

**Report on the use of Expressed Breast
Milk in the Neonatal Intensive Care, Local
Neonatal Unit and Special Care Baby Units
across the Yorkshire and Humber
Neonatal ODN**

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Acknowledgements

We would like to thank the Yorkshire and the Humber Operational Delivery Network for allowing us to use this data in our project. In particular thank you to Charlotte Bradford and her team for preparing the data for analysis.

Introduction

Use of expressed breast milk (EBM) has been shown to reduce morbidity and mortality in pre-term babies (1). The recent Lancet series reported that children who are breastfed for longer have lower infectious morbidity and mortality and higher intelligence (2). Many women when considering their choice of infant feeding consider whether or not to breast feed rather than whether to express breast milk. This study has arisen out of a desire to gain more information regarding the use of EBM in hospitals with a consideration regarding improving the number of babies receiving EBM for longer. The hospitals within the Yorkshire and the Humber Neonatal Operational Delivery Network (ODN) have a wealth of good clinical practice occurring and also have wide variation in their local population.

The aims of this study are:

- To gather information regarding patterns of EBM use to try to understand when mothers stop expressing
- To share good practice relating to EBM usage across the region to improve morbidity and mortality

Method

A retrospective analysis of anonymised Badger data has been performed which was supplied by the team at the Yorkshire and Humber ODN. It encompassed the data pertaining to all babies born at a single unit, admitted to the Neonatal Intensive Care Unit (NICU) /Local Neonatal Unit (LNU) / Special Care Baby Unit (SCBU) and then discharged from the unit for the time period of March 2017- April 2018. It initially did not include any babies who transferred between hospitals or admitted to the local post-natal wards/transitional care units. Further analysis of units including the babies also admitted to transitional care units was performed for the NICUs due to feedback relating to numbers analysed within these units. Babies of all gestations were included in the analysis. Demographic information was supplied relating to gestation, maternal intention to breast feed, weight and length of stay in the unit. Then data was analysed relating to day 1 of life, day 7 and every 7 days until day 56. The data included information regarding feeding (nil by mouth, breast, bottle, nasogastric tube (NGT)/ oral gastric tube (OGT), cup, other) and type of feed (maternal breast milk- breast feeding/fresh/frozen, donor breast milk, formula feeding, other (includes specialist formulas)). It also included the method of feeding and type of feed at discharge. This data was analysed using an excel spreadsheet and comparison was made of these parameters against how many babies were feeding on total on that day; excluding babies who were nil by mouth, not on the unit or missing data. Data was then further analysed using IBM SPSS.

The units included are (number in brackets refers to the number of babies analysed):

NICU

Bradford (102)
Hull (181)
Leeds (164)
Sheffield (140)

LNU

Airedale (126 babies)
Barnsley (118)
Calderdale (214)
Chesterfield (112)
Doncaster (117)
Grimsby (173)
Pinderfields (118)
Rotherham (119)
Scunthorpe (89)
York (111)

SCBU

Bassetlaw (33)
Harrogate (51)
Scarborough (74)

Following addition of babies also admitted to transitional care (TC) from NICU being included in the total due to premature babies progressing from the NICU to TC (number in brackets refers to the number of babies analysed):

NICU + TC

Hull (266)
Bradford (319)
Leeds (481)
Sheffield (277)

Subgroup analysis of the NICU + TC infants was performed to analyse infants born <33 weeks gestation in line with NNAP data.

NICU + TC < 33 weeks gestation

Bradford (90)
Hull (80)
Leeds (86)
Sheffield (73)

From the descriptions above you can see that the number of infants admitted to each unit are variable. They are affected by whether the unit has a transitional care, the number of term admissions there are and whether there are many transfers as babies transferred between units were not included in the analysis. Individual units also have differing policies regarding whether babies are nursed on the transitional care or on the postnatal ward dependent on gestation or weight. These factors will also have influenced the numbers of infants available for analysis.

Results

Demographics

NICUs (without transitional care data)

Gestation (weeks)	Unit	Min	Average	Median	Max
	Bradford (102 babies)	23	32	31	41
	Hull (181 babies)	24	34	33	42
	Leeds (164 babies)	24	35	36	41
	Sheffield (140 babies)	25	33	33	42
Birthweight (g)		Min	Average	Median	Max
	Bradford (102 babies)	610	1925	1620	5730
	Hull (181 babies)	480	2201	2060	5040
	Leeds (164 babies)	545	2406	2445	4800
	Sheffield (140 babies)	683	2119	1890	5930
Inpatient stay (days)		Min	Average	Median	Max
	Bradford (102 babies)	1	36	28	125
	Hull (181 babies)	1	26	16	123
	Leeds (164 babies)	1	28	18	139
	Sheffield (140 babies)	2	40	28	138

Leeds has babies of a higher average gestation admitted to its unit in this data set which may reflect babies being born in Leeds with a diagnosis of a cardiac condition.

Hull has the shortest, median length of inpatient stay and reduced maximum length of stay in comparison to the other NICUs. During presentations at the North and South Joint ODN study day discussion around this data suggested that this may be due to babies discharged whilst NG feeding.

NICUs with Transitional Care Data Included

Gestation (weeks)	Unit	Min	Average	Median	Max
	Bradford (319 babies)	23	35	36	42
	Hull (266 babies)	24	34	35	42
	Leeds (481 babies)	24	36	36	42
	Sheffield (277 babies)	25	34	34	42
Birthweight (g)		Min	Average	Median	Max
	Bradford (319 babies)	610	2445	2300	5730
	Hull (266 babies)	480	2306	2270	5040
	Leeds (481 babies)	545	2523	2455	5010
	Sheffield (277 babies)	683	2283	2180	5930
Inpatient stay (days)		Min	Average	Median	Max
	Bradford (319 babies)	1	20	10	127
	Hull (266 babies)	1	20	12	123
	Leeds (481 babies)	1	16	9	139
	Sheffield (277 babies)	2	28	18	138

When adding in the babies who also are admitted to Transitional Care, either TC on it's own or from NICU there is an increase in the median gestation of babies in this data set. Sheffield has the longest median length of stay.

Subset Analysis of <33 weeks gestation, NICUs with Transitional Care Data Included

Gestation (weeks)	Unit	Min	Average	Median	Max
	Bradford (90 babies)	23	29	30	32
	Hull (80 babies)	24	30	31	32
	Leeds (86 babies)	24	30	31	32
	Sheffield (73 babies)	25	29	29	32
Birthweight (g)		Min	Average	Median	Max
	Bradford (90 babies)	610	1324	1360	2080
	Hull (80 babies)	480	1480	1410	2290
	Leeds (86 babies)	545	1404	1375	2380
	Sheffield (73 babies)	683	1343	1260	2310
Inpatient stay (days)		Min	Average	Median	Max
	Bradford (90 babies)	15	48	39	127
	Hull (80 babies)	14	45	36	123
	Leeds (86 babies)	13	44	38	139
	Sheffield (73 babies)	22	64	59	138

Sheffield had the longest length of stay with Hull having the median shortest length of stay. Sheffield had the median lowest gestation and the median lightest baby in this data set. This may explain why Sheffield has a longer median length of stay in this data set.

LNUs

Gestation (weeks)	Units	Min	Average	Median	Max
	Airedale (126 babies)	27	35	35	41
	Barnsley (118 babies)	27	35	35	41
	Calderdale (214 babies)	27	35	34	42
	Chesterfield (112 babies)	28	35	35	41
	Doncaster (117 babies)	27	34	34	41
	Grimsby (173 babies)	28	36	36	42
	Pinderfields (118 babies)	27	33	33	41
	Rotherham (118 babies)	27	35	34	41
	Scunthorpe (89 babies)	27	34	34	41
	York (111 babies)	28	34	34	41
Birthweight (g)		Min	Average	Median	Max
	Airedale (126 babies)	960	2265	2140	5195
	Barnsley (118 babies)	880	2591	2415	4990
	Calderdale (214 babies)	830	2352	2195	4795
	Chesterfield (112 babies)	860	2424	2415	4260
	Doncaster (117 babies)	856	2284	2154	4540
	Grimsby (173 babies)	840	2605	2500	5060
	Pinderfields (118 babies)	850	1994	1770	4150
	Rotherham (118 babies)	920	2376	2270	4440
	Scunthorpe (89 babies)	933	2358	2189	4325
	York (111 babies)	1200	2282	2175	4790
Inpatient stay (days)		Min	Average	Median	Max
	Airedale (126 babies)	1	18	13	80
	Barnsley (118 babies)	2	18	12	79
	Calderdale (214 babies)	2	17	13	87
	Chesterfield (112 babies)	1	15	11	67
	Doncaster (117 babies)	3	21	14	95
	Grimsby (173 babies)	1	13	9	57
	Pinderfields (118 babies)	2	23	19	70
	Rotherham (118 babies)	1	23	15	122
	Scunthorpe (89 babies)	1	15	12	69
	York (111 babies)	1	15	13	61

The data analysed from Pinderfields showed a reduced median gestation and reduced median weight in babies admitted. Shortest median lengths of stay occurred at Grimsby Hospital. Following discussion at the ODN representatives from Grimsby hospital discussed that babies were routinely discharged with NGTs in-situ.

SCBUs

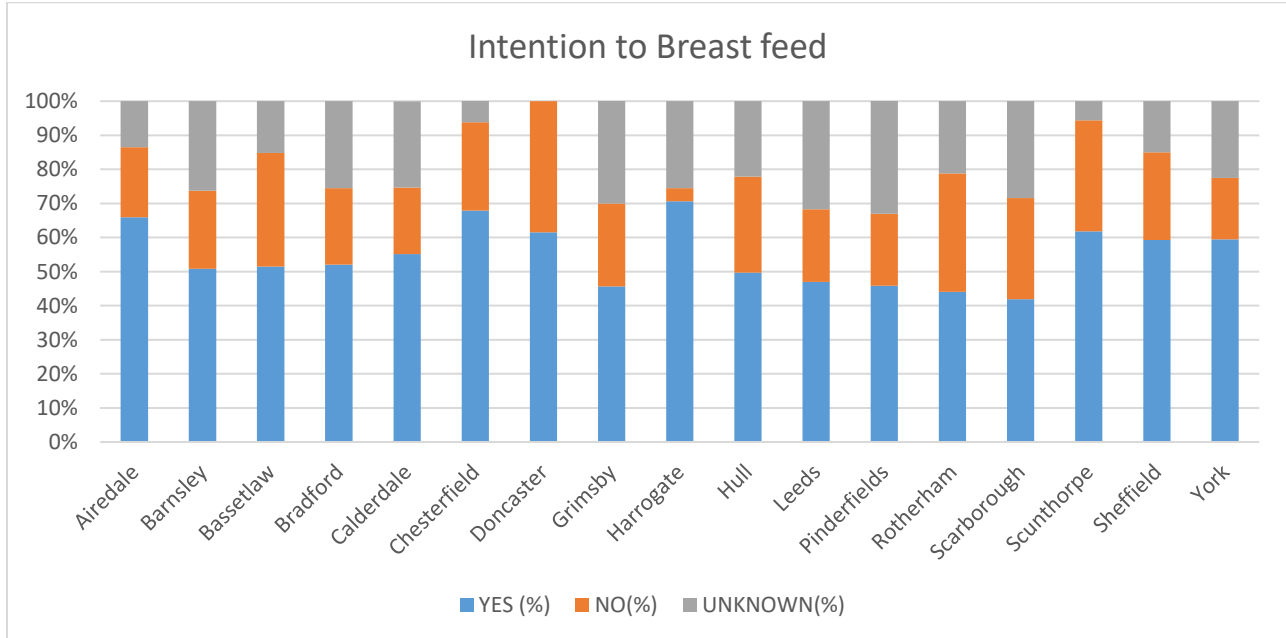
Gestation (weeks)	Unit	Min	Average	Median	Max
	Bassetlaw (33 babies)	31	35	34	41
	Harrogate (51 babies)	32	36	35	41
	Scarborough (74 babies)	30	37	37	41
Birthweight (g)		Min	Average	Median	Max
	Bassetlaw (33 babies)	1460	2397	2200	4010
	Harrogate (51 babies)	1485	2491	2310	4370
	Scarborough (74 babies)	1595	2783	2508	4805
Inpatient stay (days)		Min	Average	Median	Max
	Bassetlaw (33 babies)	1	15	14	44
	Harrogate (51 babies)	1	11	11	27
	Scarborough (74 babies)	1	10	8	30

Bassetlaw cared for the more premature babies in this data set in comparison with the other SCBUs, median inpatient stay is likely to be a reflection of this.

Intention to Breast Feed

On admission to the Neonatal Unit there is a question on the Badger data set which asks the question regarding mother's intention to breast feed. It is likely that this information, which is very subjective, is taken from a variety of sources and is open to interpretation. I have analysed this question because I think that it is interesting how many women from each hospital have been reported to have said that they did not intend to breast feed, I think this gives some insight into mother's preferences when entering the neonatal unit.

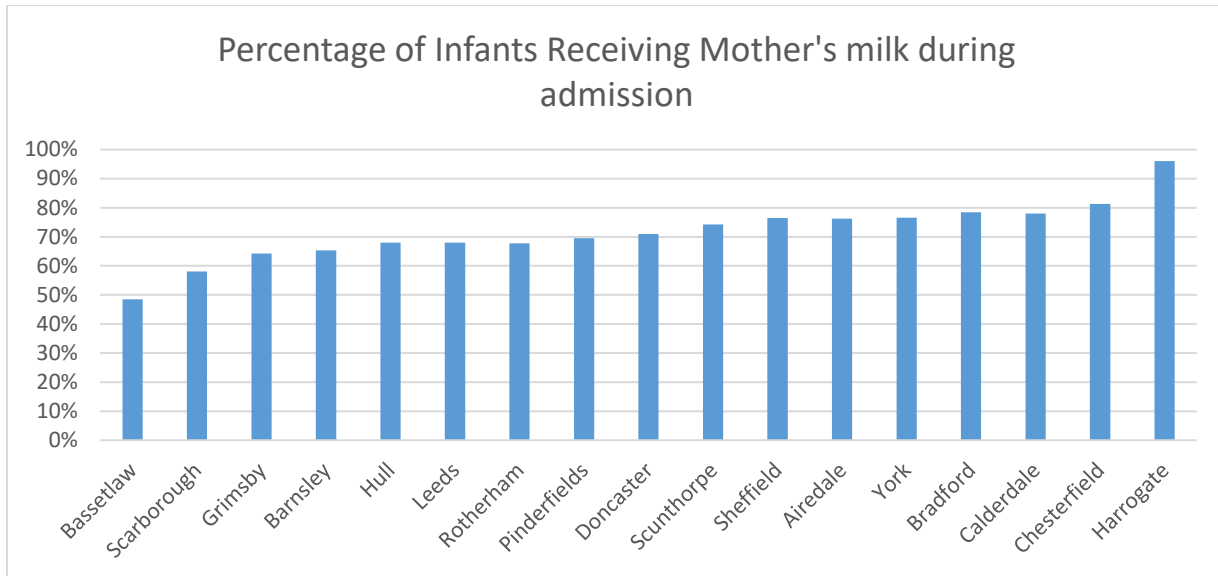
Intention to BF	Airedale	Barnsley	Bassetlaw	Bradford	Calderdale	Chesterfield	Doncaster	Grimsby	Harrogate
YES	66%	51%	52%	52%	55%	68%	62%	46%	71%
NO	21%	23%	33%	23%	20%	26%	39%	24%	4%
UNKNOWN	14%	26%	15%	26%	25%	6%	0%	30%	26%
	Hull	Leeds	Pinderfields	Rotherham	Scarborough	Scunthorpe	Sheffield	York	
YES	50%	47%	46%	44%	42%	62%	59%	60%	
NO	28%	21%	21%	35%	30%	33%	26%	18%	
UNKNOWN	22%	32%	33%	21%	28%	6%	15%	23%	



There is a wide variation in mother's intention to breast feed across the region, from 4% to 39% of mothers saying they did not intend to breast feed and 44-71% of mothers saying they did intend to breast feed. Many factors have been discussed in the literature as reasons for wanting and not wanting to breast feed. Barriers include the support available to mothers, education of professionals, media portrayal of feeding and promotion of formulas.

Received Mother's Milk During Admission

This data relates to whether the infant received any expressed breast milk at any point during their admission, again there is wide variation from 49% of infants to 96%.



Average of all units: 72%

Average of NICUs: 73%

Average of LNUs: 72%

Average SCBUs: 68%

Intention and Outcome

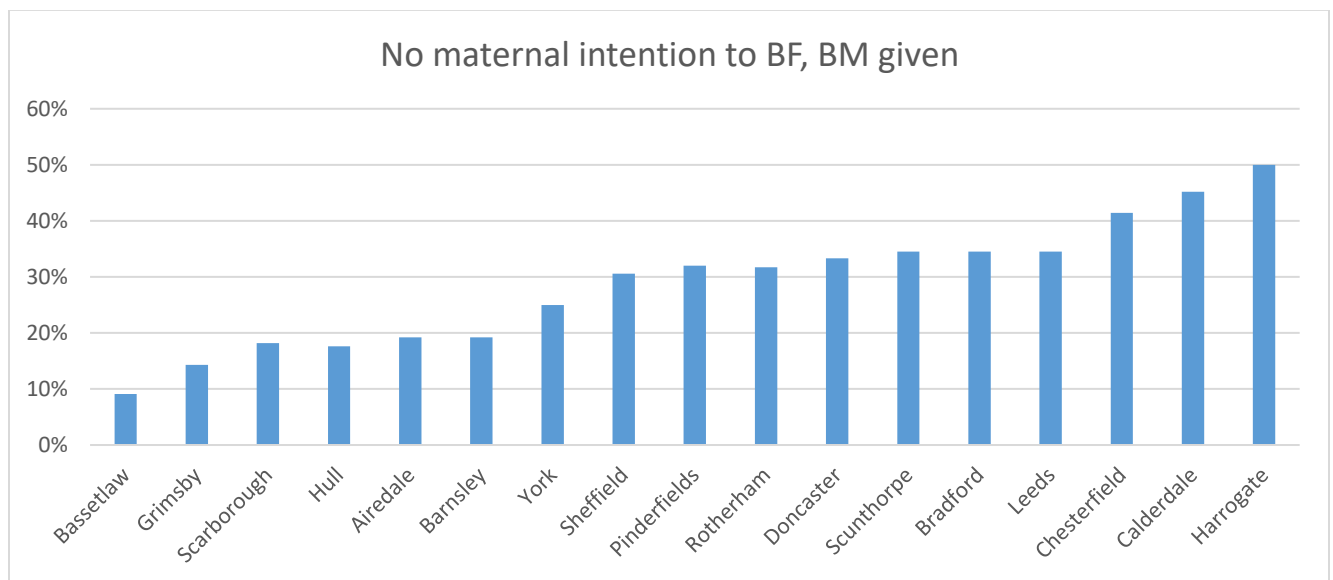
Here, the data relating to whether mothers declared they intended to breast feed has been linked to whether the infant received breast milk during the admission and whether the baby was discharged receiving breast milk (EBM/breast feeding). This is not including the transitional care data for the NICUs.

NICU	Mum intended to BF			Mum didn't intend to BF			Mum's intention unknown		
	No BM	BM given	Discharged on BM	No BM	BM given	Discharge d on BM	No BM	BM given	Discharged on BM
Bradford	8%	93%	64%	65%	35%	17%	12%	89%	62%
Hull	7%	93%	69%	82%	18%	8%	25%	75%	33%
Leeds	10%	91%	66%	66%	35%	14%	29%	71%	48%
Sheffield	5%	95%	60%	69%	31%	8%	19%	81%	38%
Average NICU	7%	93%	65%	71%	29%	12%	21%	79%	45%

LNU	Mum intended to BF			Mum didn't intend to BF			Mum's intention unknown		
	No BM	BM given	Discharged on BM	No BM	BM given	Discharged on BM	No BM	BM given	Discharged on BM
Airedale	7%	93%	68%	81%	19%	8%	18%	82%	53%
Barnsley	10%	90%	52%	82%	19%	4%	42%	58%	42%
Calderdale	8%	92%	72%	55%	45%	26%	28%	72%	46%
Chesterfield	4%	96%	63%	59%	41%	28%	14%	86%	57%
Doncaster	6%	94%	53%	67%	33%	4%	0%	0%	0%
Grimsby	5%	95%	66%	86%	14%	7%	42%	58%	35%
Pinderfields	17%	83%	44%	68%	32%	16%	26%	74%	39%
Rotherham	4%	96%	60%	68%	32%	15%	32%	68%	40%
Scunthorpe	2%	98%	62%	66%	35%	10%	60%	40%	20%
York	8%	92%	76%	75%	25%	10%	24%	76%	68%
Average	7%	93%	62%	71%	30%	13%	29%	61%	40%

SCBU	Mum intended to BF			Mum didn't intend to BF			Mum's intention unknown		
	No BM	BM given	Discharged on BM	No BM	BM given	Discharged on BM	No BM	BM given	Discharged on BM
Bassetlaw	18%	82%	59%	91%	9%	0%	80%	20%	20%
Harrogate	0%	100%	92%	50%	50%	0%	8%	92%	69%
Scarborough	16%	84%	68%	82%	18%	5%	38%	62%	38%
Average	11%	89%	73%	74%	26%	2%	42%	58%	42%

If the mother has said that she does not intend to breast feed there is wide variation from 9% to 50% whether the mother will go on to express when the benefits of expressed breast milk/breast feeding are explained. This could be due to the discussions and explanations being given by the staff to the mothers on the units.



Breast milk use over time

Data was analysed for each unit reviewing the number of babies receiving EBM- through breast feeding, fresh EBM via NGT/OGT/cup/bottle or frozen EBM. If the baby was receiving EBM in any form this was recorded as EBM. If they were receiving donor EBM and maternal EBM together they would be recorded as receiving EBM. If they were receiving donor EBM only or donor EBM with formula feed this would be recorded as donor EBM. If the infant was receiving formula (pre-term or infant formula) or formula and other this would be recorded as formula. If the baby was only receiving a specialist formula feed for example neocate this would be recorded as other.

Data was analysed for day 1 of life, day 7, day 14 and continued until day 56. The amount of particular feed being used on the unit was recorded as a percentage of the babies receiving feeds on that day- babies who were nil by mouth, not on the unit or if the data was missing were excluded from the total.

To review key points in the EBM journey I have looked at 3 specific areas:

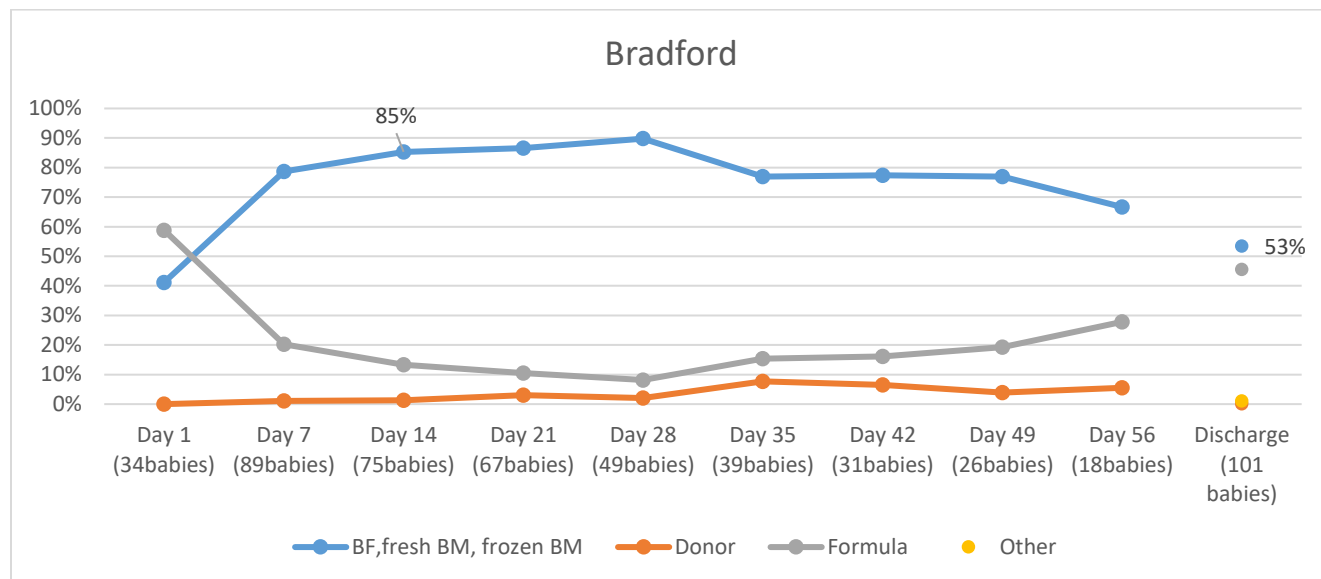
- Percentage of babies receiving EBM at day 14- to represent the number of mothers establishing expressing

- The point at which EBM falls by greater than 10% to represent a discontinuing in expressing (or 5% if no 10% fall)

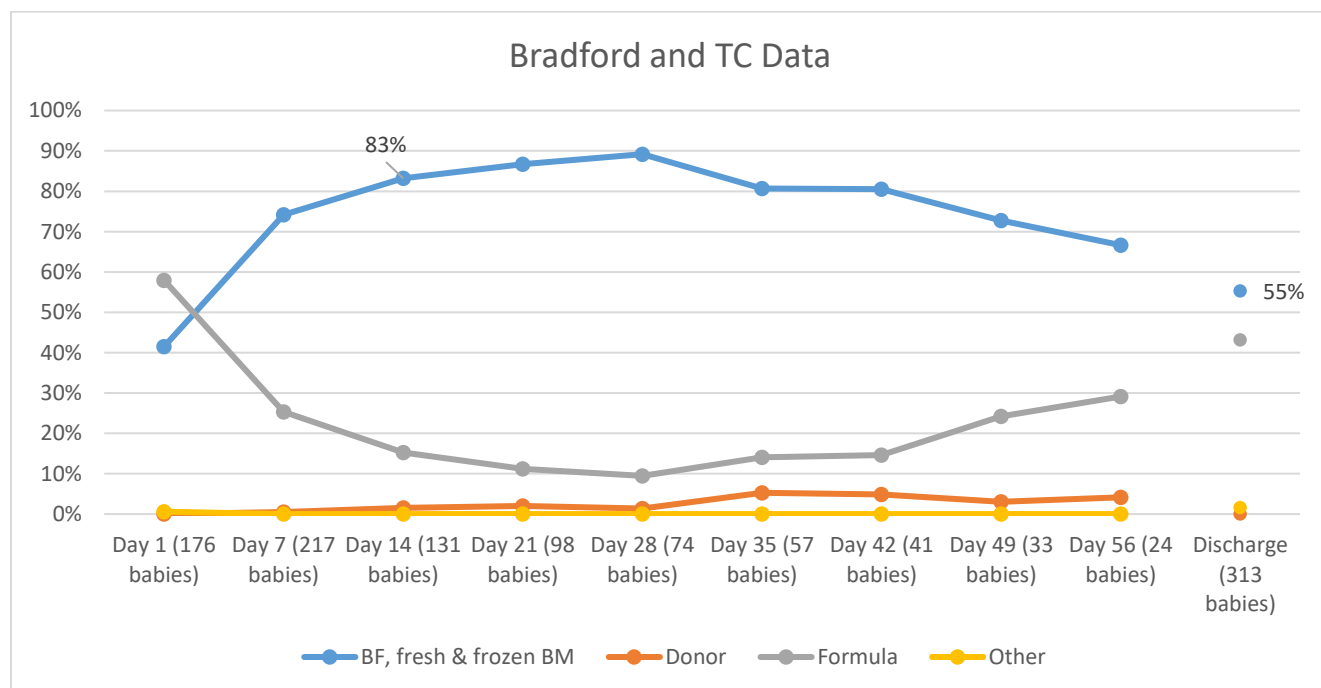
- The difference between the day 14 and discharge rate to represent the number of mothers choosing to not express/breast feed at discharge

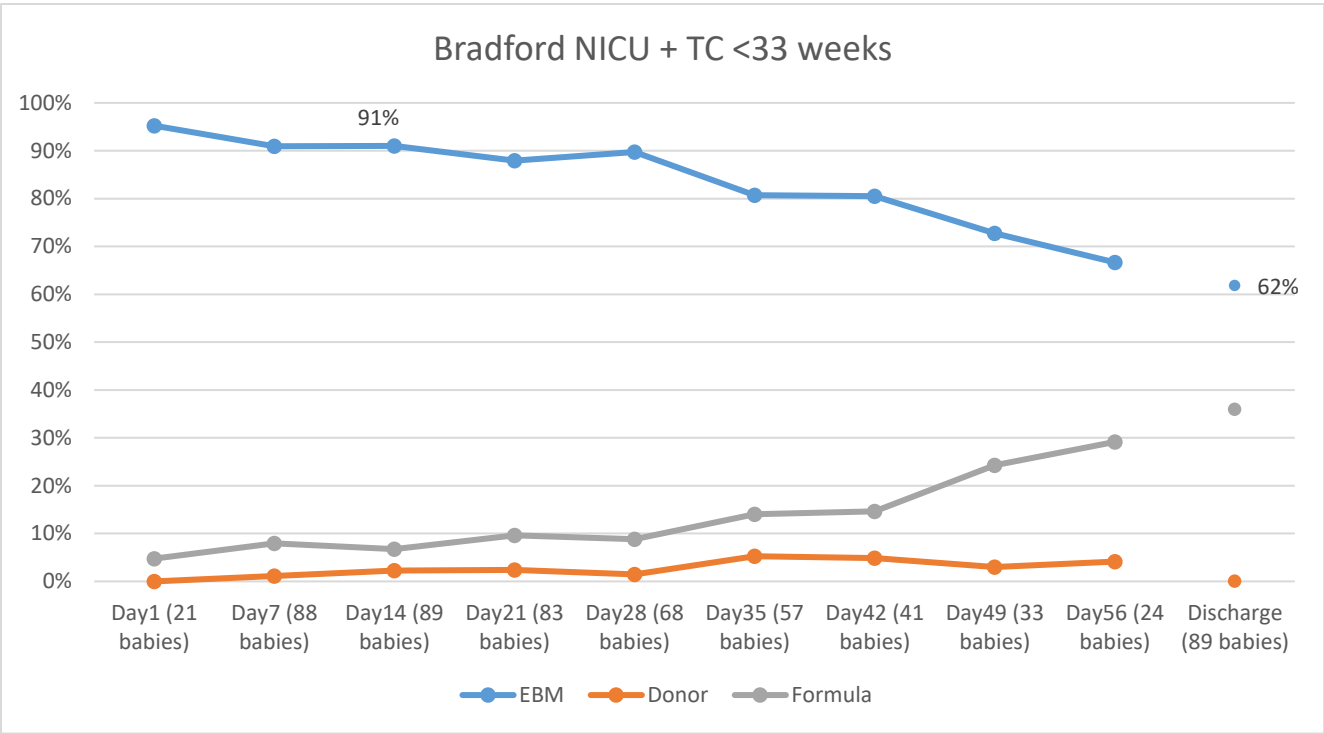
Bradford

By day 14 85% of babies are receiving EBM. At discharge 54% of babies are discharged receiving EBM/BF and 46% are discharged solely on formula (term and pre-term).



When adding in the babies who are also resident on transitional care, the number of babies included in this data set triples to 319 babies. However, the patterns on the graph regarding EBM remain very similar. By day 14 83% of babies are receiving breast milk. At discharge 55% of babies are receiving breast milk.

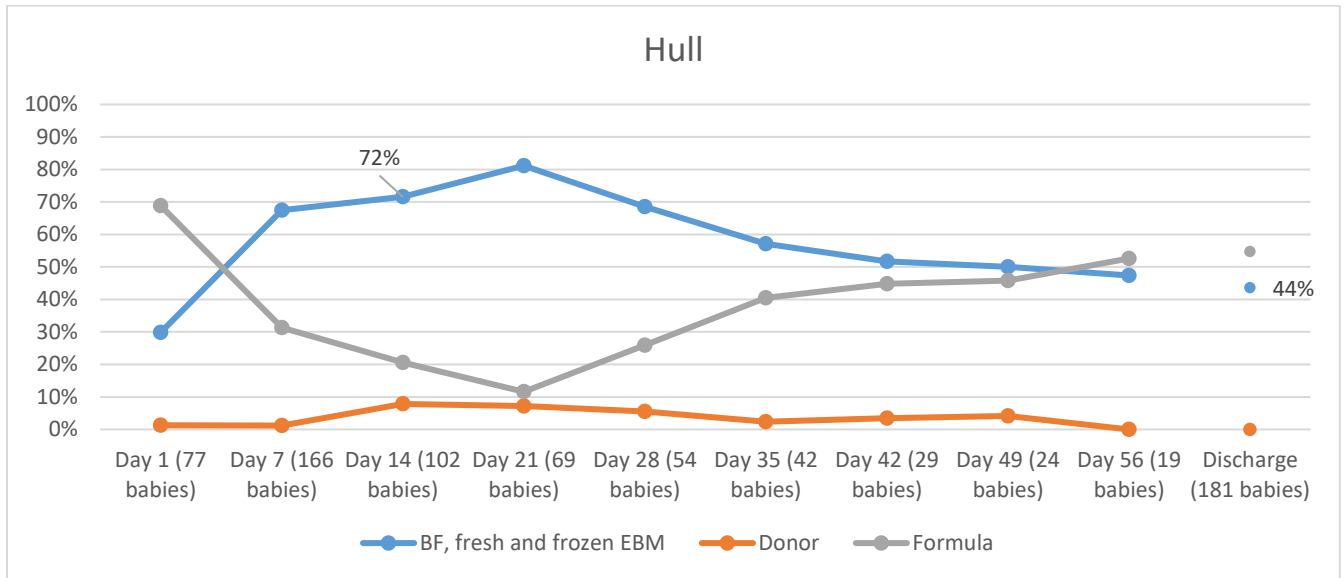




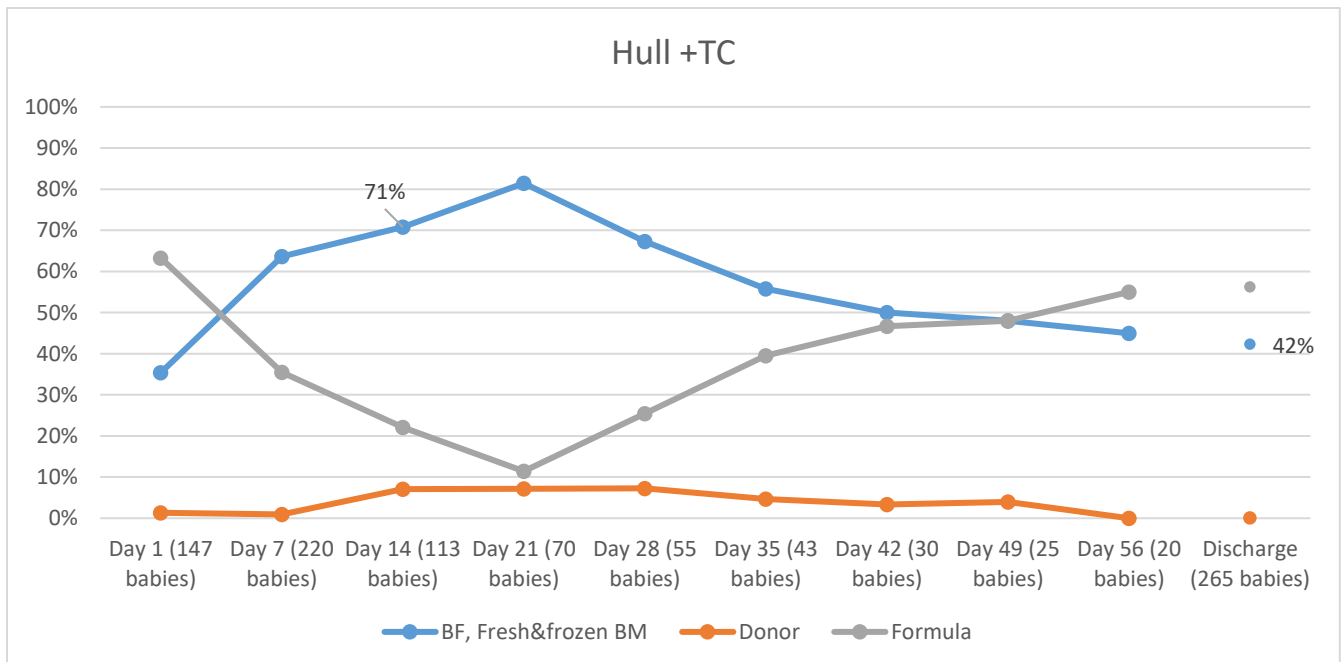
When focusing on the infants <33 weeks gestation the amount of EBM received increases with more babies in this data set discharged on EBM.

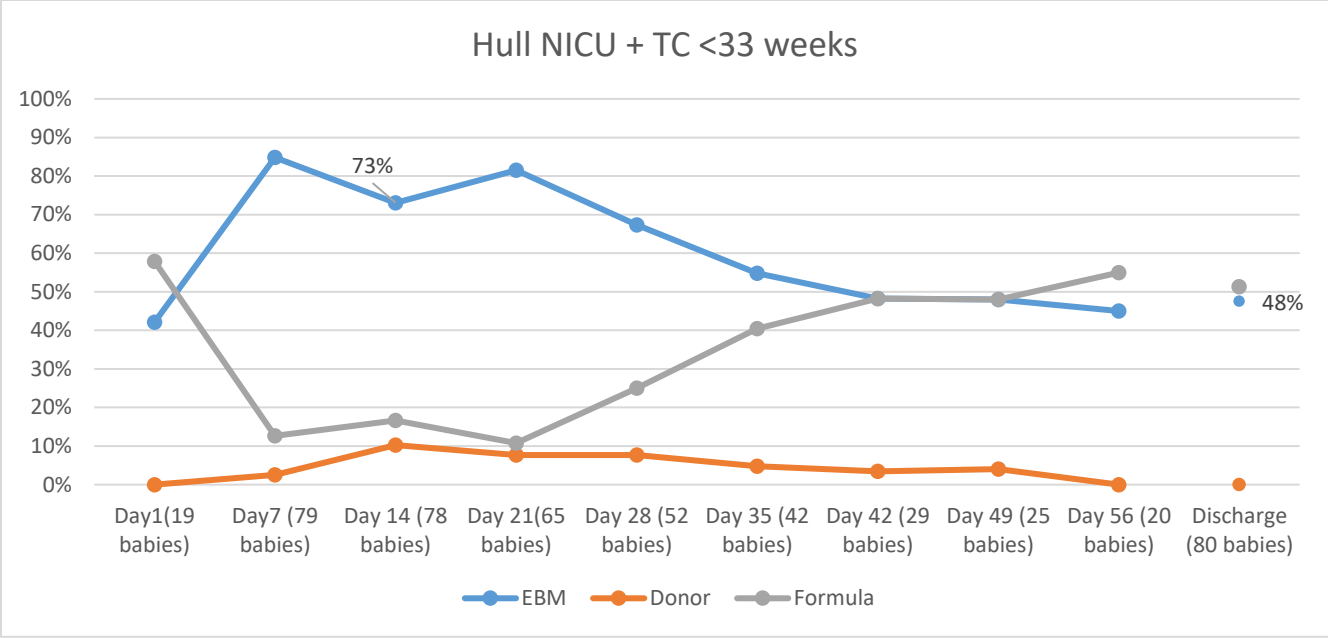
Hull

Hull is a tertiary neonatal unit. By 14 days 72 % of babies are receiving EBM. There is a drop off of more than 10% at day 28 (81% to 69%). 44% of babies are discharged receiving EBM/BF.



When adding in the TC data, the number of babies analysed increases from 181 to 266. The shape of the graph is very similar with 71% of babies receiving EBM by day 14 and 42% of babies being discharged receiving BM. A 10% decrease in the amount of BM being received occurs at day 21 in this data set.

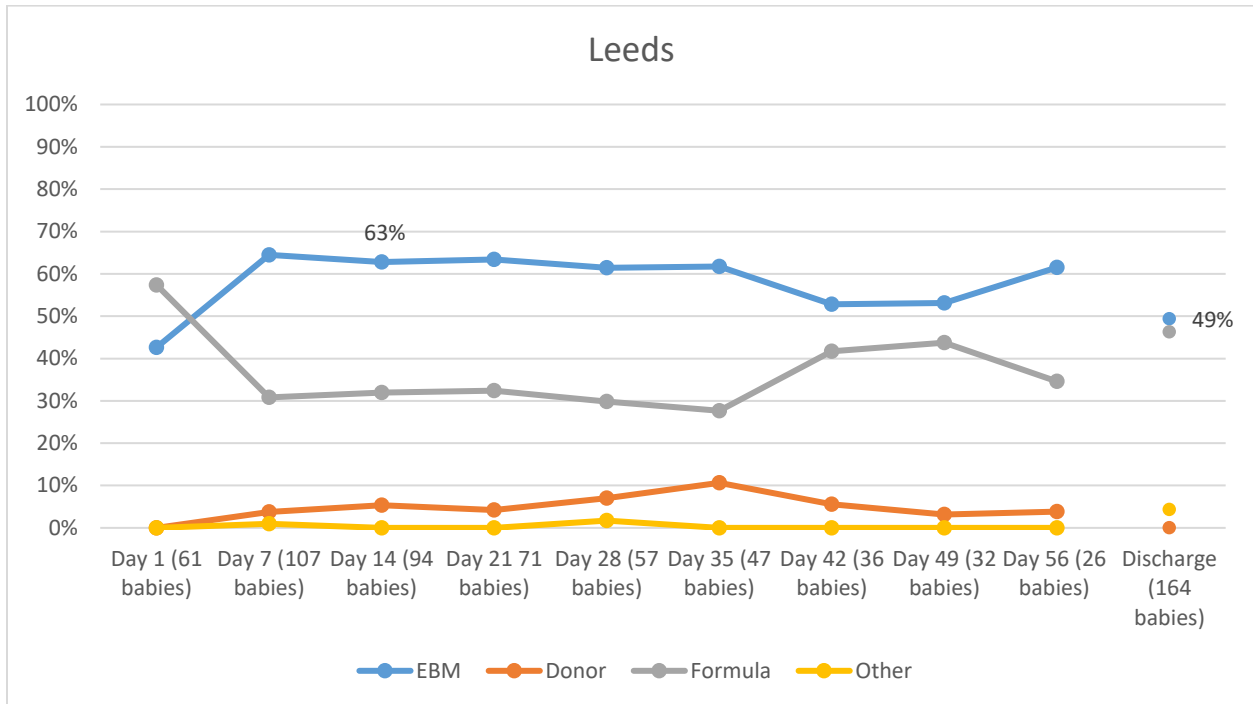




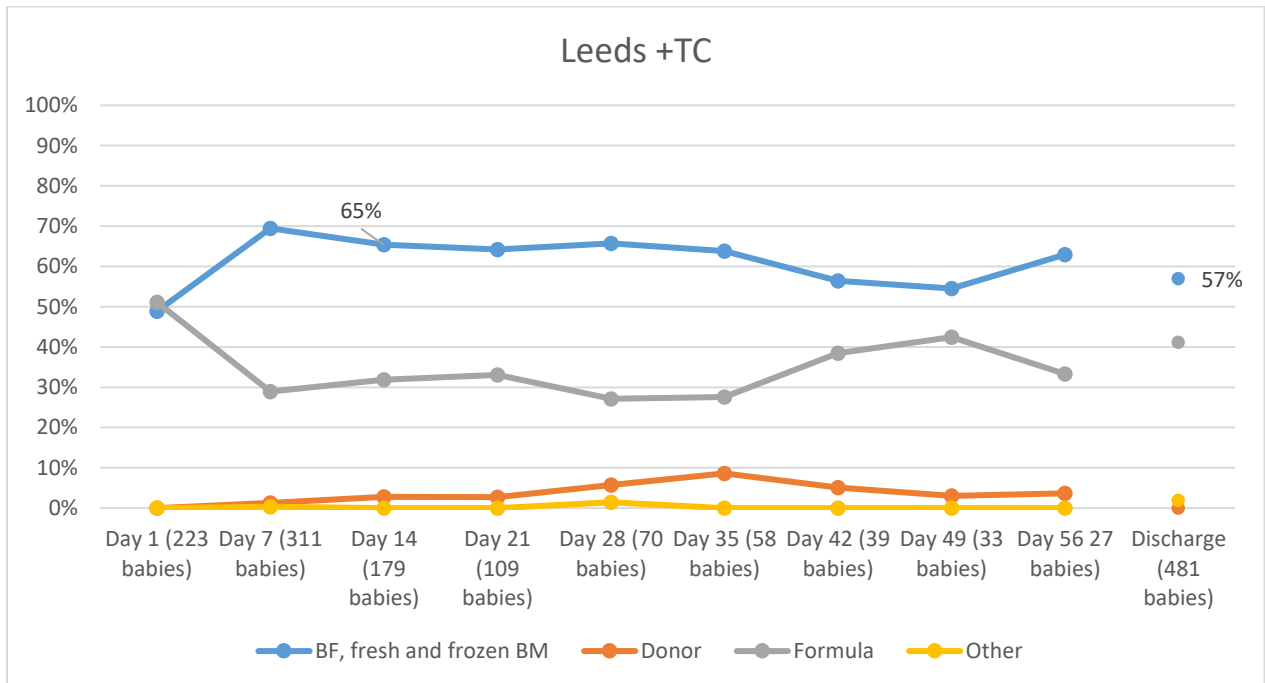
When separating out the infants <33 weeks gestation there are higher numbers discharged receiving EBM.

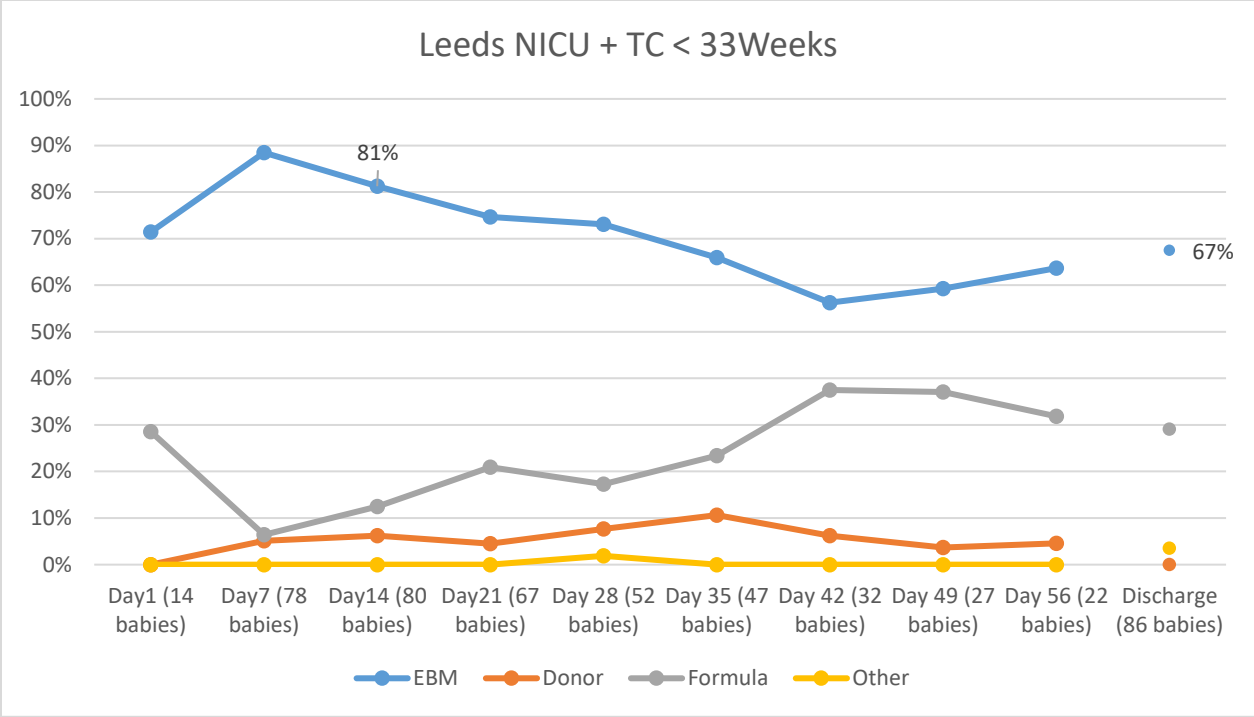
Leeds

Leeds is a tertiary neonatal unit. It has a surgical unit and cardiac surgery on site. By day 14 63% of babies are established on EBM. EBM at discharge was 49% in this data set.



When adding in the data of Transitional Care the analysis increases from to 481 babies. The number receiving EBM by 14 days is 65%. The number receiving EBM at discharge is 57%.

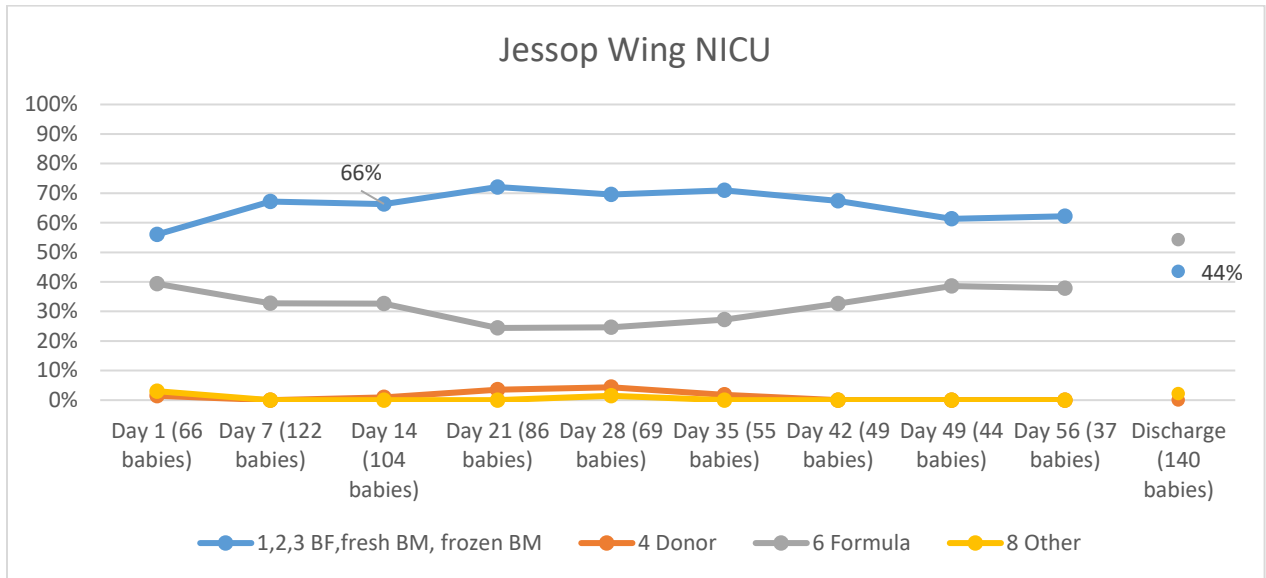




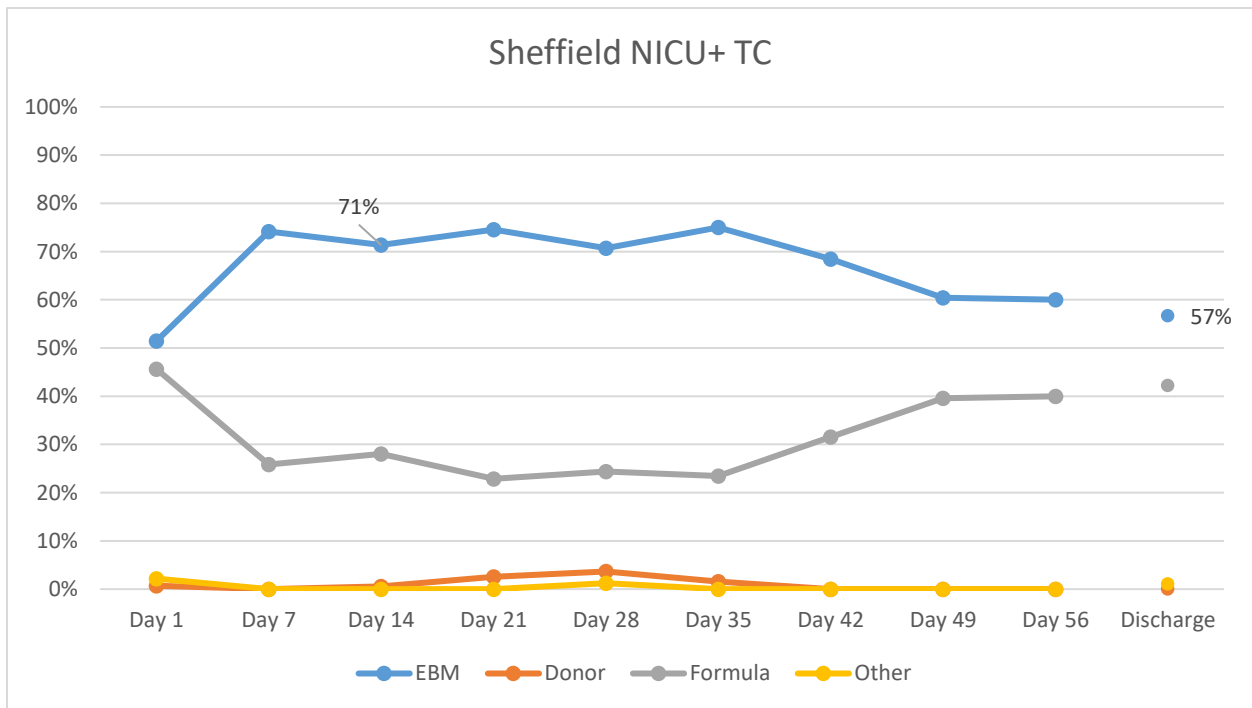
When reviewing the data pertaining to infants < 33 weeks gestation many more babies are established on EBM by 2 weeks gestation and therefore discharged receiving EBM. There is a 5% fall from day 14.

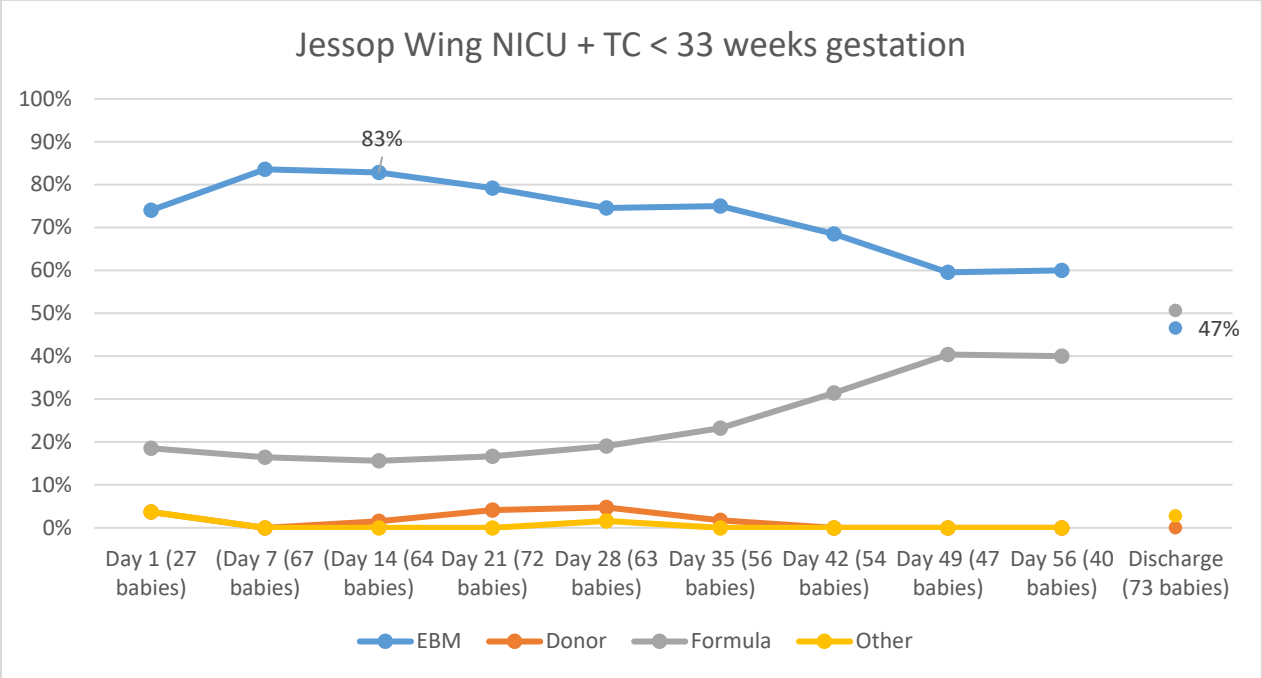
Sheffield

At 14 days 66 % of babies are receiving EBM. There is a 5% drop off rate at day 42 and then there is a drop off at discharge to 44%.



When adding in the data pertaining to Transitional Care, which includes 277 babies, there again is a similar pattern. There is a decrease of >5% at day 35. There are 57% of infants discharged receiving EBM in this data set.

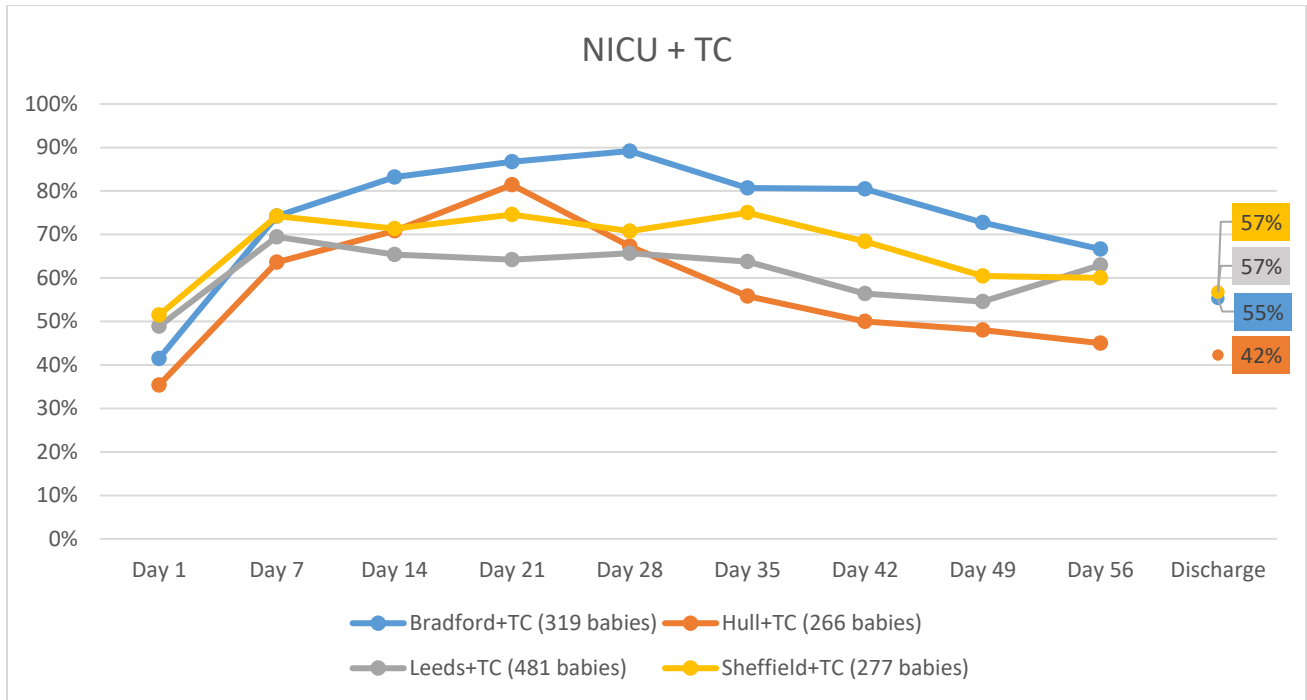




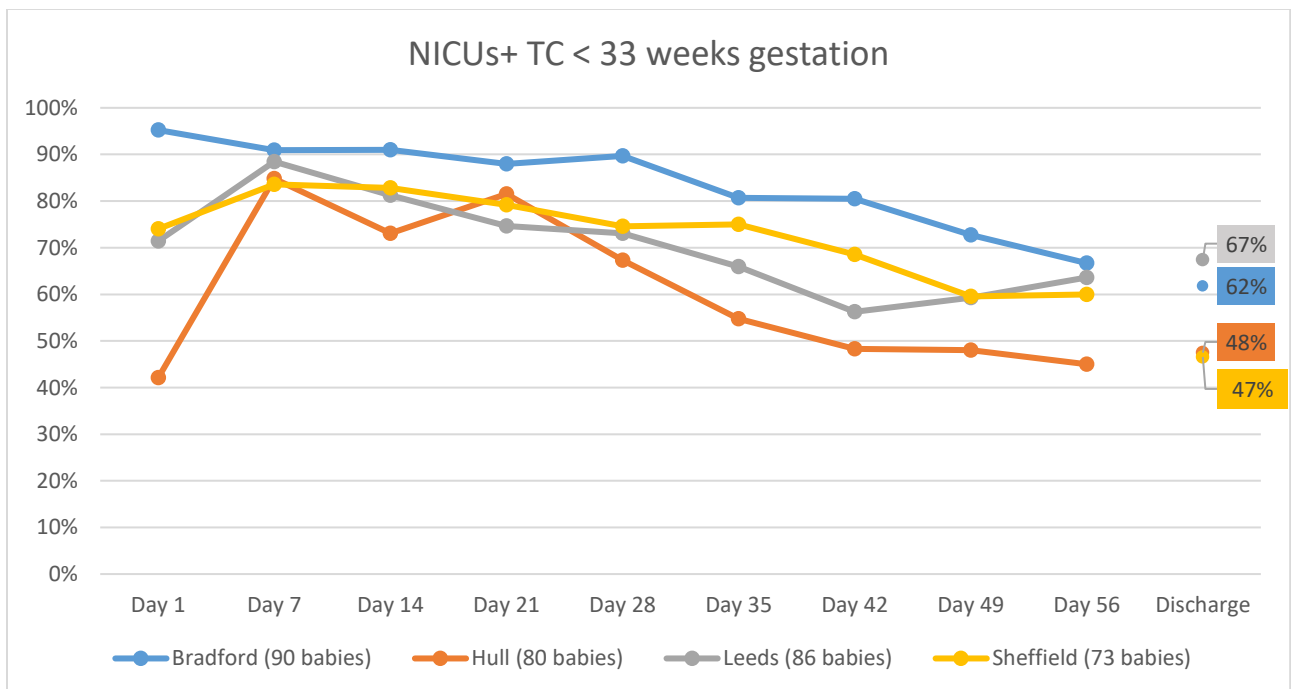
When reviewing the infant < 33 weeks gestation there is a greater number of babies receiving EBM at 14 days with a greater than 5% discharge at day 35. There is a drop off at discharge.

NICU + TC Data

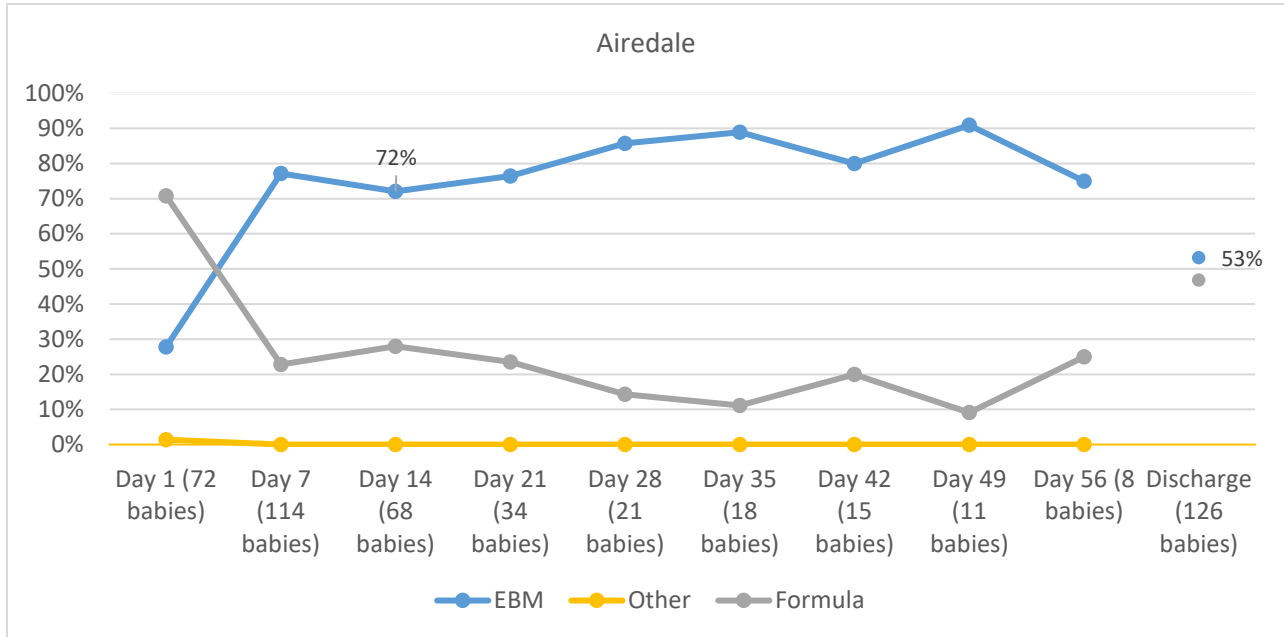
When reviewing the data sets for all of the NICUs each unit has a different pattern of EBM usage.



When reviewing the data relating to infants < 33weeks gestation more infants are receiving EBM earlier.

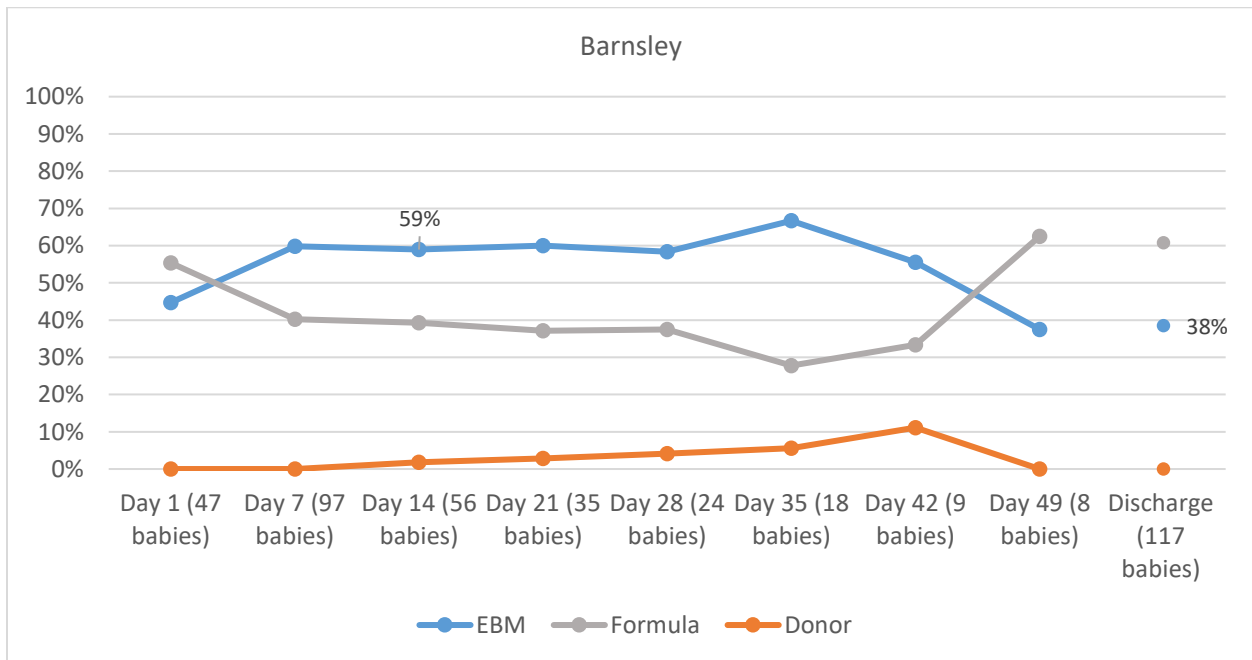


**LNUs
Airedale**



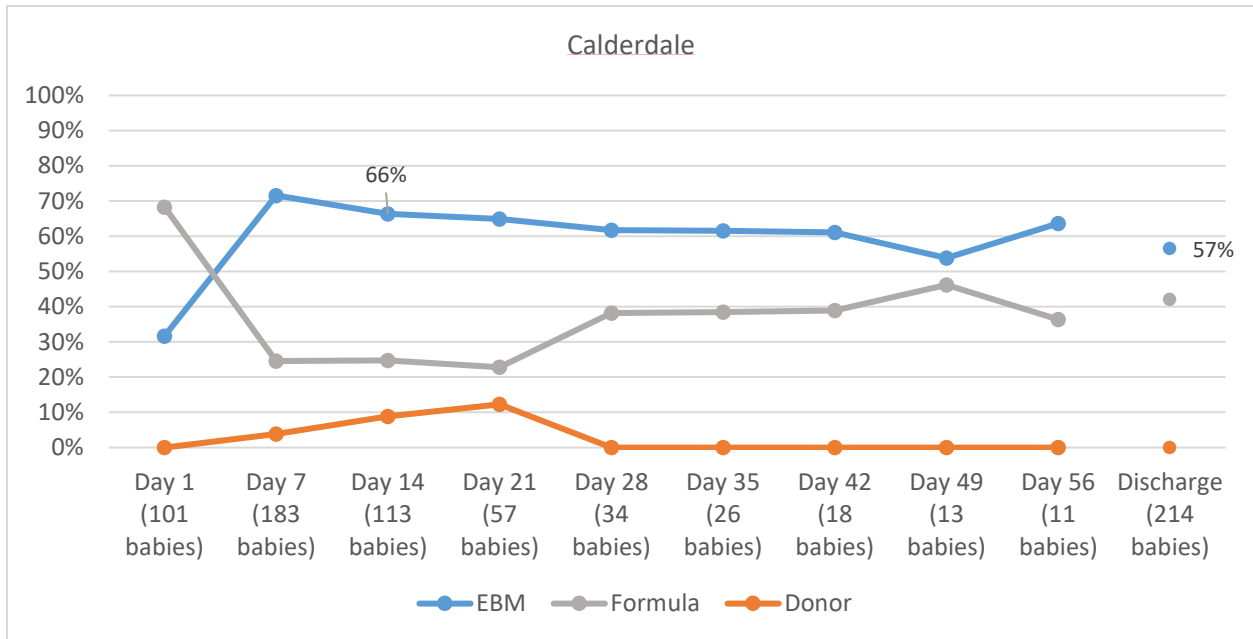
Airedale has 72% of infants receiving EBM at day 14. There is a >5% decrease at day 35. There is a decrease at discharge to 53%. Note there are only 8 babies remaining as in-patients by day 56.

Barnsley



Barnsley has 60% of infants receiving EBM at day 14. Barnsley has decrease at discharge to 38%. Note from day 42 there are only 9 babies included in the analysis. There is a 10% drop seen at day 35.

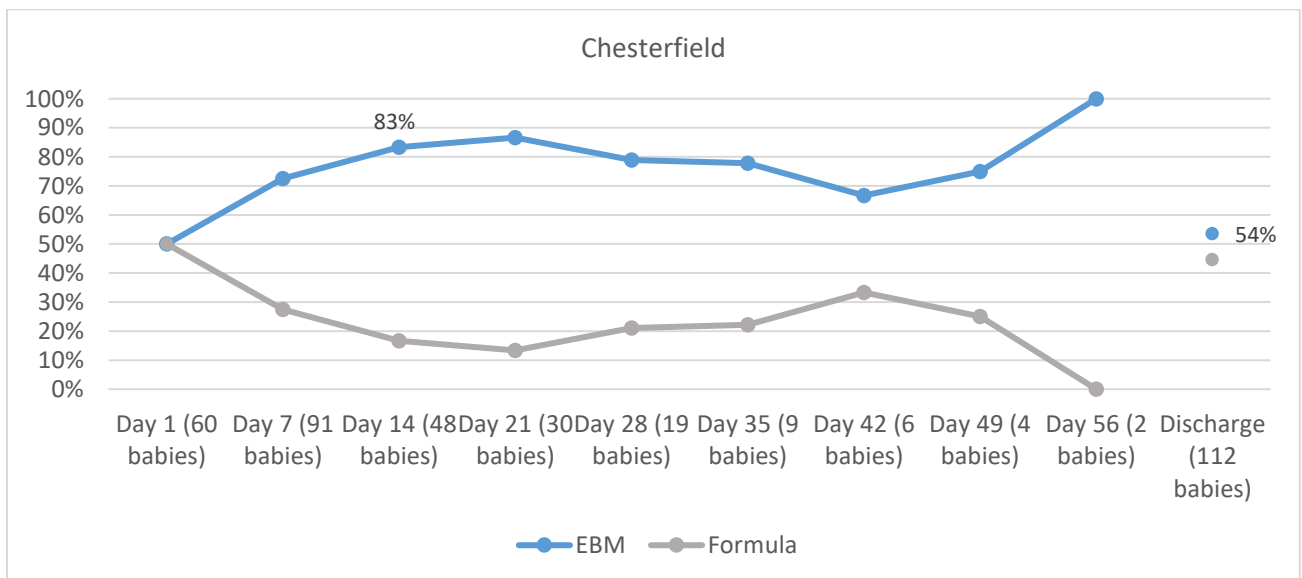
Calderdale



Calderdale has 65% EBM usage at day 14 which gradually declines to day 42 where there is a >5% decrease. At discharge 57% of infants are receiving EBM.

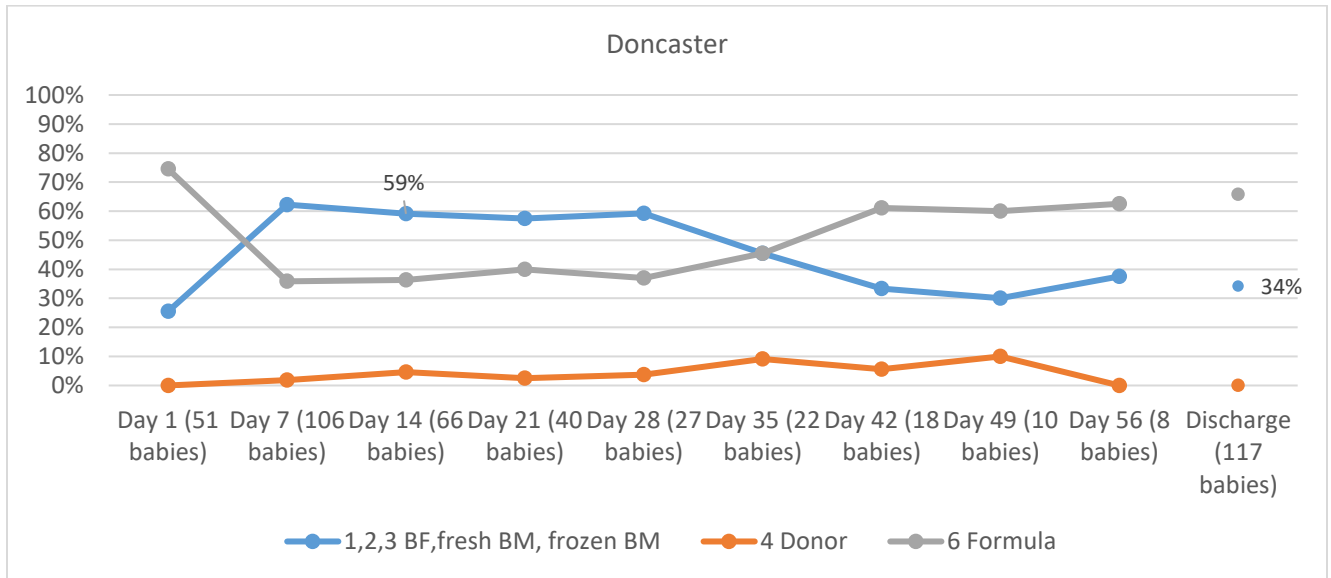
Chesterfield

Chesterfield has 83% of infant receiving EBM by day 14 in this data set. Drop off occurs at day 21 (>5%). Drop off seen at discharge to 54%. Note the low numbers of babies from day 35.



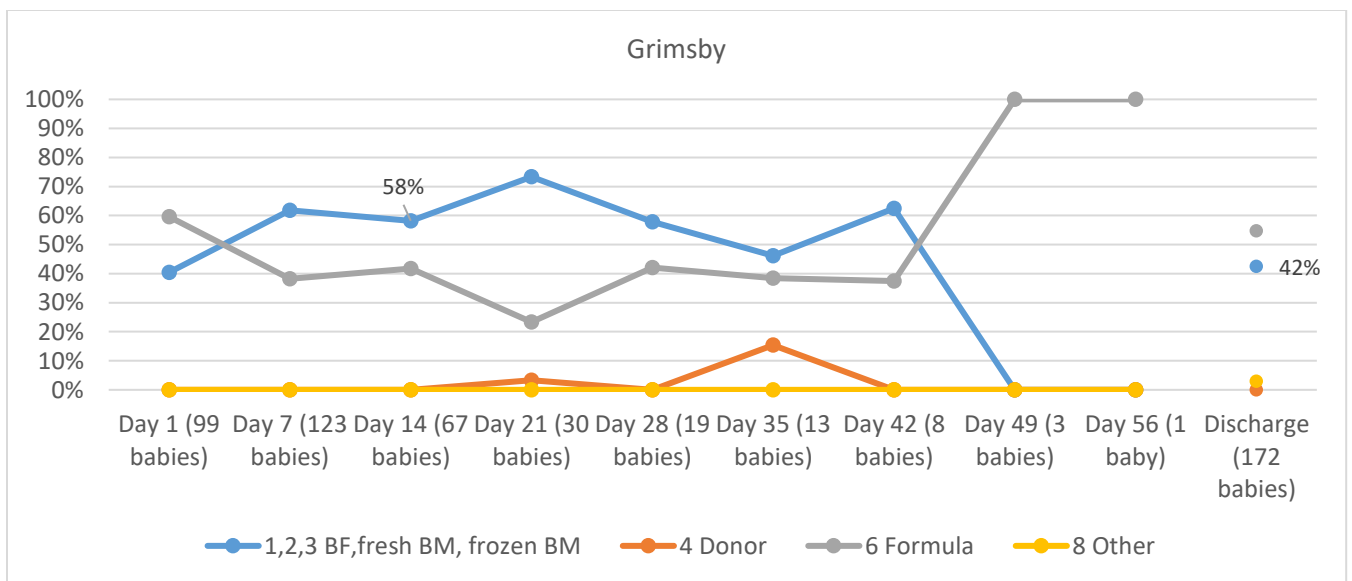
Doncaster

Doncaster has 59% of infants receiving EBM at day 14. There is a drop off >10% at day 28. At discharge there is a decrease to 34% of babies receiving EBM.



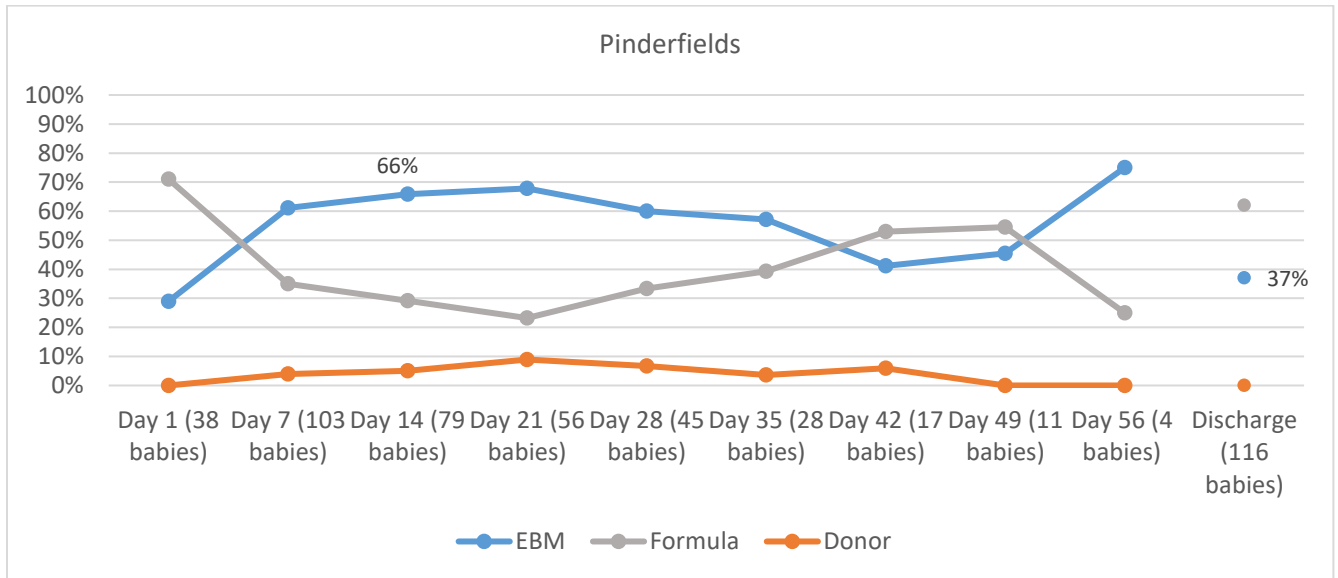
Grimsby

At day 14 58% of babies are receiving EBM. Drop off of >10% occurs from day 21 but this includes smaller numbers. Discharge data reveals 42% of infants receiving EBM. Note the low numbers of babies towards the end of the data set.



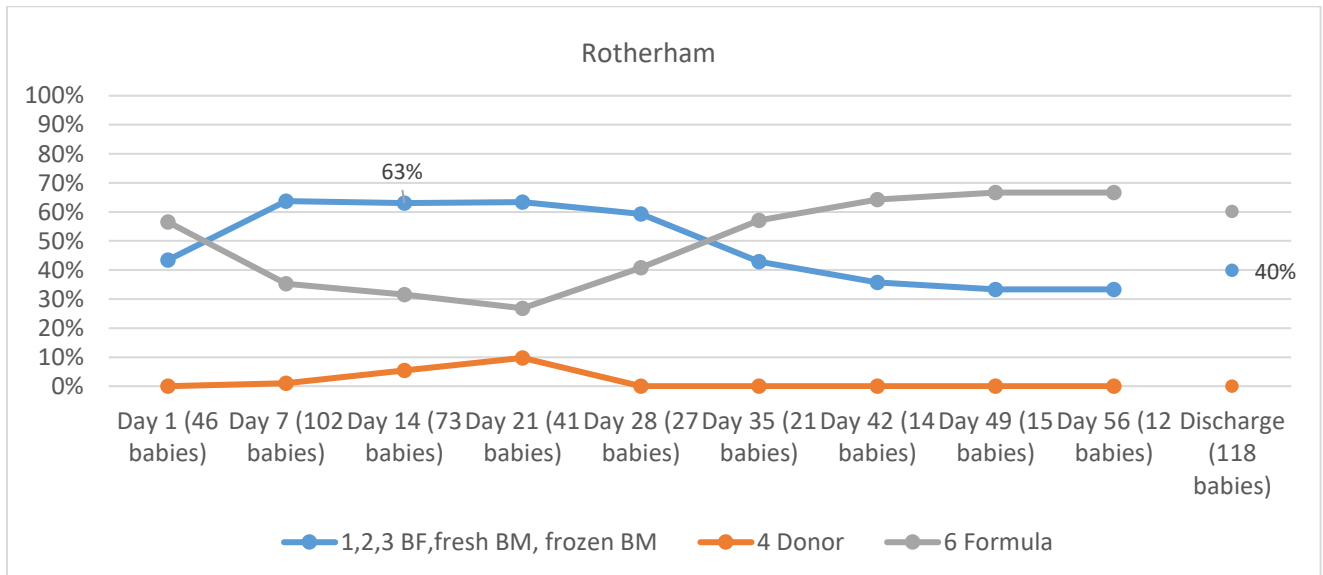
Pinderfields

At day 14 66% of babies are receiving EBM. A drop off of >5% occurs at day 21. At discharge 37% of babies are receiving EBM.



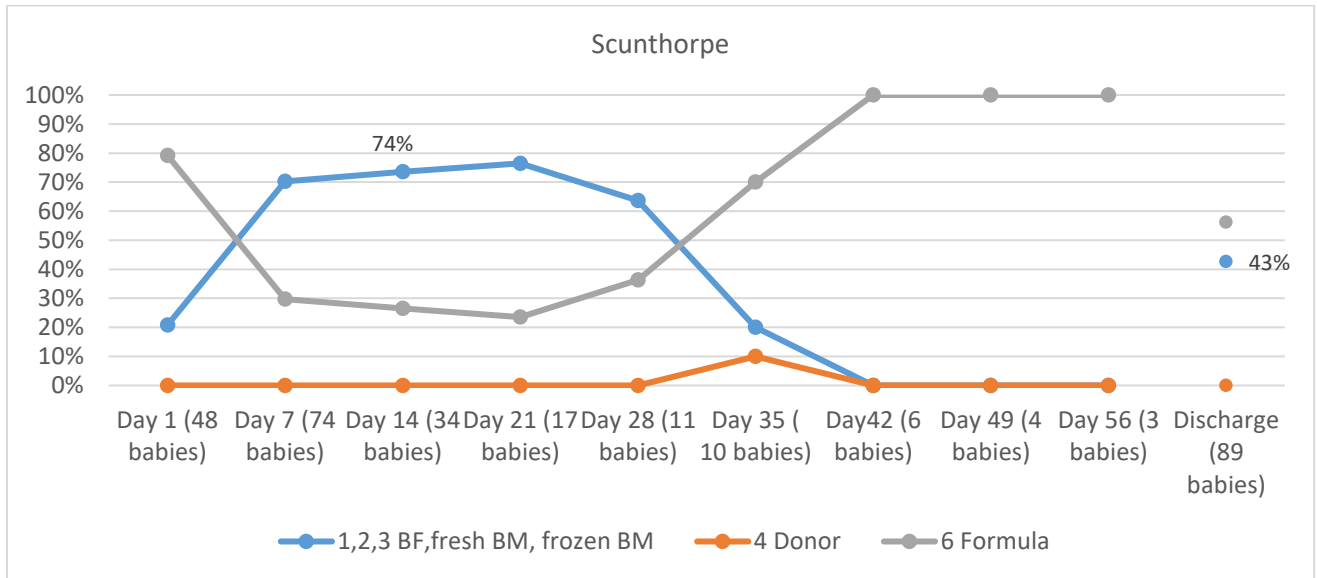
Rotherham

At day 14 63% of infants are receiving EBM. There is a >10% decrease in EBM occurring at day 28. At discharge 41% of babies are receiving EBM.



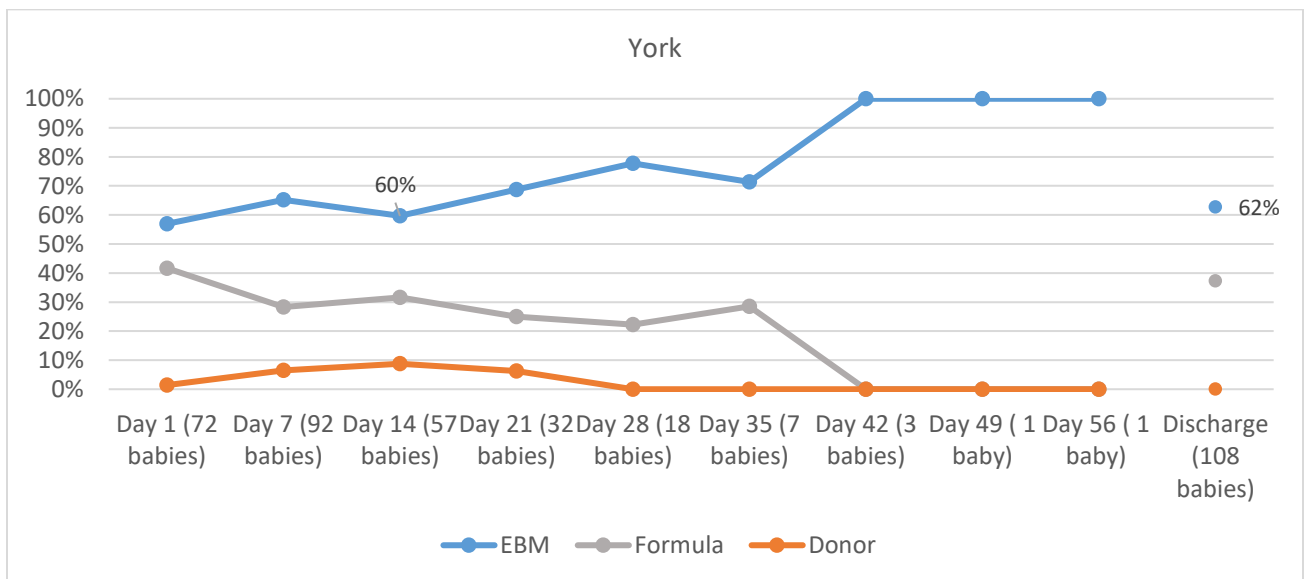
Scunthorpe

On day 14 74% of babies were receiving EBM. Drop off of >10% occurred at day 21. At discharge 43% were receiving EBM.



York

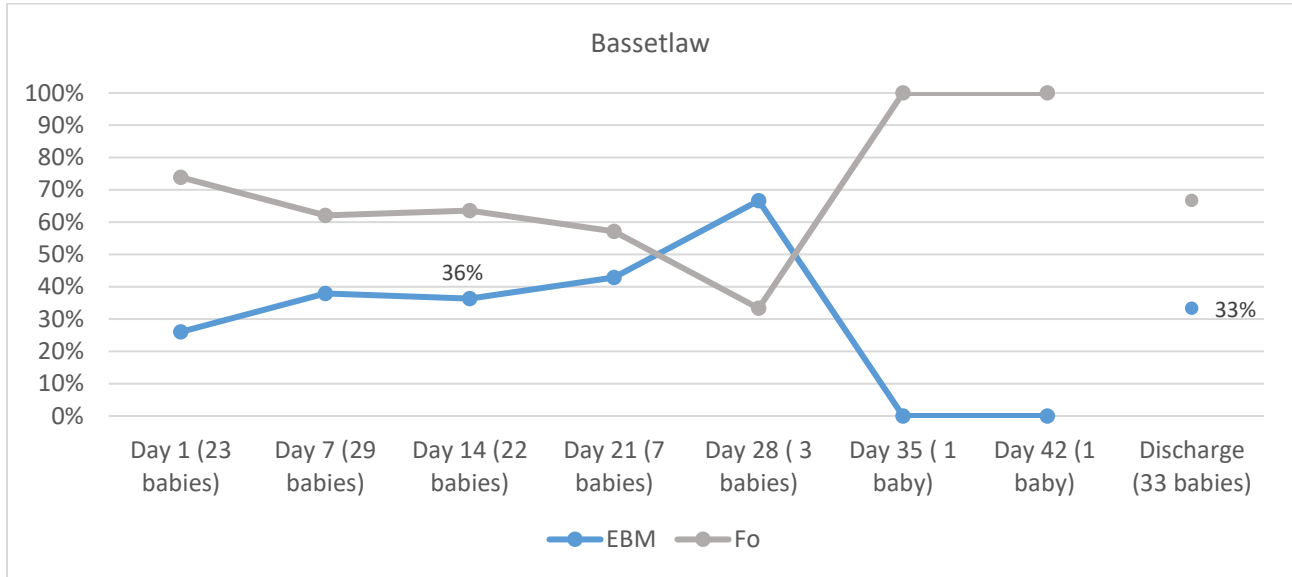
At day 14 60% of babies are receiving EBM. There is 5% drop off seen at day 28. At discharge 62% of infants are receiving EBM.



SCBUs

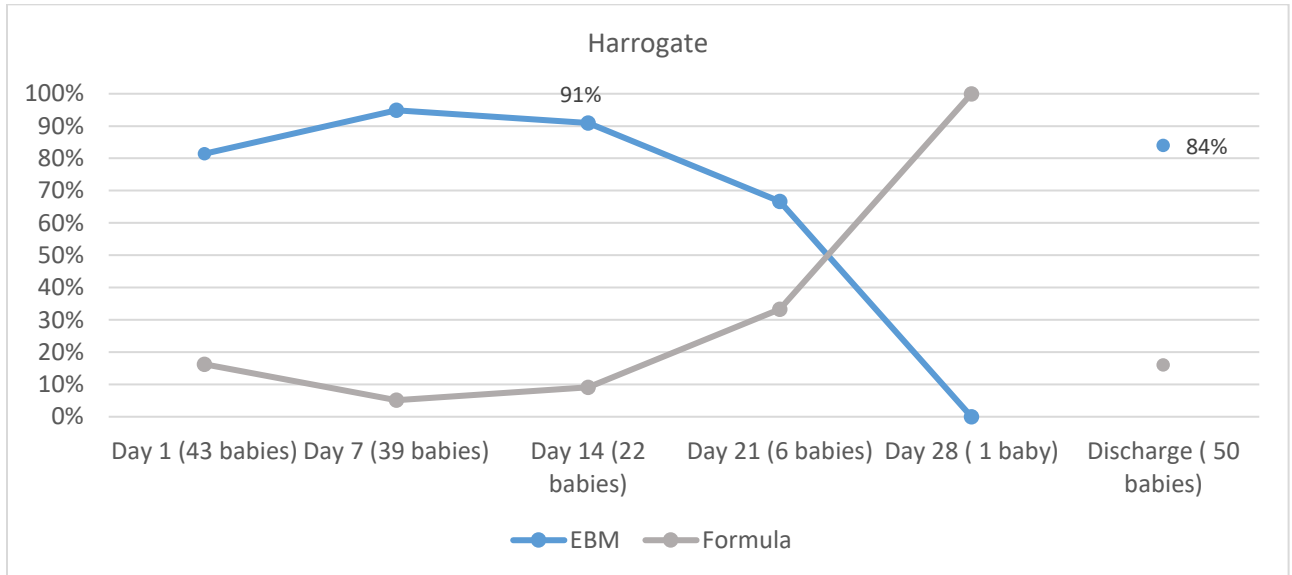
Bassetlaw

This graph displays to day 42 due to all babies having been discharged by day 49. At day 14 36% of infants are established on EBM. At discharge 33% of babies are receiving EBM.



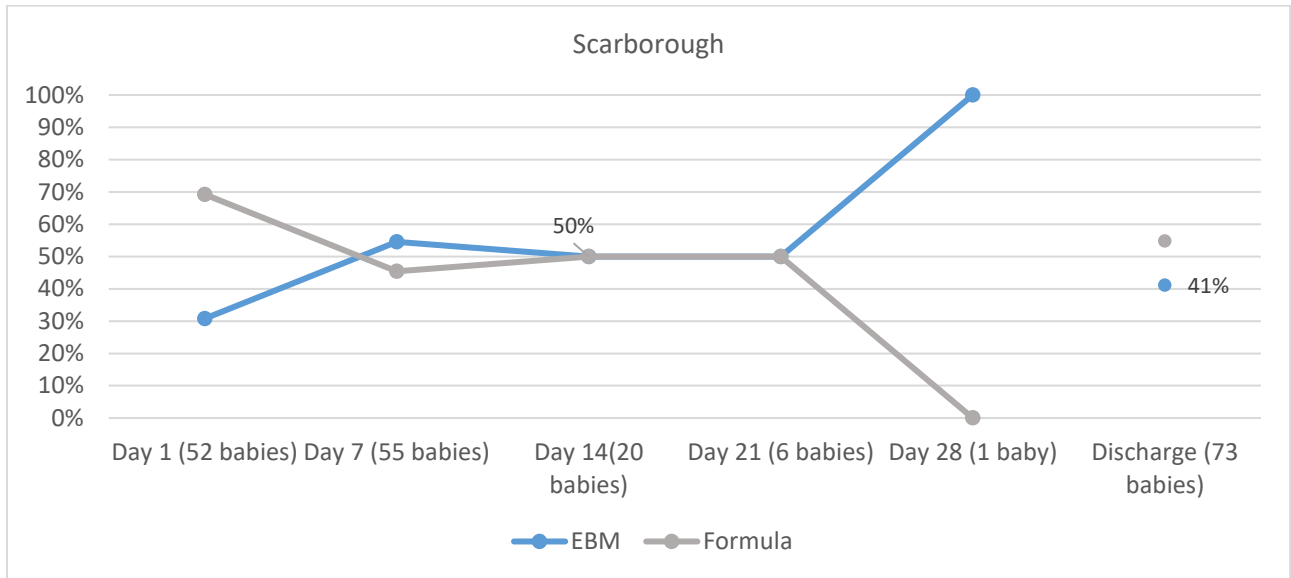
Harrogate

This graph only displays to day 28 due to all patients having been discharged by day 35. 91% of infants are receiving EBM at day 14 and 84% at discharge.



Scarborough

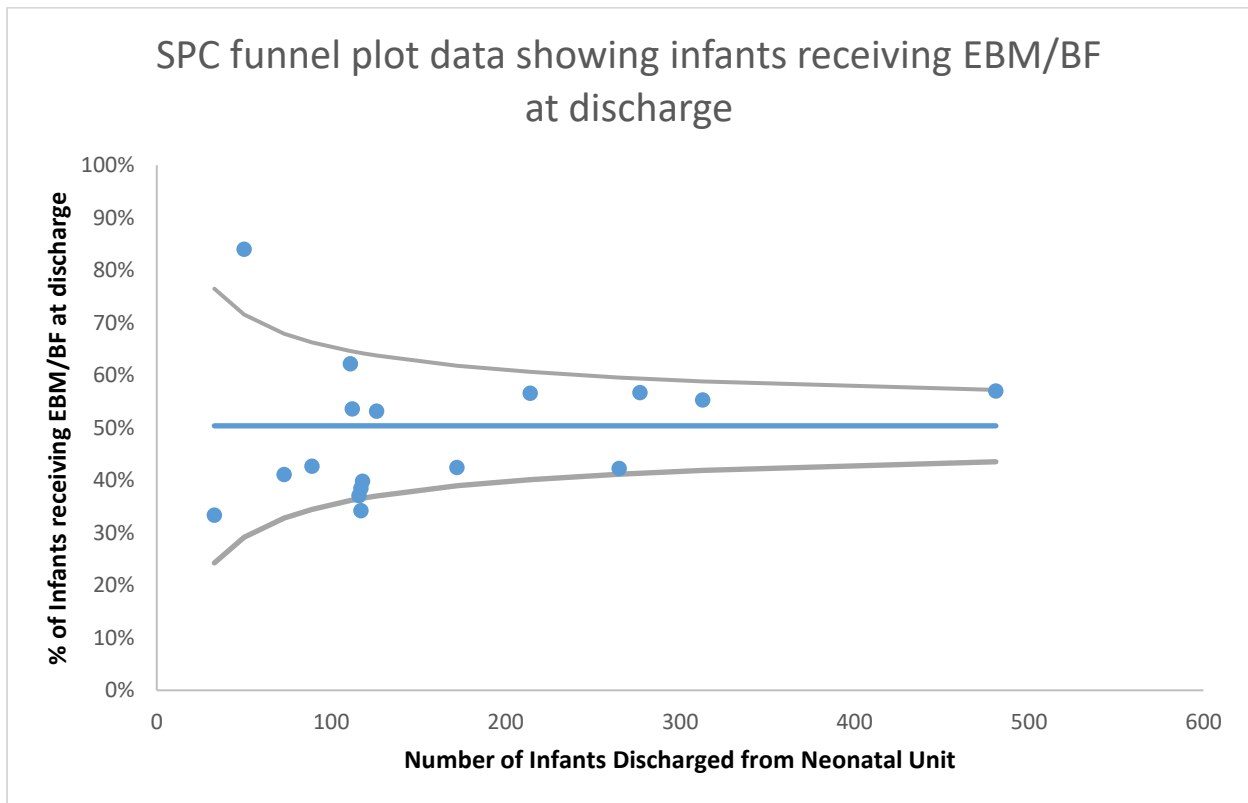
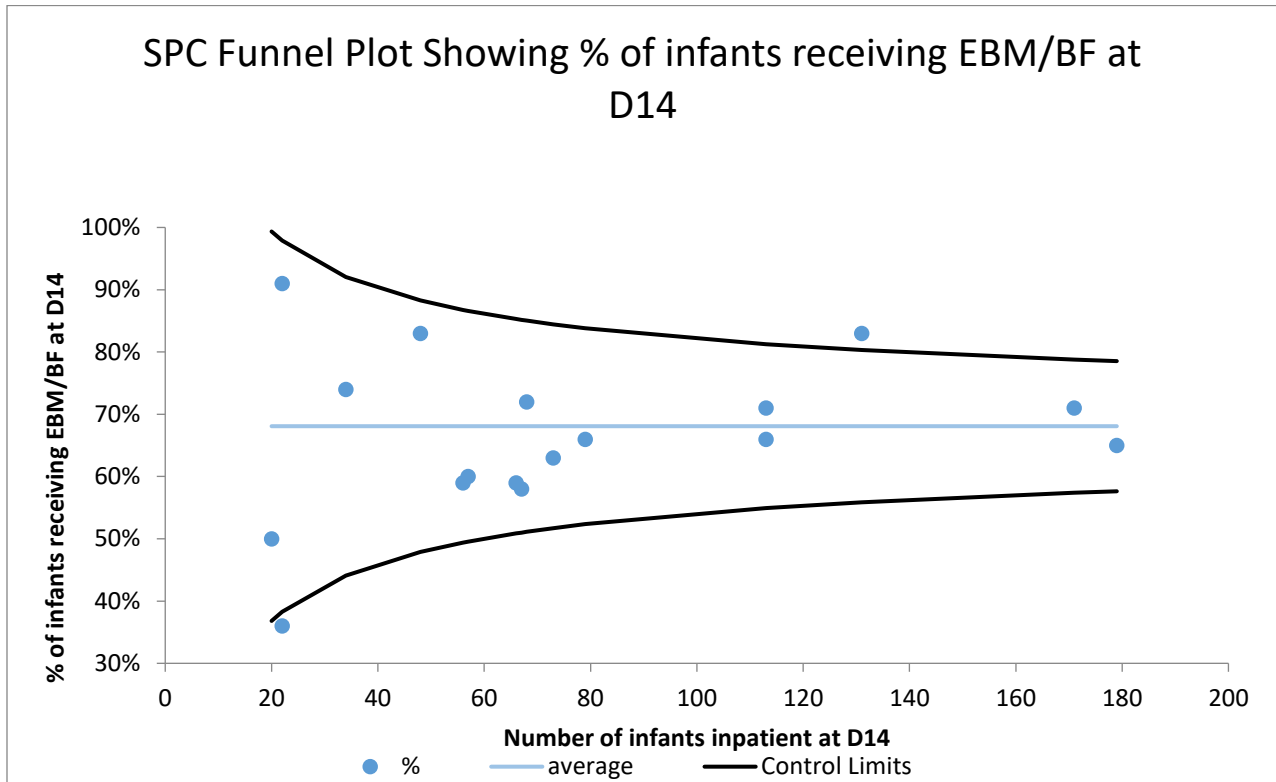
This graph only displays to day 28 due to all patients having been discharged by day 35. At day 14 50% of babies are receiving EBM and at discharge 41% of babies are receiving EBM.



Summary

	2 week	Day of fall>10%	Day of fall >5%	Discharge	Difference between 2 week data and discharge
Bradford	85%	28		54%	31%
Bradford + T/C	83%		28	55%	28%
Bradford + T/C < 33 weeks	91%		28	62%	29%
Hull	72%	21		44%	28%
Hull +T/C	71%	21		42%	29%
Hull +T/C < 33 weeks	73%	21		48%	25%
Leeds	63%		35	49%	14%
Leeds + T/C	65%		35	57%	8%
Leeds + T/C < 33 weeks	81%	35	14	67%	14%
Sheffield	66%		42	44%	22%
Sheffield + T/C	71%		35	57%	14%
Sheffield + T/C< 33 weeks	83%		35	47%	36%
Airedale	72%		35	53%	19%
Barnsley	59%	35		38%	21%
Calderdale	66%		42	57%	9%
Doncaster	59%	28		34%	25%
Chesterfield	83%		21	54%	29%
Grimsby	58%	21		42%	16%
Pinderfields	66%		21	37%	29%
Rotherham	63%	28		40%	23%
Scunthorpe	74%	21		43%	31%
York	60%		28	62%	-2%
Bassetlaw	36%			33%	3%
Harrogate	91%			84%	7%
Scarborough	50%			41%	9%
Total Average	67%			49%	

Summary



Breast Feeding at Discharge

	Day 1	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Day 49	Day 56	Discharge
Bradford+TC	18%	26%	18%	19%	20%	19%	23%	21%	21%	39%
Hull +TC	19%	19%	17%	13%	18%	10%	13%	19%	25%	25%
Leeds+TC	32%	32%	22%	22%	17%	20%	15%	29%	31%	44%
Sheffield +TC	21%	30%	26%	24%	26%	25%	19%	17%	30%	36%

	Day 1	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Day 49	Day 56	Discharge
Airedale	22%	32%	32%	32%	45%	22%	33%	27%	25%	44%
Barnsley	39%	23%	18%	14%	29%	35%	22%	13%	17%	26%
Calderdale	18%	37%	29%	24%	12%	12%	24%	33%	50%	37%
Chesterfield	16%	20%	29%	24%	11%	11%	40%	50%	50%	19%
Doncaster	19%	25%	23%	23%	22%	9%	11%	10%	0%	23%
Grimsby	23%	19%	18%	30%	11%	23%	25%	0%	0%	29%
Pinderfields	9%	14%	14%	18%	27%	25%	17%	45%	50%	22%
Rotherham	21%	16%	22%	22%	11%	18%	14%	13%	8%	26%
Scunthorpe	18%	26%	20%	18%	27%	20%	0%	0%	0%	26%
York	33%	40%	35%	50%	61%	71%	100%	100%	100%	50%

	Day 1	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Discharge
Bassetlaw	9%	21%	27%	29%	67%	0%	0%	25%
Harrogate	48%	79%	71%	17%	0%	N/A	N/A	73%
Scarborough	17%	35%	30%	33%	0%	N/A	N/A	39%

Variation seen in babies discharged breast feeding, ranging from 19-73%. From the data published by Public Health England the 'aggregate breastfeeding rate for England in 2017/18 is 42.7% (with confidence intervals of 42.6-42.8%).' (3). It suggests viewing the data with caution due to aggregation of data.

How does this relate to NNAP Data and local data?

	This Data Set, 2017-2018, all gestations			NNAP 2017 Data < 33/40 (4)		BF at 6-8 week check (5)	
	No of infants	D42	Discharge	No of infants	Discharge	6-8 week	Source
Bradford +TC	319	81%	55%	106	57.5%	No data	
Hull + TC	266	50%	42%	80	42.5%	43.1%	East Riding of Yorkshire
Leeds +TC	481	56%	57%	102	60.8%	47.7%	
Sheffield +TC	277	68%	57%	69	56.5%	51.5%	
Airedale	126	80%	53%	18	61.1%	48.5%	North Yorkshire
Barnsley	118	56%	39%	24	29.2%	No data	
Calderdale	214	61%	57%	47	44.7%	No data	
Chesterfield	112	67%	54%	26	57.7%	No data	
Doncaster	117	33%	34%	31	29.0%	27.8%	(Quarter 2 only)
Grimsby	173	63%	42%	17	52.9%	28%	North East Lincolnshire
Pinderfields	118	41%	37%	69	44.9%	No data	
Rotherham	118	36%	41%	20	30.0%	30.4%	
Scunthorpe	89	0%	43%	18	44.4%	22.6-35.3%	(Across 3 quarters of the year, no annual figure) North Lincolnshire
York	111	100%	64%	32	68.8%	No data	
Bassetlaw	33	0%	33%	3	100.0%	No data	
Harrogate	51	n/a	84%	5	80.0%	No data	
Scarborough	74	n/a	41%	4	75.0%	No data	

The NNAP data is available online and relates to infants <33 weeks gestation.

The local data is obtained from data inputted by Health Visitors relating to breast feeding at the 6-8 week check (5). It is an incomplete data set and they discuss how they have aggregated the data. I have also used areas of the region to relate to different hospitals. It may be more useful to relate this figure to the local hospitals postnatal data where available.

In general the neonatal discharge rates are above the background population rates, therefore neonatal units can be commended for their work on this, however clearly it would be beneficial to have the rates on discharge higher.

Data

Statistical Analysis

The data collected has been analysed using IBM SPSS. Both univariate and multivariate iterative backwards conditional logistic regression and Chi² analysis were used. Logistic regression variables include: unit type, intention to breast feed, gestation, birth weight, temperature on admission, received any maternal breast milk during admission (whether secondary to a breast feed or by expressed breast milk), day of life and total care days. Statistical significance of $p < 0.05$ was used, confidence intervals calculated and the number needed to treat (the number of mothers required to express breast milk/ breast feed for one infant to be discharged home receiving maternal breast milk) was calculated.

Multivariate Analysis

A backwards conditional logistic regression revealed that intention to BF, receiving EBM/BF, total care days and unit type were all significantly related to BF/receiving EBM at discharge. Intention to BF was no longer statistically significant by day 28. However, total care days, and unit type remained statistically significant to BF/receiving EBM at discharge.

Variables significantly related to receiving EBM/BF at discharge for different days of inpatient stay					
Day of inpatient stay	Number of babies	Variable	P value	OR	95% CI
56	125	Unit type: NICU	0.038	3.89	1.08-14.08
56	125	Total care days	<0.001	1.06	1.02-1.10
21	576	Unit type: LNU	0.001	2.05	1.32-3.18
21	576	Total care days	<0.001	1.02	1.01-1.03
21	576	Intention to breast feed	0.006	2.49	1.30-4.74
21	576	Received EBM/BF Day 14	0.039	2.96	1.06-8.26
21	576	Received EBM/BF Day 21	<0.001	19.6	7.14-55.56
14	975	Unit type: LNU	<0.001	2.49	1.72-3.61
14	975	Total care days	<0.001	1.03	1.02-1.04
14	975	Intention to breast feed	0.002	2.29	1.36-3.86
14	975	Received any mother's milk	0.011	14.7	1.87-111.11

14	975	Received EBM/BF Day 14	<0.001	26.3	14.08-50
7	1638	Unit type: LNU	<0.001	2.07	1.56-2.75
7	1638	Total care days	<0.001	1.02	1.02-1.03
7	1638	Intention to breast feed	<0.001	2.60	1.77-3.82
7	1638	Received any mother's milk	<0.001	50	11.9-200
7	1638	Received EBM/BF Day 1	0.037	1.39	1.02-1.88
7	1638	Received EBM/BF Day 7	<0.001	6.67	4.52-9.80
1	1970	Unit type: LNU	<0.001	1.69	1.32-2.17
1	1970	Total care days	<0.001	1.02	1.01-1.03
1	1970	Intention to breast feed	<0.001	3.66	2.61-5.13
1	1970	Received any mother's milk	<0.001	142.86	58.8-333.3
1	1970	Received EBM/BF Day 1	0.042	1.32	1.01-1.72

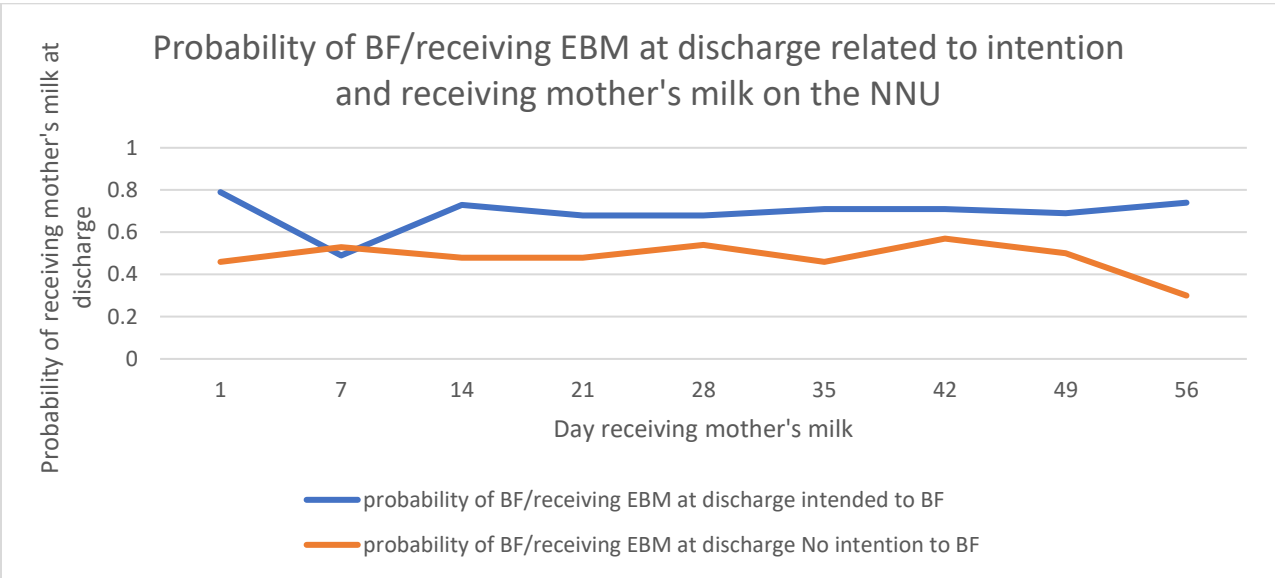
Intention to Breast feed

If the mother indicates that she intended to breast feed, the probability that the baby is discharged home on EBM/BF is 0.66. The probability that the baby is discharged home is the mother had no intention to breast feed is 0.12 (RR 2.60, 95% CI 2.41, 2.82, CHI squared $p < 0.001$). Number needed to treat 1.85 (95% CI 1.71, 2.00).

This analysis reveals that mother's intention to BF has a large impact on whether the baby will be receiving EBM/BF at discharge. This intention may be possible to be influenced with education to try to facilitate an informed choice when the baby is ill/ premature. This could be affected by antenatal care and also antenatal counselling.

If the infant is receiving EBM/BF on day 1 of life and intended to breast feed the probability of receiving EBM/BF at discharge is 0.79. If no intention to breast feed and receiving EBM/BF on day 1 of life the probability of receiving EBM/BF at discharge is 0.46. NNT 3.02 (95% CI 2.11, 5.32, $p > 0.001$).

		Infant receiving EBM/ BF on day								
		1	7	14	21	28	35	42	49	56
Probability of receiving EBM/BF at discharge if intended to BF	0.66	0.79	0.74	0.73	0.68	0.68	0.71	0.71	0.69	0.74
Probability of receiving EBM/BF at discharge if no intention to BF	0.12	0.46	0.53	0.48	0.48	0.54	0.46	0.57	0.50	0.30



If we can inform mother’s regarding the benefits of EBM and facilitate expressing/BF on the NNU the number of babies being discharged BF/ receiving mother’s milk can potentially be increased. Probability of going home breast feeding/ receiving EBM if no intention to BF is 0.12. If the mother is expressing and the baby receiving EBM/BF on day 1 this increases the probability of the baby going home breast fed/receiving EBM to 0.46, NNT 2.96.

If no intention to BF and receive mother’s milk on day 1 of life the chances of being discharged BF/ receiving EBM is 0.46. If the infant doesn’t receive EBM on day 1 the chances of being discharged on EBM/BF is 0.10. NNT 2.80 (95% CI 2.15,4.00, p=0.001).

If the mother intended to BF and the baby receives EBM/BF on day 1 probability of going home breast feeding is 0.79. If you intended to breastfeed but the baby doesn’t receive EBM/BF on day 1 the probability of going home on EBM/BF is 0.60. NNT 5.40 (95% CI 4.21, 7.54, p <0.001).

This data highlights the importance of commencing expressing on day 1 of life and giving this EBM to the infant as this can influence whether the baby is likely to be receiving EBM/BF at discharge.

Infant receiving EBM/BF on NNU regardless of maternal intention

If a baby receives EBM/BF whilst an in-patient the probability of being discharged on EBM/BF is 0.67. The probability of going home on EBM/BF if no EBM/BF on the NNU is 0.01 (RR 3.01, 95%CI 2.81,3.22, CHI squared $p<0.001$). NNT 1.51 (95% CI 1.43, 1.60). This figure of 0.01 is likely to reflect the babies in this data set who were admitted to the NNU for only a short period of time.

The probability of going home on EBM/BF if receiving EBM/BF on day 1 is 0.77. Probability of being discharged home on EBM/BF if not receiving EBM/BF on day 1 is 0.41 (RR 2.59, 95% CI 2.22, 3.02, CHI squared $p<0.001$). NNT 2.75 (95% CI 2.43,3.13).

The probability of going home BF/receiving EBM if receiving EBM/BF on day 7 is 0.71. Probability of being discharged home on EBM/BF if not receiving EBM/BF on day 7 is 0.09 (RR 3.16, 95% CI 2.90, 3.45, CHI squared $p<0.001$). NNT 1.60 (95% CI 1.51, 1.70).

The probability of going home on EBM/BF if receiving EBM/BF on day 14 is 0.70. Probability of going home on EBM/BF if not receiving EBM on day 14 is 0.04 (RR 3.22, 95% CI 2.90,3.57, CHI squared $p<0.001$). NNT 1.52 (95% CI 1.42, 1.63).

When comparing day 1 and day 7 data of babies not receiving EBM/BF on day 1 versus day 7 the probability of being discharged home on EBM/BF falls from 0.41 to 0.09 with RR 1.54 (95% CI 1.48, 1.61, $p< 0.001$). NNT 3.11 (95% CI 2.77, 3.53). When comparing day 7 and day 14 data of babies not receiving EBM/BF on day 7 versus day 14 the probability of being discharged home on EBM/BF falls from 0.09 to 0.04 with RR 1.04 (95% CI 1.01,1.08, $p =0.005$) NNT 24.42 (95% CI 13.92, 99.08).

	Probability of going home receiving EBM/BF if:				
	Receiving EBM/BF on day	Not receiving EBM/BF on day	Relative Risk (95% CI)	Chi ² p value	NNT (95% CI)
Day 1	0.77	0.41	2.59 (2.22-3.02)	<0.001	2.75 (2.45-3.13)
Day 7	0.71	0.09	3.16 (2.90-3.45)	<0.001	1.60 (1.51-1.70)
Day 14	0.70	0.04	3.22 (2.90-3.57)	<0.001	1.52 (1.63-1.42)
Day 21	0.67	0.05	2.84 (2.52-3.21)	<0.001	1.62 (1.46-1.81)
Day 28	0.66	0.02	2.90 (2.50-3.35)	<0.001	1.56 (1.40-1.76)
Day 35	0.69	0.04	3.09 (2.56-3.73)	<0.001	1.54 (1.38-1.76)
Day 42	0.70	0.05	3.16 (2.49-3.99)	<0.001	1.54 (1.36-1.76)
Day 49	0.73	0.05	3.45 (2.57-4.64)	<0.001	1.48 (1.30-1.73)
Day 56	0.75	0.04	3.88 (2.71-5.55)	<0.001	1.40 (1.22-1.65)

The analysis of the data suggests areas for optimization including antenatal counselling, expressing on day 1, establishing expressing/BF by day 7 and to a lesser extent day 14. This then needs to be sustained as there is tailing off in expressing/BF as the time spent on the neonatal unit increases.

Discussion

Patterns can be seen when considering the graphs of each unit. I have separated these into:

- The degree at which EBM established- ranges from 36-90%
- When the 'drop off' can be seen- ranges from 21 days onwards
- How big a drop off there is at discharge- from 0- 31% (average drop off in 16 units 18.7%)

It is interesting to see that each unit appears to have different patterns of EBM use. Each unit varies on the degree of establishment and some units have higher rates of EBM at discharge. All units bar one show a reduction in babies receiving EBM at discharge compared to the number of babies receiving EBM whilst on the Neonatal unit. This may reflect the challenges of trying to establish breast feeding but also that mothers may have not intended to breast feed and switch to formula feeding for home. It is difficult to discern a specific point where mothers choose to stop expressing and this is likely to have many factors contributing to it.

When reviewing data from Bradford there is a significant uptake of babies receiving EBM that even though drop off occurs it does so gradually and Bradford remains above the other NICUs until discharge. It therefore seems reasonable to consider reviewing methods for establishing EBM in the first two weeks as it would seem appropriate to prioritise establishing as many babies as possible on EBM whilst pre-term and at greatest risk of morbidity and mortality.

When reviewing the statistics it seems clear that reviewing maternal intention to breast feed antenatally, optimising expressing on day 1, establishing expressing/BF by day 7 and to a lesser extent day 14 and supporting mothers in sustaining are all important.

Although this data analysis can direct us to when we should focus on i.e. in the first two weeks of life, it does not tell us what we should do to achieve this increase in EBM use nor what the constraints in the systems are.

When reviewing the population data, where available, the data from the units compared to the local population data reveals higher rates of EBM being given to babies residing on the neonatal unit at day 42/being discharged from the units in the region. This, along with the data relating to babies receiving EBM when it is reported that mothers did not intend to breast feed, highlights some of the excellent work that staff are doing across the region to promote the use of EBM in the Neonatal Unit.

Plans

This report is part of a linked document to a report of process maps of the EBM journey across the region. This report will also be shared to allow units to consider their practice and whether there are unit- specific changes they would like to implement in their departments to increase the number of babies discharged receiving EBM/BF.

From the data it seems clear that the focus needs to be:

Antenatal discussion

Expressing on day 1 of life

Establishing expressing by day 7/to a lesser extent day 14

Sustaining expressing

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