Morbidity Meeting	Ongoing	Yes, Circulated via e-mail + discussed at senior staff meeting	Monthly	<ul style="list-style-type: none"> <li>Joint mortality and morbidity meeting with Obstetrics &amp; Gynaecology</li> <li>Format under review</li> </ul>	In progress
Neonatal Mortality & Morbidity Review	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting	Quarterly	<ul style="list-style-type: none"> <li>Presentation at Neonatal Clinical Governance Meeting</li> <li>Summary report available in departmental annual report</li> </ul>	
Audit of Blood Cultures (Microbiology)	Ongoing	No, circulated via e-mail +		<ul style="list-style-type: none"> <li>6 monthly review not continued</li> </ul>	

		discussed at senior staff meeting		<p>due to Microbiology staffing issues</p> <ul style="list-style-type: none"> <li>• Resume regular reviews</li> <li>• More detailed audit of available data</li> <li>• Audit of new infection prevention measures</li> </ul>	<p>In progress</p> <p>In progress</p> <p>In progress</p>
Audit: Infection Control	Ongoing	No, circulated via intranet infection control dashboard		<ul style="list-style-type: none"> <li>• Very good compliance generally including hand hygiene and care bundles</li> <li>• Documentation needs improvement</li> </ul>	In progress
The Safety Thermometer	Ongoing	No, awaiting report		<ul style="list-style-type: none"> <li>• National audit on nursing safety metrics, e.g. catheter care and pressure sores</li> </ul>	
Review of Risks, Incidents, Complaints & Claims	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• Medication errors still featuring high, but static</li> <li>• No major incidents otherwise</li> <li>• Review risk panel structure and risk review process</li> <li>• Explore new ways of improving medication errors and communication</li> </ul>	<p>Completed</p> <p>In progress</p>
Survey: Parent Satisfaction	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• Bespoke wireless real-time feedback system discontinued in 2018</li> <li>• Develop Google Survey</li> </ul>	In progress
<b>Specialty Identified Projects</b>					

Audits					
Maternal Factors Influencing Neonatal Blood Pressure	Completed	Yes, circulated via e-mail + discussed at senior staff meeting	May 2019	<ul style="list-style-type: none"> <li>Some evidence of correlation between certain maternal factors</li> <li>Ambiguity in published literature</li> </ul>	
KSS Audit On Implementing DCC	Completed	Yes, circulated via e-mail + discussed at senior staff meeting	May 2019	<ul style="list-style-type: none"> <li>PDSA cycle has proven beneficial for the implementation, practice and recording of UCM</li> <li>Inclusive educational sessions with obstetric, neonatal and paediatric teams allowed for a dynamic process where perceived barriers to UCM could be dealt with when they arose.</li> <li>This, combined with regular reminders, have led to a change in practice locally, and a willingness to engage with UCM in the wider Neonatal Network</li> </ul>	
Changes In Alcohol Consumption In Response To Pregnancy	Completed	Yes, circulated via e-mail + discussed at senior staff meeting	May 2019	<ul style="list-style-type: none"> <li>Most women understand the important health messages around alcohol and pregnancy</li> <li>5% who realise change their alcohol intake late, 3.5% continue to drink</li> <li>Between 3.5% and 5% are at risk from FASD</li> <li>Diagnosis of PAE is difficult – novel technologies are being explored such as Software-</li> </ul>	

				Assisted 3D Photographic Analysis of Face-Morphology and Sonographic Analysis of Corpus Callosum Morphology	
Guidelines/Policies					
Patent Ductus Arteriosus Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• New</li> <li>• In response to varying practices affecting overall management</li> </ul>	Completed
LISA Procedure	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• New</li> <li>• In light of evolving practice</li> </ul>	Completed
Blood Culture and Cannulation Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• New</li> <li>• In response to varying practices affecting overall management</li> </ul>	Completed
<b>NIPE Referral Guideline for Midwives and Junior Neonatal Staff Guideline</b>	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• New</li> <li>• In response to varying practices affecting overall management</li> </ul>	Completed
Enteral Nutrition Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• Update</li> <li>• In response to varying practices affecting overall management</li> </ul>	Completed
Non Invasive Respiratory	Completed	Yes, circulated		<ul style="list-style-type: none"> <li>• Update</li> </ul>	Completed

Support Guideline		via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>In response to varying practices affecting overall management</li> </ul>	
Thyroid Disorder Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>Update</li> <li>In response to varying practices affecting overall management</li> </ul>	Completed
Insertion and Care of PICC Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>Update</li> <li>In response to varying practices affecting overall management</li> </ul>	Completed
CMV Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>Update</li> <li>In response to varying practices affecting overall management</li> </ul>	Completed
HBV Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>Update</li> <li>In response to varying practices affecting overall management</li> </ul>	Completed
Red Cell Guideline	In progress	No		<ul style="list-style-type: none"> <li>Currently under review</li> </ul>	In progress
HSV and VZV Guideline	In progress	No		<ul style="list-style-type: none"> <li>Currently under review</li> </ul>	In progress
Other					
Management of Preterm Infants at the Edge of Viability	In progress	Yes, circulated via e-mail + discussed at senior joint staff meeting		<ul style="list-style-type: none"> <li>Plans to improve management through joint efforts with O&amp;G Department – guideline development, parent information and documentation</li> </ul>	In progress

		with O&G Department			
Neonatal Music Project	In progress	Yes, circulated via e-mail + discussed at senior staff meeting		<ul style="list-style-type: none"> <li>• Music and sounds seem to have positive effect on babies, parents and staff</li> <li>• Research evidence in this area is evolving</li> <li>• Agreed to trial some regular exposure to music on the unit</li> </ul>	In progress



## Appendix 4

### List of Publications 2019

JS Soul, R Pressler, M Allen, G Boylan, H Rabe, R Portman, P Hardy, S Zohar, B Tseng, V Bhatt-Mehta, C Hahn, S Denne, S Auvin, A Vinks, J Lantos, N Marlow, JM Davis, for the International Neonatal Consortium. Recommendations for the Design of Therapeutic Trials for Neonatal Seizures. *Pediatr Res* 2019. 85:943–954; <https://doi.org/10.1038/s41390-018-0242-2> Review. PMID: 30584262

Rabe H. Packed red cell transfusion changes cerebral oxygenation and cardiac output. *Pediatr Res* 2019 May;85(6):748-749. doi: 10.1038/s41390-019-0294-y.

Anton O, Jordan H, Rabe H. Strategies for implementing placental transfusion at birth: A systematic review. *Birth* 2019 Sep;46(3):411-427. doi: 10.1111/birt.12398. [Epub ahead of print] Review

Mills M, Pelling V, Harris L, Smith J, Aiton N, Rabe H, Fernandez R. Comparison of MRI and Cranial Ultrasound 1- and 2-Dimensional Morphological Measurements of the Newborn Corpus Callosum. *Pediatr Res* 2019; Apr 9. doi: 10.1038/s41390-019-0386-8. [Epub ahead of print]

Rabe H, Gyte G, Diaz-Rossello JL, Duley L. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database of Systematic Reviews* 2019 (in print)  
DOI:10.1002/14651858.CD003248.pub4

Bravo MC, López-Ortego P, Sánchez L, Madero R, Cabañas F, Koch A, Rabe H, Rojas-Anaya H, Pellicer A on behalf of NeoCirculation Consortium.(NEO-CIRC). Validity of biomarkers of early circulatory impairment to predict outcome: A retrospective analysis. Short title: Biomarkers of early circulatory impairment and outcome. *Frontiers Paediatrics* 2019; May 29;7:212. doi: 10.3389/fped.2019.00212. eCollection 2019.

Amess P, Rabe H, Wertheim D. Visual assessment of heart rate variability patterns associated with neonatal infection in preterm infants. *Early Hum Dev* 2019; Volume 134, July 2019, Pages 31-33 doi.org/10.1016/j.earlhumdev.2019.05.017

Göpel W, Müller M, Rabe H, Borgmann J, Rausch TK, Faust K, Kribs A, Dötsch J, Ellinghaus D, Härtel C, Roll C, Szabo M, Nürnberg P, Franke A, König IR, Turner M, Herting E. A genetic background of high blood pressure is associated with reduced mortality in premature neonates. *Arch Dis Child Fetal Neonatal Ed* 2019; Jun 14. pii: fetalneonatal-2019-317131. doi: 10.1136/archdischild-2019-317131. [Epub ahead of print]

Aviles-Espinosa R, Rendon-Morales E, Luo Z, Dore H, Anton O, Rabe H, Prance RJ. Neo-SENSE: A non-invasive smart sensing mattress for cardiac monitoring of babies (Conference Paper). SAS 2019 - 2019 IEEE Sensors Applications Symposium, Conference Proceedings 3 May 2019, Article number 870597114th IEEE Sensors Applications Symposium, SAS 2019; Sophia Antipolis; France; 11 March 2019 through 13 March 2019; Category number CFP19SAS-ART; Code 147860

Anton O, Fernandez R, Rendon-Morales E, Aviles-Espinosa R, Jordan H, Rabe H. Heart rate monitoring in newborn babies: a systematic review. *Neonatology* 2019;116(3):199-210. doi: 10.1159/000499675. [Epub ahead of print]

Kirupakan K, de Souza P, Le Roux C, Rabe H, Patel B. Evaluation of the causal effects between dopamine infusion changeover and fluctuations in mean arterial pressure in neonates. *Arch Dis Child Ed* 2019; 0: p. archdischild-2019-317123v-archdischild-2019-317123

Rabe H, Andersson O. Maternal and infant outcomes after different modes of cord management. *JAMA* 2019; 322:1864-65 doi: 10.1001/jama.2019.16003

Dempsey G, Rabe H. The Use of Cardiotonic Drugs in Neonates. Review. *Clinics in Perinatology* 2019; Jun;46(2):273-290. doi: 10.1016/j.clp.2019.02.010. Epub 2019 Mar 30. Review.

Rabe H, Gyte GM, Diaz Rosselo JL, Duley L. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database Syst Rev*. 2019 Sep 17;9:CD003248. doi: 10.1002/14651858.CD003248.pub4

Seaton SE, Barker L, Draper ES, Abrams KR, Modi N, Manktelow BN; UK Neonatal Collaborative. Estimating neonatal length of stay for babies born very preterm. *Arch Dis Child Fetal Neonatal Ed*. 2019 Mar;104(2):F182-F186. doi: 10.1136/archdischild-2017-314405. Epub 2018 Mar 27