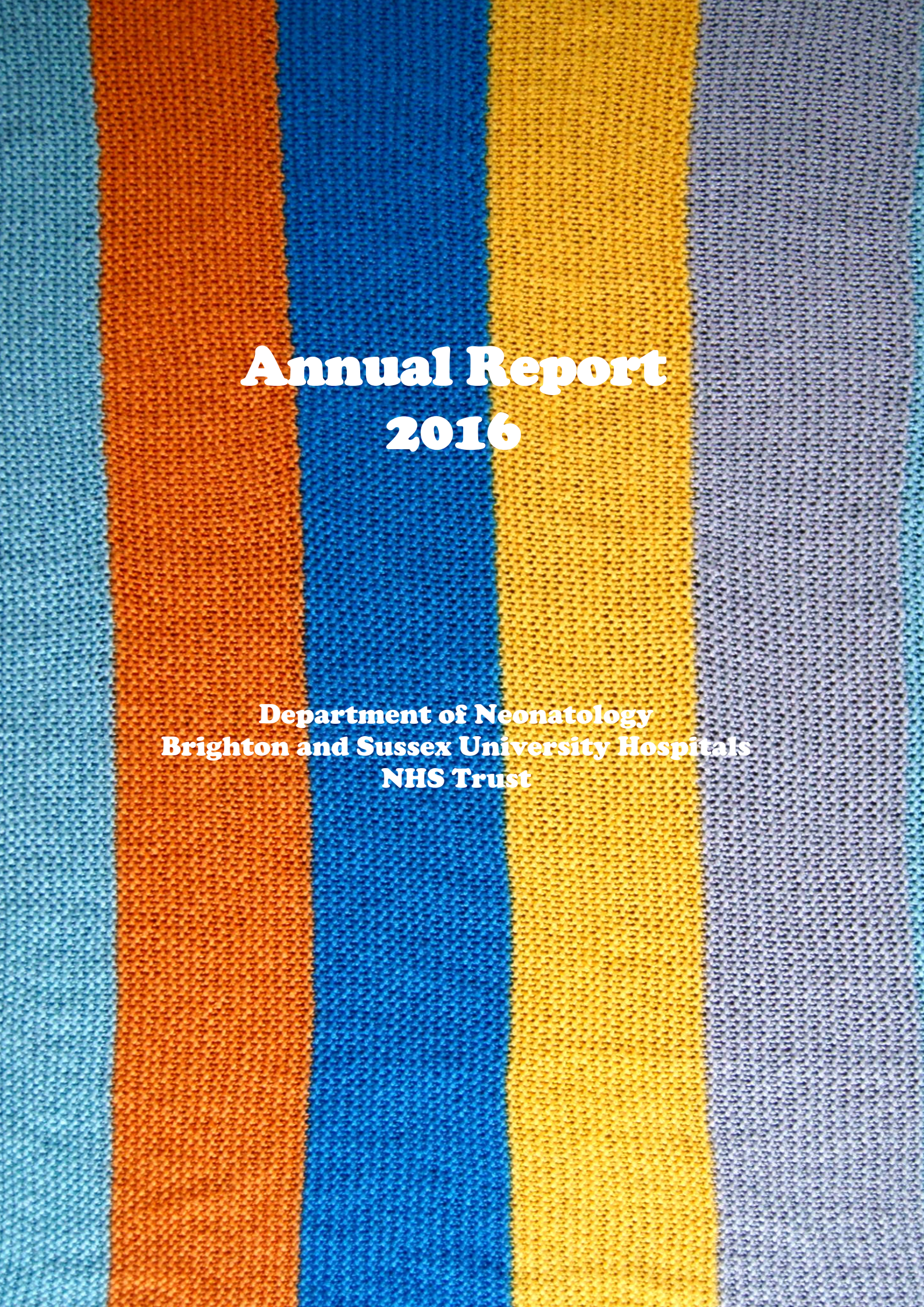

Annual Report
2016
Department of Neonatology
Brighton and Sussex University Hospitals
NHS Trust

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

Thank you to all those who give their time and take such care to knit blankets, hats and clothes and make incubator and cot covers for our babies. Your efforts are greatly appreciated.
The blanket on the front cover was knitted by a mum to replace a very special blanket given to her by the transport team following the transfer of her baby to London.

Abbreviations	
AABR	Auditory Acoustic Brainstem Responses
ANNP	Advanced Neonatal Nurse Practitioner
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
DEBM	Donor expressed breast milk
EBA	Early Birth Association
ETT	Endotracheal tube
FTE	Full time equivalent
GA	Gestational age
HD	High dependency
HHFNC	Humidified High Flow Nasal Cannula
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
N/K	Not Known
NNU	Neonatal Unit
OAE	Otoacoustic emissions
PDA	Patent Ductus Arteriosus
PM	Post Mortem
PPHN	Persistent Pulmonary Hypertension
PRH	Princess Royal Hospital
PROM	Premature Rupture of Membranes
RACH	Royal Alexandra Children's Hospital
RDS	Respiratory Distress Syndrome
ROP	Retinopathy of Prematurity
RSCH	Royal Sussex County Hospital
SC	Special Care
SCBU	Special Care Baby Unit
TOF	Tracheo-Oesophageal Fistula
TMBU	Trevor Mann Baby Unit
VRE	Vancomycin Resistant Enterococcus

Data used to compile this report has been collected from BadgerNet.
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 2016, there were 3,380 deliveries at the Royal Sussex County Hospital and 2,443 deliveries at the Princess Royal Hospital.

The Trevor Mann Baby Unit, Brighton:
The TMBU is one of three 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 and provides 24/7 cover alongside similar services in Kent and Surrey. We have a team of drivers, our own ambulance, and provide a dedicated consultant for the service during daytime hours.

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 wards 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 expansion of 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 ANNPs, supported by consultant neonatologists. Women likely to deliver at less than 34 weeks gestation or whose baby is likely to require high dependency or intensive 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.

Neonatal Surgery:
There is a high risk pregnancy unit for fetal assessment and fetal medicine, and referrals are accepted for perinatal care prior to neonatal surgery. There is a monthly antenatal surgical clinic. All neonatal surgery is performed on site at the RACH 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 and a breast feeding advisor and maternity counselor. The Respiratory and Community Paediatric Nursing Team 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 babies of mothers with problems of substance misuse.

Staffing

Medical Staff

Consultant Neonatologists:

Dr Neil Aiton	Interest in Cardiology, One Stop Clinic
Dr Philip Amess	Lead Clinician, interest in developmental outcome
Dr Prashanth Bhat	Interest in neonatal ventilation and IT
Dr Robert Bomont	Paediatric College Tutor, Training Programme Director
Dr Ramon Fernandez	Lead for Clinical Governance, interest in nutrition
Dr Cathy Garland	Transport Consultant, 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	Honorary Clinical Senior Lecturer, Clinical Director Children's Services.
Dr Nikolay Drenchev	Locum Consultant

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

Consultant Ophthalmologist: Mr Dominic Heath, Miss Victoria Barrett

Consultant Audiologist: Mr Rob Low

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

Consultant Obstetricians:
Mr Salah Abdu
Mr Tosin Ajala
Mr Rob Bradley
Miss Heather Brown
Mr Ani Gayen
Mr Greg Kalu
Mr Ehab Kelada
Mr Tony Kelly
Mr Onome Ogueh
Miss Jo Sinclair
Mr David Utting

Consultant Paediatric Surgeons:
Miss Ruth Hallows
Mr Varadarajan Kalidasan
Miss Anouk van der Avoirt
Mr Bommaya Narayanaswamy
Mr Saravanakumar Paramalingam
Mr Nicholas Alexander (locum)

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

Mr Simon Watts, Mr Prodip Das (ENT)

Visiting Consultants:

Dr Owen Miller	Cardiology
Dr Kuberan Pushparajah	Cardiology
Dr Shelagh Mohammed	Genetics
Dr Chris Reid	Nephrology
Dr Tammy Hedderly	Neurology

Junior and Middle Grades Medical Staff:

Tier 2:	Associate Specialist (Dr Michael Samaan) Specialist Doctor (Dr Fatou Wadda) 4 Specialist Registrars 2 Trust Clinical Fellows / 2 ANNPs
Tier 1:	6 ST3, 2 Trust Clinical Fellows

Neonatal Nurses

Senior Nursing Staff

Lorraine Tinker	Head of Paediatrics and Neonatal Nursing
Clare Morfoot	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 Lead)
Chrissie Leach (Transport lead)
Jackie Cherry
Sandra Hobbs
Karen Marchant
Judith Simpson
Judy Edwards (Neonatal Community team lead)

Advanced Neonatal Nurse Practitioners

Jamie Blades
Maggie Bloom
Dee Casselden
Naomi Decap
Karen Hoover
Caroline McFerran
Simone van Eijck
Nicola McCarthy
Lisa Kaiser
Sandra Summers
Jonathan O'Keeffe

Outreach Team:

Judy Edwards
Sarah Arief

Support Staff

Unit Technician:	John Caisley
Pharmacist:	Bhumik Patel
Speech and Language Therapist:	Amanda Harvey
Physiotherapy:	Melanie Smith
Dietician:	Carole Davidson
Counsellor:	Peter Wells
Secretarial support:	Jane Battersby, Emma Morris, Patricia Walker

Admissions, Activity and Mortality
Trevor Mann Baby Unit

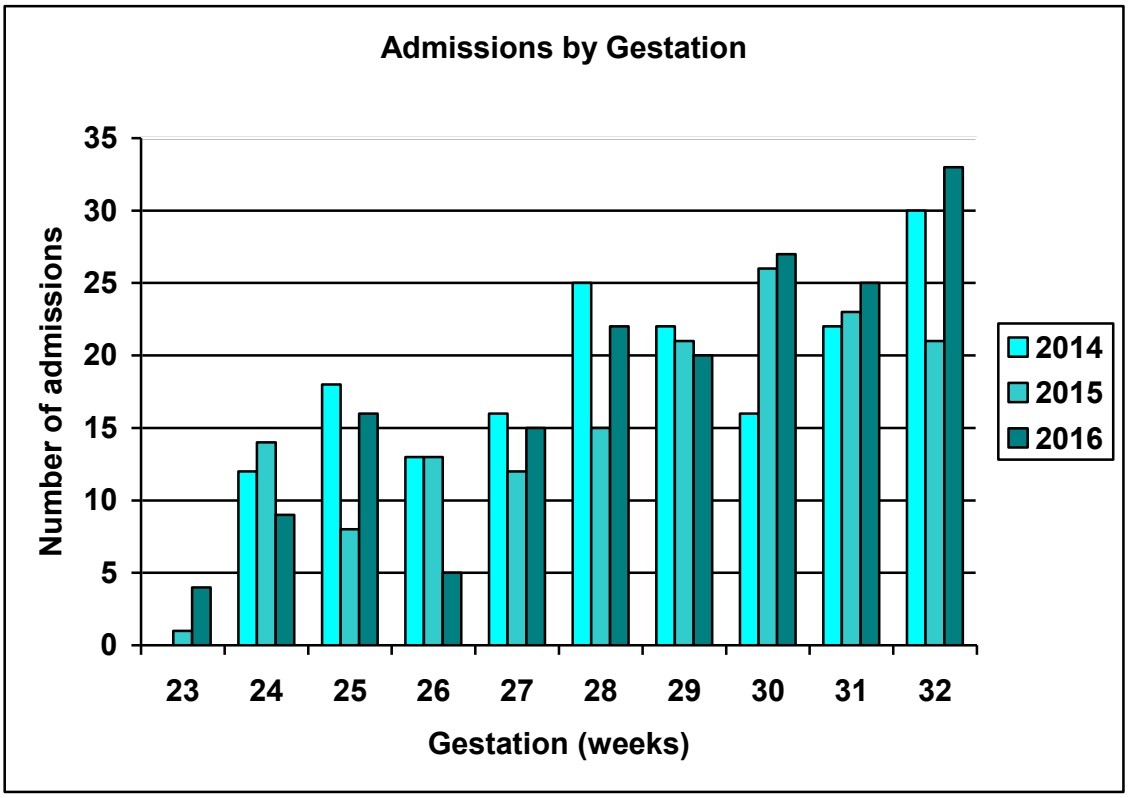
TMBU Admissions	Total Admissions per year
2005	444
2006	415
2007	465
2008	524
2009	456
2010	525
2011	562
2012	567
2013	528
2014	516
2015	534
2016	**524**

Includes re-admissions

TMBU Admissions	2014	2015	2016
Total number of live births (RSCH)	3400	3415	**3380**
Total admissions (including re-admissions)	516	534	**524**
Inborn	350	357	**356**
Inborn booked RSCH	292	272	**254**
Inborn booked elsewhere	58	75	**102**
Outborn	146	146	**141**
Re-admissions	20	30	**21**
Admissions from home	4	1	**6**
Percentage inborn births admitted to TMBU	10	10	**10**

Admission details	2014		2015		2016	
Gestation (weeks)	**Babies**	**%**	**Babies**	%	**Babies**	%
23	0	*0*	1	*<1*	**4**	*1*
24	12	*2*	14	*3*	**9**	*2*
25	18	*4*	8	*1.5*	**16**	*3*
26	13	*3*	13	*2.5*	**5**	*1*
27	16	*4*	12	*2*	**15**	*3*
28	25	*5*	15	*3*	**22**	*4*
29	22	*4*	21	*4*	**20**	*4*
30	16	*3*	26	*5*	**27**	*5*
31	22	*4*	23	*4.5*	**25**	*5*
32	30	*6*	21	*4*	**33**	*6.5*
33-36	144	29	137	27	**144**	*29*
37-41	172	35	205	41	**180**	*36*
>42	6	1	8	1.5	**3**	*<1*
Birth weight (g)						
<500	4	1	2	<1	**2**	*<1*
<750	22	4	19	4	**30**	*6*
<1000	35	7	24	5	**20**	*4*
<1500	65	13	66	13	**62**	*12*
Multiple pregnancies (number of babies)						
Twins	90	23	101	20	**85**	*17*
Triplets	9	2	0	0	**3**	*<1*

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

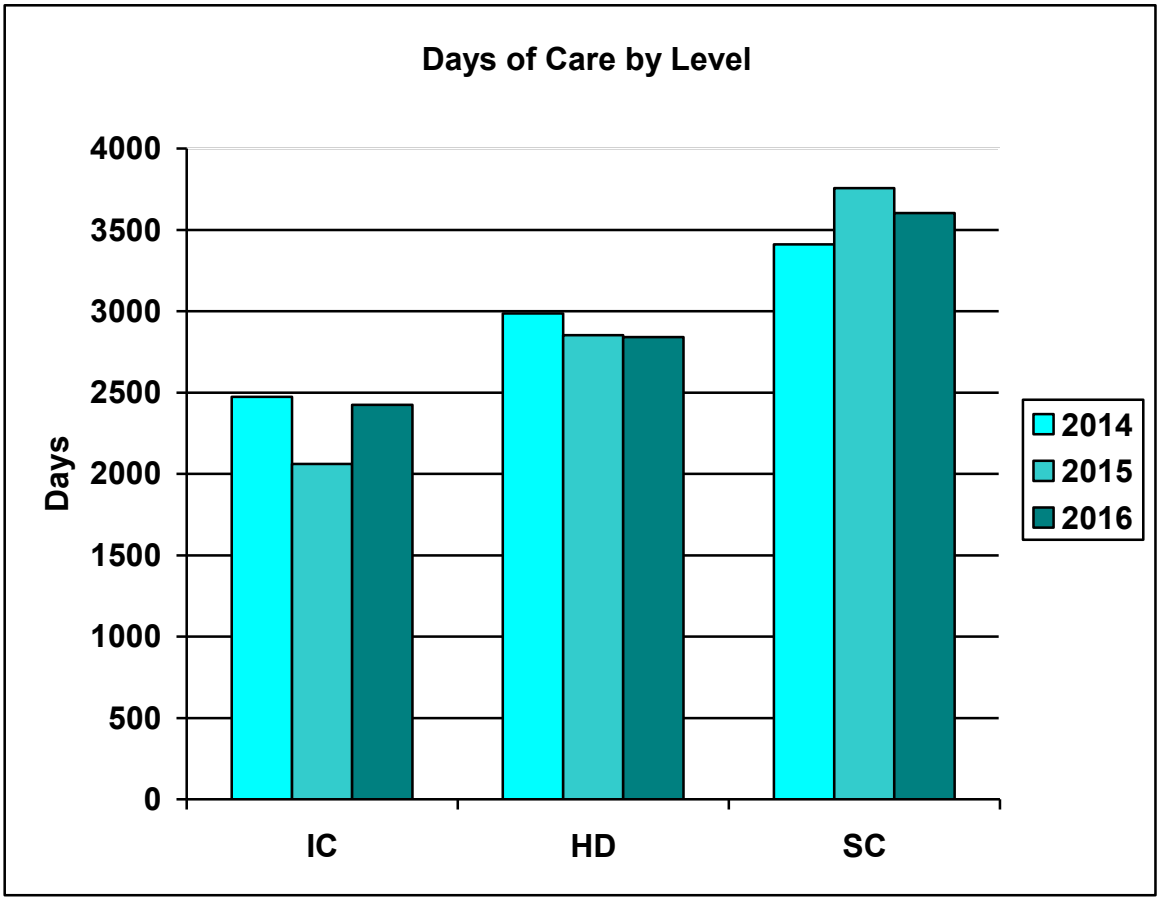


Transfers in	2014	2015	2016
In-Utero			
Babies delivered and admitted	59	75	102
Refused in-utero transfers	77	73	87
Ex-Utero	146	146	141
Princess Royal Hospital	31	31	31
East Sussex Hospitals	37	39	32
West Sussex Hospitals	18	21	16
Other Network Hospitals	24	43	36
Outside Network	30	34	26
Refused ex-utero transfers	17	11	19

Does not include re-admissions or home births

Cot occupancy	2014		2015		2016	
Cots	Days	*% occ*	Days	*% occ*	Days	*% occ*
IC	2474	*75*	2061	*63*	**2424**	***74***
HD	2987	*102*	2853	*98*	**2840**	***97***
IC & HD (total)	5461	*88*	4914	*79*	**5264**	***85***
SC	3410	*93*	3756	*103*	**3603**	***99***
Total	8871	*90*	8670	*88*	**8867**	***90***
Transitional Care	-		-		**1334**	

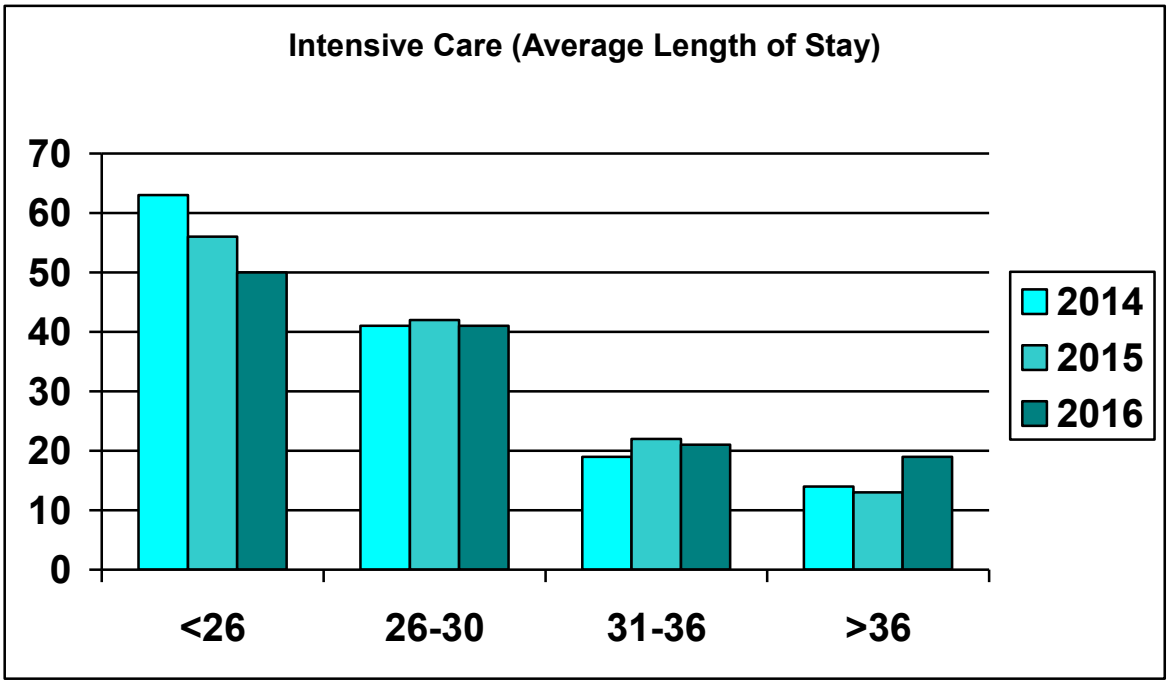
2001 BAPM definition for care levels in 2014
2011 BAPM definition for care levels in 2015/16



TMBU Care Categories 2016						
Gestation at birth (weeks)	IC		HD		SC only	
	Babies	Days	Babies	Days	Babies	Days (total days)
< 23						
23	**3**	41	4	118	-	
24	**7**	100	4	133	-	
25	**16**	441	12	310	-	
26	**5**	77	4	146	-	
27	**15**	314	15	323	-	
28	**19**	288	22	322	-	
29	**19**	220	18	177	-	
30	**15**	85	23	97	2	9
31	**10**	47	22	137	-	
32	**15**	46	29	108	2	16
33-36	**41**	155	81	331	54	521
37-41	**65**	315	93	345	59	234
>41	**3**	12	2	13	-	-

2011 BAPM definition for care levels **– based on 2016 admissions**

Average length of stay by gestation			
Gestation	2014	2015	2016
	IC days		
<26	63	56	**50**
26-30	41	42	**41**
31-36	19	22	**21**
>36	14	13	**19**
	HDU days		
<26	37	33	**54**
26-30	20	21	**17**
31-36	16	16	**15**
>36	7	9	**8**



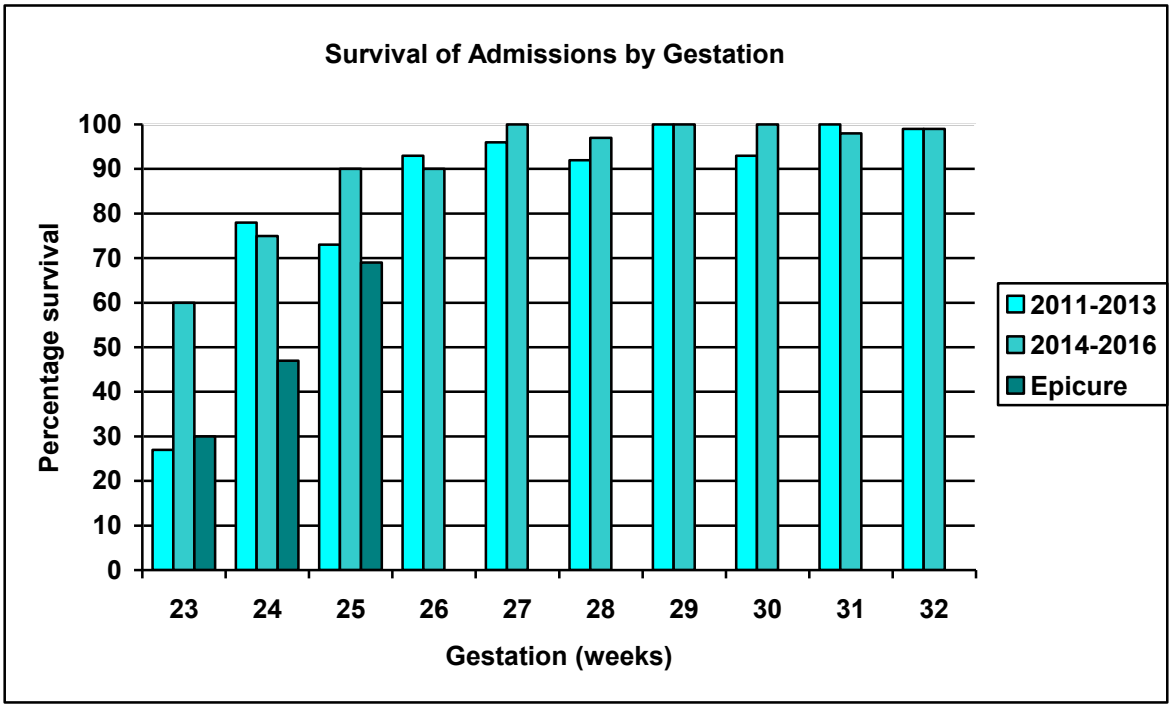
Transfers out	2014	2015	2016
Specialist medical care	5	4	**18**
Cardiac care	9	13	**6** (1 ECMO)
Discharges			
Home/Foster care	155	177	**201**
Postnatal ward	133	120	**105**
Local hospital care	193	192	**183**
Princess Royal Hospital	67	68	**61**
RACH	27	20	**16**
East Sussex Hospitals	45	39	**34**
West Sussex Hospitals	21	23	**16**
Other KSS Network Hospitals	23	21	**24**
Other Hospitals Outside KSS Network	5	21	**31**
Delayed transfer out to local care (days)	95	145	**N/K**

Survival of all inborn live births by gestation 2016								
GA	Live births	Admitted to TMBU*	Died before admission	Died <7d	Died 7-28d	Died >28d	Total deaths	Admissions surviving to discharge
23	4	**4**				1		**3**
24	3	**3**		1				**2**
25	12	**12**						**12**
26	3	**3**				1		**2**
27	9	**9**						**9**
28	10	**10**						**10**
29	17	**17**				1		**16**
30	21	**21**						**21**
31	16	**16**						**16**
32	29	**29**						**29**
33-36	216	**107**						**107**
37-42	2942	**127**						**127**
>42	20	**0**						**-**
Total	**3302**	**358**		**1**		**3**		**354**

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

TMBU, 3 year rolling survival to discharge for extreme preterm admissions							
	2014		2015		2016		
GA	Admitted	Died	Admitted	Died	Admitted	Died	Survival to discharge %
23	0	0	1	1	**4**	**1**	**60%**
24	12	2	14	5	**9**	**2**	**75%**
25	18	2	8	1	**16**	**1**	**90%**
26	13	2	13	0	**5**	**1**	**90%**
27	16	0	12	0	**15**	**0**	**100%**

Includes inborn and ex-utero transfers



Mortality Statistics (RSCH)	2011	2012	2013	2014	2015	2016
Total deliveries	3721	3582	3303	3410	3428	**3390**
Total livebirths	3695	3569	3292	3400	3415	**3380**
Total stillbirths	26	13	11	10	12	**10**
Deaths before admission*	4	0	0	2	2	**0**
Total neonatal deaths	22	23	19	14	11	**9**
Inborn	13	17	11	11	6	**4**
Outborn	9	6	8	3	5	**5**
Early neonatal deaths**	10	8	5	3	1	**1**
Late neonatal deaths**	2	4	5	3	2	**0**
Deaths >28 days**	1	5	0	1	3	**3**
Still birth rate	7.0	3.6	3.3	2.9	3.5	**2.9**
Perinatal mortality rate	10.7	5.9	4.8	4.4	4.4	**3.2**
Neonatal mortality rate**	3.2	3.4	3.0	1.8	0.9	**0.3**
Mortality Statistics (BSUH = RSCH + PRH)	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Total deliveries	6162	6057	5841	5851	5915	**5838**
Total livebirths	6126	6035	5828	5729	5892	**5823**
Total stillbirths	36	22	13	22	22	**15**
Deaths before admission*	4	0	0	1	2	**0**
Early neonatal deaths**	11	8	6	5	1	**1**
Late neonatal deaths**	2	4	5	4	3	**0**
Deaths >28 days**	1	5	0	1	3	**3**
Still birth rate	5.8	3.6	2.2	3.8	3.7	**2.6**
Perinatal mortality rate	8.3	5.0	3.3	4.6	3.9	**2.7**
Neonatal mortality rate**	2.8	2.0	1.9	1.7	0.8	**0.2**

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

*****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 Clinical Governance Meetings and when appropriate at joint meetings with other baby units. Deaths are reported to the neonatal MBRRACE-UK database and are individually reviewed at the Sussex, Child Death Overview Panel.

TMBU deaths (inborn and ex-utero transfers) 2016					
Delivered	**GA**	**BW**	**Age d**	**PM**	**Cause of death, related factors**
Deaths related to prematurity					
RSCH	23	614	63	No	Grade 4 IVH
Worthing	24	545	9	No	Severe lung disease, preterm rupture of membranes at 20 weeks gestation
RSCH	29	1180	32	No	Severe lung disease, preterm rupture of membranes at 17 weeks gestation
Worthing	25	730	6	Yes	Pulmonary interstitial emphysema, chorioamnionitis
RSCH	24	682	1	Yes	Antenatal bilateral hydrothorax
NEC					
RSCH	26	748	42	No	NEC, extreme prematurity
Deaths related to perinatal asphyxia					
Home	40	3400	1	No	Severe HIE, sepsis
Home	31	1761	2	No	Severe HIE, breech presentation
Congenital abnormality					
East Surrey	37	1660	2	Yes	Metabolic disease

Post Mortems	2014	2015	2016
Total deaths	14	13	**9**
Post Mortems performed (% of deaths)	6 (43)	2 (15)	**4(44)**

TMBU, 4 year rolling mortality (all admissions)											
	Total Admissions:					Deaths					Survival to discharge
	2013	2014	2015	2016	Total	2013	2014	2015	2016	Total	(%)
Inborn	362	350	357	356	**1425**	12	11	6	3	**32**	**>99**
Outborn	134	146	146	141	**567**	7	3	7	6	**23**	**96**
<26 weeks	34	30	23	29	**116**	12	4	7	4	**27**	**87**
<28 weeks	57	29	25	20	**131**	0	2	0	1	**3**	**98**
<31 weeks	43	63	62	69	**237**	2	2	0	1	**5**	**98**
31+ weeks	353	374	394	385	**1506**	5	6	5	3	**19**	**99**
<500g	4	4	2	2	**12**	4	0	1	0	**4**	**66**
<750g	27	22	19	30	**98**	10	2	5	5	**22**	**78**
<1000g	43	35	22	20	**120**	0	4	2	0	**6**	**95**
<1500g	66	65	66	62	**259**	2	2	0	1	**5**	**98**
>1500g	354	370	395	389	**1508**	5	6	5	3	**19**	**99**

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

SCBU Admissions	2014	2015	2016
Total number of livebirths	2429	2477	**2443**
Total number of stillbirths	12	10	**5**
Total admissions*	273 (20)	284 (24)	**261 (18)**
Percentage of live births admitted	11%	11%	**11%**

***(re-admissions)**

Admission details	2014		2015		2016	
	Babies	%		%		%
Total admissions	253		260		**243**	
Inborn	189	75	199	70	**167**	**69**
Outborn	64	25	61	21	**75**	**31**
Gestation ( ) = babies born elsewhere and transferred to PRH						
23	0		0		**1**	
24	1		1(1)		**1(1)**	
25	5(3)		0		**2(2)**	
26	2(1)		0		**2(2)**	
27	1(1)		3(3)		**1(1)**	
28	6(5)		2(2)		**4(4)**	
29	5(3)		12(11)		**6(6)**	
30	5(5)		7(4)		**10(10)**	
31	9(7)		4(4)		**7(5)**	
32	13(9)		5(4)		**11(10)**	
33-36	75(20)		86(25)		**91(24)**	
37-42	136(17)		144(21)		**120(9)**	
>42	0		0		**0**	
Birthweight (g) ( ) = babies born elsewhere and transferred back to PRH						
<500	2(1)		0		**0**	
<750	3(1)		0		**4(3)**	
<1000	5(5)		1(1)		**5(5)**	
<1500	20(14)		17(17)		**17(16)**	
Multiple births (number of babies)						
Twins	35		30		**36**	
Triplets	6		0		**3**	

Does not include re-admissions

Transfers	2014	2015	2016
Ex-Utero			
Transfers out to Brighton	24	31	**35**
Transfers out to elsewhere	1	3	**10**
Transfers in from Brighton	46	65	**67**
Transfers in from elsewhere	7	5	**7**
Transfers in from home	6	11	**18**

Cot occupancy	2014		2015		2016	
Cots	**Days**	**% occ**	**Days**	**% occ**	**Days**	**% occ**
IC	144	-	45	-	**21**	
HD	211	-	184	-	**207**	
SC	2018	-	1929	-	**1778**	
Total	**2374**	**81**	**2158**	**74**	**2006**	**69**

Mortality Statistics (PRH)	2013	2014	2015	2016
Total deliveries	2538	2441	2487	**2448**
Total livebirths	2536	2429	2477	**2443**
Total stillbirths	2	12	10	**5**
Early neonatal deaths*	1	2	0	**0**
Late neonatal deaths*	0	1	1	**0**
Post neonatal deaths (>28 days)*	0	0	0	**0**
Still birth rate	0.8	4.9	4.0	**2.0**
Perinatal mortality rate	1.2	5.7	4.0	**2.0**
Neonatal mortality rate*	0.4	1.2	0.4	**0**

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

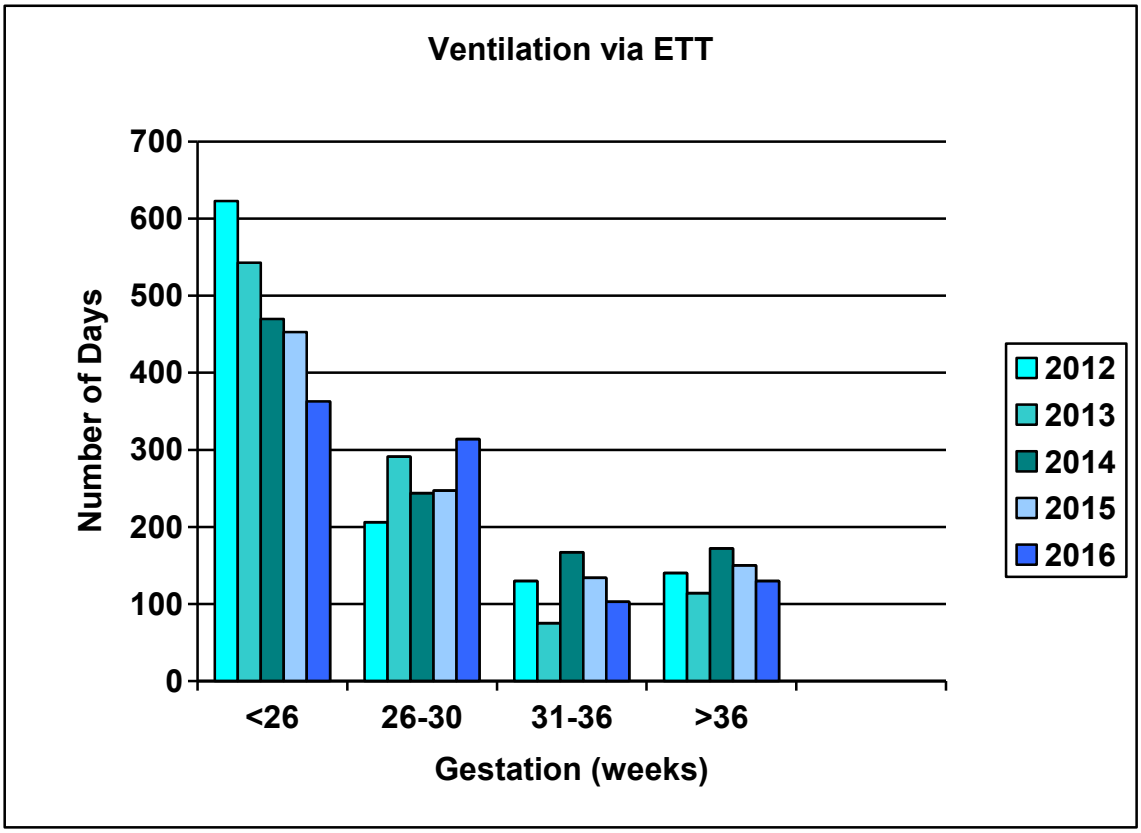
Summary of Clinical Activity
Trevor Mann Baby Unit

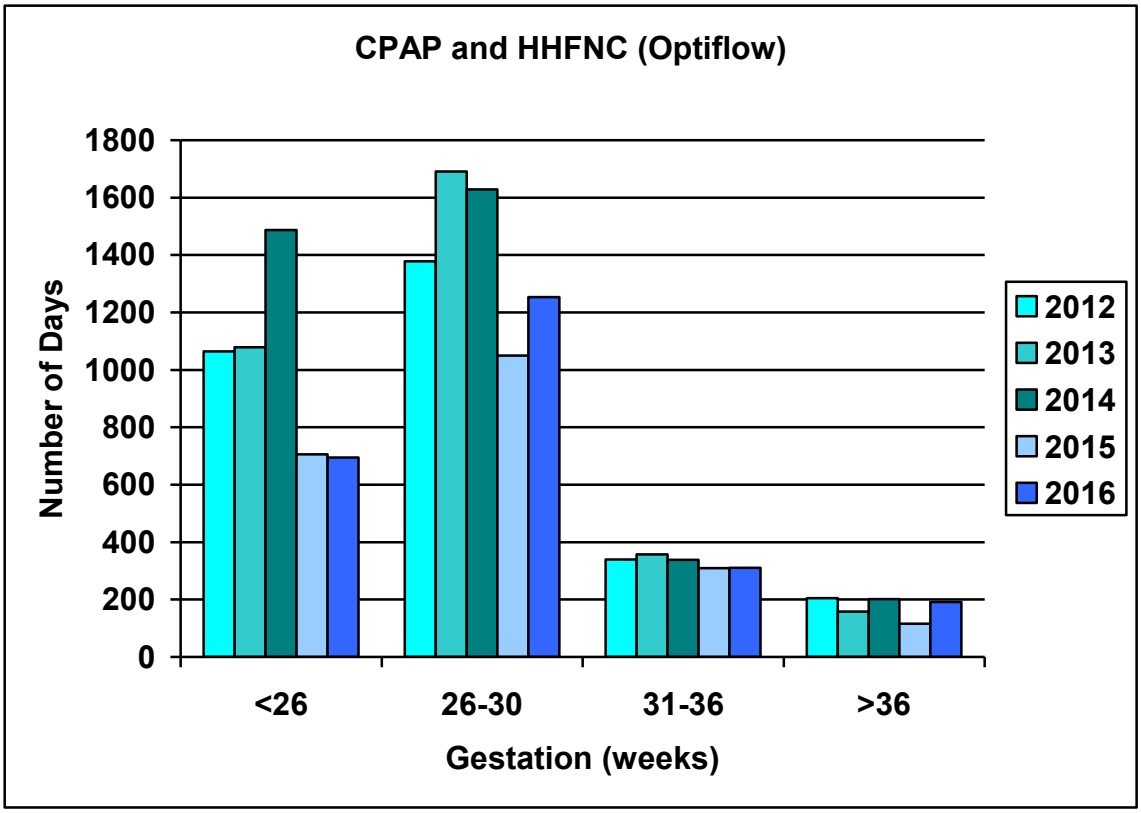
Respiratory Support	2014		2015		2016	
	Days	Babies	Days	Babies	Days	Babies
Ventilation via ETT	1053	158	984	181	**868**	**175**
HFOV	84	28	46	17	**42**	**17**
CPAP	710	125	460	115	**589**	**114**
HHFNC	2201	235	1721	222	**1832**	**280**
Surfactant (doses)		84 (96)		100 (114)		**83 (102)**
Nitric Oxide	102	28	47	17	**86**	**23**

Respiratory diagnoses	Number of Babies		
	2014	2015	2016
Respiratory Distress Syndrome	165	129	**158**
Transient Tachypnoea	19	19	**13**
Signs of respiratory distress of the newborn	182	184	**204**
Persistent Pulmonary Hypertension	19	19	**15**
Meconium aspiration	15	10	**13**
Cystic Fibrosis	3	0	**2**

Respiratory Complications	2014	2015	2016
Pulmonary haemorrhage	11	10	**7**
Pulmonary air leak	27	24	**33**
Oxygen at 36 weeks CA	34	26	**35**
Oxygen at 28 days	63	59	**70**
Discharged with home oxygen	10	7	**8**

Management of PDA	2014	2015	2016
Patent Ductus Arteriosus	46	45	**49**
PDA treated medically	14	16	**17**
PDA ligated	14	5	**6**


Ventilation via ETT
700
600
500
400
300
200
100
0
Number of Days
<26
26-30
31-36
>36
Gestation (weeks)
2012
2013
2014
2015
2016


CPAP and HHFNC (Optiflow)
1800
1600
1400
1200
1000
800
600
400
200
0
Number of Days
<26
26-30
31-36
>36
Gestation (weeks)
2012
2013
2014
2015
2016

Infection	Positive Blood Cultures		
	2014	2015	2016
Group B streptococcus	1	2	3
Non-haemolytic streptococcus	0	1	3
Alpha haemolytic streptococcus	1	0	0
Haemophilus	0	0	0
Coagulase-negative staphylococcus	31	42	31
MSSA	1	2	3
MRSA	0	0	0
Enterococcus faecalis	2	11	6
Listeria	0	0	0
Escherichia coli	5	5	4
Bacillus cereus	5	0	2
Klebsiella species	0	2	2
Serratia species	0	0	0
Enterobacter species	0	2	2
Pseudomonas species	2	1	0
Candida species	3	1	2
Acinetobacter species	0	1	0
Paenibacillus species	0	1	0
Corynebacterium striatum	0	0	1
Diphtheroid	0	0	1
Micrococcus lutens	0	0	1
TOTAL	**51**	**71**	**61**

Necrotising Enterocolitis	2014	2015	2016
NEC confirmed cases (EUT)	6 (3)	19 (9)	14 (5)
NEC suspected cases (EUT)	16	27	15 (8)
Perforated NEC (EUT)	3	7 (4)	6 (3)
NEC treated surgically (EUT)	4	18 (9)	11 (7)

Neonatal Surgical Cases (not NEC)	2014 Cases	2015 Cases	2016 Cases
Gastroschisis	5	7	**4**
Exomphalos	1	3	**2**
Hirschsprungs	3	1	**1**
Malrotation	1	0	**5**
Meconium ileus	3	3	**7**
Gut perforation (not NEC)	2	2	**2**
Oesophageal Atresia / TOF	12	8	**6**
Intestinal atresia/obstruction	1	5	**2**
Inguinal hernia repair	4	5	**6**
Imperforate anus/rectal anomaly	0	3	**0**
Lung cyst/sequestration	1	0	**0**
Diaphragmatic eventration	0	0	**0**
Diaphragmatic hernia	2	0	**1**
TOTAL	**35**	**37**	**36**

Cranial Ultrasound Diagnoses	Number of Babies		
	2014	2015	2016
IVH with parenchymal involvement (EUT)	9 (7)	14 (10)	**8 (4)**
Post haemorrhagic hydrocephalus (requiring surgical intervention)	4 (0)	4 (1)	**5 (0)**
Infarction without IVH	0	2	**2**
Periventricular ischaemic injury with cyst formation (EUT)	2	4	**3 (1)**

All babies <32 weeks gestation have routine cranial ultrasound examinations

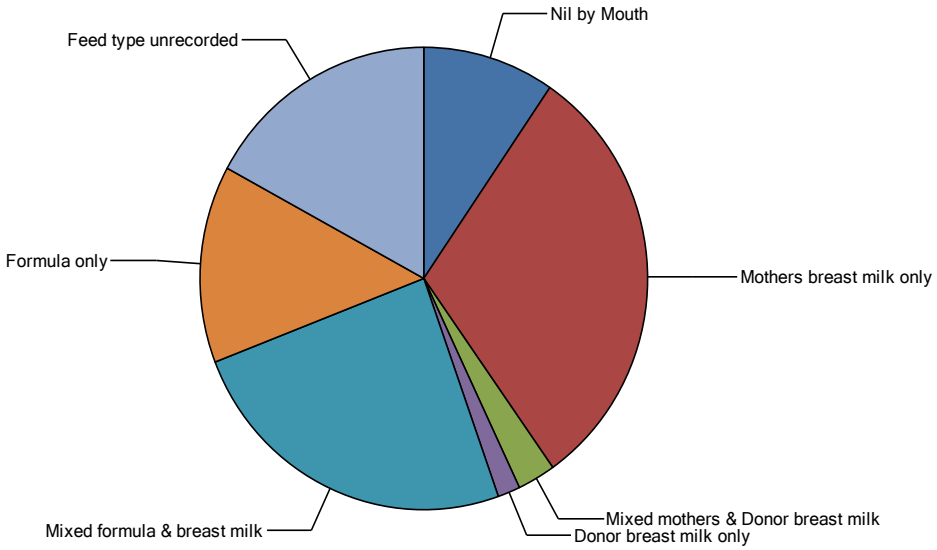
Hypoxic Ischaemic Encephalopathy	2014	2015	2016
HIE grade 1 (EUT)	9	10	**16 (9)**
HIE grade 2 (EUT)	12	18	**15 (12)**
HIE grade 3 (EUT)	4	6	**3 (1)**
Hypothermia therapy	22	28	**23**
- Inborn (BSUH)	9	11	**11**
- Outborn	13	17	**12**

Retinopathy of Prematurity	2014	2015	2016
ROP grades 3/4	5	5	**2**
ROP treated with laser therapy	5	3	**1**

Screening as per recommendations from Royal College of Ophthalmologists

Neonatal Dashboard	2016		
	Eligible	Result	%
Antenatal steroids given (24 – 34 weeks gestation)	171	146	85
Temperature <36 ^{o}C on admission from LW (<32 weeks gestation at birth)	89	8	9
Parent seen within first 24 hours of admission (first admission to TMBU)	333	323	97
TPN commenced by day 2 (<29 weeks gestation, <1000g BW)	50	46	92
ROP screening completed on time (<32 weeks gestation and or <1500g BW)	76	72	95
Breast milk at discharge home (<33 weeks and first admission to TMBU)	51	40	78
Catheter related sepsis	2839 line days	5 +ve BC	1.8 per 1000 line days
Magnesium sulphate	49	26	53

Enteral feeds	Nil by mouth	Mother's breast milk only	Mother's breast milk & donor	Donor breast milk only	Formula & breast milk	Formula only	Feed type not recorded	Total days
TMBU	979	3153	282	166	2518	1418	1754	1 0270
% of all days	9.5	30.7	2.8	1.6	24.5	13.8	17.1	100
National average	6.6	35.2	2.0	1.0	21.3	27.6	6.3	100



Summary of Clinical Incidents

We collect information on clinical incidents using the Trust system. Our trigger list includes:

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

Clinical incidents are reviewed by the Neonatal Risk Panel 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.

Incident Category	2010	2011	2012	2013	2014	2015	2016
Access, admission, transfer, discharge	8	5	0	8	3	1	**4**
Clinical assessment (including diagnosis, scans, tests, assessments)	12	5	2	6	6	21	**22**
Consent, communication, confidentiality	9	8	7	7	12	9	**5**
Documentation (including records, identification)	15	18	9	11	15	30	**19**
Implementation of care and ongoing monitoring / review	4	5	5	12	8	10	**15**
Infection Control Incident	1	1	2	1	4	2	**2**
Infrastructure (including staffing, facilities, environment)	7	4	11	16	16	16	**4**
Medical device / equipment	16	19	9	11	11	15	**10**
Drugs and prescribing	72	80	53	58	59	56	**51**
Patient accident	1	1	0	1	0	1	**2**
Treatment, procedure	28	19	19	12	10	17	**15**
Other Incident	2	5	16	42	31	18	**6**
Total	**175**	**170**	**133**	**185**	**175**	**196**	**155**

Grade	2010	2011	2012	2013	2014	2015	2016
No Harm: Impact Prevented	37	37	20	12	11	21	**14**
No Harm: Impact not Prevented	100	116	108	150	141	153	**122**
Low	35	16	12	18	18	19	**18**
Moderate	3	1	0	5	2	1	**1***
Severe	0	0	0	0	3	0	**0**
Total	**175**	**160**	**140**	**185**	**175**	**192**	**155**

**** Hypoglycaemia (metabolic condition)***

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.

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.

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
- Bayley Scales of Infant Development III (from September 2006 onwards)
- Health Status Questionnaire
- Refer to specialist services as appropriate or discharge if no concerns.

Results for the 24 month check were analysed for 269 Sussex born babies cared for on the TMBU within the first 24 hours of life.

Gestation at birth	23	24	25	26	27	28	>28	Total
Total admitted	22	69	66	68	97	113	11	446
*Survived to discharge	9	31	49	51	83	90	22	335

(*Of the 335 Sussex born babies who survived to discharge, 66 did not receive 24 month Bayley III developmental assessments. Of these 37 were DNA's, 13 families had moved out of area, 6 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 HV.)

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

SGS	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, 269 infants had 24 month developmental assessments completed.

Outcome (%)	23	24	25	26	27	28	>29	Total (%)
Cognitive								
Normal	4	12	20	29	44	63	11	183 (68.0)
Mild	2	5	7	4	12	15	3	48 (17.8)
Moderate	1	4	4	4	5	2	1	21 (7.8)
Severe	0	4	3	3	6	1	0	17 (6.3)
Communication								
Normal	2	10	18	13	29	56	8	136 (50.6)
Mild	3	5	6	18	15	13	5	65 (24.2)
Moderate	1	4	7	4	10	7	2	35 (13.0)
Severe	1	6	3	5	13	5	0	33 (12.2)
Motor								
Normal	3	14	21	19	31	55	11	154 (57.2)
Mild	3	2	7	12	20	15	3	62 (23.0)
Moderate	1	4	3	2	7	7	0	24 (8.9)
Severe	0	5	3	7	9	4	1	29 (10.8)
Combined outcomes								
Normal	2	10	14	9	24	44	8	111 (41.3)
Mild	3	4	8	19	15	24	5	78 (30.0)
Moderate	1	6	8	4	14	5	1	39 (14.5)
Severe	1	5	4	8	14	8	1	41 (15.2)
Total assessed	7	25	34	40	67	81	15	269

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)

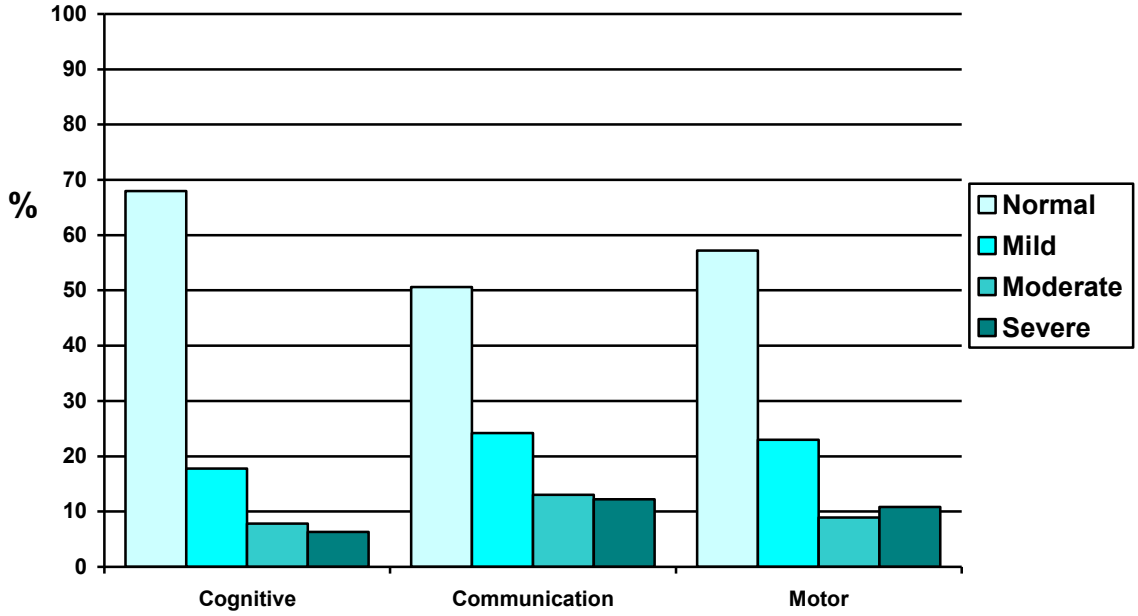
25 and 26 weeks gestation (n=74)

Outcome (%)	Cognitive	Communication	Motor
Normal	49 (66)	31 (42)	40 (54)
Mild impairment	11 (15)	24 (32)	19 (26)
Moderate impairment	8 (11)	11 (15)	5 (7)
Severe disability	6 (8)	8 (11)	10 (13)

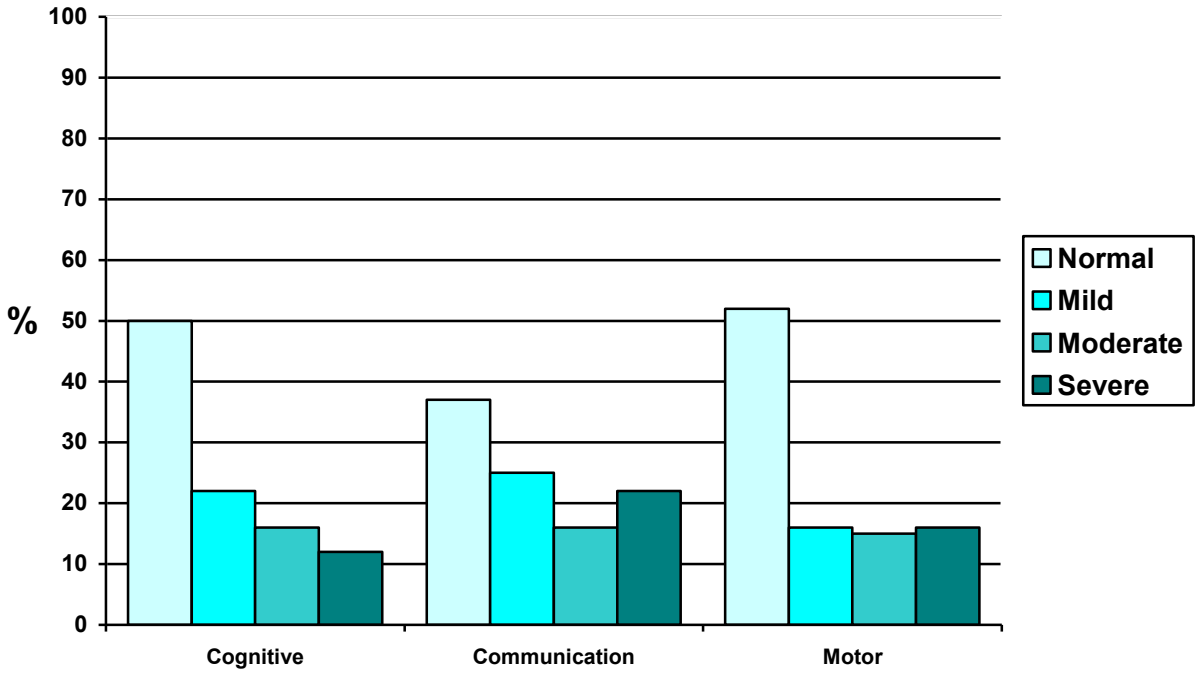
27 weeks gestation and above (n=163)

Outcome (%)	Cognitive	Communication	Motor
Normal	118 (72)	93 (57)	97 (59)
Mild impairment	30 (18)	33 (20)	38 (23)
Moderate impairment	8 (5)	19 (12)	14 (9)
Severe disability	7 (4)	18 (11)	14 (9)

Neurodevelopmental Outcome of Pre-term Infants
<29 wks at 24 months CA
(n = 269)



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



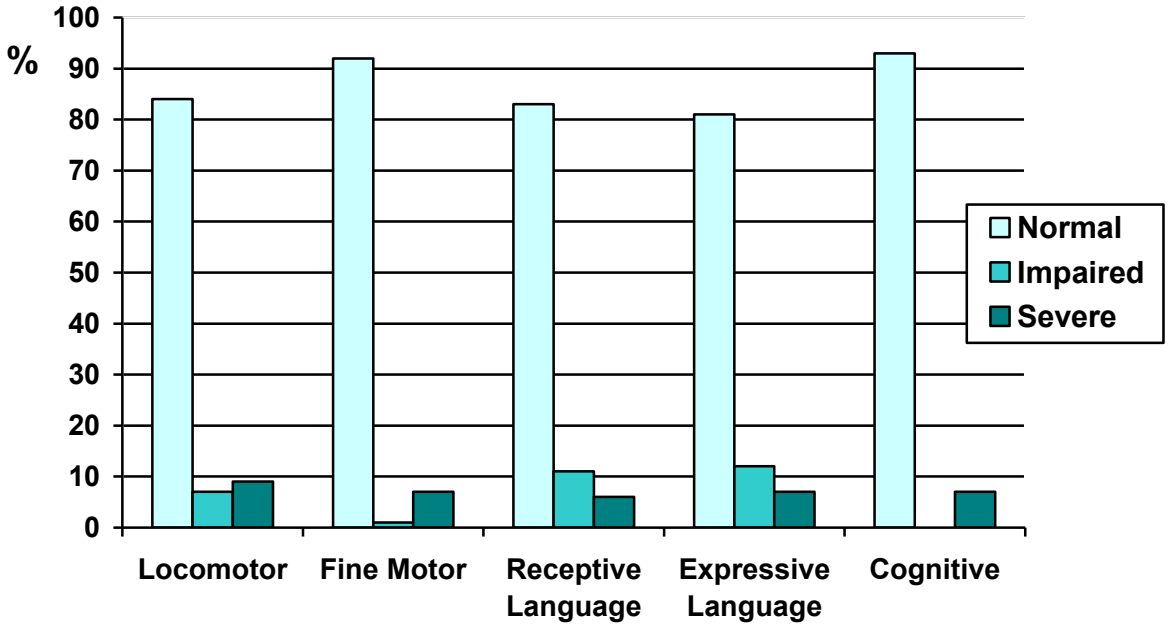
Neurodevelopmental Outcome of Babies with Hypoxic Ischaemic Encephalopathy

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	144
Assessments performed:	82
Died	28
Did Not Attend	13
Out of area (referred for assessment locally)	18

Neurodevelopmental Outcome of Cooled Babies (n=82)

Outcome (%)	Locomotor	Fine Motor	Receptive Language	Expressive Language	Cognitive
Normal	69 (84)	75 (92)	68 (83)	66 (81)	76 (93)
Impaired	6 (7)	1 (1)	9 (11)	10 (12)	0
Severe disability	7 (9)	6 (7)	5 (6)	6 (7)	6 (7)



Transport

The Sussex Neonatal Transport Service, together with similar services in Kent and Surrey, provides 24 hour cover across the KSS Neonatal Network.

Transports Undertaken	Referring Network			Grand Total
	Kent	Surrey	Sussex	
Intensive Care	195	116	85	396
High Dependency Care	67	65	59	191
Special Care	162	95	162	419
Grand Total	424	276	306	1006

In 2016 there were 57 Sussex postnatal transfers for medical IC, 78.9% stayed within Sussex.

	Referring Network			Grand Total
	Kent	Surrey	Sussex	
Required medical IC and received outside region	14 13.3%	17 28.3%	12 21.1%	43
Required medical IC and received within region	91 86.7%	43 71.7%	45 78.9%	179
Total postnatal referrals for medical IC	105	60	57	222

Of the 180 surgical transfers referred postnatally, 153 originated in Kent & Surrey, 29 of these received surgical care in Sussex. Of the 27 referrals for postnatal transfers originating in Sussex, 81.5% stayed in Sussex for surgery.

Receiving Network	Referring Network			Grand Total
	Kent	Surrey	Sussex	
Sussex	12	17	22	51
London	81	33	3	117
Kent				0
Surrey		1	1	2
Out of Region		9	1	10
Grand Total	93	60	27	180

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 and at overview 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 http://www.bsuh.nhs.uk/tmbu. We are committed to audit and have a well developed programme under the supervision of Dr Fernandez.

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
John Bell	Research midwife
Cathy Olden	Research nurse
Vivien Richmond	Research nurse
Sonia Sobowiec Kouman	Research nurse
Liz Symes	Research nurse
Christine Laycock	Data Officer
Duncan Fatz	Monitoring, Trial Manager
Hector Rojas	FP7 Project Manager
Liam Mahoney	PhD student

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 later this year. The study is open for recruitment of new tertiary care centers. If you are interested please email neocirc003@scren.es.
The consortium was successful in bidding for additional grant funding from the Chiesi Foundation which will be used for in depth analysis of biomarkers to define neonatal circulatory failure.

Dr Bomont has acted as local lead in the multi-center European PANNA study which investigates the effects of anti-retroviral agents in HIV positive mothers and their babies (www.pannastudy.com). He also acts as local PI for a pain study for newborn babies after surgery run by Grünenthal.

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 and INTEREST study have now closed.
We are continuing care site for SIFT and BabyOSCAR.

Dr Liam Mahoney has completed recruitment to the NeoAdapt 3 study, which assessed circulatory adaptation in babies with HIE and total body cooling therapy. Dr Mahoney has completed his PhD thesis and we wish him all the bets for his future career ambitions.

Dr Seddon and his respiratory research team have continued recruitment into the NIHR-RfPB funded study of pulse oximetry and respiratory rate detection. This study is now closed. 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 a teaching App for health professionals to learn these techniques. BSMS Global health student Jennifer Hockey will do field studies in the East of England Operational Delivery Network and at hospitals in Nepal together with local collaborators from UNICEF later this year.

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. On behalf of the network, and in collaboration with BSMS, we organized the 10th Regional Paediatric and Neonatal Research Day, which was again very well attended.

The department is hosting the Summer Meeting of the Neonatal Society on **29th and 30th June 2017**. For further information visit the website:
http://www.neonatalsociety.ac.uk/meetings/meetingsscientific.shtml

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 404 Reproductive and Child Health. This has been radically changed and we look forward to having more timetabled time with medical students. During their time with us they learn to carry out a structured newborn examination both at the RSCH and PRH sites. Online learning tools are available to complement this training. Consultants and registrars are involved in the student assessments at the end of the module and in the end of year three and year five OSCE's.

A number of students chose to undertake the student selected module (SSC) BSMS 404 in year 4. 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.

The Department also supervises 5th year students during their Paediatric module to develop further their understanding of newborn medicine. Each year some students spend their end of year 5 module 505 in our department in order to gain in-depth experience in neonatal medicine.

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.

Dr Rabe, in her role of Senior Clinical Lecturer, has taken over as lead 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 Core Paediatric Trainees within KSS.

Support Services

Speech & Language Therapy (SLT)

This service is generally provided by 2 Speech and Language Therapists (1.3 FTE) employed by Sussex Community Trust under a Service Level Agreement with the Brighton and Sussex University Hospitals Trust.

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 BPD 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 and Rachelle Quaid (Level 5 RACH).

The service provides assessment and management of feeding difficulties for all babies admitted to TMBU including those transferred to the Royal Alexandra Children's Hospital. Feeding difficulties may occur for the following reasons and may be transient or life long:

- neurological anomalies; e.g. HIE, IVH
- anatomical anomalies; e.g. TOF
- babies with syndromes; e.g. Trisomy 21
- prematurity
- respiratory difficulties

Other services provided include:

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

Babies discharged home with feeding difficulties who live in Brighton and Hove or those who attend the BPD 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 Melanie Smith 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 TMBU where the nutritional management of more complex infants can be discussed. There are weekly outpatient clinics for follow up of babies discharged from the TMBU and 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 Special Care Baby Unit at Princess Royal Hospital. 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, offer appropriate advice to clients on substance misuse, harm minimisation, and to deal with 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 each month as follows:

Week 1	PRH One Stop Clinic – antenatal and postnatal
Week 2	RSCH One Stop Clinic – antenatal
Week 3	RSCH One Stop Clinic – baby appointments and/or antenatal prescribed medications
Week 4	RSCH One Stop Clinic – antenatal

In 2016 six babies were admitted to Trevor Mann Baby Unit with Neonatal Abstinence Syndrome.

Counselling

There is currently a reduced counselling service available for parents. Our counselling post is currently vacant but help is available from the Trust Chaplaincy Service at both the TMBU and SCBU at PRH. The Revd Peter Wells attends staff meetings to give support and The Early Birth Association has kindly funded The Mind Clinic during 2015. The Mind Clinic is a non-NHS organization that comes into the work place to help staff.

Parent Information

A wide range of information for parents is available. Around the time of admission, parents are given a booklet specifically 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 (EBA) 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

As a historical part of the Trevor Mann Baby Unit, Rockinghorse Children's Charity continues to strengthen its links with the neonatal service, also supporting the Special Care baby Unit at Princess Royal Hospital.

The charity hosts a fund dedicated to the support of TMBU, all of which is specifically for TMBU and its work. The charity welcomes donations to this fund.

In 2017, Rockinghorse will celebrate its 50th anniversary and together with the hospital will be hosting a visit from HRH Princess Alexandra. As part of its 'Sussex Giving for Sussex Children' initiative, the charity will be supporting the building programme for the SCBU at PRH.

The charity continues to collaborate with the Early Birth Association and future plans remain to keep working with the EBA charity for the mutual benefit of the unit and its patients.

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 2016

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 pilot site (see below) • All requirements according to NIPE fulfilled except for DDH screening (KP2) – process review with Paediatric Orthopaedic Team and Sonographers required	In progress
NICE Guidance Intrapartum Care CG 55/Antibiotics for Early-onset Neonatal Infection CG 149	Yes	No new presentation last year.		• New guideline CG149 implemented • All requirements fulfilled • Compliance with guideline generally good • Blood culture reporting system improved to 36 h	Required

				• Audit of Gentamicin dosing schedule	
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
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	Required
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

National Audits					
Maternal, Newborn and Infant Clinical Outcome Review Programme	Continuous	No new presentation last year.  Adobe Acrobat Document		• Our adjusted neonatal mortality rate is 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  Microsoft Excel 97-2003 Worksheet		• Overall good performance and reporting quality • Approx. 40% babies have low admission temperatures • Audit of admission temperatures to address possible shortfalls	In progress
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 • Local audit performed (see	Completed

				below) • Analysis awaited by PHE	In progress
National Training Survey	Continuous	No new presentation last year.  Adobe Acrobat Document		• Number of respondents not high enough to produce useful report • 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 In progress
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 continue due to Microbiology staffing issues • Data for last year not reviewed • New colour-coded cannulation and nursing trolleys, cannulation packs and blood culture packs introduced to improve sepsis rates • 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 • Maternal expressed milk related errors addressed with better practice guidance • NCPAP nasal injuries addressed with different NCPAP interface	Completed Ongoing Completed Completed
Survey: Parent Satisfaction	Ongoing	Yes, circulated via e-mail + discussed at senior staff meeting		• Replaced by bespoke wireless real-time feedback system in 2015 – annual report awaited	In progress
Specialty Identified Projects					
Audits					
Newborn Pulse Oximetry Audit	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Documentation of babies and screener not fully reliable • Screening picks up also unwell babies • Babies on SCBU not officially screened • Babies that go home before 6	

				hours are missed • No handouts for parents • Consider modifications of local screening protocol and practice including SCBU and postnatal ward	In progress
Guidelines					
Update - Perioperative Management Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• In response to incidents • Perioperative handover sheet being trialled – now formal part of anaesthetic handover	Completed
Neonatal Seizure Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Still some adjustments needed	In progress
Invasive Ventilation Guideline	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• New ventilators with VG introduced • Completely new invasive respiratory support guideline	Completed
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
Enteral Nutrition Guideline Update	Completed	Yes, circulated via e-mail + discussed		• Plan to introduce protein fortifier • Plan to introduce milk analyser to	

		at senior staff meeting		allow individualized protein fortification • Explore costs and develop guidance	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
Arterial Hypotension Guideline	In progress	No		• Currently under review	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					
Concept of Safety Huddles	Completed	Yes, circulated via e-mail + discussed at senior staff meeting		• Rolled out	In progress

Appendix 4

List of Publications 2016

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

Harris C, Bhat P, Murthy V, Milner AD, Greenough A. The first breath during resuscitation of prematurely born infants. Early Human Development 100 (2016) 7–10

Bhat P, Peacock JL, Rafferty GF, Hannam S, Greenough A. Prediction of infant extubation outcomes using the tension-time index. Arch Dis Child Fetal Neonatal Ed 2016;101:F444–F447. doi:10.1136/archdischild-2015-309264

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. 2017 Jan 11. doi: 10.1038/pr.2016.257. [Epub ahead of print]

Reviews

Katheria A, Lakshminrusimha S, Rabe H, McAdams R, Mercer J. Placental transfusion – a review*. J Perinatol. 2016 Sep 22. doi: 10.1038/jp.2016.151. [Epub ahead of print]
J Perinatol. 2017 Feb;37(2):105-111. doi: 10.1038/jp.2016.151

Book Chapter

Mahoney L, Rojas-Anaya H, Rabe H: Cardiac emergencies in the Newborn. In: G. Buonocore et al. (eds.), *Neonatology*, Springer New York 2016
DOI 10.1007/978-3-319-18159-2_216-11

Presentations at national and international meetings

Heath P, NEOMERO consortium: NEOMERO-2: A EUROPEAN MULTICENTRE PHASE I-II CLINICAL TRIAL OF MEROPENEM IN INFANTS <3 MONTHS WITH BACTERIAL MENINGITIS (BM). Annual Conference ESPID, 11.-13.5.2016, Brighton, UK

Thompson C, Mahoney L, Scutt G, Rabe H, Patel B. Does Temperature or Intravenous Vehicle Effect Dopamine or Dobutamine's Stability? Pediatric Academic Societies Meeting, Baltimore, UDA. April 30th – May 3rd 2016. ePAS:4163.521

Mahoney L, Wertheim D, Seddon P, Fernandez Alvarez JR, Aiton N, Rojas-Anaya H, Rabe H. Non-Invasive Assessment of Normal Cardiovascular Adaptation in Term & Near Term Infants. Pediatric Academic Societies Meeting, Baltimore, UDA. April 30th – May 3rd 2016. ePAS:3589.541

Mahoney L, Wertheim D, Fernandez Alvarez JR, Aiton N, Rojas-Anaya H, Seddon P, Rabe H. Comparison Of Cardiovascular Adaptation in Infants Requiring Intensive Care or Total Body Cooling. The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016.

Mahoney L, Wertheim D, Fernandez Alvarez JR, Aiton N, Rojas-Anaya H, Seddon P, Rabe H. Cardiovascular Adaptation in Late Preterm Infants Requiring Intensive Care. The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016.

Mahoney L, Wertheim D, Fernandez Alvarez JR, Aiton N, Rojas-Anaya H, Seddon P, Rabe H. Late Preterm Infants: Distinctly Different Cardiovascular Adaptation To Term Neonates. The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016.

Croysdill R, Devandran K, Mahoney L, Bomont R, Lawn C, Watkins R, Rabe H, Fernandez-Alvarez J.R. Observational Cohort Study Of Mid-Face Injuries Associated With NCPAP And Heated Humidified High flow Nasal Cannula (HHHFNC). The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016.

Devandran K, Croysdill R, Mahoney L, Amess P, Bhat P, Garland C, Rabe H, Fernandez Alvarez J.R. Observational Cohort Study Of Pneumothorax Associated With NCPAP And Heated Humidified Highflow Nasal Cannula (HHHFNC). The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016.

Kirupakaran K, Mahoney L, Patel B, Rabe H. A 24 Hour Study On The Stability Of Dopamine And Dobutamine Under Laboratory Simulated Neonatal Ward Conditions. The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016.

Invited Lectures

Rabe H: Haemodynamic Issues that pose regulatory Challenges. INC Second Annual Neonatal Scientific Workshop at the FDA, Silver Spring, USA 7.3.-9.3.2016

Rabe H: Cord Clamping: who and when?
Keynote lecture at 8th Dresden Symposium: Asphyxia, Hypothermia and Delivery Room Management. Dresden, Germany, 10.-11.3.2016

Rabe H: Milking of the cord: Evidence and How to do it? Workshop at Annual PAS-Meeting, Baltimore, USA, 30.4.-3.5.2016

Rabe H: Effects of delayed cord clamping in preterm infants. XXV European Congress of Perinatal Medicine, Maastricht, NL, 15.-18.6.2016

Rabe H: Delayed Cord Clamping in the Preterm. “First Hour of Care” Celebration Event, East of England Neonatal Operational Delivering Network, Cambridge, 28.6.2016

H Rabe: Cord clamping: current evidence and ongoing research
The 6th Congress of the European Academy of Paediatric Societies. Geneva, Switzerland. October 21-25, 2016