

**Regional audit of the 5 Health and Social Care Trusts**

**Specialty/Service of audit: Paediatric**

**Audit of Parenteral Fluid Therapy for Children and Young Persons**  
**(aged over 4 weeks & under 16 years)**

**AUDIT REPORT VOLUME 2**

<b>Audit report</b>	
Volume 1	Audit Methodology, Discussion and Recommendations
<b>Volume 2</b>	<b>Audit Findings (Data tables and audit proformas)</b>

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## Audit Report Volume 2

Report Volume 2 of the Audit of Parenteral Fluid Therapy for Children and Young Persons (aged over 4 weeks & under 16 years) includes the data that was gathered during the audit and data fields that were cross referenced during the analysis stage.

Data is presented on a regional basis and where there are specific data from one of the five Health and Social Care Trusts (HSCTs), coding has been used to anonymise the HSCTs in Volume 1 and Volume 2 of the Audit Report.

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### **Meetings schedule**

The meeting schedule for this project was:

- 30<sup>th</sup> September 2013
- 18<sup>th</sup> October 2013
- 20<sup>th</sup> November 2013
- 21<sup>st</sup> January 2014 (subgroup)
- 27<sup>th</sup> February 2014
- 27<sup>th</sup> May 2014

### **Clinical expert audit review**

Clinical experts were used throughout the audit to provide interpretation and comment on the clinical relevance of data that was variant.

The clinical experts included 5 Consultants and 2 Senior Nurse Managers, all with full time experience in paediatrics. This included: 3 Consultant Paediatricians, each with over ten years experience as a Consultant; 1 Consultant Paediatric Anaesthetist and Intensivist with extensive training exposure including Great Ormond Street Hospital; 1 Associate Specialist in Paediatrics with particular regional experience in fluid balance; 1 Clinical Manager for Paediatrics and Neonatology and one Governance Nursing Lead, a previous Clinical Sister in Paediatric Intensive Care Unit and trainer in fluid management.

## **FINDINGS**

The audit measured HSCTs practice against the standards set out in the DHSSPS Parenteral Fluid Therapy for Children & Young Persons (aged over 4 weeks & under 16 years) Initial management guideline Wallchart (June 2013) as given in Appendix 1.

A single Baseline proforma was collected for every patient upon entry to this audit, containing 14 categories of information as given in Appendix 2. A Daily proforma was completed for each Daily Fluid Balance Chart (DFBC) obtained for that patient's stay. It contained 24 categories of information as given in Appendix 3.

The audit generated a large amount of data and the audit reporting has been divided into two volumes:

- Volume 1: Audit Methodology, Discussion and Recommendations.
- Volume 2: Audit Findings (Data tables and audit proformas).

Health and Social Care Trust	Code
BHSCT	
NHSCT	
SEHSCT	
SHSCT	
WHSCT	

Each HSCT is identified with a letter throughout volumes 1&2 of this report.

Each HSCT will be given their individual coded letter and the overall code is available to the Project Team and the members of the DHSSPSNI who commissioned the audit.

## Baseline Proforma

Figure 1: Number of Baseline proforma returns per HSCT

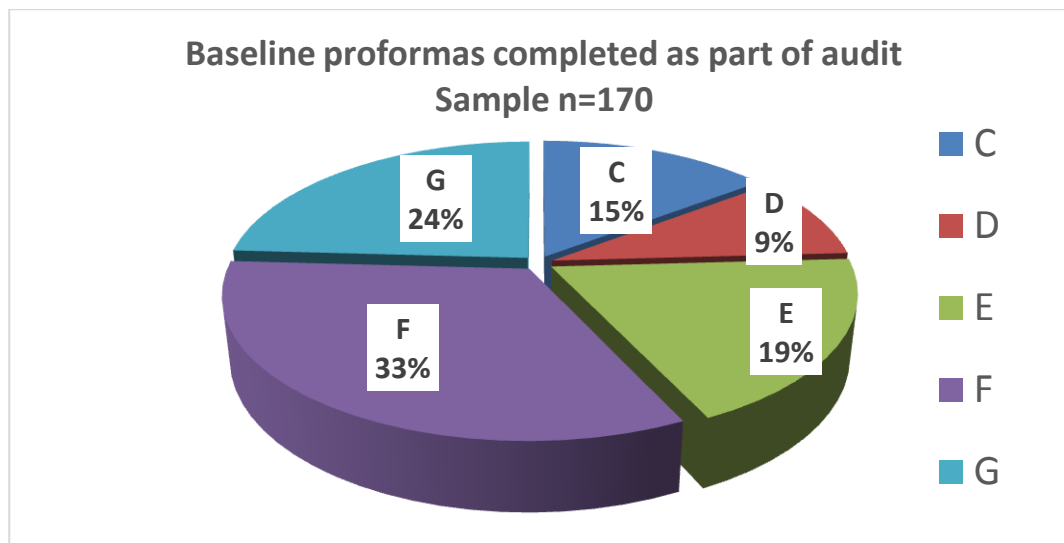


Table 1 shows the spread of the sample across the HSCTs. Four of the five HSCTs verified that data was collected on all children who fitted the audit criteria, aged over 4 weeks and under 16 years, who received IV Fluids during the time period of the audit. One HSCT collected data on 41 out of 56 patient records. Data was not collected due to difficulties accessing patient records and the timescale of the audit.

Table 1: Number of Baseline proforma returns per HSCT

Health and Social Care Trust (HSCT)	Baseline proformas completed as part of audit. Sample n=	Sample %
C	25	15
D	16	9
E	32	19
F	56	33
G	41	24
<b>Regional Total</b>	<b>170</b>	<b>100</b>

Table 2 shows that the audit sample was 49% Male (84 patients) and 51% Female (86 patients).

Table 2: Male/Female breakdown of sample

Sex	n=	Male	%	Female	%
<b>Regional Total</b>	<b>170</b>	<b>84</b>	<b>49</b>	<b>86</b>	<b>51</b>

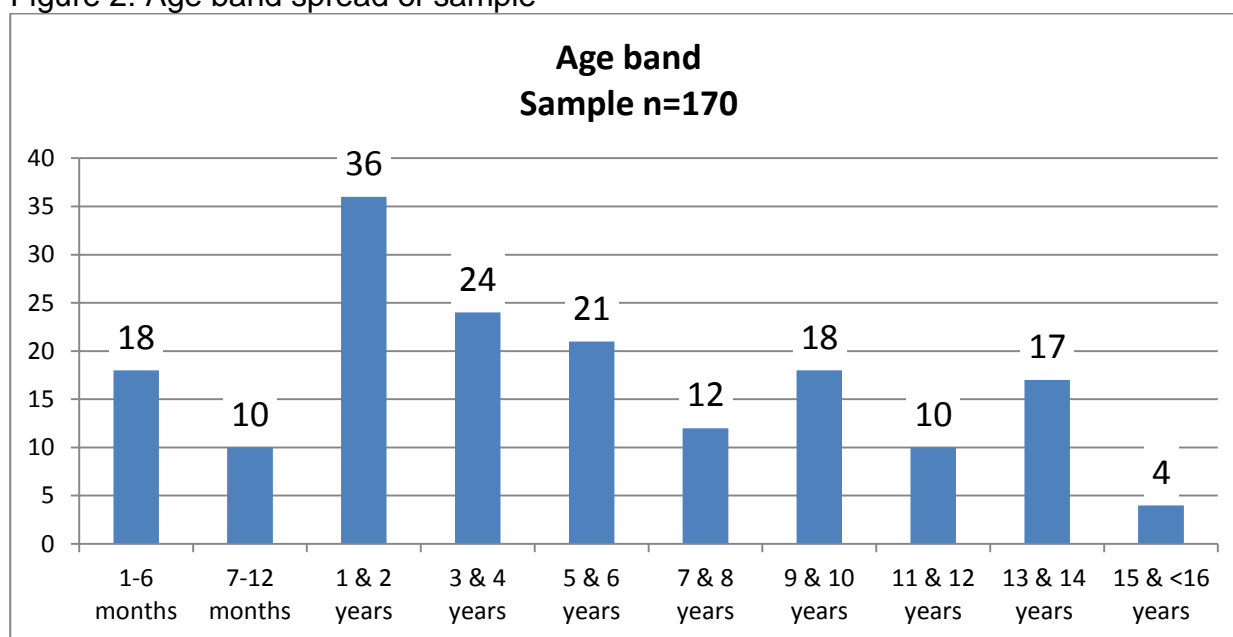
## Age distribution of sample

Table 3 and Figure 2 show that the audit sample had an even age spread.

Table 3: Age distribution of sample

Age Band	n=	%
1-6 months	18	11
7-12 months	10	6
1 & 2 years	36	21
3 & 4 years	24	14
5 & 6 years	21	12
7 & 8 years	12	7
9 & 10 years	18	11
11 & 12 years	10	6
13 & 14 years	17	10
15 & <16 years	4	2
<b>Regional total</b>	<b>170</b>	<b>100</b>

Figure 2: Age band spread of sample





## Admission setting

Table 4 shows that the majority of patients were treated within Paediatric setting (95%).

Table 4: Admission setting

Setting	n=	Paediatric	%	Adult	%
<b>Regional Total</b>	<b>170</b>	<b>162</b>	<b>95</b>	<b>8</b>	<b>5</b>

### Young people being cared for in an adult ward

There were 8 patients treated in an adult ward, the age ranged from 13-15 years old. For the 8 patients there was data collected on 10 DFBC. However the 2 instances of DFBC missing from the audit applied to this group.

- 6 had DFBC fully completed for each day of episode.
- 2 patients are the two instances of missing charts in the audit, the reason given for this was misfiling.
- 7 had E&U test results available within 4 hours of commencing fluids. 1 had a test result at 16 hours 25 minutes prior to commencing fluids was Normal (Na 140), this patient had diagnosis of Appendicitis and was at high risk of hyponatraemic complications.

Table 5: Patients treated in an adult setting - Baseline proforma data

<b>Young people being cared for in an adult ward: Baseline proforma (8 patients)</b>			
Gender	Male = 3 : Female = 5		
Age	13 years	14 years	15 years
	1	3	4
Setting	Medical		Surgical
	3		5
Diagnosis (Low / High risk of hyponatraemic complications)	?Inflammatory bowel disease/ ?Infection (High); Glandular Fever (High); Appendicitis x2 (High) Abscess on foot (High); Fractured left ankle (High); Gastroenteritis (High); Influenza (High).		
Chart completed for each day?	Yes	No	
	6	2 – charts missing during audit	
Weighed on admission	Yes	No	
	8	0	
E&U test results available within 4 hours of commencing fluids	Yes	No	
	7	1 – E&U tested 16 hours 25 minutes prior to fluids starting.	

Table 6: Patients treated in an adult setting – Clear identification of patient, Fluid indication and Fluid duration

<b>Young people being cared for in an adult ward: Daily proforma (n=8 patients)</b>				
Patient was clearly identified (two of three identifiers Name, Date of Birth & Medical Record Number accepted)	Yes		No	
	7 (DFBC n=9)		1 (DFBC n=1) – only the name was on the chart, this was on day 2 and the patient was clearly identified on day1.	
Fluid indication	Maintenance single fluid	Maintenance and Deficit	Maintenance & On- going losses	
	5	1	2	
Maintenance fluid n=8	Identified on the prescription chart	Evidence of fluid calculation	No evidence of fluid calculation	
	8	7	1 – Clinical expert confirmed that the maintenance fluid prescription, the rate of the fluid and the type of the fluid were all appropriate.	
Maintenance and Deficit fluids (n=1)	Identified on the prescription chart	Evidence of fluid calculation	No evidence of fluid calculation	
	1	1	0	
Maintenance and On-going losses fluids(n=2)	Identified on the prescription chart	Evidence of fluid calculation	No evidence of fluid calculation	
	2	1	1 – Clinical expert reviewed this case and confirmed that the fluid prescription was appropriate.	
Duration of fluids	2 hours 30 minutes	between 5 and 7 hours	between 10 and 11 hours	between 28 and 30 hours
	1	2	3	2
Number of DFBC for the episode of care (n=8 patients had n=12 DFBC minus n=2 missing chart, meaning data available on n=10 DFBC)	1 DFBC		2 DFBC	
	4		4 (DFBC n=8 – the n=2 missing charts apply to this group)	

Table 7: Patients treated in an adult setting (data on 10 DFBC) – Appropriate fluid, Electrolyte monitoring, Reassessment, Fluid Intake total, Output total, Fluid balance, and Laboratory Glucose/BM monitoring

<b>Young people being cared for in an adult ward: Daily proforma (10 DFBC)</b>			
Recognised appropriate type of fluid given	Yes		No
	10		0
E&U test taken on the day of the chart	Yes		No
	9		1 - the audit data shows that the E&U test result was available 4 hours within commencing IV Fluids
Primary location of the E&U results (n=9)	DFBC	Patient records	Laboratory system
	3	4	2
Sodium test result	Normal		Abnormal
	10		0
Was the Na <130mmol/L at any time?	Yes		No
	0		10
12 hour medical reassessment	Yes		Not applicable as patient was less than 12 hours admitted
	6		4
Intake total per 12 hours recorded	Yes		No
	8		2
Intake total per 24 hours recorded	Yes	No	Not applicable as not on fluids for that period
	4	2	4
Output total per 12 hours recorded	Yes		No
	5		5
Output total per 24 hours recorded	Yes	No	Not applicable as not on fluids for that period
	3	3	4
24 hour Fluid Balance (ml) recorded on chart	Yes		No
	5		5
Was the laboratory glucose or BM monitored?	Yes	No	Not applicable
	4	1	5
For those with laboratory glucose or BM monitored (n=4)	There were no episodes of laboratory glucose or BM <3.		

## Type of admission

As elective patients receiving fluids for less than 4 hours were excluded from the audit, Table 8 shows that the majority of the sample were emergency admissions, 92%. Elective admissions were 4.7% and 'Other' was 3.5%. The 'Other' data (6 DFBC) for type of admission are for patients transferred from another hospital, two of these specified from A&E.

Table 8: Type of admission

Type of admission	n=	Emergency	%	Elective	%	Other	%
Regional Total	170	156	92	8	4.7	6	3.5

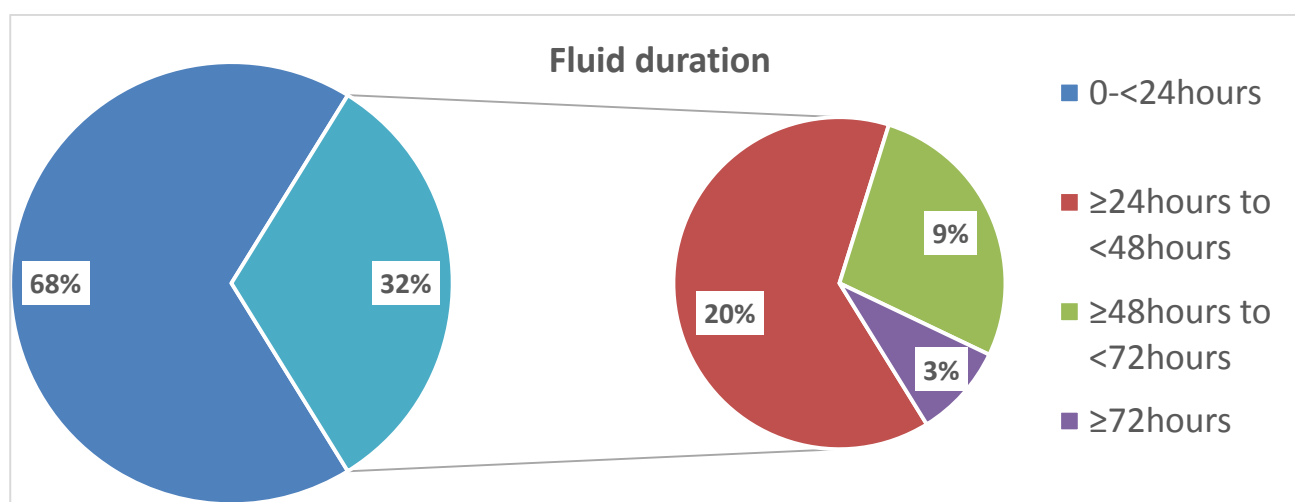
## Duration of IV Fluid treatment

Table 9 and Figure 3 show that two thirds of the audit sample had fluids for less than 24 hours. 33% had fluids for longer than 24 hours. The fluid duration for the 3 patients with greater than 72 hours was: 73 hours; 137 hours 25 minutes; and 193 hours 25 minutes.

Table 9: Duration of IV Fluid treatment

Duration from commencement to discontinuation of IV Fluids	n=	0 to <24 hours	%	≥24 to <48 hours	%	≥48 to <72 hours	%	≥72 hours	%
Regional Total	170	115	68	35	20	15	9	5	3

Figure 3: Fluid duration



## Number of Daily Fluid Balance Charts (DFBC) per episode

Table 10 shows that three quarters of the audit sample (128/170) had up to two DFBC for the episode of care. 23% had three or four DFBC, and 2% (3/170) had between five and eight DFBC. The data in Table 10 provides evidence that good documentation is being maintained.

Table 10: Number of Daily Fluid Balance Charts (DFBC) per episode

Number of Daily Fluid Balance Charts DFBC) per episode	n=	1	%	2	%	3	%	4	%	5	%	6	%	7	%	8	%
<b>Regional Total</b>	<b>170</b>	<b>44</b>	<b>26</b>	<b>84</b>	<b>49</b>	<b>29</b>	<b>17</b>	<b>10</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

From this point onwards in the report the audit proforma question (framed coloured box) will precede the applicable data.

### Question:

Were daily Fluid Balance Charts completed for each day (8:00 to 8:00) of episode? - For Daily Fluid Balance Yes / No

Daily Fluid Balance and Prescription charts were checked to determine that an entry had been recorded every hour for the duration of IV Fluid treatment. As noted above there were 2 DFBC missing from the audit which in relation to completion of the DFBC means that for 168/170 (99%) patients the audit found evidence that there were DFBC completed for every day of the episode of care. Table 11 shows that for 96% (164/170) of patients the hourly records on the DFBC related to the episode of care were fully completed. Table 11 shows that for 6 patients that the hourly records on the DFBC of that day were not fully completed.

Table 11: Full completion of DFBC

Were the Daily Fluid Balance Charts completed for each day?	n=	Yes	%	No	%
<b>Regional Total</b>	<b>170</b>	<b>164</b>	<b>96</b>	<b>6</b>	<b>4</b>

Tables 12 to 15 show further details of the 6 patients for whom a 'No' response was given in Table 11.

Table 12: Per HSCT details of the number of hours of episode not recorded on DFBC

Answer = No	Trust	Details of the number of hours of episode not recorded on DFBC (n=6)
2	C	<ul style="list-style-type: none"> <li>n=1 for 5 hours, this was out of 6 hours and 20 minutes duration of IV Fluids</li> <li>n=1 for 4 hours, this chart was missing in the audit.</li> </ul>
0	D	
1	E	Number of hours of the episode that were not recorded was 19 hours 30 minutes. This chart was missing in the audit
3	F	<ul style="list-style-type: none"> <li>n=2 for 1 hour</li> <li>n=1 for 4 hours</li> </ul>
0	G	

Table 13: Trust C - Further details of patients with hours not recorded on DFBC

Trust C: Details of the number of hours not recorded on DFBC		
Patient	n=1	n=1
Number of hours that were not recorded on single DFBC	5 hours	4 hours
Full completion of Prescription chart for each day?	No 5 hours not recorded on Prescription chart	No 4 hours not recorded as chart is missing
Gender	Female	Female
Age	5 years 5 months	13 years 4 months
Setting	Combined Paediatric Medical & Surgical	Adult Medical
Type of admission	Emergency	Emergency
Diagnosis	Post tonsil bleed	Gastroenteritis
Risk of hyponatraemic complications?	High	High
Number of DFBC per episode	1	2
Duration on IV Fluids	6 hours 20 minutes	11 hours
Type of indication of IV Fluids	Bolus, Maintenance & On-going Losses	Maintenance & On-going Losses
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes

Table 14: Trust E - Further details of patients with hours not recorded on DFBC

<b>Trust E: Details of the number of hours not recorded on DFBC</b>	
Patient	n=1
Number of hours that were not recorded on single DFBC	19 hours 30 minutes
Full completion of Prescription chart for each day?	No 19 hours 30 minutes not recorded as chart is missing
Gender	Female
Age	14 years 8 months
Setting	Adult Surgical
Type of admission	Emergency
Diagnosis	?Appendicitis
Risk of hyponatraemic complications?	High
Number of DFBC per episode	2
Duration on IV Fluids	29 hours 30 minutes
Type of indication of IV Fluids	Maintenance and Deficit
Appropriate fluids for duration of IV Fluids treatment?	Yes

Table 15: Trust F - Further details of patients with hours not recorded on DFBC

<b>Trust F: Details of the number of hours not recorded on DFBC</b>			
Patient	n=1	n=1	n=1
Number of hours that were not recorded on single DFBC	1 hour	1 hour	4 hours
Full completion of Prescription chart for each day?	Yes	Yes	Yes
Gender	Male	Female	Female
Age	1 year 1 month	7 months	10 years 6 months
Setting	Paediatric Medical	Paediatric Medical	Paediatric Surgical
Type of admission	Emergency	Emergency	Emergency
Diagnosis	possible Gastroenteritis	Bronchiolitis and LRTI	Appendicectomy
Risk of hyponatraemic complications?	High	High	High
Number of DFBC per episode	2	4	2
Duration on IV Fluids	15 hours 30 minutes	68 hours 30 minutes	13 hours 50 minutes
Type of indication of IV Fluids	Maintenance	Maintenance	Bolus & Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes

Question:

Were any fluid balance charts missing? Yes / No

Table 16: Missing DFBC

Were any of the Daily Fluid Balance Charts missing?	n=	Yes	%	No	%
<b>Regional Total</b>	<b>170</b>	<b>2</b>	<b>1</b>	<b>168</b>	<b>99</b>

The 2 missing charts applied to two HSCTs and were explained as being due to misfiling. There is data in Table 12, 13, 14, 18, 19 & 20 that is repeated for these 2 patients as they had a missing DFBC.

Question:

Were daily Fluid Balance Charts completed for each 24 hours of episode? - For Prescription Yes / No

Table 17: Completion of Prescription Charts

Were the Prescription Charts completed for each day	n=	Yes	%	No	%
<b>Regional Total</b>	<b>170</b>	<b>158</b>	<b>93</b>	<b>12</b>	<b>7</b>

Tables 18 to 22 show further details of the 12 patients for whom there was a 'No' response given in Table 17.

Table 18: HSCT details of the number of hours of episode not recorded on Prescription Chart

Children	HSCT	Details
3	C	Periods missing: Appropriate fluids administered. <ul style="list-style-type: none"> <li>• n=1 for 5 hours (out of 6 hours 20 minutes duration of IV Fluids, Emergency, in theatre)</li> <li>• n=1 for 4 hours,</li> <li>• n=1 chart missing</li> </ul>
0	D	
1	E	• n=1 chart missing
5	F	Emergency admissions, Appropriate fluids administered. Periods missing: <ul style="list-style-type: none"> <li>• n=2 for 1 hour</li> <li>• n=3 for 2 hours</li> </ul>
3	G	Periods missing: Appropriate fluids administered. <ul style="list-style-type: none"> <li>• n=2 for 1 hour</li> <li>• n=1 for 4 hours</li> </ul>



Table 19: Trust C - Further details of patients with hours not recorded on DFBC

<b>Trust C: Details of the number of hours not recorded on Prescription Chart</b>			
Patient	n=1	n=1	n=1
Number of hours that were not recorded on single Prescription Chart	5 hours	no response given	4 hours
Full completion of DFBC for each day?	No 5 hours not recorded on DFBC	Yes	No 4 hours not recorded as chart is missing
Gender	Female	Female	Female
Age	5 years 5 months	5 weeks	13 years 4 months
Setting	Combined Paediatric Medical & Surgical	Paediatric Medical	Adult Medical
Type of admission	Emergency	Emergency	Emergency
Diagnosis	Post tonsil bleed	Gastroenteritis	Gastroenteritis
Risk of hyponatraemic complications?	High	High	High
Number of DFBC per episode	1	2	2
Duration on IV Fluids	6 hours 20 minutes	10 hours	11 hours
Type of indication of IV Fluids	Bolus, Maintenance & On-going Losses	Maintenance & On-going losses	Maintenance & On-going Losses
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes

Table 20: Trust E - Further details of patients with hours not recorded on DFBC

<b>Trust E: Details of the number of hours not recorded on Prescription Chart</b>	
Patient	n=1
Number of hours NOT recorded on single Prescription Chart	19 hours 30 minutes
Full completion of DFBC for each day?	No - 19 hours 30 minutes not recorded as chart is missing
Gender	Female
Age	14 years 8 months
Setting	Adult Surgical
Type of admission	Emergency
Diagnosis	?Appendicitis
Risk of hyponatraemic complications?	High
Number of DFBC per episode	2
Duration on IV Fluids	29 hours 30 minutes
Type of indication of IV Fluids	Maintenance and Deficit
Appropriate fluids for duration of IV Fluids treatment?	Yes

Table 21: Trust F - Further details of patients with hours not recorded on DFBC

<b>Trust F: Details of the number of hours not recorded on Prescription Chart</b>					
Patient	n=1	n=1	n=1	n=1	n=1
Number of hours that were not recorded on single Prescription Chart	1 hour	1 hour	2 hours	2 hours	2 hours
Full completion of DFBC for each day?	Yes	Yes	Yes	Yes	Yes
Gender	Male	Male	Male	Female	Female
Age	3 years 2 months	3 months	1 year 5 months	6 years 8 months	8 years 4 months
Setting	Paediatric Medical	Paediatric Medical	Paediatric Medical	Paediatric Medical	Paediatric Surgical
Type of admission	Emergency	Emergency	Emergency	Emergency	Emergency
Diagnosis	Tonsillitis	Severe Bronchiolitis	Gastroenteritis	Scarlet fever	Post Op Ileus
Risk of hyponatraemic complications?	High	High	High	High	High
Number of DFBC per episode	3	2	3	3	3
Duration on IV Fluids	30 hours	14 hours	52 hours 30 minutes	33 hours 30 minutes	47 hours 30 minutes
Type of indication of IV Fluids	Maintenance	Bolus & Maintenance	Maintenance	Maintenance	Maintenance & Deficit
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes	Yes	Yes

Table 22: Trust G - Further details of patients with hours not recorded on DFBC

<b>Trust G: Details of the number of hours not recorded on Prescription Chart</b>			
Patient	n=1	n=1	n=1
Number of hours that were not recorded on single Prescription Chart	1 hour – noted in theatre	1 hour	4 hours
Full completion of DFBC for each day?	Yes	Yes	Yes
Gender	Male	Male	Female
Age	2 months	7 months	5 years 2 months
Setting	Paediatric Surgical	Paediatric Surgical	Paediatric A&E (1 d) & Paediatric Medical (7 d)
Type of admission	Emergency	Elective	Emergency
Diagnosis	Vomiting / pyloric stenosis?	Elective Closure Colostomy	Chicken Pox & Cellulitis
Risk of hyponatraemic complications?	High	High	High
Number of DFBC per episode	3	2	8
Duration on IV Fluids	43 hours 15 minutes	30 hours	193 hours 25 minutes
Type of indication of IV Fluids	Bolus, Maintenance & On-going Losses	Maintenance	Bolus (day 1 only) & Maintenance
Appropriate fluids for duration of episode of IV Fluids treatment?	Yes	Yes	Yes

## Recording of weight

Question:

Was weight recorded on Admission?

Table 23: Weight recorded on admission

Weight recorded on admission	n=	Yes	%	No	%
<b>Regional Total</b>	<b>170</b>	<b>170</b>	<b>100</b>	<b>0</b>	<b>0</b>

Question:

Was the weight measured or estimated?

Table 24: Weighed or estimated weight

Patient weighed or estimated	n=	Weighed	%	Estimated	%
<b>Regional Total</b>	<b>170</b>	<b>161</b>	<b>95</b>	<b>9</b>	<b>5</b>

Question:

Was the date that weight was taken recorded?

The DFBC used by four of the HSCTs have a specific place to record the date that the weight was taken and it was within three of these HSCTs that the 9 patients referred to in Table 25 who did not have the date of weight recorded applies to. One HSCT chart does not have a specific place to record the date that the weight was taken and the data collector referred to the patient record notes to confirm that the date had been recorded.

Table 25: Recording of date of weight

Date of weight recorded	n=	Yes	%	No	%
<b>Regional Total</b>	<b>170</b>	<b>161</b>	<b>95</b>	<b>9</b>	<b>5</b>

## Electrolyte monitoring

### Question:

Was E&U result available within 4 hours of commencing IV Fluids treatment?

The E&U result was shown in the audit to be available within 4 hours of commencing treatment for 92% (155/169) as seen in Table 26. This test was not necessary for 1/170 as the patient was an elective admission.

The data shows of the 14 that did not meet it, 11 patients had a E&U test taken on their first DFBC. For the 3 patients that did not have a E&U taken on the first DFBC of the episode, two patients had a E&U test taken on Day 2 of 2 and for one patient a E&U test was not applicable as fluids discontinued on Day 2 of 2.

Table 26: E&U result availability

E&U result available within 4 hours of IV Fluids commencing	n=	Yes	%	No	%	Not necessary
Regional Total	170	155	92	14	8	1

The audit then gathered additional data on the time of E&U results prior and post commencing fluids for the 14 where the results were not available within 4 hours of commencing fluid. The data that was recorded on the laboratory system is listed below.

Table 27: HSCT details of 'No' E&U result available within 4 hours of IV Fluids commencing

Answer = No	Trust	Details: 'No' E&U result available within 4 hours of IV Fluids commencing (n=14)
1	C	Normal result; E&U was taken during first DFBC
1	D	Patient had a Normal E&U result (Na141) available 4 hours and 26 minutes prior to commencing fluids and a Normal E&U result (Na140) available 6 hours and 53 minutes post commencing fluids.
2	E	<ul style="list-style-type: none"> <li>1 had a Normal E&amp;U result (Na140) available 16 hours and 25 minutes prior to commencing fluids</li> <li>1 had a Normal E&amp;U result (Na139) available 6 hours and 29 minutes prior to commencing fluids</li> </ul>
7	F	<ul style="list-style-type: none"> <li>1 had a Normal E&amp;U result (Na142) available 4 hours and 10 minutes post commencing fluids.</li> <li>1 had an Abnormal E&amp;U result (Na132) available 9 hours and 35 minutes prior to commencing fluids and had a Normal E&amp;U result (Na137) available 7 hours and 55 minutes post commencing fluids.</li> <li>1 had a Normal E&amp;U result (Na136) available 10 hours and 28 minutes post commencing fluids.</li> <li>1 had a Normal E&amp;U result (Na141) available 12 hours and 15 minutes prior to commencing fluids.</li> </ul>

		<ul style="list-style-type: none"> <li>1 had a Normal E&amp;U result (Na139) available 16 hours and 55 minutes prior to commencing fluids and a Normal E&amp;U result (Na142) available 6 hours and 5 minutes post commencing fluids.</li> <li>1 had a Normal E&amp;U result (Na140) available 21 hours and 40 minutes post commencing fluids.</li> <li>1 had a daily test on the two days prior to commencing IV Fluids and the result for both was Normal (Na138). A Normal E&amp;U result (Na138) was available 8 hours post commencing fluids.</li> </ul>
3	G	<ul style="list-style-type: none"> <li>1 had a Normal E&amp;U result (Na143) available 32 hours prior to commencing fluids and an Abnormal E&amp;U result (Na133) available 16 hours post commencing fluids, this patient had a Normal E&amp;U result (Na136) available 37 hours post commencing fluids.</li> <li>1 had a Normal E&amp;U result (Na144) available 25 hours 10 minutes post commencing fluids.</li> <li>1 had no record on the laboratory system.</li> </ul>

Table 28: Trust C - Further details of 'No' E&U result available within 4 hours of IV Fluids commencing

<b>Trust C: Details: 'No' E&amp;U result available within 4 hours of IV Fluids commencing</b>	
Patient	n=1
E&U result availability prior to commencing IV Fluids	E&U taken on the day of the DFBC, result Normal, result recorded in patient records. Further data on test times prior and post commencing IV Fluids not returned for audit data.
E&U result availability post commencing IV Fluids	
Gender	Male
Age	13 years 2 months
Setting	Paediatric Medical & Paediatric Surgical
Type of admission	Emergency
Diagnosis	Abrasions and lacerations to back
Risk of hyponatraemic complications?	High
Number of DFBC per episode	1
Duration on IV Fluids	5 hours 30 minutes
Type of indication of IV Fluids	Maintenance & On-going Losses
Appropriate fluids for duration of IV Fluids treatment?	Yes

Table 29: Trust D - Further details of 'No' E&U result available within 4 hours of IV Fluids commencing

<b>Trust D: Details: 'No' E&amp;U result available within 4 hours of IV Fluids commencing</b>	
Patient	n=1
E&U result availability prior to commencing IV Fluids	4 hours 26 minutes
E&U result availability post commencing IV Fluids	6 hours 53 minutes
Gender	Male
Age	14 years 6 months
Setting	Paediatric Surgical
Type of admission	Emergency
Diagnosis	Appendicitis
Risk of hyponatraemic complications?	High
Number of DFBC per episode	1
Duration on IV Fluids	4 hours 10 minutes
Type of indication of IV Fluids	Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes

Table 30: Trust E - Further details of 'No' E&U result available within 4 hours of IV Fluids commencing

<b>Trust E: Details: 'No' E&amp;U result available within 4 hours of IV Fluids commencing</b>		
Patient	n=1	n=1
E&U result availability prior to commencing IV Fluids	16 hours and 25 minutes	6 hours and 29 minutes
E&U result availability post commencing IV Fluids	No details on laboratory system for time period of this episode	No details on laboratory system
Gender	Female	Female
Age	14 years 5 months	10 years 6 months
Setting	Adult Surgical	Paediatric Surgical
Type of admission	Emergency	Emergency
Diagnosis	Appendicitis	Abdominal pain
Risk of hyponatraemic complications?	High	Low
Number of DFBC per episode	1	2
Duration on IV Fluids	5 hours 35 minutes	15 hours 30 minutes
Type of indication of IV Fluids	Maintenance	Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes

Table 31: Trust F - Further details of 'No' E&amp;U result available within 4 hours of IV Fluids commencing

<b>Trust F: Details: 'No' E&amp;U result available within 4 hours of IV Fluids commencing</b>							
Patient	n=1	n=1	n=1	n=1	n=1	n=1	n=1
E&U result availability prior to commencing IV Fluids	12 hours 15 minutes	9 hour 35 minutes	No details on laboratory system	4 hours 10 minutes	16 hours 55 minutes	25 hours 10 minutes. Had test on day previous also. Both results Normal (Na138).	No details on laboratory system
E&U result availability post commencing IV Fluids	No further details	7 hours 55 minutes	10 hours 28 minutes	No details on laboratory system	6 hours 5 minutes	8 hours	21 hours 40 minutes
Gender	Female	Female	Male	Male	Female	Female	Male
Age	5 years	1 year 8 months	10 years 8 months	14 years 8 months	6 years 9 months	10 years 6 months	10 years 6 months
Setting	Paediatric Surgical	Paediatric Surgical	Paediatric Surgical	Paediatric Surgical	Paediatric Medical	Paediatric Surgical	Paediatric Surgical
Type of admission	Emergency	Emergency	Emergency	Emergency	Emergency	Emergency	Emergency
Diagnosis	Acute Appendicitis	LRTI	Appendicectomy	Right post auricular abscess	Vomiting overnight	Appendicectomy	Appendicitis
Risk of hyponatraemic complications?	High	High	High	High	High	High	High
Number of DFBC per episode	1	1	1	2	2	1	2
Duration on IV Fluids	20 hours	7 hours 25 minutes	14 hours	8 hours 50 minutes	8 hours 15 minutes	13 hours 50 minutes	9 hours
Type of indication of IV Fluids	Bolus & Maintenance	Maintenance	Bolus & Maintenance	Maintenance	Maintenance	Bolus & Maintenance	Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 32: Trust G - Further details of 'No' E&U result available within 4 hours of IV Fluids commencing

<b>Trust G: Details: 'No' E&amp;U result available within 4 hours of IV Fluids commencing</b>			
Patient	n=1	n=1	n=1
E&U result availability prior to commencing IV Fluids	32 hours (tested at originating hospital)	No details on laboratory system	No details on laboratory system
E&U result availability post commencing IV Fluids	16 hours	25 hours 10 minutes	No details on laboratory system
Gender	Male	Male	Male
Age	11 years 4 months	7 months	6 years 11 months
Setting	Paediatric Surgical	Paediatric Surgical	Paediatric Surgical
Type of admission	Emergency / Other (transfer from other hospital)	Elective	Other (transfer from other hospital)
Diagnosis	Fractured leg	Elective Closure Sigmoid Colostomy	Dislocated elbow / ORIF Surgery
Risk of hyponatraemic complications?	High	High	High
Number of DFBC per episode	2	2	2
Duration on IV Fluids	18 hours	30 hours	15 hours 48 minutes
Type of indication of IV Fluids	Maintenance	Maintenance	Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes



## Daily Proforma

The audit findings include data from 355 Daily Proformas that were completed on the Daily Fluid and Balance Charts (DFBCs) used by the 5 Health and Social Care Trusts.

There were 2 DFBC missing during the audit that applied to this sample. One DFBC was not filed for one patient in the HSCT C and for one patient in the HSCT E. Meaning that the total number of DFBC should have been 357.

As shown in Table 33 and Figure 4, HSCT F and HSCT G each represented a third of the sample and the remaining three HSCTs combined provided a third of the sample.

Table 33: Number of Daily proforma returns per HSCT

Health and Social Care Trust (HSCT)	Daily Proformas completed as part of audit	
	HSCT Sample n=	HSCT %
C	51	14
D	30	8
E	58	16
F	110	31
G	106	30
<b>Regional Total</b>	<b>355</b>	<b>100</b>

Figure 4: Number of Daily proforma returns per HSCT

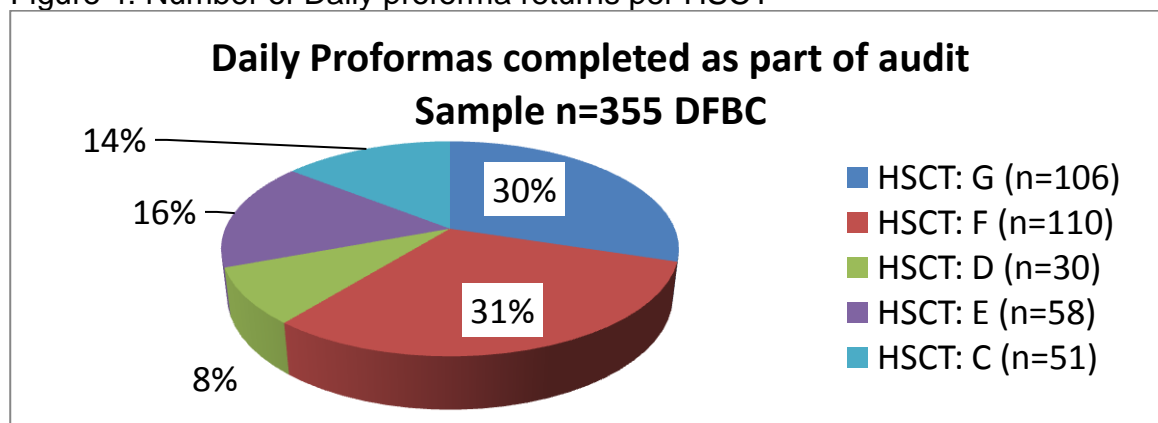


Table 34 and Table 35 show the breakdown of paediatric and adult setting for the DFBC.

Table 34: Paediatric / Adult Setting that the DFBC was used within

Setting	n=	Paediatric	%	Adult	%
<b>Regional Total</b>	<b>355</b>	<b>345</b>	<b>97</b>	<b>10</b>	<b>3</b>

Table 35: Setting per DFBC

Setting	n=	%
Paediatric A&E	9	3
Paediatric Medical	186	52
Paediatric Surgical	111	31
Combined Paediatric Medical and Surgical	30	8
A&E and Paediatric Medical	7	2
A&E and Paediatric Surgical	2	1
Adult Medical	3	1
Adult Surgical	7	2
<b>Regional Total</b>	<b>355</b>	<b>100</b>

The audit showed that an age appropriate chart was used in 100% of the DFBC analysed as displayed in Table 36.

Table 36: Age appropriate DFBC used

Age appropriate chart	n=	Yes	%	No	%
<b>Regional Total</b>	<b>355</b>	<b>355</b>	<b>100</b>	<b>0</b>	<b>0</b>

## Clear identification of patient on DFBC

97% of children had all three identifier details recorded. Table 37 shows that for 348/355 DFBC (98%) had at least two or more identifier details recorded.

Table 37: Clear identification of patient on DFBC

Patient identification	n=	Patient clearly identified on DFBC			
		Yes	%	No	%
Regional Total	355	348	98	7	2

100% of patients had their name recorded on the DFBC.

Table 38: Name of patient recorded on DFBC

Patient identification	n=	Name on DFBC			
		Yes	%	No	%
Regional Total	355	355	100	0	0

97% of patients (343/355) had their Date of Birth recorded on the DFBC.

Table 39: Date of Birth on DFBC

Patient identification	n=	DoB on DFBC			
		Yes	%	No	%
Regional Total	355	343	97	12	3

97% of patients (344/354) had their Medical Record or HSC number recorded on the DFBC.

Table 40: Medical record or HSC number on DFBC

Patient identification	n=	Medical record or HSC number on DFBC				Unanswered
		Yes	%	No	%	n=
Regional Total	355	344	97	10	3	1

## Indication for fluid prescription

78% of the DFBC (276/355) had a single fluid indication.

19% of the DFBC (67/355) had two fluid indications.

3% of the DFBC (10/355) had three fluid indications.

1% of the DFBC (2/355) had all four fluid indications.

Table 41: Indication for fluid treatment

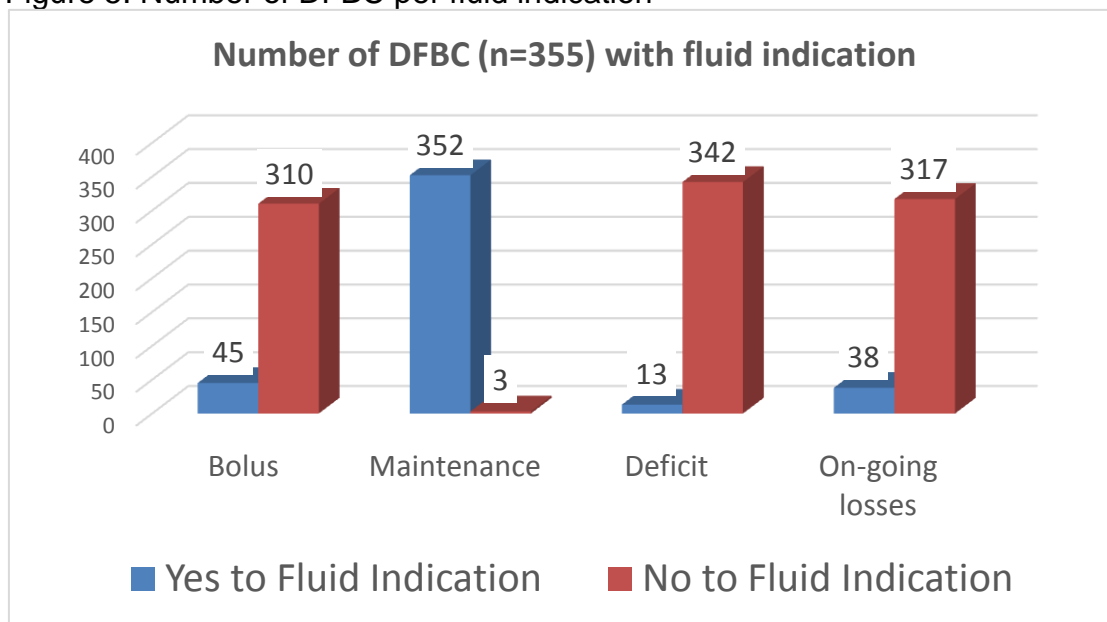
Table 17: Indication for fluid treatment																							
Fluid indication	Sample	B		M		D		O		M+B		M+D		M+O		M+B+D		M+B+O		M+D+O		B+M+D+O	
		Evidence of a <u>Fluid bolus</u> on chart - single fluid		Evidence of <u>Maintenance</u> on chart - single fluid		Evidence of <u>Fluid deficit</u> on chart - single fluid		Evidence of a <u>On-going Losses</u> on chart - single fluid		Evidence of a <u>Maintenance &amp; Fluid bolus</u> on chart		Evidence of <u>Maintenance &amp; Fluid deficit</u> on chart		Evidence of a <u>Maintenance &amp; On-going Losses</u> on chart		Evidence of a <u>Maintenance &amp; Fluid bolus &amp; Fluid Deficit</u> on chart		Evidence of a <u>Maintenance &amp; Fluid Bolus &amp; On-going Losses</u> on chart		Evidence of a <u>Maintenance &amp; Fluid Deficit &amp; On-going Losses</u> on chart		Evidence of all 4 indications	
		n=	%	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%	n=	%
Regional Total	355	2	1	273	77	0	0	1	0.3	32	9	8	2	27	8	2	1	7	2	1	0.3	2	1

The breakdown of the sample per indication is displayed in Table 42.

Table 42: Number of DFBC with fluid indication

Type of indication	Number of DFBC (n=355) responded 'Yes' fluid indication		Number of DFBC (n=355) responded 'No' to fluid indication	
	n=	%	n=	%
<b>Bolus</b>	45	13	310	87
<b>Maintenance</b>	352	99	3	1
<b>Deficit</b>	13	4	342	96
<b>On-going losses</b>	38	11	317	89

Figure 5: Number of DFBC per fluid indication



99% of the DFBC (352/355) had a maintenance fluid. 13% of the DFBC (45/355) had a bolus fluid. 11% of the DFBC (38/355) had an on-going losses fluid. 4% of the DFBC (13/355) had a deficit fluid.

## BOLUS

### Question : **Fluid bolus**

- Is there evidence (on the prescription chart or in the clinical record) of a fluid bolus? If “No” – go to Question 6
- Is bolus identified on Prescription chart?
- is there evidence (on the fluid balance chart or in the clinical record) of the calculation of fluid bolus?

Table 43 shows that of the 45 DFBC where there was evidence of a fluid bolus, that 91% of DFBC (41/45) had ‘bolus’ identified on the prescription chart.

Table 43: Bolus identified on prescription chart

Sample with evidence of bolus	Fluid bolus identified on prescription chart			
	Yes	%	No	%
n=				
45	41	91	4	9

Table 44 shows that for 51% of DFBC (23/45) there was no evidence of the bolus calculation either on the DFBC or the patient clinical record. The audit investigated this further by asking that clinical experts in the four HSCTs that this data applied to assess that the bolus prescription was appropriate in the 23 DFBC.

Table 44: Evidence of bolus calculation

Sample with evidence of bolus	Evidence of Bolus calculation			
	Yes	%	No	%
n=				
45	22	49	23	51

**Additional Question:**

Where there was no evidence of the fluid calculation on either the DFBC or the patient clinical record, clinical experts in each HSCT were asked to review 'Was the bolus prescription appropriate?'

Table 45: Per HSCT details of 'Was the bolus prescription appropriate?'

Answer = No	Trust	HSCT details of 'Was the bolus prescription appropriate?' (n=23)
0	C	
4	D	The clinical expert found that for all DFBC the fluid prescription was appropriate.
2	E	The clinical expert found that for both DFBC the fluid prescription was appropriate.
5	F	The clinical expert found that 1 out of 5 was an appropriate prescription, however 4 out of the 5 were not appropriate. The clinical expert note for these is as follows: <ul style="list-style-type: none"> <li>• "Fluid used was 0.9% saline with 5% glucose"</li> <li>• "Fluid used was 20ml/kg of Hartmann's. Given in theatre."</li> <li>• "Volume was 10ml/kg but fluid used was Hartmann's"</li> <li>• "Volume was 10ml/kg but fluid used was Hartmann's"</li> </ul>
12	G	The clinical expert found that 11 out of 12 were appropriate prescriptions. 1 out of the 12 was not appropriate and the clinical expert note states: <ul style="list-style-type: none"> <li>• "Bolus identified under indication Dehydration not Bolus therefore should be slower correction."</li> </ul>

Table 46: HSCT F – Further details of 'No' to 'Was the bolus prescription appropriate?'

Trust F: Further details of the 'No' evidence of Bolus calculation				
Patient	n=1	n=1	n=1	n=1
'Was the bolus prescription appropriate?' Yes/No	No	No	No	No
'Was the bolus prescription appropriate?' Notes	"Fluid used was 0.9% saline with 5% glucose"	"Fluid used was 20ml/kg of Hartmann's. Given in theatre."	"Volume was 10ml/kg but fluid used was Hartmann's"	"Volume was 10ml/kg but fluid used was Hartmann's"
Gender	Female	Male	Male	Male
Age	5 years	10 years 8 months	13 years 11 months	10 years 6 months
Setting	Paediatric Surgical	Paediatric Surgical	Paediatric Surgical	Paediatric Surgical
Type of admission	Emergency	Emergency	Emergency	Emergency
Diagnosis	Appendicitis	Appendicectomy	Appendicitis	Appendicitis
Risk of hyponatraemic complications?	High	High	High	High
Number of DFBC per episode	1	1	2	2
Duration on IV Fluids	20 hours	14 hours	23 hours 10 minutes	26 hours
Type of indication of IV Fluids	Bolus & Maintenance	Bolus & Maintenance	Bolus & Maintenance	Bolus & Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes	Yes

Table 47: HSCT G – Further details of 'No' to 'Was the bolus prescription appropriate?'

<b>Trust G: Further details of the 'No' evidence of Bolus calculation (n=1)</b>	
Patient	n=1
'Was the bolus prescription appropriate?' Yes/No	No
'Was the bolus prescription appropriate?' Notes	"Bolus identified under indication Dehydration not Bolus therefore should be slower correction."
Gender	Female
Age	5 months
Setting	Paediatric A&E
Type of admission	Emergency
Diagnosis	Fever/Sepsis?
Risk of hyponatraemic complications?	High
Number of DFBC per episode	2
Duration on IV Fluids	20 hours 30 minutes
Type of indication of IV Fluids	Bolus & Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes



## MAINTENANCE

### Question: **Maintenance Fluid**

- Is there evidence (on the prescription chart or in the clinical record) of maintenance fluid? If "No" – go to Question 7.
- Is maintenance identified on Prescription chart?
- Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of maintenance fluid? If 'No' to Question 6c then **Refer to Clinical Expert** for appropriateness of maintenance prescription.

Table 48 shows for the 352 DFBC where there was evidence of a maintenance fluid, that 91% of DFBC (322/352) had 'maintenance' identified on the prescription chart.

Table 48: Maintenance fluid identified on prescription chart

Evidence of <b><u>Maintenance Fluid</u></b> on chart		Maintenance fluid identified on prescription chart				
		Yes	%	No	%	unanswered
Regional Total	n=352	322	92	28	8	2

Table 49 shows that for 5% of DFBC (18/346) there was no evidence of the maintenance calculation either on the DFBC or the patient clinical record.

Table 49: Evidence of Maintenance fluid calculation

Evidence of <b><u>Maintenance Fluid</u></b> on chart		Evidence of Maintenance fluid calculation						
		Yes	%	No	%	On previous chart	%	Unanswered
Regional Total	n=352	322	93	18	5	6	1.7	6

For the 18 DFBC where there was no evidence of fluid calculation the clinical experts in each HSCT were asked to answer further questions.

Question:
a. Was maintenance prescription appropriate?
b. Was the rate appropriate?
c. Was the type of fluid appropriate?

Table 50, Table 51 and Table 52 show for 100% of the DFBC (17/17) that the maintenance prescription, the rate and the type of fluid was appropriate. For 1 DFBC this was not applicable as fluids discontinued.

Table 50: Appropriateness of maintenance prescription where there was no evidence of fluid calculation

Maintenance fluid with NO evidence of fluid calculation		Clinical expert: Was the Maintenance prescription appropriate?				
		Yes	%	No	%	Not applicable as fluids discontinued
Regional Total	n=18	17	100	0	0	1

Table 51: Appropriateness of rate of fluid where there was no evidence of fluid calculation

Maintenance fluid with NO evidence of fluid calculation		Clinical expert: Was the <b>rate</b> appropriate?				
		Yes	%	No	%	Not applicable as fluids discontinued
Regional Total	n=18	17	100	0	0	1

Table 52: Appropriateness of type of fluid where there was no evidence of fluid calculation

Maintenance fluid with NO evidence of fluid calculation		Clinical expert: Was the <b>type</b> of fluid appropriate?				
		Yes	%	No	%	Not applicable as fluids discontinued
Regional Total	n=18	17	100	0	0	1

## DEFICIT

### Question: **Fluid Deficit**

- Is there evidence (on the prescription chart or in the clinical record) of a fluid deficit? If “No” – go to Question 8.
- Is deficit identified on Prescription chart?
- Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of fluid deficit?
- Did the patient receive oral fluid other than ORS or medications during this period of IV deficit replacement?  
If Yes, what type of fluid? \_\_\_\_\_

Table 53 shows for where there was evidence of a deficit fluid (13 DFBC), that 54% of the DFBC (7/13) had ‘deficit’ identified on the prescription chart.

Table 53: Fluid deficit identified on prescription chart

Evidence of <u>Fluid Deficit</u> on chart	n=	Fluid Deficit identified on prescription chart			
		Yes	%	No	%
<b>Regional Total</b>	<b>13</b>	<b>7</b>	<b>54</b>	<b>6</b>	<b>46</b>

Table 54 shows that for 31% of DFBC (4/13) there was no evidence of the deficit calculation either on the DFBC or the patient clinical record. The audit investigated this further by asking that clinical experts in the 1 HSCT that this data applied to assess that the deficit prescription was appropriate in the 4 DFBCs.

Table 54: Evidence of Fluid deficit calculation

Evidence of <u>Fluid Deficit</u> on chart	n=	Evidence of Fluid Deficit calculation			
		Yes	%	No	%
<b>Regional Total</b>	<b>13</b>	<b>9</b>	<b>69</b>	<b>4</b>	<b>31</b>

**Additional Question:**

Where there was no evidence of the fluid calculation on either the DFBC or the patient clinical record, clinical experts in each HSCT were asked to review 'Was the deficit fluid prescription appropriate?'

Table 55: Per HSCT details of 'Was the deficit prescription appropriate?'

Answer = No	Trust	HSCT details of 'Was the deficit prescription appropriate?' (n=4)
0	C	
0	D	
0	E	
4	F	The clinical expert found that all four were treated appropriately. 3 out of 4 were stated as an appropriate prescription, and 1 out of 4 the comment was given, "Only mildly dehydrated. Deliberately not treated for this."
0	G	

For the 13 DFBC with deficit fluid indication, Table 56 shows that 3 DFBC had an Oral Fluid other than ORS was given. Types of oral fluid given recorded for the 3 patients who received other oral fluids were 'Juice.'

Table 56: Oral fluid other than ORS given for fluid deficit indication

Evidence of <u>Fluid Deficit</u> on chart	n=	Oral Fluid other than ORS given		Type of Oral Fluid
		No	Yes	
<b>Regional Total</b>	<b>13</b>	<b>10</b>	<b>3</b>	<b>n=3 Juice</b>

## ONGOING-LOSSES

### Question: On-going losses

- Is there evidence (on the prescription chart or in the clinical record) of on-going losses fluid? If "No" – go to Question 9.
- Is on-going losses identified on Prescription chart?
- Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of on-going losses fluid?

Table 57 shows that 38/355 had evidence of On-going losses fluid, that 95% of these DFBC (36/38) had 'on-going losses' identified on the prescription chart.

Table 57: On-going losses identified on prescription chart

Evidence of a <u>On-going Losses</u> on chart		Is on-going losses identified on prescription chart?			
		Yes	%	No	%
Regional Total	n=38	36	95	2	5

Table 58 shows that for 24% (9/38) there was no evidence of the Ongoing losses fluid calculation.

Table 58: Evidence of On-going losses calculation

Evidence of a <u>On-going Losses</u> on chart		Evidence of On-going Losses calculation?			
		Yes	%	No	%
Regional Total	n=38	29	76	9	24

The audit investigated this further by asking that clinical experts in the 3 HSCTs that this data applied to assess that the deficit prescription was appropriate in the 9 DFBC.

### Additional Question:

Where there was no evidence of the fluid calculation on either the DFBC or the patient clinical record, clinical experts in each HSCT were asked to review 'Was the on-going losses prescription appropriate?'

Table 59: Per HSCT details of 'Was the on-going losses prescription appropriate?'

Answer No	=	Trust	HSCT details of 'Was the on-going losses prescription appropriate?'
6		C	The clinical expert found all of the prescriptions to be appropriate.
0		D	
0		E	
1		F	The clinical expert found that the prescription was appropriate.
2		G	The clinical expert found both of the prescriptions to be appropriate. This HSCT data showed n=1 response 'Yes evidence of calculation,' however the clinical expert noted that the calculation was incorrect.

## PARTICULAR RISK OF HYPONATRAEMIC COMPLICATIONS

Question:

What was the diagnosis? \_\_\_\_\_

**Did it include one of the following:**

Peri-operative patients	Intravascular volume depletion
Patients with head injuries	Bronchiolitis
Gastric losses	Gastroenteritis with dehydration
CNS infection	Hypotension
Severe Sepsis	Salt wasting syndromes

The diagnosis of the patients in the audit sample (n=170) is shown in Table 60. Of this 168 patients had a single diagnosis which included 349/355 DFBC. The other 6 DFBC applied to 2 patients who had fluids over three DFBC with a different diagnosis each day.

The audit asked for (i) the diagnosis per DFBC and (ii) if the patient's condition included one of the categories shown on the wall chart to be particularly at risk of hyponatraemic complications. However due to uncertainty by the data collectors when responding to part (ii) of the question no analysis will be carried out on this data. Clinical experts determined whether the patients were at high or low risk of hyponatraemic complications using the (i) diagnosis data gathered.

156/170 patients (92%) had a diagnosis that was a high risk of hyponatraemic complications.

Table 60: Diagnosis spread of sample

Diagnosis	Number	Risk of Hyponatraemic complications
<i>Medical</i>		
Gastroenteritis, Vomiting	47	High
Bronchiolitis, Chest infection, Pneumonia, Asthma	13	High
Scarlet fever, other fevers, infections, Sepsis	13	High
Tonsillitis	11	High
Viral illness	7	High
Abdominal Pain	6	Low
Tonsillectomy	5	High
UTI	6	High
<i>Surgical</i>		
Appendicitis, Appendicectomy	22	High
Surgical abdomen, postop abdominal surgery	12	High
Pyloric stenosis	5	High
Orthopaedic Surgery, fractures – postoperative	7	High
Seizures, Neurosurgical	5	High
Trauma - minor	3	low
Testicular	3	High
Miscellaneous	5	Low
<b>Regional Total</b>	<b>170</b>	<b>156 High / 14 Low</b>

## FLUID APPROPRIATENESS

### Question:

What were the IV Fluids prescribed? (If more than one fluid has been prescribed for the period please indicate approx duration for each)

Normal saline/Sodium Chloride 0.9% - approximate duration: \_\_ hours

Normal saline/Sodium Chloride 0.9% + 5% Glucose - approximate duration: \_\_ hours

Hartmann's - approximate duration: \_\_ hours

Hartmann's + 3% glucose - approximate duration: \_\_ hours

Other – please specify: \_\_\_\_\_ - approximate duration: \_\_ hours

If 'Other' then **Refer to Clinical Expert** for appropriateness of fluid given.

The DFBC data from the audit sample shows that 355 (100%) had one type of fluid administered; 65/355 (18%) had two types of fluids administered; and 5/355 (1%) had three types of fluids administered.

Table 61: Type of IV Fluids Administered

Type of fluid	1 <sup>st</sup> type of fluid	2 <sup>nd</sup> type of fluid	3 <sup>rd</sup> type of fluid
Sodium chloride 0.9%; Sodium chloride 0.9% + 5% glucose; Hartmann's Solution; Hartmann's Solution + 3% glucose	334	42	1
Other fluid	21	23	4
<b>Regional total</b>	<b>355</b>	<b>65</b>	<b>5</b>

Fluid administration was found in the audit to be appropriate for all fluids per DFBC for 354/355 DFBC (99.7%). For 1 infant, the third fluid given was found borderline not to be appropriate had an undecided diagnosis and was deemed to be at high risk of hyponatraemic complications. The clinical expert gave the following comment with regard to the 1 fluid reviewed as not appropriate,

*“Part of the problem is the question. The child had two maintenance fluids in the first 24 hour period. The initial choice was good (so answer to that question is ‘Yes’ but only for part of the 24 hour period). The second choice answer is ‘No’ but this refers to the same 24 hour period. So both answers apply. While answer ‘No’ trumps it isn't necessarily a reflection of bad/ inappropriate practice. (I did however want to highlight the fact that the child was still nearly a neonate by definition will have affected the thinking about the choice and the change of maintenance to the 0.45%Nacl with 5% glucose fluid was a deliberate decision, reflecting this borderline dilemma [though going with 0.45% saline with glucose 5% is strictly speaking outside the guidance it is understandable and arguably OK subject to the biochemistry results and subsequent monitoring that was done].*

Further analysis and judgement by other clinical experts came to the view that the fluid was appropriate.

## Electrolyte Monitoring

Question:

Was E&U taken on the day of this fluid balance chart?

Table 62 shows that 8% of the sample (27/355) this was not applicable as fluids were discontinued. 309/328 (94%) had a E&U test taken on the day of the fluid balance chart. For the 6% (19/328) of DFBC that did not have a E&U test taken, further analysis of this is provided in Table 63.

Table 62: E&U testing and recording of results

Was E&U taken on the day of the DFBC?		Yes	%	No	%	Not applicable as fluids discontinued
<b>Regional Total</b>	<b>n=355</b>	<b>309</b>	<b>94</b>	<b>19</b>	<b>6</b>	<b>27</b>

Table 63 shows that 16/19 were the final DFBC for the treatment episode. The patient diagnoses for the remaining 3 were: 1 Fractured leg; 1 Dislocated elbow/ ORIF surgery; and 1 Elective Closure Sigmoid Colostomy. These were peri-operative patients who had a high risk of hyponatraemic complications.

Table 63: Further details of the 'No' responses for E&U taken on day of DFBC

Sample n=	Day of DFBC	Time fluids discontinued	Duration on fluids
1	2 of 2	10:00	3 hours 35 minutes
2	5 of 5	16:15	91 hours
3	2 of 2	10:00	8 hours 40 minutes
4	2 of 2	11:00	15 hours
5	2 of 2	14:00	8 hours 30 minutes
6	2 of 2	13:00	7 hours 45 minutes
7	3 of 3	09:00	33 hours 30 minutes
8	2 of 2	09:00	3 hours 50 minutes
9	2 of 2	10:30	23 hours 50 minutes
10	2 of 2	14:00	22 hours
11	2 of 2	23:00	26 hours
<b>12</b>	<b>1 of 2</b>	<b>15:00</b>	<b>18 hours</b>
13	7 of 7	09:00	137 hours 25 minutes
14	4 of 4	11:00	56 hours 45 minutes
<b>15</b>	<b>1 of 2</b>	<b>19:00</b>	<b>30 hours</b>
16	2 of 2	01:00	34 hours
<b>17</b>	<b>1 of 2</b>	<b>10:00</b>	<b>15 hours 48 minutes</b>
18	2 of 2	12:00	22 hours
19	1 of 1	00:00	2 hours 30 minutes



Question:

Were the E&U results recorded on the (When a Yes response is given – Go to Question 13):

Fluid balance /Prescription Chart

Patient notes/records?

Laboratory results system?

Or **No** evidence of E&U performed?

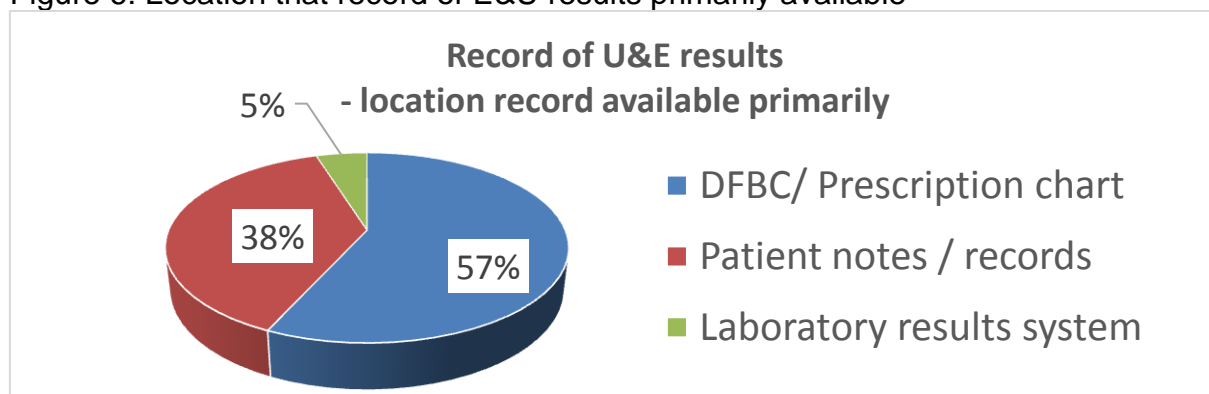
Table 64 shows that 95% (293/308) of DFBCs with a E&U test taken on the day of the DFBC had the result recorded in either the DFBC or the patient records.

Table 64: Location that record of E&U results available primarily

Record of E&U results - location record available primarily		DFBC/ Prescription chart	%	Patient notes / records	%	Laboratory results system	%	No evidence E&U performed	%	Unanswered
<b>Regional Total</b>	<b>n=309</b>	<b>175</b>	<b>57</b>	<b>118</b>	<b>38</b>	<b>15</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>1</b>

Figure 6 displays the results of Table 64.

Figure 6: Location that record of E&U results primarily available



Question:

If it was taken was the Sodium result either:

- Sodium result **Normal (135-145mmol/L)**
- Sodium result **Abnormal <135mmol/L or >145mmol/L**

Table 65 shows that 84% DFBC (259/309) had a 'Normal' Sodium result and that 16% (50/309) had an 'Abnormal' Sodium result.

Table 65: Normal and Abnormal results for DFBC with E&U taken

Sodium result	n=	Normal	%	Abnormal	%
<b>Regional Total</b>	<b>309</b>	<b>259</b>	<b>84</b>	<b>50</b>	<b>16</b>

Question: **Abnormal Sodium Result - <135mmol/L or >145mmol/L**

Was E&U repeated during the time period of this daily fluid balance chart (08:00 to 08:00)?  
Yes/No

Time of E&U result on this day \_\_\_\_:\_\_\_\_ Sodium (Na<sup>+</sup>) value \_\_\_\_\_

- If 'No' then Refer to Clinical Expert

Table 66 shows that 84% of 'Abnormal' Sodium results (42/50) were repeated during time period of the DFBC. Of the 8 DFBC that did not have a repeat test performed in this timeframe, Table 67 shows that on review a clinical expert determined that for 75% DFBC (6/8) a repeat E&U test was not required.

Table 66: Number of Abnormal result with E&U test repeated within DFBC time period

<b>Abnormal Sodium result: test repeated within time period of DFBC</b>		<b>Yes</b>	<b>%</b>	<b>No</b>	<b>%</b>
<b>Regional Total</b>	<b>n=50</b>	<b>42</b>	<b>84</b>	<b>8</b>	<b>16</b>

Table 67: Clinical expert review of whether repeat test was required

For Abnormal Sodium results where test was not repeated, clinical expert view on whether E&U test was required		<b>Yes repeat E&amp;U required</b>	<b>%</b>	<b>No repeat E&amp;U not required</b>	<b>%</b>
<b>Regional Total</b>	<b>n=8</b>	<b>2</b>	<b>25</b>	<b>6</b>	<b>75</b>

Comments by clinical expert per HSCT on repeat E&U requirement are shown in Table 68.

Table 68: Per HSCT details of whether a repeat E&U required

n=	HSCT	HSCT details of whether repeat E&U required (n=8)
0	C	
2	D	<ul style="list-style-type: none"> <li>• 2 Repeat E&amp;U not required <ul style="list-style-type: none"> <li>○ "Type 1 Diabetes. Na 133 but when corrected for high blood sugar corrected Na 138."</li> <li>○ "Initial 11:20 value 148, patient transferred at 13:00."</li> </ul> </li> </ul>
1	E	<ul style="list-style-type: none"> <li>• 1 Repeat E&amp;U not required</li> </ul>
2	F	<ul style="list-style-type: none"> <li>• 2 Repeat E&amp;U not required <ul style="list-style-type: none"> <li>○ "The child was treated with appropriate fluids, made a quick recovery with IV Fluids down and as original NA 133mmol/l it was not necessary to check a repeat E&amp;U."</li> <li>○ "Consultant reviewed on rounds IV Fluids discontinued and repeat E&amp;U not considered necessary. Checked at OP attendance and Na138."</li> </ul> </li> </ul>
3	G	<ul style="list-style-type: none"> <li>• 1 Repeat E&amp;U not required <ul style="list-style-type: none"> <li>○ "Only slightly low (133+ repeated within 24 hours - IV Fluids having been stopped)."</li> </ul> </li> <li>• 2 Repeat E&amp;U required <ul style="list-style-type: none"> <li>○ "E&amp;U should have been repeated"</li> <li>○ "No record of repeat E&amp;U however IV Fluids continued for a further 24 hours"</li> </ul> </li> </ul>

Further details of the 2 DFBC for which the clinical expert found that a repeat E&U was required is shown in Table 6.

Table 69: Trust G - Further details of 'Yes' repeat E&U required

<b>Trust G - Further details of 'Yes' repeat E&amp;U required (n=2)</b>		
Patient	n=1	n=1
Was a repeat E&U required?	Yes "E&U should have been repeated"	Yes "No record of repeat E&U however IV Fluids continued for a further 24 hours"
Other E&U tests during episode of care	E&U tested on 2 days of episode, Abnormal results both days, test repeated on day 1 but not repeated on day 2 of 2. Day 1 initial result Na130 & repeat Na134. Day 2 initial result Na134. Fluids discontinued at 17:00 on Day 2.	E&U tested on 3 of 4 days of episode, Normal results day 1 and day 2. Abnormal result day 3 and test not repeated. Day 4 no E&U test and fluids discontinued at 11:00.
Gender	Male	Male
Age	4 years and 1 month	7 years 4 months
Setting	Paediatric Medical	Paediatric Surgical
Type of admission	Emergency	Emergency
Diagnosis	Tonsillitis/rash	Appendicitis
Risk of hyponatraemic complications?	Low	High
Number of DFBC per episode	2	4
Duration on IV Fluids	15 hours 50 minutes	56 hours 45 minutes
Type of indication of IV Fluids	Maintenance	Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes

Question:

Was the E&U result Na<sup>+</sup> <130 mmol/L at any time? Yes (continue below) / No

Time of abnormal result: \_\_\_\_:\_\_\_\_

Question:

Was there a 4-6 hours follow-up E&U taken? Yes / No

Time of follow-up result: \_\_\_\_:\_\_\_\_

Of the 309 DFBC shown in Table 62 to have had a E&U test taken on the day of the DFBC, Table 70 shows that 6 DFBC (2%) had a Sodium result of <130mmol/L.

Table 70: Sodium result <130mmol/L

Was the Sodium result <130mmol/L at any time?		Yes	%	No	%
Regional Total	n=309	6	2	303	98

Of these 6, Table 71 shows that 4 (67%) had a follow up E&U test taken 4-6 hours later.

Table 71: 4-6 hours follow up E&U test

If yes to <130mmol/L at any time: number of DFBC with 4-6 hours follow up E&U taken		Yes	%	No	%
Regional Total	n=6	4	67	2	33

Of the 2 shown in Table 71 where a follow up E&U not carried out within 4-6 hours, 1 patient had 10 hours 40 minutes between E&U results and 1 patient had 17 hours between results

Question:

Is there evidence of 12 hour medical reassessment?

Table 72 shows that for 98% (326/332) of the DFBC there was evidence that a 12 hour medical reassessment had been carried out. For a 23 DFBC this was not applicable.

Table 72: Evidence of a 12 hour medical reassessment

Is there evidence of a 12 hour medical reassessment?		Yes	%	No	%	Not applicable less than 12 hours admitted	Not applicable as fluids discontinued
Regional Total	n=355	326	98	6	2	22	1

The details of the 2% (6/332) DFBC where there was no evidence of a 12 hour medical reassessment are shown below.

Table 73: HSCT details of where there was no evidence of a 12 hour medical reassessment

Answer = No	Trust	HSCT details of where there was no evidence of a 12 hour medical reassessment (n=6)
0	C	
0	D	
4	E	3 of the 4 patients received 12 hour medical reassessment on other DFBC related to episode.
0	F	
2	G	n=2 DFBC applied to one patient.

Table 74: Trust E: Details of where there was no evidence of a 12 hour medical reassessment (n=4)

<b>Trust E: Details of where there was no evidence of a 12 hour medical reassessment</b>				
Patient	n=1	n=1	n=1	n=1
Evidence of a 12 hour medical reassessment?	No	No	No	No
Other details	Day 1 of 1 Patient had been admitted for 1 hours and 30 minutes prior to commencing IV Fluid treatment.	Day 2 of 3 Patient received 12 hour medical reassessment on other DFBC related to episode.	Day 2 of 3 Patient received a 12 hour medical reassessment on the other DFBC related to episode.	Day 3 of 3. Patient received a 12 hour medical reassessment on the other DFBC related to episode. Fluids were discontinued at noon.
Gender	Female	Male	Female	Female
Age	8 years and 7 months	1 year	1 year and 8 months	2 years 2 months
Setting	Paediatric Medical	Paediatric Medical	Paediatric Medical	Paediatric Medical
Type of admission	Emergency	Emergency	Emergency	Emergency
Diagnosis	Seizure	Gastroenteritis	UTI	?Sepsis
Risk of hyponatraemic complications?	High	High	High	High
Number of DFBC per episode	1	3	3	3
Duration on IV Fluids	10 hours and 20 minutes	47 hours 30 minutes	37 hours and 15 minutes	34 hours 30 minutes
Type of indication of IV Fluids	Maintenance	Maintenance	Maintenance	Maintenance
Appropriate fluids for duration of IV Fluids treatment?	Yes	Yes	Yes	Yes – Prescription recorded on previous chart

Table 75: Trust G: Details of where there was no evidence of a 12 hour medical reassessment (n=2)

<b>Trust G: Details of where there was no evidence of a 12 hour medical reassessment</b>	
Patient	n=1 (DFBC n=2)
Evidence of a 12 hour medical reassessment?	No
Other details	Clinical expert comment, <i>"This baby had Pyloric Stenosis Repair and seems to have had appropriate fluid management. However fluids for 7/4/14 are prescribed on 6/4/14 chart and not actually signed as having been administered despite charting on IVF on the Intake part of the chart."</i>
Gender	Female
Age	3 months
Setting	Paediatric Surgical
Type of admission	Other (transfer from other hospital)
Diagnosis	Pyloric Stenosis (Repair)
Risk of hyponatraemic complications?	High
Number of DFBC per episode	2
Duration on IV Fluids	19 hours 30 minutes
Type of indication of IV Fluids	Maintenance & On-going losses
Appropriate fluids for duration of IV Fluids treatment?	Yes Day 2 - comment made that administration not signed off.



Question: GRAND TOTAL IN

Was the Fluids **total intake** recorded on the daily fluid balance chart?

- per 12 hours (DAY/NIGHT)? Yes / No

- per 24 hours (DAY&NIGHT)? Yes / No / N/A – not on fluids for that period

The data collectors were informed that 12 hours could be either the Day or Night total (applicable for up to 12 hours that the patient was being treated with IV Fluids), meaning 12 hours as either Day (08:00 to 20:00) or Night (20:00 to 08:00). For 24 hours, this total included Day plus Night, and response option of 'Not applicable as not on fluids for that period' was given. The audit checked that the data collectors had interpreted and answered this question correctly.

Table 76 shows that the total Intake of fluids per 12 hours was recorded on 63% (224/354) of the DFBC.

Table 76: Recording of Fluids Intake per 12 hours DAY/NIGHT on DFBC

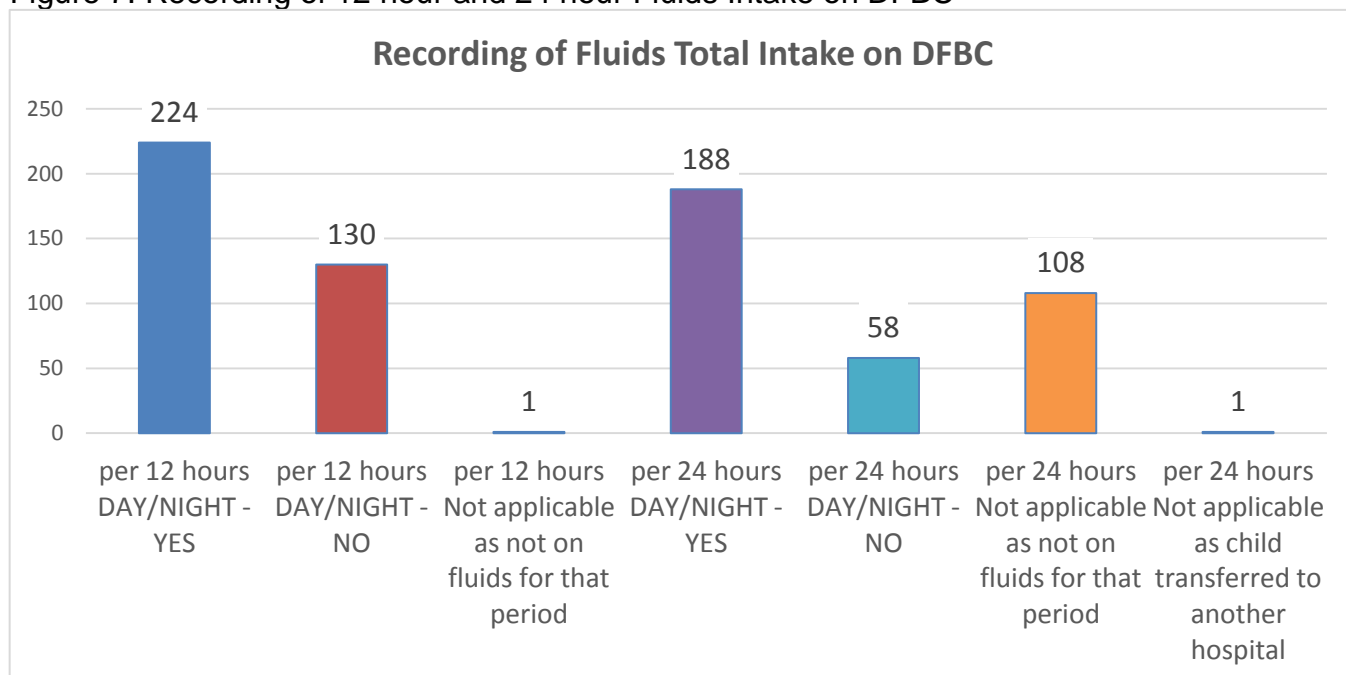
Recording of Fluids total intake on DFBC		per 12 hours DAY/NIGHT		per 12 hours DAY/NIGHT		Not applicable as not on fluids for that period
		Yes	%	No	%	n=
Regional Total	n= 355	224	63	130	37	1

Table 77 shows that the total Intake of fluids per 24 hours was recorded for 188/355 and was not applicable for 109/355 DFBC. Of the 246 that could have had a 24 hour period totalled, 76% (188/246) had this recorded.

Table 77: Recording of Fluids Intake per 24 hours DAY&NIGHT on DFBC

Recording of Fluids total intake on DFBC	n=	per 24 hours DAY&NIGHT		per 24 hours DAY&NIGHT		Not applicable as not on fluids for that period	Not applicable as child transferred to another hospital
		Yes	%	No	%	n=	n=
Regional Total	355	188	76	58	24	108	1

Figure 7: Recording of 12 hour and 24 hour Fluids Intake on DFBC



As shown in Figure 7 the recording of Fluids Total Intake was not carried out for 130/354 DFBC of the 12 hour totalling and for 58/246 DFBC of the 24 hour totalling.

**Question: GRAND TOTAL OUTPUT**

Was the Fluids **total output** recorded on the daily fluid balance chart?

– per 12 hours (DAY / NIGHT)? Yes / No

– per 24 hours (DAY & NIGHT)? Yes / No / N/A – not on fluids for that period

Table 78 shows that the Fluid Output was recorded per 12 hours for 40% (142/353) DFBC and that this was not recorded for 211 DFBC. Of the remaining 2 DFBC, 1 was not applicable and for 1 no response was provided.

Table 78: Recording of Fluids Output per 12 hours DAY/NIGHT on DFBC

Recording of total output on DFBC	n=	per 12 hours DAY/NIGHT		per 12 hours DAY/NIGHT		Not applicable as not on fluids for that period	Unanswered
		Yes	%	No	%	n=	n=
<b>Regional Total</b>	<b>355</b>	<b>142</b>	<b>40</b>	<b>211</b>	<b>60</b>	<b>1</b>	<b>1</b>

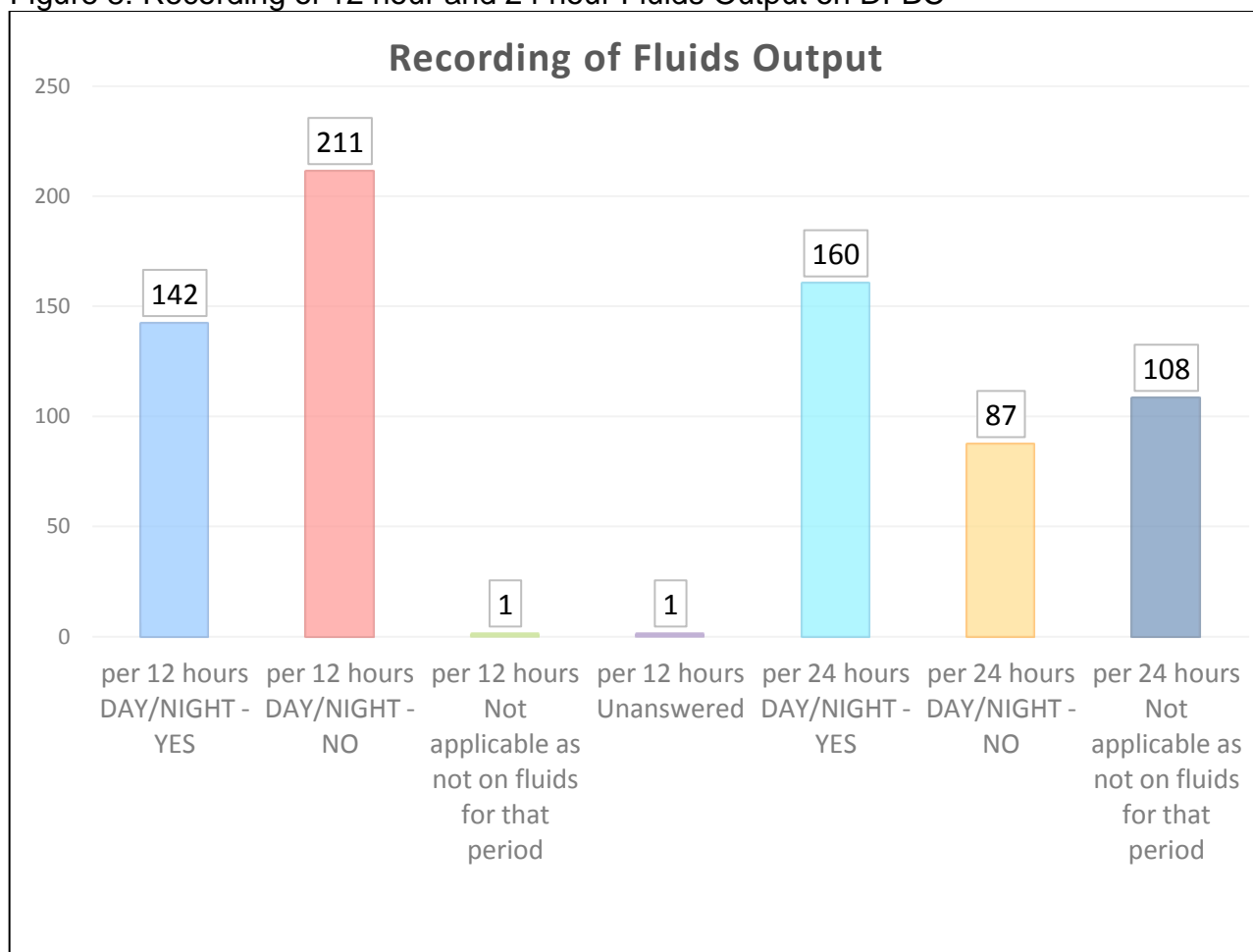
Table 79 shows that the Fluid Output was recorded per 24 hours for 65% DFBC (160/247) and not applicable for 108 DFBC.

Table 79: Recording of Fluids Output per 24 hours DAY&NIGHT on DFBC

Recording of total output on DFBC	n=	per 24 hours DAY&NIGHT		per 24 hours DAY&NIGHT		Not applicable as not on fluids for that period
		Yes	%	No	%	n=
Regional Total	355	160	65	87	35	108

For 1 'No' response, the Data collector commented with reference to Output, that the patient was advised to measure but did not do it as had loose bowel movements at the same time. Therefore Output totalling and fluid balance was difficult to complete.

Figure 8: Recording of 12 hour and 24 hour Fluids Output on DFBC



**Question:**

Was the 24 hour Fluid Balance (ml) recorded on audited chart? Yes / No / Not available on chart

Table 80 shows that 43% (147/341) of DFBCs had the 24 hour fluid balance (ml) recorded, this was not recorded on 194 of DFBCs.

Table 80: 24 hour Fluid Balance (ml) recorded on DFBC

Was the 24 hour fluid balance (ml) recorded on the DFBC?		Yes	%	No	%	Not applicable as not on fluids for that period	Not available on chart
Regional Total	n=355	147	43	194	57	3	11

**Question:**

Was laboratory glucose or BM monitored every 12 hours (+/- 4 hours)? Yes / No

Table 81 shows that for 62% (218/353) of the DFBCs the laboratory glucose or BM was monitored every 12 hours (+/- 4hours). For 135 DFBCs this monitoring was not carried out and for 2 this was not applicable.

Table 81: Monitoring of laboratory glucose/BM

Was laboratory glucose or BM monitored every 12 hours (+/- 4 hours)?		Yes	%	No	%	Not applicable as not on fluids for that period
Regional Total	n=355	218	62	135	38	2

**Question:**

Were there any episodes of laboratory glucose/BM <3? Yes / No

Table 82 shows that of the 218 DFBC which had laboratory glucose/BM monitored every 12 hours that 6% (13/218) had an episode of laboratory glucose/BM of <3.

Table 82: Episodes of laboratory glucose/BM <3

Were any episodes of laboratory glucose/ BM <3?		Yes	%	No	%
Regional Total	n=218	13	6	205	94

Of the 13 DFBC with an episode of laboratory glucose/BM of <3, Table 83 shows that 8 DFBC (62%) were treated for Hypoglycaemia and that 5/8 (38%) were not. Of the 13 DFBC these applied to eleven patients. There were references made in the data collector notes of treatment for Hypoglycaemia in an A&E setting for 2 patients, "Given Hypostop in A&E" and "Given Glucogel in A&E."

Table 83: Patients treated for Hypoglycaemia

Did the patient receive treatment for Hypoglycaemia?		Yes	%	No	%
Regional Total	n=13	8	62	5	38

The audit data showed for an additional patient that 1 DFBC had no episode of BM<3 and was treated for Hypoglycaemia with 2-4ml/kg 10% Glucose.

Question:

Did the patient receive treatment for Hypoglycaemia? Yes / No

If Yes, did the patient receive:

- 5ml/kg 10% glucose
- 2-4 ml/kg 10% glucose
- Other - please specify: \_\_\_\_\_

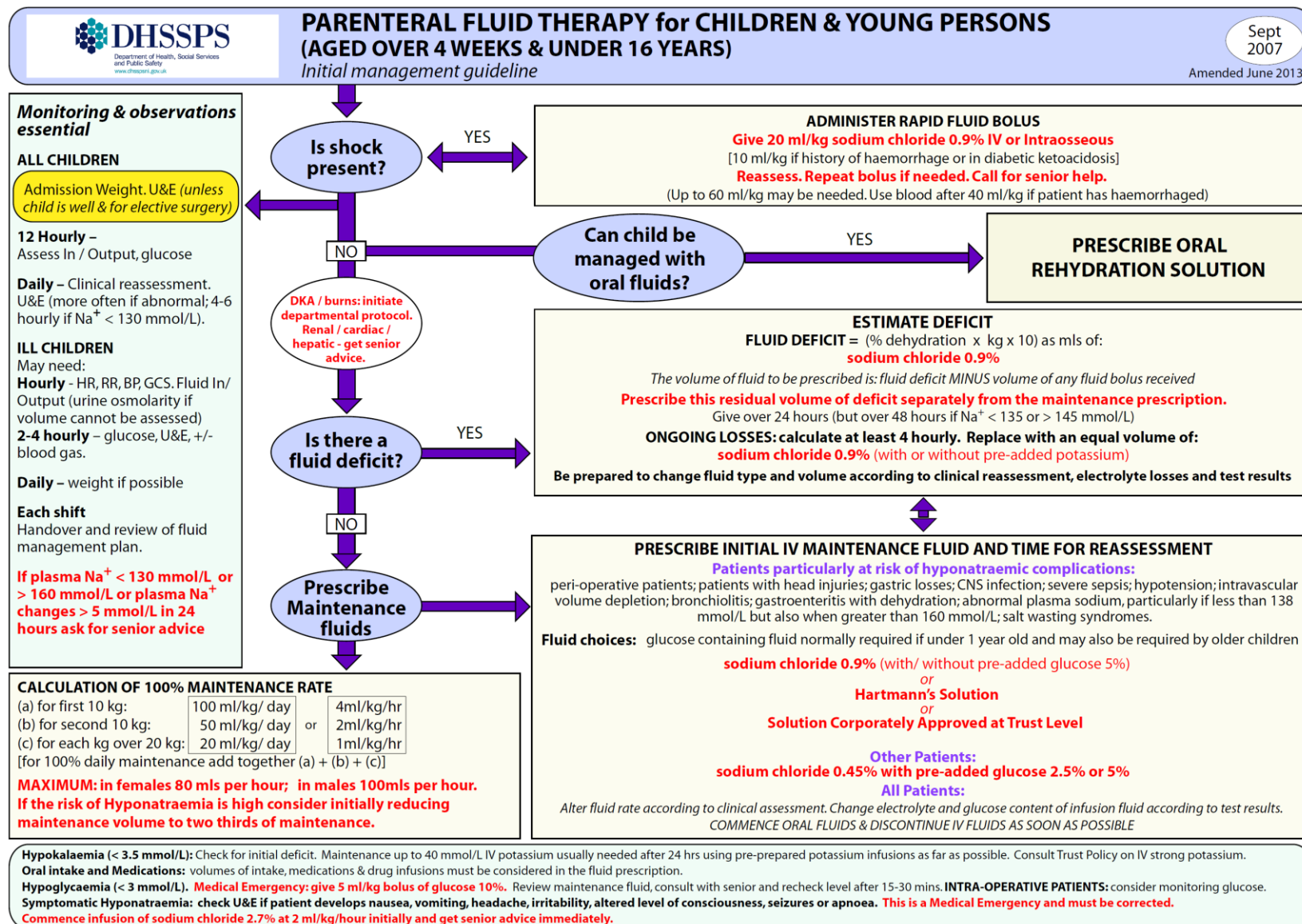
Table 84 shows the treatment given for Hypoglycaemia for the 8 DFBC was: 6 had 2-4ml/kg 10% Glucose; and 2 had 'Other.' Of the Other, 1 was "Oral Dextrose Solution" and 1 was "Hypostop. Given Dioralyte."

Table 84: Treatment given for Hypoglycaemia

If Yes - treatment for Hypoglycaemia – what did the patient receive?		5ml/kg 10% Glucose	%	2-4ml/kg 10% Glucose	%	Other	%
Regional Total	n=8	0	0	6	75	2	25

## Appendix 1: DHSSPS Parenteral Fluid Therapy for Children & Young Persons (aged over 4 weeks & under 16 years)

### Initial management guideline of the June 2013 Wallchart



## Appendix 2 – Baseline proforma

Audit Reference Number:



### GAIN – Audit of Parenteral Fluid Therapy for Children & Young Persons (aged over 4 weeks & under 16 years)

#### Baseline proforma – to be completed per patient

#### Reminder

Day period for Daily chart = 8:00 to 8:00 / Day period for Prescription = 24 hours

Recording of time = 24 hour clock to be used when completing proforma

**Audit Reference No:** *Please write in Header section box on every proforma page*

1.	Trust: Belfast <input type="checkbox"/> Southern <input type="checkbox"/> Western <input type="checkbox"/> Northern <input type="checkbox"/> South Eastern <input type="checkbox"/>						
2.	Audit data collector code: _____						
3.	Clinical expert audit reviewer code: _____ N/A for this episode of care <input type="checkbox"/>						
4.	Demographics: Male <input type="checkbox"/> Female <input type="checkbox"/> Age when admitted: ____Years ____Months						
5.	Admission: Date: ____/____/____ Time: ____:____						
6.	<p>Location where first IV Fluids were given:</p> <p>Ward name: _____</p> <table border="0"> <tr> <td>Paediatric: Medical <input type="checkbox"/></td> <td>Adult: Medical <input type="checkbox"/></td> </tr> <tr> <td>Surgical <input type="checkbox"/></td> <td>Surgical <input type="checkbox"/></td> </tr> <tr> <td>A&amp;E <input type="checkbox"/></td> <td>A&amp;E <input type="checkbox"/></td> </tr> </table>	Paediatric: Medical <input type="checkbox"/>	Adult: Medical <input type="checkbox"/>	Surgical <input type="checkbox"/>	Surgical <input type="checkbox"/>	A&E <input type="checkbox"/>	A&E <input type="checkbox"/>
Paediatric: Medical <input type="checkbox"/>	Adult: Medical <input type="checkbox"/>						
Surgical <input type="checkbox"/>	Surgical <input type="checkbox"/>						
A&E <input type="checkbox"/>	A&E <input type="checkbox"/>						
7.	<p>Emergency (unscheduled) <input type="checkbox"/> Elective (surgery) <input type="checkbox"/></p> <p>Other <input type="checkbox"/> Details _____</p>						
8.	<p>Date and time IV Fluids infusion commenced?</p> <p>Date: ____/____/____ Time: ____:____</p>						
9.	<p>Date and time IV Fluids infusion discontinued ?</p> <p>Date: ____/____/____ Time: ____:____ Not known <input type="checkbox"/></p>						



<b>10.</b>	Total number of daily Fluid Balance Charts for episode: _____ DAYS
<b>11.</b>	<p>Were daily Fluid Balance Charts completed for each <u>day</u> (8:00 to 8:00) of episode?</p> <p>For Daily Fluid Balance    Yes <input type="checkbox"/>    No <input type="checkbox"/> - if No, what were the number of hours not recorded? _____ hrs</p> <p>Were any fluid balance charts missing:    Yes <input type="checkbox"/>    No <input type="checkbox"/></p> <p>- if Yes, how many are missing? _____ charts</p>
<b>12.</b>	<p>Were daily Fluid Balance Charts completed for each 24 hours of episode?</p> <p>For Prescription    Yes <input type="checkbox"/>    No <input type="checkbox"/> - if No, what were the number of hours not recorded? _____ hrs</p>
<b>13.</b>	<p>Was weight recorded on Admission:</p> <p>Yes <input type="checkbox"/> (continue below)    No <input type="checkbox"/></p> <p>Weighed <input type="checkbox"/>    Estimate <input type="checkbox"/></p> <p>Was the date that weight was taken recorded?    Yes <input type="checkbox"/>    No <input type="checkbox"/></p>
<b>14.</b>	<p>Was E&amp;U result available within 4 hours of commencing IV Fluids treatment?</p> <p>Yes <input type="checkbox"/>    No <input type="checkbox"/>    Not necessary as elective surgery <input type="checkbox"/></p>

Thank you for completing this proforma. If you have any queries in relation to the audit proforma please contact GAIN Office (Telephone 028 9052 0629).

## Appendix 3 – Daily proforma

Audit Reference Number:



### GAIN – Audit of Parenteral Fluid Therapy for Children & Young Persons (aged over 4 weeks & under 16 years)

#### Daily Fluid Balance Chart Proforma – to be completed for each Fluid Balance Chart

##### Reminder

Day period for Daily chart = 8:00 to 8:00 / Day period for Prescription = 24 hours

Recording of time = 24 hour clock to be used when completing proforma

1.	<b>Daily Fluid Balance Chart:</b> DAY _____ of _____
2.	Was an age appropriate daily Fluid Balance Chart used? Yes <input type="checkbox"/> No <input type="checkbox"/>
3.	<p>Location of child on Daily Fluid Balance Chart audited: Ward name: _____</p> <p>Paediatric: Medical <input type="checkbox"/>      Adult: Medical <input type="checkbox"/>  Surgical <input type="checkbox"/>      Surgical <input type="checkbox"/>  A&amp;E <input type="checkbox"/>      A&amp;E <input type="checkbox"/></p>
4.	<p>Was the patient clearly identified <b>anywhere on</b> the Daily Fluid Balance Chart? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Name of child on chart Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Date of Birth on chart Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>MRC (Medical Record Card) or HSC Number Yes <input type="checkbox"/> No <input type="checkbox"/></p>
5.	<p><b><u>Fluid bolus</u></b></p> <p>a. Is there evidence (on the prescription chart or in the clinical record) of a fluid <u>bolus</u>?  Yes <input type="checkbox"/> No <input type="checkbox"/> If "No" – go to Question 6.</p> <p>b. Is bolus identified on Prescription chart?  Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>c. Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of fluid bolus?  Yes <input type="checkbox"/> No <input type="checkbox"/></p>

6.	<p><b><u>Maintenance Fluid</u></b></p> <p>a. Is there evidence (on the prescription chart or in the clinical record) of <u>maintenance</u> fluid?  Yes <input type="checkbox"/> No <input type="checkbox"/> If "No" – go to Question 7.</p> <p>b. Is maintenance identified on Prescription chart?  Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>c. Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of maintenance fluid? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If 'No' to Question 6c then <b>Refer to Clinical Expert</b> <input type="checkbox"/> for appropriateness of maintenance prescription.</p> <p><b><u>Clinical expert audit reviewer:</u></b></p> <p>d. Was maintenance prescription appropriate? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>e. Was the rate appropriate? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>f. Was the type of fluid appropriate? Yes <input type="checkbox"/> No <input type="checkbox"/></p>
7.	<p><b><u>Fluid Deficit</u></b></p> <p>a. Is there evidence (on the prescription chart or in the clinical record) of a fluid <u>deficit</u>?  Yes <input type="checkbox"/> No <input type="checkbox"/> If "No" – go to Question 8.</p> <p>b. Is deficit identified on Prescription chart?  Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>c. Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of fluid deficit? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>d. Did the patient receive oral fluid other than ORS or medications during this period of IV deficit replacement? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If Yes, what type of fluid? _____</p>
8.	<p><b><u>On-going losses</u></b></p> <p>a. Is there evidence (on the prescription chart or in the clinical record) of <u>on-going losses</u> fluid?  Yes <input type="checkbox"/> No <input type="checkbox"/> If "No" – go to Question 9.</p> <p>b. Is on-going losses identified on Prescription chart?  Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>c. Is there evidence (on the fluid balance chart or in the clinical record) of the calculation of on-going losses fluid? Yes <input type="checkbox"/> No <input type="checkbox"/></p>

9.	<p><i>Diagnosis for the day this daily Fluid Balance Chart was used. Refer to casenotes for this data.</i></p> <p>What was the diagnosis? _____</p> <p><b>Did it include one of the following:</b></p> <table border="0"> <tr> <td>Peri-operative patients <input type="checkbox"/></td> <td>Intravascular volume depletion <input type="checkbox"/></td> </tr> <tr> <td>Patients with head injuries <input type="checkbox"/></td> <td>Bronchiolitis <input type="checkbox"/></td> </tr> <tr> <td>Gastric losses <input type="checkbox"/></td> <td>Gastroenteritis with dehydration <input type="checkbox"/></td> </tr> <tr> <td>CNS infection <input type="checkbox"/></td> <td>Hypotension <input type="checkbox"/></td> </tr> <tr> <td>Severe Sepsis <input type="checkbox"/></td> <td>Salt wasting syndromes <input type="checkbox"/></td> </tr> </table>	Peri-operative patients <input type="checkbox"/>	Intravascular volume depletion <input type="checkbox"/>	Patients with head injuries <input type="checkbox"/>	Bronchiolitis <input type="checkbox"/>	Gastric losses <input type="checkbox"/>	Gastroenteritis with dehydration <input type="checkbox"/>	CNS infection <input type="checkbox"/>	Hypotension <input type="checkbox"/>	Severe Sepsis <input type="checkbox"/>	Salt wasting syndromes <input type="checkbox"/>
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CNS infection <input type="checkbox"/>	Hypotension <input type="checkbox"/>										
Severe Sepsis <input type="checkbox"/>	Salt wasting syndromes <input type="checkbox"/>										
10.	<p>What were the IV Fluids prescribed? (If more than one fluid has been prescribed for the period please indicate approx duration for each)</p> <table border="0"> <tr> <td><input type="checkbox"/> Normal saline/Sodium Chloride 0.9%</td> <td>- approximate duration: _____ hours</td> </tr> <tr> <td><input type="checkbox"/> Normal saline/Sodium Chloride 0.9% + 5% Glucose</td> <td>- approximate duration: _____ hours</td> </tr> <tr> <td><input type="checkbox"/> Hartmann's</td> <td>- approximate duration: _____ hours</td> </tr> <tr> <td><input type="checkbox"/> Hartmann's + 3% glucose</td> <td>- approximate duration: _____ hours</td> </tr> <tr> <td><input type="checkbox"/> Other</td> <td></td> </tr> </table> <p>– please specify: _____ - approximate duration: _____ hours</p> <p>If 'Other' then <a href="#">Refer to Clinical Expert</a> <input type="checkbox"/> for appropriateness of fluid given.</p> <p><b><u>Clinical expert audit reviewer:</u></b></p> <p>Was the Fluid prescription appropriate for this 24 hour period (8:00 to 8:00) of time? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>_____</p> <p>_____</p> <p>_____</p>	<input type="checkbox"/> Normal saline/Sodium Chloride 0.9%	- approximate duration: _____ hours	<input type="checkbox"/> Normal saline/Sodium Chloride 0.9% + 5% Glucose	- approximate duration: _____ hours	<input type="checkbox"/> Hartmann's	- approximate duration: _____ hours	<input type="checkbox"/> Hartmann's + 3% glucose	- approximate duration: _____ hours	<input type="checkbox"/> Other	
<input type="checkbox"/> Normal saline/Sodium Chloride 0.9%	- approximate duration: _____ hours										
<input type="checkbox"/> Normal saline/Sodium Chloride 0.9% + 5% Glucose	- approximate duration: _____ hours										
<input type="checkbox"/> Hartmann's	- approximate duration: _____ hours										
<input type="checkbox"/> Hartmann's + 3% glucose	- approximate duration: _____ hours										
<input type="checkbox"/> Other											
11.	<p>Was E&amp;U taken on the day of this fluid balance chart?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Not applicable as fluids were discontinued <input type="checkbox"/></p>										

<b>12.</b>	<p><b><u>12. Were the E&amp;U results recorded on the:</u></b></p> <p><i>When a Yes response is given + answer to adjoining question – Go to Question 13</i></p> <p><b>12a:</b> Fluid balance /Prescription Chart      Yes <input type="checkbox"/>      No <input type="checkbox"/>      Not available on chart <input type="checkbox"/></p> <hr/> <p><b>12b:</b> If Yes to Q12a- Time of recording:    within 4 hours <input type="checkbox"/>      Greater than 4 hours <input type="checkbox"/>      No time <input type="checkbox"/></p> <hr/> <p><b>12c:</b> Patient notes/records?      Yes <input type="checkbox"/>      No <input type="checkbox"/></p> <hr/> <p><b>12d:</b> If Yes to 12c- Time of recording:    within 4 hours <input type="checkbox"/>      Greater than 4 hours <input type="checkbox"/>      No time <input type="checkbox"/></p> <hr/> <p><b>12e:</b> Laboratory results system?      Yes <input type="checkbox"/>      No <input type="checkbox"/></p> <hr/> <p><b>12f:</b> Or <b>No</b> evidence of E&amp;U performed <input type="checkbox"/></p>
<b>13.</b>	<p>If it was taken was the Sodium result either:</p> <p>- Sodium result <b>Normal (<u>135-145mmol/L</u>)</b> <input type="checkbox"/>      Go to Question 15</p> <p>- Sodium result <b>Abnormal <u>&lt;135mmol/L or &gt;145mmol/L</u></b> <input type="checkbox"/>      Go to Question 14</p>
<b>14.</b>	<p><b><u>Abnormal Sodium Result - &lt;135mmol/L or &gt;145mmol/L</u></b></p> <p>Was E&amp;U repeated during the time period of this daily fluid balance chart (08:00 to 08:00)?</p> <p>Yes <input type="checkbox"/></p> <p>Time of E&amp;U result on this day ____:____ Sodium (Na<sup>+</sup>) value _____</p> <p>Time of E&amp;U result on this day ____:____ Sodium (Na<sup>+</sup>) value _____</p> <p>Time of E&amp;U result on this day ____:____ Sodium (Na<sup>+</sup>) value _____</p> <p>No <input type="checkbox"/> - If 'No' then <b>Refer to Clinical Expert</b></p> <p><b><u>Clinical expert audit reviewer:</u></b></p> <p>Was repeat E&amp;U required?      Yes <input type="checkbox"/>      No <input type="checkbox"/></p> <p>_____</p> <p>_____</p>

15.	<p>Is there evidence of 12 hour medical reassessment?</p> <p>E.g. Fluids totalled /glucose measured / assessment of patient's hydration/ assessment if oral fluids are now appropriate/ assessment if potassium needed / consideration of urine output.</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> N/A (less than 12 hours admitted) <input type="checkbox"/> Unsure - <b>Refer to Clinical Expert</b> <input type="checkbox"/></p> <p style="text-align: right;">Data collector to provide details of why unsure:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b><u>Clinical expert audit reviewer:</u></b></p> <p>Is there evidence of 12 hour medical reassessment? Yes <input type="checkbox"/> No <input type="checkbox"/></p>
16.	<p>Was the E&amp;U result Na<sup>+</sup> &lt;130 mmol/L at any time? Yes <input type="checkbox"/> (continue below) No <input type="checkbox"/></p> <p>Time of abnormal result: ____:____</p> <p>Was there a 4-6 hours follow-up E&amp;U taken? Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>Time of follow-up result: ____:____</p>
17.	<p>GRAND TOTAL IN</p> <p>Was the Fluids <b>total intake</b> recorded on the daily fluid balance chart?</p> <p>– per 12 hours (DAY / NIGHT)?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>– per 24 hours (DAY &amp; NIGHT)?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> N/A – not on fluids for that period <input type="checkbox"/></p>
18.	<p>GRAND TOTAL OUT</p> <p>Was the <b>total output</b> recorded on the daily fluid balance chart?</p> <p>– per 12 hours (DAY / NIGHT)?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>– per 24 hours (DAY &amp; NIGHT)?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> N/A – not on fluids for that period <input type="checkbox"/></p>
19.	<p>Was the 24 hour Fluid Balance (ml) recorded on audited chart?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/> Not available on chart <input type="checkbox"/></p>
20.	<p>Was laboratory glucose or BM monitored every 12 hours (+/- 4 hours)?</p> <p style="text-align: right;">Yes <input type="checkbox"/> No <input type="checkbox"/></p>

21.	<p>Were there any episodes of laboratory glucose/BM &lt;3?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/></p>
22.	<p>Did the patient receive treatment for Hypoglycaemia?</p> <p>Yes <input type="checkbox"/> No <input type="checkbox"/></p> <p>If Yes, did the patient receive:</p> <ul style="list-style-type: none"> <li>- 5ml/kg 10% dextrose <input type="checkbox"/></li> <li>- 2-4 ml/kg 10% dextrose <input type="checkbox"/></li> <li>- Other <input type="checkbox"/> - please specify: _____</li> </ul>
23.	<p><b>OPTIONAL (for Data Collector)</b></p> <p>If applicable please use the space below to provide any other comments that may not have been taken into consideration throughout this proforma.</p>
24.	<p><b>OPTIONAL <u>Clinical assessment notes</u> (for Clinical Expert Audit Reviewer)</b></p> <p>If necessary please use this space if there are any notes or comments.</p>

Thank you for completing this proforma. If you have any queries in relation to the audit proforma please contact GAIN Office (Telephone 028 9052 0629).

#### **Appendix 4: Abbreviation Glossary**

DFBC	Daily Fluid Balance Chart
GAIN	Guidelines and Audit Implementation Network
HSCTs	Health and Social Care Trusts