Commissioned by the Healthcare Quality Improvement Partnership

201

N N A P

9. What percentage of babies of more than or equal to 35 [+0] weeks gestation have an encephalopathy within the rst three calendar days of birth?

10. How many blood stream infections [a] are there on a NNU per 1,000 days of central line [b] care?

[a] the growth of a recognised pathogen in pure culture, or in the case of a mixed growth, or growth of skin commensal, the added requirement for 3 or more of 10 prede ned clinical signs

[b] central line = UAC, UVC, percutaneous long line or surgically inserted long line.

These questions are addressed by the data items listed at Appendix B.

2.3 Participating units

There were 179 NNU in operation in England and Wales during 2013; all of which contributed data for this report (NNU levels SCU, LNU and NICU. De nitions of the di erent categories of care can be found on page 9 of this report). The results for James Cook University Hospital, Middlesbrough, include those of Friarage Hospital as these units submit one combined set of data for South Tees Hospitals NHS Trust and the Leeds Neonatal Service covers both Leeds General and St James's Hospitals. Similarly, data for the Leicester neonatal service includes data for Leicester General Hospital and Leicester Royal In rmary. Participating units are listed at Appendix C.

Liverpool Women's Hospital, which is using a standalone Badger system, requested that their data be included in selected audit questions only (questions 1, 2, 3, 5 and 6), as the quality and quantity of the data received for other questions was not representative of data that had been entered locally. of the dr othtainC b f(he r)m0.1(tanp(he re L)10(viou c)15(o)30(v)30(ers both L)10(eeds Gener)25710(or)0.5(

Table 1.2

Babies born in England and Wales at a gestational age <29 weeks with their temperature taken within the rst hour of birth, by neonatal network of birth. Discharges during 2013.

Neonatal network of birth	Number of eligible babies	TIME OF TEMPERATURE MEASUREMENT (FROM BIRTH)			
		Within an hour (as % of eligible babies)	After an hour	Not taken after admission	Missing / unknown data
Other*	32	27 (84%)	4	1	0
Bedfordshire and Hertfordshire	68	68 (100%)	0	0	0
Cheshire and Merseyside	107	101 (94%)	1	0	5
Eastern	133	124 (93%)	5	2	2
Greater Manchester	193	185 (96%)	5	0	3
Kent	90	80 (89%)	6	0	4
Lancashire and South Cumbria	83	75 (90%)	4	0	4
London - North Central	110	103 (94%)	4	2	1
London - North East	194	175 (90%)	15	0	4
London - North West	169	144 (85%)	19	1	5
London - South East	125	119 (95%)	4	0	2
London - South West	68	61 (90%)	3	0	4
Midlands - Central	134	128 (96%)	5	1	0
Midlands - South West	128	116 (91%)	8	0	4
North Trent	114	106 (93%)	6	0	2
Northern	141	129 (91%)	7	0	5
Peninsula - South West	55	51 (93%)	4	0	0
South Central (North)	100	97 (97%)	3	0	0
South Central (South)	148	148 (100%)	0	0	0
Sta□ordshire,Shropshire and Black Country Newborn Network					

NNU level	Place of birth	Number of eligible babies	TIME OF TEMPERATURE MEASUREMENT (FROM BIRTH)				TEMPERATURE VALUES (°C) (AS % OF MEASUREMENTS TAKEN WITHIN AN HOUR FROM BIRTH)	
			Within an hour (as % of eligible babies)	After an hour	Not taken after admission	Missing/ unknown data	36.0°C - 36.5°C	36.6°C - 37.4°C
	West Middlesex University Hospital Ω	13	13 (100%)	0	0	0	4 (31%)	8 (62%)
	West Su□olk Hospital Ω	5	5 (100%)	0	0	0	0 (0%)	4 (80%)
	Worthing Hospital Ω	5						

Outlier analysis

1. Participating NNU for outlier analysis

We identi ed 2,876 babies in 170 NNU for inclusion in the temperature outlier analysis. We excluded from outlier analysis NNU where more than 10% of babies had no temperature records. We also excluded NNU with fewer than 10 babies born under 29 weeks' gestation, and NNU that did not submit a full year of data. The 'non participant' units are identi ed in table 1.5. This left 88 participating NNU and 2,434 babies included in the outlier analysis, most of the exclusions being due to many NNU having fewer than 10 eligible babies. There were two NNU with more than 10 babies (33 babies in total) that did not provide su cient data to participate in the outlier analysis. Further detail about the data set analysed is available online.

In the participating NNU, 95% of babies with temperature records had their temperature taken within one hour of birth.

2. Results of outlier analysis

The main outlier analysis was based on complete data in participating NNU. We used a staged methodology to identify NNU where the rate of temperature measurement within one hour of birth was unusually low. As in previous NNAP reports, we chose the thresholds 0.025 and 0.001 to ag NNU with unusually low values. The lower thresholds demarcate the rates where the probabilities are 0.025 and 0.001 of seeing a NNU fall below these levels when it is truly consistent with temperature taking in the population of usual NNU. We also adjusted the thresholds for multiple testing. We present the results of the outlier analysis using a funnel plot (Figure 1). Further detail and references for the methodology are available online.

NNU below threshold: We identi ed one NNU for further investigation. This NNU was on the 0.025 threshold. This unit was contacted about potential outlier status, and had an opportunity to review the accuracy of its data prior to the report's publication. Further details on the data outlier analysis process can be found on page 94 of this report.

Sensitivity analysis for NNU above threshold with missing temperature records: We also checked if units close to but above the 0.025 threshold that had missing values would fall below the threshold in the worst case scenario that all their missing values indicated no temperature was taken or temperature was taken late. We found no NNU that would fall below the threshold in the worst case scenario.

Good performance: We identi ed NNU where all babies had temperature records and all were within one hour of admission. There were 31 NNU with >= 10 babies, and 60 NNU with <10 babies, that took the temperature of all their babies on time and recorded it. These are identi ed in table 1.5.

NNU level	NNU name	Number of eligible babies	Number of babies with a known ROP screening (as % of eligible babies)	SCREENED ON TIME			Number of babies with no screening data (as % of eligible babies)
				During care	After discharge	Total (as % of eligible babies)	
LNU	Airedale General Hospital Ω	23	23 (100%)	18	5	23 (100%)	0 (0%)
	Barnet Hospital #	53	45 (85%)	45	0	45 (85%)	8 (15%)
	Barnsley District General Hospital Ω	24	24 (100%)	21	3	24 (100%)	0 (0%)
	Basildon Hospital	45	42 (93%)	33	8	41 (91%)	3 (7%)
	Basingstoke and North Hampshire Hospital Ω	20	20 (100%)	15	5	20 (100%)	0 (0%)
	Broomfield Hospital	37	37 (100%)	34	0	34 (92%)	0 (0%)
	Calderdale Royal Hospital	58	58 (100%)	48	9	57 (98%)	0 (0%)
	Chesterfield and North Derbyshire Royal Hospital Ω	29	29 (100%)	25	4	29 (100%)	0 (0%)
	City Hospital	99	97 (98%)	88	5	93 (94%)	2 (2%)
	Colchester General Hospital	31	30 (97%)	24	4	28 (90%)	1 (3%)
	Countess Of Chester Hospital	17	16 (94%)	13	3	16 (94%)	1 (6%)
	Croydon University Hospital	64	64 (100%)	56	4	60 (94%)	0 (0%)
	Diana Princess Of Wales Hospital	38	35 (92%)	30	5	35 (92%)	3 (8%)
	Doncaster Royal Infirmary Ω	57	57 (100%)	51	6	57 (100%)	0 (0%)
	Dorset County Hospital	20	20 (100%)	16	3	19 (95%)	0 (0%)
	East Surrey Hospital	32	32 (100%)	23	7	30 (94%)	0 (0%)
	Glangwili General Hospital #	15	11 (73%)	9	2	11 (73%)	4 (27%)
	Gloucestershire Royal Hospital	67	67 (100%)	65	0	65 (97%)	0 (0%)
	Great Western Hospital #	45	15 (33%)	13	0	13 (29%)	30 (67%)
	Hillingdon Hospital	46	45 (98%)	32	8	40 (87%)	1 (2%)
	Ipswich Hospital #	35	27 (77%)	21	1	22 (63%)	8 (23%)
	Kettering General Hospital	35	34 (97%)	27	7	34 (97%)	1 (3%)
	Kingston Hospital	48	43 (90%)	32	5	37 (77%)	5 (10%)
	Leighton Hospital	35	35 (100%)	30	4	34 (97%)	0 (0%)

Outlier analysis

1. Participating NNU for outlier analysis

We initially identi ed 8,000 babies in 175 NNU for inclusion in the outlier analysis. We excluded NNU where more than 10% of babies had no ROP screening records. We also excluded NNU with fewer than 10 babies requiring a screen, and NNU that did not submit a full year of data. This left 128 participating NNU and 6,412 babies. There were 39 NNU (1,329 babies) that did not provide su cient data to participate in the outlier analysis. The 'non-participant' NNU are indicated in Table 3.4. The non participant units di er from the participant units, being on average smaller, and having particularly incomplete data for more mature IUGR babies. Further detail about the data set analysed is available online. In the participating NNU, 94% of babies with screening records were appropriately screened according to NNAP guidelines.

2. Results of outlier analysis

The outlier analysis was based on complete data in participating NNU – babies with missing data were excluded. We used a staged methodology to identify NNU where the appropriate ROP screening rates were unusually low; more detail is available online. As in previous NNAP reports, we chose the thresholds 0.025 and 0.001 to ag NNU with unusually low values. We also adjusted the thresholds for multiple testing. We present the results of the outlier analysis using a funnel plot (Figure 2).

NNU below threshold: We identi ed one NNU for further investigation. This unit was below the 0.001 threshold. This unit was contacted about potential outlier status, and had an opportunity to review the accuracy of its data prior to the report's publication. Further details on the data outlier analysis process can be found on page 94 of this report.

Sensitivity analysis for NNU above threshold with missing screens: We also checked if NNU close to but above the 0.025 threshold that had some babies with no screening records would fall below the threshold in the worst case scenario that all their babies with no screening records had in fact failed to achieve the NNAP criteria (i.e. not screened at all, or not screened according to NNAP standards). It was found that two NNU could fall below the threshold if all of their missing screens failed to achieve the NNAP standard. If just one of the missing screens in each of these NNU achieved the standard, they would not fall below the 0.025 threshold. No other NNU would fall below the 0.025 threshold under this worst case scenario.

Good performance: There were 22 NNU with no missing screening records and all babies achieving the NNAP standard. These are indicated in table 3.4 .

Figure 2:
Funnel plot for proportion of babies <32 weeks gestation or <1,501g with screening records who were screened according to NNAP interpretation of RCPCH, RCOphth, BLISS guideline.

Thresholds are 0.001 and 0.025 limits adjusted for multiple testing. Red dots show the two NNU identi ed by the missing screening records sensitivity analysis. Each dot represents one NNU.

Question 4

What proportion of babies of <33 weeks gestation at birth were receiving any of their own mother's milk at discharge to home from a neonatal unit?

Standard: Benchmarking

Source of Standard: NNAP Board

Results

Only babies who had a nal discharge to 'home' at the end of their rst episode of care are included in this analysis, i.e. all the babies included in this question were admitted to and stayed in only one NNU before being discharged home.

Of the **10,229** babies born in NNAP NNU at less than 33 weeks there were **5,920** babies born <33 weeks reported by **170** NNU who met the criteria for inclusion in this question.

Daily data summaries for the last or penultimate day of care indicated that **59%** of eligible babies were receiving mother's milk, exclusively or with another form of feeding, at the time of their discharge from neonatal care. Of the remaining babies, **40%** were recorded as receiving others028 >>BDC BT /T1_0

NNU level	NNU name	Number of eligible			

NNU level	NNU name	Number of eligible babies	ENTERAL FEEDS AT THE TIME OF DISCHARGE		
			Feeding with any mother's milks (as % of eligible babies)	Feeding without mother's milk (as % of eligible babies)	Missing data (as % of eligible babies)
	Lancashire Women and Newborn Centre	93	37 (40%)	56 (60%)	0 (0%)
	Leeds Neonatal Service	90	42 (47%)	48 (53%)	0 (0%)
	Leicester Neonatal Service	106	44 (42%)	61 (58%)	1 (1%)

NNU level	NNU name	Number of eligible babies	ENTERAL FEEDS AT THE TIME OF DISCHARGE		
			Feeding with any mother's milks (as % of eligible babies)	Feeding without mother's milk (as % of eligible babies)	Missing data (as % of eligible babies)
	University Hospital Of North Sta□ordshire	67	32 (48%)	35 (52%)	0 (0%)
	University Hospital Of North Tees	39	12 (31%)	27 (69%)	0 (0%)
	University Hospital Of Wales	38	29 (76%)	9 (24%)	0 (0%)
	William Harvey Hospital	42	18 (43%)	24 (57%)	0 (0%)
	Wrexham Maelor Hospital	33	7 (21%)	25 (76%)	1 (3%)
NICU Total		**2649**	**1521 (57%)**	**1123 (42%)**	**5 (0%)**
Total		**5920**	**3509 (59%)**	**2393 (40%)**	**18 (0%)**

NNAP, 1 January - 31 December 2013

Additional data for tables 4.1 – 4.3 is available online.

Outlier analysis

1. Participating NNU for outlier analysis

We initially identi ed 5,920 babies in 170 NNU for inclusion in the outlier analysis. No NNU had >10% missing feeding records at discharge, so none were classi ed as 'non-participant'. We excluded NNU with fewer than 10 eligible babies, and NNU that did not submit a full year of data. This left 144 NNU and 5,777 babies born to 5,143 mothers for the outlier analysis. Further detail is online. In the included NNU, 60% of babies with feeding records were wholly or partially fed with their own mother's milk at discharge home.

2. Results of outlier analysis

The main outlier analysis was based on complete feeding data in included NNU. We calculated the expected rate of discharge breastmilk feeding in each NNU, based on the characteristics of mothers, and compared the actual rate of breastmilk feeding with the expected rate. Further detail on the risk adjustment model to calculate expected rates are available online. We used a staged methodology to identify NNU where the breastmilk feeding rates were unusually low. As in previous NNAP reports, we chose the thresholds 0.025 and 0.001 to ag NNU with unusually low values. The thresholds demarcate the breastmilk feeding rates where the probabilities are 0.025 and 0.001 of seeing a NNU fall below these levels when it is truly consistent with the breastmilk feeding rate in the population of usual NNU. We adjusted the thresholds for multiple testing. We also identi ed NNU above the 0.975 and 0.999 thresholds. We present the results of the outlier analysis using a funnel plot (Figure 4.2).

NNU outside thresholds: We identi ed six NNU with unusually low numbers of babies fed mother's breast milk at discharge. These NNU were contacted about potential outlier status, and had an opportunity to review the accuracy of their data prior to the report's publication. Further

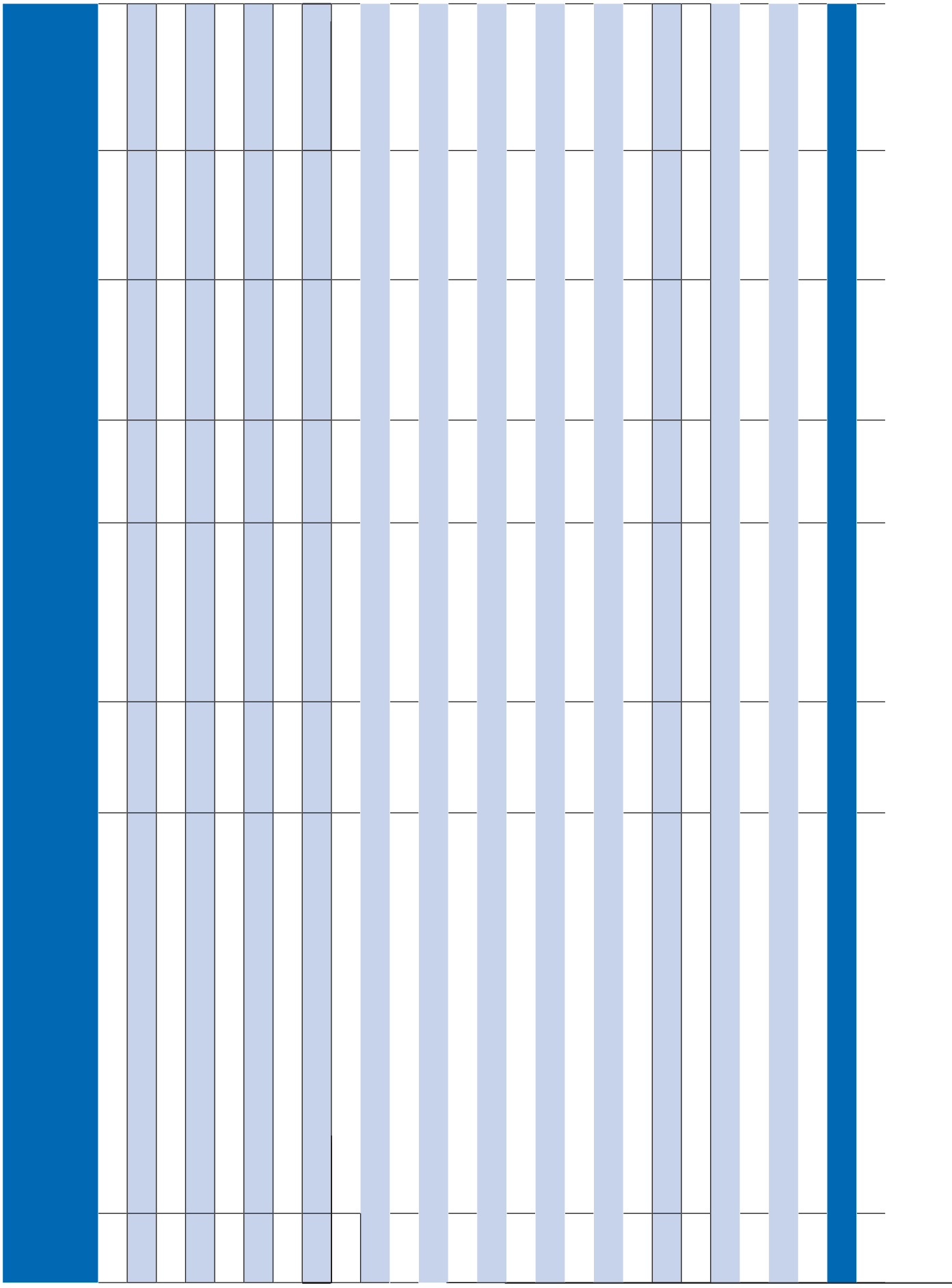
Question 5

Is there a documented consultation with parents by a senior member of the neonatal team within 24 hours of admission?

Standard: 100%

Table 5.4

Number of parents and/or carers of babies seen by a senior member of the neonatal team within 24 hours of admission by NNU.



Outlier analysis

1. Participating NNU for outlier analysis

We initially identi ed 50,757 babies in 176 NNU for inclusion in the outlier analysis. We excluded

Figure 5

Funnel plot for proportion of babies with consultation time records whose parents had a consultation that achieved the NNAP standard.

Thresholds are 0.001 and 0.025 limits adjusted for multiple testing.

Question 6

Are all babies who require transfer out of a unit kept within their own network, except where clinical reasons dictate otherwise?

Standard: >90% of transfers within the baby's first network of care

Source of Standard: NNAP Board

Results

There were a total of **80,000** babies eligible for inclusion in the NNAP 2013 audit. Of these babies, **214** have been excluded from this question as their complete episodic data, including their first episode of care, was not available for analysis. This analysis was conducted using the remaining **79,786** babies who had complete episodic data.

From these **79,786** babies, there were a total of **11,020** transfers involving **7,409** babies. This means that **9%** of babies experienced at least one transfer during their time in neonatal care. Of these transfers **81%** were within the first known network of care and **19%** were to another neonatal network. Please note that NNAP have not determined which babies were born within their 'own' network. Instead the analysis was based on the number of babies who were transferred between different NNU, and the neonatal networks to which those units belonged. A transfer within network is one where the baby is transferred to a hospital within the first known network of care. Conversely, a transfer outside a neonatal network is one where a baby is transferred to a NNU that did not belong to the first network of care.

Neonatal network	Eligible babies	Number of eligible babies transferred (as % of eligible babies)	Total number of transfers for these babies	Transfers within network (as % of all transfers)	Transfers outside of network (as % of all transfers)	REASON FOR TRANSFER OUT OF NETWORK			
						Cardiac care	Surgical care	Other* reason	Unknown
Sta□ordshire, Shropshire and Black Country Newborn Network	4008	147 (4%)	207	139 (67%)	68 (33%)	0	9	59	0
Surrey and Sussex	3667	380 (10%)	586	432 (74%)	154 (26%)	12	32	110	0
Trent	2507	267 (11%)	442	350 (79%)	92 (21%)	1	5	86	0
Wales	2681	334 (12%)	505	479 (95%)	26 (5%)	2	9	15	0
Western	6522	439 (7%)	660	557 (84%)	103 (16%)	3	2	98	0
Yorkshire	4183	397 (9%)	590	545 (92%)	45 (8%)	0	3	42	0
Total	**79786**	**7409 (9%)**	**11020**	**8978 (81%)**	**2042 (19%)**	**57**	**310**	**1675**	**2**

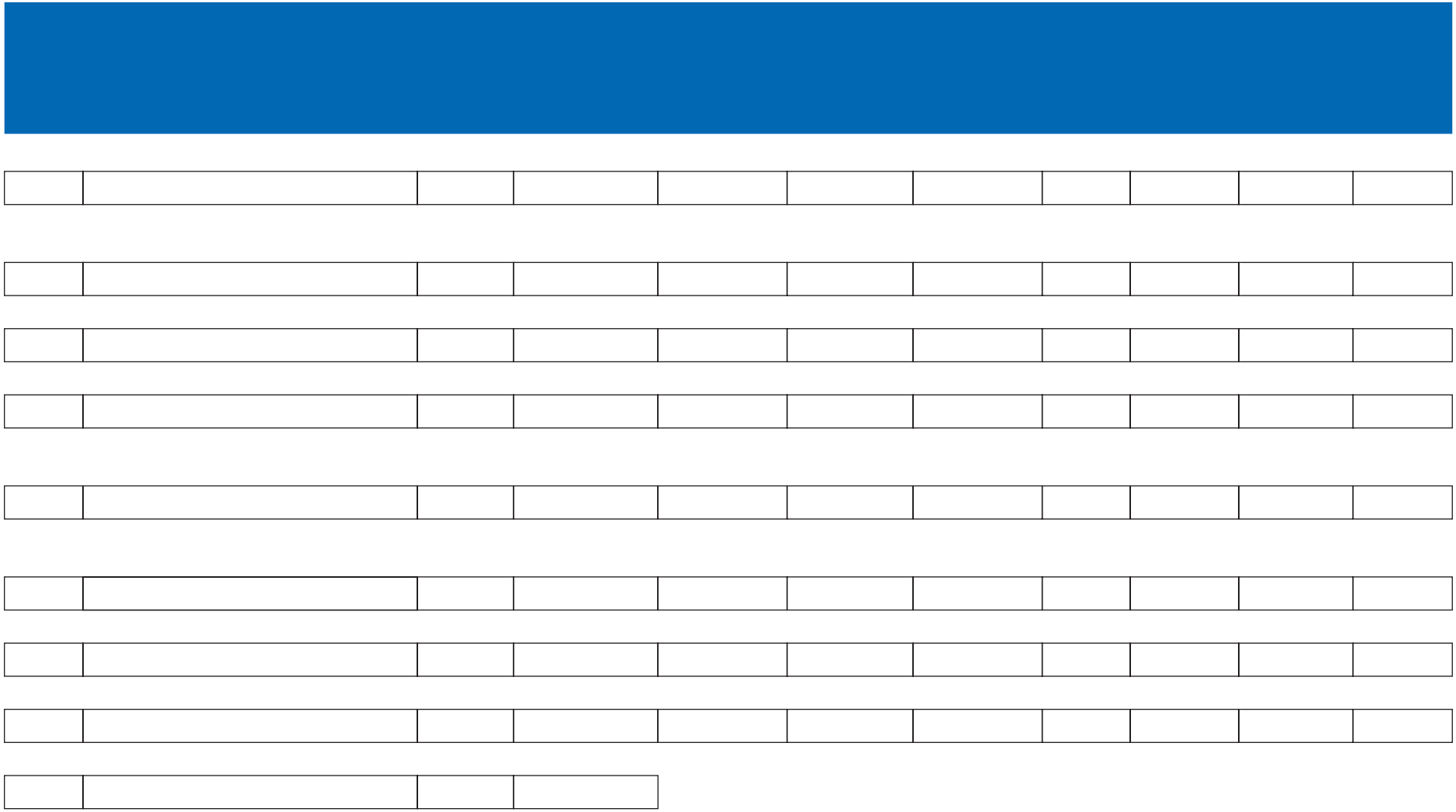
NNAP, 1 January - 30 December 2013

**Other reasons for transfer that could be selected were 'continuing care', 'specialist care' and 'other'.*

Neonatal network of birth	Eligible babies	SOME HEALTH DATA ENTERED				NO HEALTH DATA ENTERED			
		Impairment not determinable	No impairment	Mild / moderate impairment	Severe impairment	Lost to			

Table 7.3

Neurodevelopmental outcomes and health data completeness from two-year (corrected post term) health follow up recorded by NNU of birth, babies born <30 weeks gestation between July 2010 and June 2011 who survived to discharge from neonatal care



Question 8

What percentage of babies admitted to a neonatal unit have:

(a) One or more episodes of a pure growth of a pathogen from blood?
(b) One or more episode of a pure growth of a pathogen from CSF?
(c) Either a pure growth of a skin commensal or a mixed growth with

Table 8.2

Positive blood culture results by neonatal unit level and gestational age.

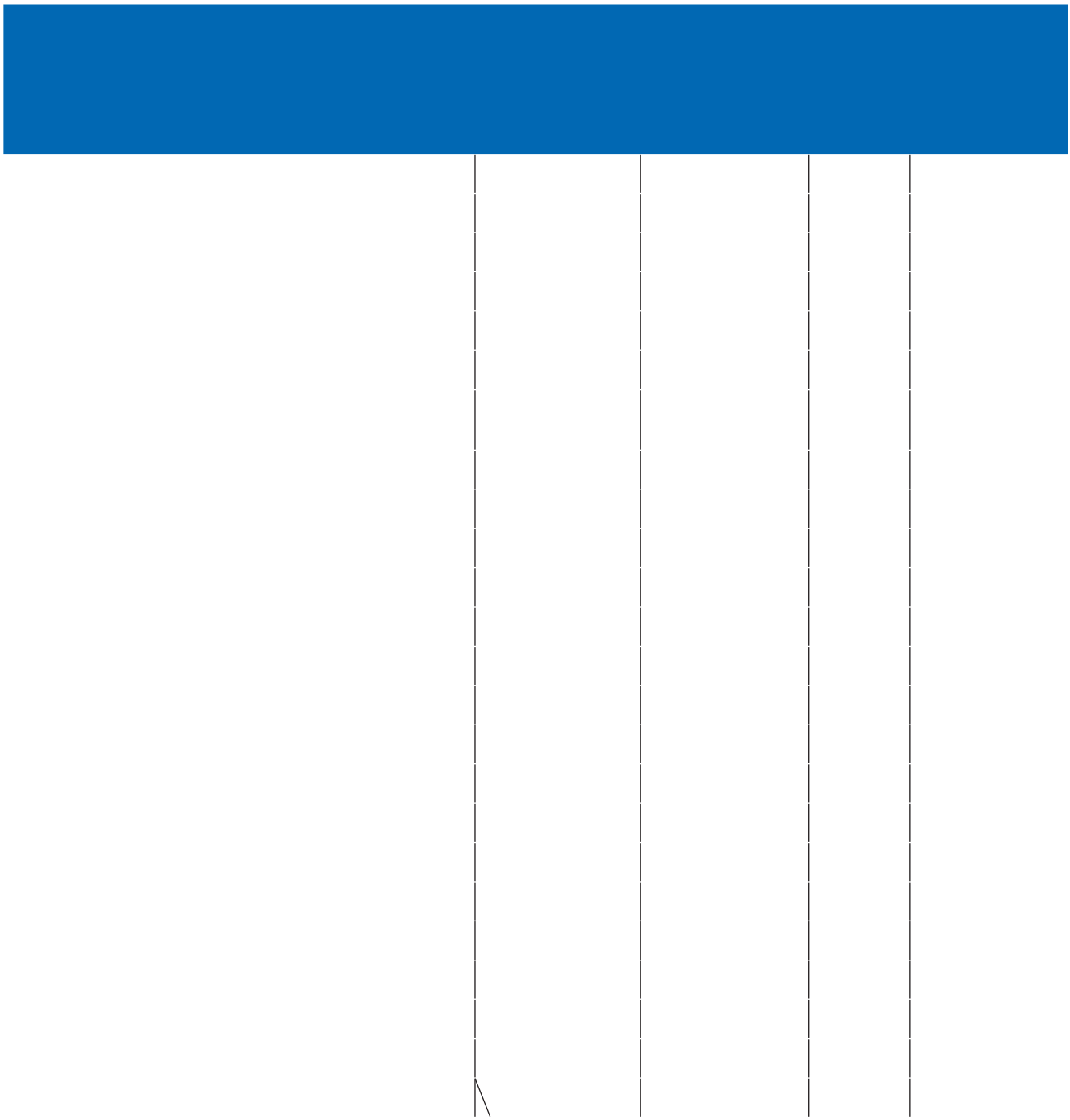
NNU Level	Gestational					

Question 9

As outlined in Section 2.6, due to difficulties in obtaining denominator data in 2012, the Project Board took the decision that no denominator data would be collected for 2013. A solution is being explored which will allow the analysis of data for this audit question in future.

Two-year follow up

In previous reports NNAP had published rates of follow up only at network level. In the 2012 data report, less than half of the babies born at less than 30 weeks gestation had any health data at all recorded. Therefore the Project Board decided to report the amount of health data entered by hospital.



4.7 Survey of NNAP users

In spring 2014, NNAP ran an internet based poll of audit users to gauge opinion about a wide variety of topics. A high response rate was achieved, with respondents investing signi cant time and giving very useful feedback on questions, reporting and the outlier processes. The responses have already been useful in developing the audit and will be published on the NNAP website in due course.

4.8 NNAP and the National Neonatal Research Database

Neonatal data held in the National Neonatal Research Database (NNRD) are used for NNAP audit analyses. The NNRD is created at the NDAU using operational electronic patient records which are generated as part of routine clinical care in neonatal units across England and Wales. Data are extracted to the NDAU by Clevermed Ltd for all neonatal units that have granted approval via their Caldicott Guardians. By obtaining data from NNRD, the NNAP has reduced the burden of data recording to a once only process.

Watch out for updates from the NDAU and visit their website (www.imperial.ac.uk/ndau).

Appendix A: NNAP unit leads

Fields used for:	Data field	Comment
Question 1- Admission temperature	Admission: Was Temperature Taken After Admission? (Yes/ No/Unknown)	
	Admission: Was The Baby's Temperature Recordable? (Yes/No)	Babies with an un-recordable temperature were excluded form analysis
	Admission: Admission Temperature Time (Date And Time)	Provided as minutes from birth
	Admission: Admission Temperature Value (°C)	Valid range 25-42
Question 2- Antenatal steroids	Mother: Were Antenatal Steroids Given? (Yes/No/ Unknown)	
	Mother: Was A Complete Course Of Steroids Given? (Complete/Incomplete/No/ Unknown)	
Question 3- ROP screening	Ad Hoc: Time Of ROP Screening (Date And Time)	Provided as minutes from birth
	Daily Data: ROP Screen today	Provided as minutes from birth
Question 4- Mother's		

o (en-U12 1 TfEc T(en-Data 1 TfMTE 14033 >>BDC BT/T11 1 Tf10 0 0 10 41.664EMC /Span <</Lang (en-US)/MCID 1 ROP S

Fields used for:	Data field	Comment
Question 6- Transfers within network	-	No unique elds used for this question: only 'General elds' were require36eld

1. Neuromotor	No	Yes	RQW Know
DRHVVKLVFKLOGKDYHDQ'GLIILF[ZDONLQ'J			
E,VKLVFKLOGYDLQRQOHQRUDEQRUPDOUHGXLQJRELOLW			
F			

Appendix E: NNAP audit questions 2014

1. Do all babies of less than or equal to 28 $^{+6}$ weeks gestation have their temperature taken within the first hour after birth?

2. Are all mothers who deliver their babies between 24 $^{+0}$ and 34 $^{+6}$ weeks gestation given any dose of antenatal steroids?

3. Do all babies <1,501g or a gestational age at birth <32 $^{+0}$ weeks at birth undergo the first Retinopathy of Prematurity (ROP) screening in accordance with the current guideline recommendations?

4. What proportion of babies of <33 $^{+0}$ weeks gestation at birth were receiving any of their own mother's milk at discharge to home from a neonatal unit?

5. Is there a documented consultation with parents/carers by a senior member of the neonatal team within 24 hours of admission?

6. Are all babies who require transfer out of a unit kept within their own Network, except where clinical reasons dictate otherwise?

7. Are rates of normal survival at two years comparable in similar babies in similar units? (in 2014 we are auditing babies of <30 $^{+0}$ gestation at birth.)

8. What percentage of babies admitted to a neonatal unit have:

    a) one or more episodes of a pure growth of a pathogen from blood
    b) one or more episodes of a pure growth of a pathogen from CSF
    c) either a pure growth of a skin commensal or a mixed growth with $\geq$3 clinical signs at the time of blood sampling

9. What percentage of babies of more than or equal to 35 $^{+0}$ weeks gestation have an encephalopathy within the first three full calendar days after birth?

10. How many blood stream infections [a] are there on a NNU per 1,000 days of central line [b] care?

[a]The growth of a recognised pathogen in pure culture, or in the case of a . (su[BTe15 >> ublood sampling)] 328.2564 280.3191 Tm (+0