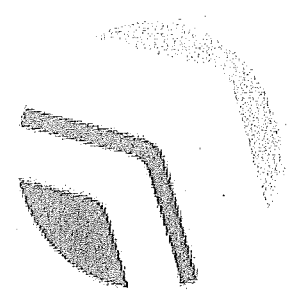


# GAINS

The logo for GAINS consists of a stylized graphic to the right of the word 'GAINS'. The graphic is composed of several overlapping, curved lines that form a shape resembling a stylized 'G' or a network node, with a shaded, three-dimensional effect.

GUIDELINES AND AUDIT  
IMPLEMENTATION NETWORK

**PILOT AUDIT OF GUIDANCE ON PARENTERAL  
FLUID THERAPY for CHILDREN & YOUNG PERSONS  
(AGED OVER 4 WEEKS & UNDER 16 YEARS)**

December 2012

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## Executive summary

This short pilot audit was carried out to help us establish whether compliance with the DHSSPS Guidance on Parenteral Fluid Therapy for Children & Young Persons was embedded into routine clinical practice. The DHSSPS Guidance was published in September 2007 and re-released with a minor update to the title in February 2010.

Intravenous fluids are given to children in many different settings ranging from overnight maintenance of hydration in a child who is mildly nauseated, through to fluid resuscitation of a child who is clinically shocked. It is not straightforward to audit such a wide range of conditions and this pilot audit of necessity can only give a broad brush view of clinical practice.

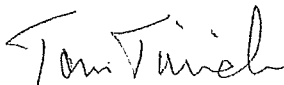
The pilot questions to obtain information on patient demographics were satisfactory and on the whole patients details are appropriately documented, patient's conditions are being monitored and the results recorded.

Our key finding is that the IV fluids being used are consistent with recommendations on the wall chart and where these differ we have found a clinical explanation.

Additional findings are that changes should be made to the audit questionnaire as a result of this pilot. These include careful definitions to clarify and reduce ambiguity, for example 24 hours may mean 24 hours after admission or any 24 hour period such as midnight to midnight. Additionally, some questions were asked which are not part of the DHSSPS Guidance wallchart, which include recording of fluid calculations which is not required by the guidance.

Current standard of practice for glucose monitoring uses point of care technology. We would consider amending the Regional Parenteral Fluid Therapy wall chart to take account of recording of all glucose monitoring. A Regional Paediatric Fluid Balance Chart to include weight, fluid calculations and relevant blood results would have been recommended but it has now been developed. Trusts should ensure that all relevant staff are thoroughly trained and up to date in all aspects of fluid management. Trusts should also regularly audit their practice against agreed standards and a full regional audit should be undertaken within one year of the recommended update to the guidance.

GAIN would like to express its deep gratitude to the Project Team, the Trust Clinical Audit Managers, and all medical, nursing and clinical audit staff across all Trusts for their support and help in completing this audit in such an effective and timely manner.



**Dr T Trinick**  
**GAIN Chairman**

## Background

In December 2011 Dr Michael McBride, Chief Medical Officer wrote to all Chief Executives asking for their co-operation in undertaking a short clinical audit of the Guidance on Parenteral Fluid Therapy for Children & Young Persons (Aged over 4 weeks and under 16 years).

The above guidance was published in 2007 and re-released with a minor update to the title in February 2010. It takes the form of a wall chart and should be displayed on the walls of all paediatric and adult wards where children and young persons are treated.

In April 2008 RQIA carried out an independent review "Reducing the Risk of hyponatraemia when administering intravenous infusions to children". From their list of 18 recommendations it was suggested that Trusts should continue to seek approval and funding for a regional audit (GAIN proposal) on the uptake of the Paediatric Parenteral fluid Therapy guideline and potential unexpected clinical consequences of the guideline (REC16). This will be informed by this audit.

## Aims

The main aim in undertaking this piece of work is to measure compliance with the DHSSPS Guidance on Parenteral Fluid Therapy for Children & Young Persons (Aged over 4 weeks and under 16 years) (See Appendix 1) over a three week period excluding those who were in ICU, or those with liver, renal or cardiac disease.

## Standards

Guidance on Parenteral Fluid Therapy for Children & Young Persons (Aged over 4 weeks and under 16 years). HSC (SQSD) 20-07 Wallchart (A3) Final Print Version-06 08.02.10. (See Appendix 1).

## Sample Size

Information on all children and young people who were administered IV fluids who were admitted to:

- Children's inpatient Ward
- Adult inpatient Ward
- Emergency Department
- Day Unit
- Theatre

was to be collected for the set period of the pilot.

## Data source

Data collected from Patient Records.

## Methodology

This prospective, regional clinical pilot audit was undertaken as follows:

- A small Project team was established, led by the DHSSPS and GAIN and facilitated by the Southern HSC Trust.
- The Project Team set about devising a proforma (See Appendix 2) which was piloted and modified accordingly.

- Medical Directors were asked to nominate a contact person who was the Trust liaison person for GAIN during the duration of the audit.
- The audit was undertaken by nominated Trust staff. Audit Facilitators assisted clinical staff in co-ordinating the audit as required.
- Audit Departments in individual Trusts entered data onto an excel spreadsheet on an ongoing basis. This dataset was then uplifted electronically into a centralised database.

### **Inclusion Criteria**

- All Trusts (Regional audit)
- All children and young people who were administered IV fluids starting during the dates noted above

For the purpose of this audit a child and young person was defined as from 4 weeks old to the day prior to their 16<sup>th</sup> Birthday on the day of first administration of IV fluids.

### **Exclusion Criteria**

Children and young people on IV fluids who are in ICU, or those with liver, renal or cardiac diseases where excluded as the general guidance does not apply in these cases.

### **Data Collection**

Data collection took the form of Two Strands with data collection periods being:

#### **Strand 1 – Trialling of the audit proforma**

IV Fluids commenced between 00:00 on Monday 12 December 2011 until 23:59 on Sunday 18 December 2011.

Following this part of the pilot the following amendments to the proforma were made:

1. Auditor's Contact name and number (rather than Contact name & number)
2. Inclusion of:
  - If U&E is not recorded on fluid balance chart of patient record, is there evidence that U&E is available on lab system Yes No (i.e. in the trial audit there were 8 emergency admissions where U&E appeared not to have been documented on admission - the audit proforma was amended to ensure the laboratory system was cross referenced in the subsequent pilot audit.
3. Day Unit and Theatre were omitted as wards on the final proforma as some of the standards did not apply when fluids were given for less than 24 hours.

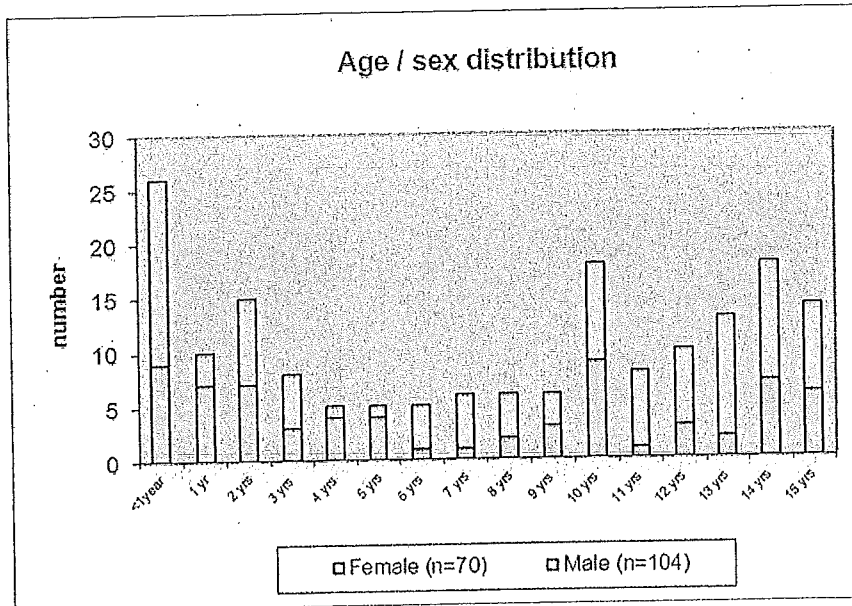
#### **Strand 2 – Main Pilot Audit**

IV Fluids commenced between 00:00 on Tuesday 03 January 2012 until 23:59 on Monday 16 January 2012.

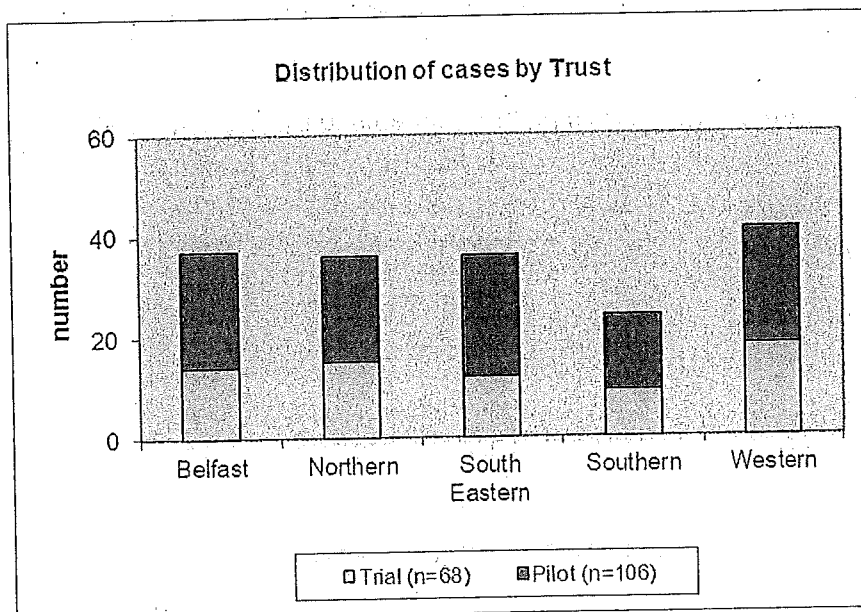
## Data Analysis

The findings from the trial and pilot audit are shown separately and together as there were a few differences and it was useful to have a larger number of cases studied to give a clearer picture.

### Distribution by Gender



### Distribution by Trust Area



The initial trial of the data collection proforma generated 68 returns  
 The pilot audit generated 106 returns.

#### **IV Fluid Prescription**

The fluid choices described in the guidance include normal saline 0.9% +/- 5% glucose or Hartmann's solution or solution corporately approved at Trust level. In addition some cases are allowed – sodium chloride 0.45% with pre-added glucose 2.5% or 5%. With five exceptions all cases fell within these guidelines.

These five cases were examined by independent senior paediatric clinicians who were not involved in the care of these children.

In four out of the five cases examined the fluids given were considered appropriate. In the fifth case 0.45% sodium chloride was given for a six hour period and then switched to normal saline 0.9% with no detrimental effect.

**Comparative Audit Findings**

	Trial of Proforma (n=68)	Pilot Audit (n=106)	Combined audit (n=174)
Patient was clearly identified on all fluid prescription sheets	(98%) 64 / 65*	(91%) 78/86*	(92%) 142/154*
<b>Comments: *excludes cases where IV fluids were commenced and discontinued in theatres</b>			

Admission weight was recorded on the fluid prescription chart or patient record	(100%)	(98%) 104/106	(99%) 172/174
<b>Comments: Admission weight is being recorded appropriately.</b>			

U&E on admission was documented: (a) Elective admission	(25%) 5/20	(21%) 7/33	(23%) 12/53
<b>Comments: In the DHSSPS Guidelines it is acknowledged that admission U&amp;E is not required when the child is well and for elective surgery (See Appendix 1)</b>			
(b) Emergency admission	(98%) 47/48	(90%) 66/73	(93%) 113/121
<b>Comments:</b>			



Fluids given for more than 24 hours	Trial of Proforma N=6	Pilot Audit N=15	Combined Audit N=21
Where IV fluids were administered >24 hours, were the following documented daily a) Input	(100%) Full documentation each day 6/6	(93%) Full documentation each day 14/15 (7%) Partial documentation 1/15	(95%) Full documentation each day 20/21 (5%) Partially Documented
<b>Comments: Following the trial audit, the proforma was changed to allow the identification of children receiving fluids for more than 24 hours.</b> b) Output	(67%) Full documentation each day 4/6 (33%) Partial documentation 2/6	(47%) Full documentation each day 7/15 (40%) Partial documentation 6/15 (13%) Not documented any day 2/15	(52%) Full documentation each day 11/21 (38%) Partially Documented 8/21 (10%) Not documented any day 2/21
<b>Comments: We recognise that it is difficult to accurately monitor output in young children and clinicians may make a judgement on whether nappy was wet or dry.</b>			
c) Plasma glucose	(16%) Full documentation each day 1/6 (16%) Partial documentation 1/6 (68%) Not documented any day 4/6	(13%) Full documentation each day 2/15 (20%) Partial documentation 3/15 (67%) Not documented any day 10/15	(14%) Full documentation each day 3/21 (19%) Partially Documented 4/21 (67%) Not documented any day 14/21
<b>Comments: GAIN has been advised that some Trusts have moved from plasma glucose to point of care monitoring of glucose. The audit tool did not offer this option to be recorded.</b>			
d) U&E	(83%) Full documentation each day 5/6 (17%) Not documented any day 1/6	(93%) Full documentation each day 14/15 (7%) Not documented any day 1/15	(90%) Full documentation each day 19/21 (10%) Not documented any day 2/21

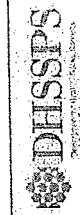
## Observations

### Areas of good practice

1. IV Fluids were appropriately prescribed in all but one child for a short period.
2. Patient weight was recorded in 99% of cases which enables the appropriate therapy to be given.

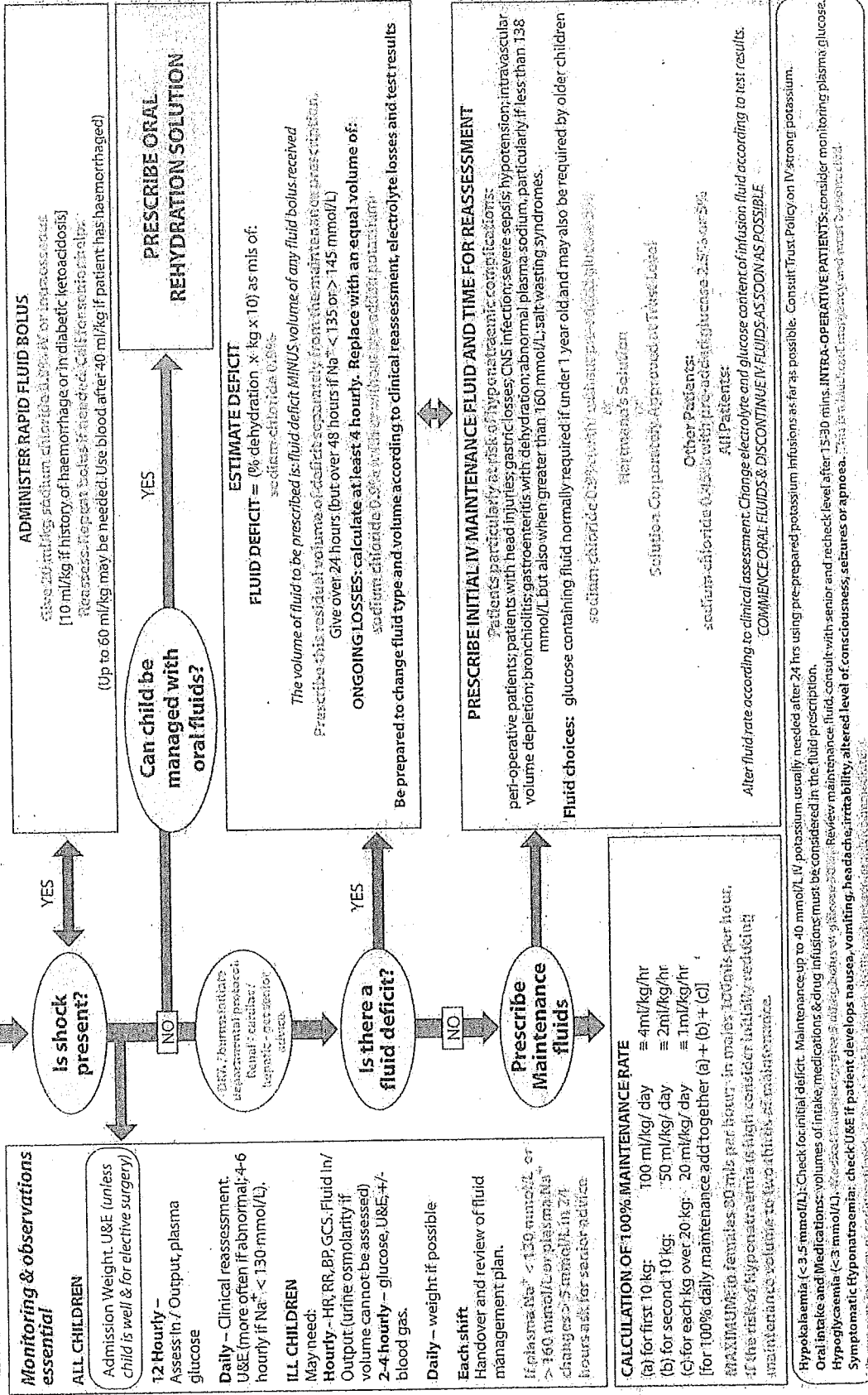
### Recommendations

1. Patients should be clearly identified on all fluid balance charts.
2. When fluids are administered for more than 24 hours there should be a fully documented record.
3. U&E should be recorded on all emergency admissions
4. Current practice for glucose monitoring includes the point of care testing and this should be acknowledged.
5. Point of care testing results should be recorded.
6. Consider amending the Regional Parenteral Fluid Therapy wall chart to take account of recording of point of care glucose monitoring.
7. A Regional Paediatric Fluid Balance Chart would have been recommended but one is being finalised to include:
  - a. Weight
  - b. Fluid calculations
  - c. Relevant blood results
8. Trusts should ensure that all relevant staff are thoroughly trained and up to date in all aspects of fluid management.
9. Individual Trusts should regularly audit their practice against agreed standards and a full regional audit should be carried out within one year of the recommended change to the guidance.



**PARENTERAL FLUID THERAPY for CHILDREN & YOUNG PERSONS (AGED OVER 4 WEEKS & UNDER 16 YEARS)**  
Initial management guideline

Sept 2007  
Amended February 2010



<b>Audit Ref No:</b>			
1.	<b>Trust:</b> Belfast <input type="checkbox"/> Southern <input type="checkbox"/> Western <input type="checkbox"/> Northern <input type="checkbox"/> South Eastern <input type="checkbox"/>		
2.	<b>Contact Name &amp; Number:</b>		
3.	<b>Demographics:</b> Male <input type="checkbox"/> Female <input type="checkbox"/> Age on 1 <sup>st</sup> Day IV Fluids were administered: _____ Years _____ Months		
4.	<b>Admission Type:</b> Emergency (unscheduled) <input type="checkbox"/> Elective <input type="checkbox"/>		
5.	<b>Ward where IV Fluids were 1<sup>st</sup> administered:</b> Children's inpatient Ward <input type="checkbox"/> Adult inpatient Ward <input type="checkbox"/> Emergency Department <input type="checkbox"/> Day Unit <input type="checkbox"/> Theatre <input type="checkbox"/>		
6.	<b>Any other ward were IV Fluids where administered:</b> Children's inpatient Ward <input type="checkbox"/> Adult inpatient Ward <input type="checkbox"/> Emergency Department <input type="checkbox"/> Day Unit <input type="checkbox"/> Theatre <input type="checkbox"/>		
7.	Date and time IV Fluids started to be administered (i.e. time first bag up) _____/_____/_____ Time: _____:_____		
8.	Date & Time IV Fluids were discontinued (time last bag was taken down) _____/_____/_____ Time: _____:_____		
9.	Was the patient clearly identified on all prescription charts? (e.g. addressograph or patient details, including name plus either DoB or H&C No) Yes <input type="checkbox"/> No <input type="checkbox"/>		
10.	Was admission weight: Recorded <input type="checkbox"/> Not Recorded <input type="checkbox"/> (on fluid chart or patient records)		
11.	Was admission U&E: Recorded <input type="checkbox"/> Not Recorded <input type="checkbox"/>		
12.	Initial fluid calculation re volume and rate of IV fluids Recorded <input type="checkbox"/> Not Recorded <input type="checkbox"/>		
13.	<b>For each day IV fluids were administered, were the following documented</b>		
		Documented for each day	Partially documented please state number of days i.e. 2 out of 3 days
			Not documented on any day
	Input		
	Output		
	Plasma glucose		
	U&E		
14.	<b>Fluids Administered throughout period of IV fluids (Tick all that were administered)</b> Normal Saline/Sodium Chloride 0.9% <input type="checkbox"/> Normal Saline/Sodium Chloride 0.9% + 5% Glucose <input type="checkbox"/> Hartmann's <input type="checkbox"/> Other (please state) <input type="checkbox"/>		

**Regional audit on the Management of children and young people on IV Fluids**  
 Draft V3 - 23 December 2011

<b>Audit Ref No:</b>		
1.	Trust: Belfast <input type="checkbox"/> Southern <input type="checkbox"/> Western <input type="checkbox"/> Northern <input type="checkbox"/> South Eastern <input type="checkbox"/>	
2.	Auditor's Contact Name & Number:	
3.	Demographics: Male <input type="checkbox"/> Female <input type="checkbox"/> DoB ...../...../.....	
4.	Ward: Children's Ward <input type="checkbox"/> Adult Ward <input type="checkbox"/> A&E <input type="checkbox"/> Number or name of ward _____	
5.	Admission: Date and Time of Admission ____ / ____ / ____ Time ____ :	
6.	Emergency (unscheduled) <input type="checkbox"/> Elective <input type="checkbox"/>	
7.	Date and time IV Fluids started to be administered (i.e. time first bag up). ____ / ____ / ____ Time: ____ :	
8.	Date & Time IV Fluids were discontinued (time last bag was taken down) ____ / ____ / ____ Time: ____ :	
9.	Was the patient clearly identified on all prescription charts? yes <input type="checkbox"/> no <input type="checkbox"/>	
10.	Was admission weight: Recorded <input type="checkbox"/> Not Recorded on fluid balance chart or patient record <input type="checkbox"/>	
11.	Was admission U&E: Recorded <input type="checkbox"/> Not Recorded <input type="checkbox"/> If U&E is not recorded on fluid balance chart or patient record, is there evidence that U&E is available on lab system yes <input type="checkbox"/> no <input type="checkbox"/>	
12.	Initial fluid calculation re volume and rate of IV fluids Recorded <input type="checkbox"/> Not Recorded <input type="checkbox"/>	
13.	Fluids Administered throughout period of IV fluids: Normal Saline/Sodium Chloride 0.9% <input type="checkbox"/> Normal Saline/Sodium Chloride 0.9% + 5% Glucose <input type="checkbox"/> Hartmann's <input type="checkbox"/> Other (please state) <input type="checkbox"/>	
14.	For each day IV fluids were administered, were the following documented	
		Documented for each day
		Partially documented – please state number of days i.e. 2 out of 3 days
	Input	
	Output	
	Plasma glucose	
	U&E	
15.	Additional comments	

Thank you for completing this proforma. Audit Managers will enter this information onto an excel spreadsheet and forward it to GAIN and Anne Quinn.

If you have any queries in relation to the audit proforma, please contact: Nicola Porter or Anne Quinn

## Project Team

Name	Designation	Organisation
<b>Core Group</b>		
Heather Livingston	Senior Medical Officer	DHSSPS
Nicola Porter	Manager	GAIN
Anne Quinn	Effectiveness & Evaluation Manager	Southern HSC Trust
Tom Trinick	Chairman	GAIN

Dr Damien Carson (GAIN) and Karen Campbell (Standards Quality & Safety) provided quality assurance comments on this report.

Trusts were requested by the Chief Medical Officer in his letter of 06 December 2011 to nominate a Trust co-ordinator. These contacts were:

Name	Designation	Organisation
Rosie Kelly	Clinical Manager, Children's Services	South Eastern HSC Trust
Ruth McDonald	Assistant Clinical & Social Care Governance Manager	Northern HSC Trust
Christine Murphy	Senior Manager for Standards, Quality and Audit	Belfast HSC Trust
Geoff Nesbitt	Consultant Anaesthetist & Associate Medical Director	Western HSC Trust
Anne Quinn	Effectiveness & Evaluation Manager	Southern HSC Trust

GAIN would like to acknowledge all medical, nursing and clinical audit staff across all Trusts who gave their time and helped with this audit in various ways.