Witness Statement Ref. No. 302/1

NAME OF CHILD: RAYCHEL FERGUSON (LUCY CRAWFORD)

Name: James McKaigue

Title: Doctor

Present position and institution:

Consultant Paediatric Anaesthetist, RBHSC

Previous position and institution: Consultant Paediatric Anaesthetist, Royal Belfast Hospital for Sick Children
[As at the time of the child's death]

Consultant Paediatric Anaesthetist, Royal Belfast Hospital for Sick Children (RBHSC)

Membership of Advisory Panels and Committees:
[Identify by date and title all of those between January 1995-July 2012]

Association Paediatric Anaesthetists Executive Committee 2002 - 2006

Previous Statements, Depositions and Reports:
[Identify by date and title all those made in relation to the child's death]

OFFICIAL USE:
List of previous statements, depositions and reports:

Ref:	**Date:**	

IMPORTANT INSTRUCTIONS FOR ANSWERING:

Please attach additional sheets if more space is required. Please identify clearly any document to which you refer or rely upon for your answer. If the document has an Inquiry reference number, e.g. Ref: 049-001-001 which is 'Chart No.1 Old Notes', then please provide that number.

If the document does not have an Inquiry reference number, then please provide a copy of the document attached to your statement.

QUERIES IN RELATION TO YOUR MEDICAL QUALIFICATIONS, EXPERIENCE , TRAINING AND RESPONSIBILITIES

(a) **Please provide the following information:**

(b) **State your medical qualifications and the dates on which they were obtained.**

MB BCh BAO *6th July 1982*

FFARCS(Irel.) *2nd July 1986*

MD *16th December 1992*

(c) **State the date you qualified as a medical doctor.**

6/7/82

(d) **Describe your career history before you were appointed to the Royal Belfast Hospital for Sick Children (RBHSC).**

From *To*

1/8/82 *31/7/83* *Pre-registration House Officer, Belfast City Hospital*

1/8/83 *31/7/84* *Senior House Officer, Anaesthetics, Belfast City Hospital*

1/8/84 *31/7/85* *Senior House Officer, Anaesthetics, Royal Victoria Hospital, Belfast*

1/8/85 *31/7/86* *Senior House Officer, Anaesthetics, Altnagelvin Area Hospital, Derry*

1/8/86 *31/10/89* *Research Fellow, Department of Therapeutics and Pharmacology, The Queen's University of Belfast*

1/11/89 *31/7/90* *Senior House Officer, Anaesthetics, Royal Victoria Hospital, Belfast*

1/8/90 *31/7/91* *Registrar, Anaesthetics, Waveney Hospital, Ballymena*

1/8/91 *31/7/92* *Registrar, Anaesthetics, Belfast City Hospital*

1/8/92 *31/7/93* *Senior Registrar, Anaesthetics, Ulster Hospital, Dundonald*

1/8/93 *31/7/94* *Senior Registrar, Anaesthetics, Royal Victoria Hospital, Belfast*

1/8/94 *31/7/95* *Clinical Fellow in Cardiothoracic Anaesthesia*

Freeman Hospital, Newcastle upon Tyne

(e) **State the date of your appointment to the RBHSC and the capacity in which you were employed.**

1st August 1995, Consultant Paediatric Anaesthetist

(f) **Provide a description of all the professional posts held by you since that date, giving the dates and details of your appointment in each case.**

1st August 1995 to date, Consultant Paediatric Anaesthetist RBHSC.

Anaesthetic Rota Organiser Children's Hospital 1996 - 1999 and Nov 1996 - Current. This involves an attempt to match anaesthetic cover to the requirements of theatre and ensure optimal use of available resources. I also produce an on-call rota for the Consultant Anaesthetists.

Lead Clinician Paediatric Anaesthesia July 1997 - July 1999. I worked on the early implementation of the planned move of paediatric neurosurgery from RVH to the Children's Hospital.

Convenor for Paediatric Anaesthesia Audit Group February 2000 to May 2004. Focus on issues important to us as paediatric anaesthetists eg drawing up guidelines with multidisciplinary input if appropriate; collating anaesthetic critical incidents and then reviewing them for learning points. A report was produced for each meeting, which was circulated within the group, the Trust Audit Department and our Clinical Director, with the intention of sharing information and learning opportunities among other anaesthetists.

Member Trust Transfusion Committee June 2000 - May 2009. I was the Children's Hospital representative on this committee and my role was to provide knowledge and advice to the committee on any relevant matters, which would have implications for the Children's Hospital.

Association Paediatric Anaesthetists Executive Committee 2002 - 2006. During my tenure as Meetings Secretary, I had responsibility for planning and organising future educational meetings for the membership.

(g) **Describe your work commitments to the RBHSC from the date of your appointment at that Hospital to April 2000 stating the locations in which you worked and the periods of time in each department /location.**

I worked at least a full-time contract.

5 sessions in Theatre per week on average

2 sessions in PICU per week on average

2 sessions allowed per week to cover On-Call

1 session allowed for pre and post operative visits to see patients

1 session allowed for audit/administration/teaching

Each session was a nominal 3.5 hours. This was a Full-Time 11/11 contract.

Sessions were worked flexibly to ensure optimum cover when colleagues were on leave.

(h) **Describe your duties in the Paediatric Intensive Care Unit on 13th April 2000.**

My duties in the Paediatric Intensive Care Unit on 13th April 2000, were to work as a Consultant Paediatric Anaesthetist and provide anaesthetic support skills to complement the overall treatment of patients, as and when necessary.

In practical terms to provide advice to the resident paediatrician on-call on matters pertaining to:

-the airway and ventilation

-sedation

-fluids and urine output

-maintenance of an adequate circulation (blood pressure & heart rate)

and also

-assist with resuscitation

-placing patients on a ventilator and if necessary making changes to ventilation

-establishing suitable vascular access if help was required

-making decisions in consultation with colleagues on what patients need to be admitted to the Paediatric Intensive Care Unit and if necessary making decisions on what patients need to be discharged from the Paediatric Intensive Care Unit

-liasing with the members of clinical teams in the management of patients' care

-handover of patient care to my anaesthetic colleagues

-communicating with parents on matters arising from the above

(2) **At any time prior to April 2000 had you received any form of advice , training or education in order to inform you of the appropriate approach to fluid management in paediatric cases and if so please state:**

I do not recall receiving any form of advice, training or education in order to inform me of the appropriate approach to fluid management in paediatric cases WS-156/1 35(a),(c); WS-129/1 41(a), 45(a), 45(c)

(a) **Who provided this advice, training or education to you?**

Please see above

(b) **When was it provided?**

Please see above

(c) **What form did it take?**

Please see above

(d) **Generally, what information were you given and what issues were covered?**

Please see above

(3) **At any time prior to April 2000 had you received any form of advice, training or education in order to inform you of the issues relating to hyponatraemia in paediatric cases and if so please state :**

I refer to a conversation I had with Dr Steen in PICU about Claire Roberts ref: WS-156/1 (5). Although I do not regard this conversation as being formal advice, training or education, this was new knowledge which I was not previously aware of.

(a) **Who provided this advice, training or education to you?**

Please see above

(b) **When was it provided?**

Please see above

(c) **What form did it take?**

Please see above

(d) **Generally, what issues were covered and what information were you given?**

Please see above

(4) **Decribe in detail your experience, prior to April 2000, of dealing with children with hyponatraemia including :**

(a) **Estimated numbers of such cases;**

I do not have detailed numbers. Prior to April 2000 I treated other children with hyponatraemia on a relatively frequent basis.

(b) **Nature of your involvement;**

I believe that I gained most of my experience through working as a Consultant Paediatric Anaesthetist in the Paediatric Intensive Care Unit.

(c) **Outcome of the cases.**

In the case of Claire Roberts, hyponatraemia was a contributory factor to the development of fatal cerebral oedema. A patient from 1997, whom I believe the Inquiry is aware of, died from other causes. To the best of my knowlege the other cases had a good outcome from their hyponatraemia.

(5) **Describe in detail your experience since April 2000, of dealing with children with hyponatraemia, including:**

Please see WS-156/1 (37)

(a) **Estimated numbers of such cases;**

I do not have this detail, but on the basis that I believe that children of any age and presenting from any specialty may develop hyponatraemia during the course of a large number of illness episodes, there would have been quite a few.

(b) **Nature of your involvement;**

I believe that I gained most of my experience through working as a Consultant Paediatric Anaesthetist in the Paediatric Intensive Care Unit

(c) **Outcome of the cases.**

With the exception of Lucy, I believe the children had a good outcome with respect to their hyponatraemia, but I cannot be sure of this in the absence of having details. It is possible that patients did not have a good outcome for another reason. As 4 (c) above

QUERIES ARISING FROM YOUR STATEMENT TO THE PSNI REGARDING LUCY CRAWFORD (115-027-001)

(6) ***"I recall receiving a telephone call from the Erne Hospital about Lucy, as is stated in the Erne Hospital notes. The telephone call was from Dr O'Donohoe. I agreed to Lucy being transferred to RBHSC….In the telephone conversation with Dr O'Donohoe it is my recollection that there was a general discussion about treatment and the type of fluid she received, a dextrose based solution. I have no recollection of the volumes that he told me."***

(a) **Please confirm the date and (approximately) the time of the telephone call.**

13th April 2000, 03:00 – 05:00

(b) **Did you make a note of the call? If so, please provide a copy.**

I did not make a note of the call

(c) **Did you communicate details of the call to any of your colleagues? If so, to whom did you communicate it?**

Although I have no specific recollection, during my handover of Lucy to Dr Chisakuta, the information would have been based on what knowledge I had acquired during this call and as a

result of speaking with Dr O'Donohoe at the bedside. I communicated similar information to Dr Crean when he arrived into work that morning. We were both present in the PICU so I would have updated him on any admissions.

(d) **In what context did the "general discussion about treatment and the type of fluid she received" take place?**

I believe it would have been in the context of my customary practice. I cannot recall with certainty, but I believe it was a critically ill child who had developed seizures, may have had fixed dilated pupils and an anaesthetist was planning to intubate the patient, or had already done so. I believe I would have advised the administration of mannitol if this had not already been given.

(e) **At the time of the telephone conversation or later, did you ask Dr. O'Donohoe to explain what had happened to cause a deterioration in Lucy's condition? If so, what did he say to you?**

I do not recall at any time if I had asked Dr O'Donohoe to explain what had happened to cause a deterioration in Lucy's condition

(f) **Did Dr O'Donohoe express any concern about the treatment Lucy had received or the fluid she had received?**

I do not recall if Dr O'Donohoe had expressed any concern about the treatment Lucy had received or the fluid she had received

(g) **Did you consider it important to establish what fluids Lucy had received and in what volume? Please give reasons for your answer.**

No I would not have considered it important to establish what fluids Lucy had received and in what volume during the initial telephone call.

My priority during this telephone call would have been to ensure that all available measures were being taken to treat a potential brain injury, by protecting the brain if possible from any further insult. This approach applied to any scenario in which there was an actual or potential brain injury. Also to tell Dr O'Donohoe that the patient should be immediately transferred to the Paediatric Intensive Care Unit.

(h) **Did Dr O'Donohoe tell you that Lucy had been treated with Solution No.18?**

I cannot recall what specific fluids Dr O'Donohoe told me that Lucy had received but I had some recollection that a dextrose based solution was administered.

(i) **When you told Police that "*I have no recollection of the volumes that he told me*"**

(i) **Was it your evidence that you recalled that Dr O'Donohoe told you the volumes of fluid that Lucy had received, but you did not remember what the volumes were?**

I do not recall specific details about the fluid administration, although I have said at (g) above, I would not necessarily have had discussions about fluid volumes during that telephone call.

(ii) **Is that still your evidence**?

Yes

(j) **What information was normally required when a child was transferred from another hospital to PICU in 2000? In particular:**

Demographic details

Relevant history to include symptoms and signs of new presentation or a deterioration, as the case may be

Ongoing management in the referring hospital, which would include recent treatment and investigations

Diagnosis/Differential diagnosis

(i) **Was there in 2000 a policy or protocol regarding the information required when a child was transferred from another hospital to PICU?**

I cannot recall a policy or protocol regarding the information required when a child was transferred from another hospital to PICU

(ii) **If there was such a policy please give details of the policy. If the policy or protocol was in writing, please provide a copy.**

Please see 6 (j) (i)

(iii) **Is there such a policy or protocol now? If so please provide a copy.**

Yes there are Protocols. References 1 & 3 attached.

(7) ***"I arrived at the hospital before Lucy arrived. I have made a record in Lucy's hospital notes. ...I can confirm that I received a transfer letter from Dr O'Donohoe regarding Lucy upon her arrival to RBHSC"***

(a) **Did you speak to Dr O'Donohoe when Lucy arrived at the RBHSC? If so, please answer the following questions:**

I recall speaking with Dr O'Donohoe when he brought Lucy to the PICU at RBHSC

(i) **What further information (apart from that contained in the transfer letter) did Dr O'Donohoe provide you about Lucy's care in the Erne Hospital?**

I do not have any specific recollection

(ii) **Did he provide any further information about the type and volume of fluids Lucy had received?**

I cannot recall if Dr O'Donohoe provided any further information about the type and volume of fluids Lucy had received

(iii) **Did you communicate the information provided by Dr O'Donohoe to any of your colleagues?**

I believe I would have communicated any relevant information provided by Dr O'Donohoe to Dr Chisakuta and Dr Crean as stated in 6(c) above

OTHER MATTERS

(8) **When did you become aware of Lucy's death?**

I became aware of Lucy's death at some point within a few days after her death. I cannot be any more precise than this.

(9) **Did you personally give consideration to the cause of Lucy's death? If so please provide full details of the consideration which you gave to this matter and to the conclusions which you reached. If you did not give consideration to this matter, please explain why not.**

No, I personally did not give consideration to the cause of Lucy's death. The care I provided to Lucy was arranging for her admission to the Paediatric Intensive Care Unit after being contacted by Dr O'Donohoe and ensuring that appropriate brain protection measures were being put in place while she was in the Erne Hospital. On arrival in the Intensive Care Unit, I believe I was with Lucy for approximately 15 to 30 mins, before I urgently had to leave her in the care of Dr Chisakuta. From my written note ref: 061-018-064 I would have told him about her low blood pressure, slow heart rate and need for a central line to continue dopamine to support the circulation. I would also have mentioned that she had fixed dilated pupils. In effect I had identified the need for urgent resuscitation and if I had not been called away would have proceeded with these measures myself. After this episode, I had no further clinical contact with Lucy. I believed that her death was discussed with the Coroner, by Dr Hanrahan.

(10) **Was Lucy's death and/or the cause of her death the subject of discussions between you and your medical colleagues in the RBHSC, or with those clinicians in the Erne Hospital responsible for treating Lucy?**

There were discussions between myself and my anaesthetic colleagues about Lucy's death, see 11 (i), but I cannot recall discussions about her cause of death. Lucy's death would have been discussed at a multidisciplinary Audit meeting in RBHSC, but I have no memory of that meeting or what was discussed. I did not discuss her death and/or cause of death with any clinician in the Erne Hospital.

(11) **If her death and /or the cause of her death was the subject of any such discussions please address the following matters:**

(i) **Whom did you have such discussions with?**

I had discussions with Dr Crean and Dr Chisakuta. I was aware that Lucy had hyponatraemia, she died and that would have of itself been mentioned. I did not speak with Dr Hanrahan, but I was aware that he had discussed Lucy's case with the Coroner, I cannot remember any further details on this matter. At some point I became aware from Dr Crean that there were issues around Lucy's fluid management. Also see Reference 4 attached.

(ii) **When did such discussions take place?**

I recall a Northern Ireland Paediatric Anaesthesia Group meeting one evening in Musgrave Park Hospital Reference 4 attached, at which issues around paediatric fluid management were discussed. The case of Raychel Ferguson was discussed. I do not recall if Lucy's death was discussed but there may have been reference made to her.

(iii) **What was the outcome of such discussions**

With reference to Lucy's case I cannot recall the discussions or the outcome. With reference to Raychel's case, I believe that everybody present would have been made aware of the dangers of iv No 18 solution being administered as a bolus to replace a fluid deficit. I also believe that the point would have been made that post-op children were at increased risk of hyponatraemia due to increased levels of ADH and therefore should be prescribed Hartmann's solution or 0.9% Saline for their post-op fluids.

(12) **State your knowledge or awareness, prior to 14 April 2000, of the cases of Claire Roberts or Adam Strain, and the issues arising from those cases and;**

Adam Strain

Please see WS-156/1 33(a)

Claire Roberts

Please see WS-156/1

(a) **State the sources of your knowledge or awareness and when you acquired it;**

Adam Strain

Please see WS-156/1 33(b)

Claire Roberts

Please see WS-156/1

(b) **Describe how that knowledge or awareness affected your work.**

Adam Strain

Please see WS-156/1, 34(c); WS-129/1, 43; WS-156/2, 44(a)

Claire Roberts

Please see WS-156/1, 34(c); WS-129/1, 43

(13) **State your knowledge or awareness , since 14 April 2000, of the cases of Claire Roberts or Adam Strain and the issues arising from those cases and;**

Adam Strain

I had no new knowledge until the Inquiry started

Claire Roberts

Since 14th April 2000, I had a brief discussion with Dr Nicola Rooney ref: WS-156/2 (22).

I also became aware that there was going to be an Inquest, but I did not become aware of the Verdict until I read it on the Inquiry website.

(a) **State the sources of your knowledge or awareness and when you acquired it.**

Adam Strain

As above

Claire Roberts

As above and ref: WS-156/2 (22). I cannot recall who told me about the impending Inquest.

(b) **Describe how that knowledge affected your work.**

Adam Strain

As above

Claire Roberts

None of the information gained affected my work.

However my practice did change, in that at some point I no longer used No18 solution as a maintenance fluid and this became Trust policy Reference 2 attached. Saline 0.18% with dextrose and potassium additives as a maintenance fluid, is only used in small babies with pyloric stenosis, Reference 2. I teach that children who may be at risk of SIADH, need to be monitored extremely closely Reference 5 attached, because of the risk of developing hyponatraemia and cerebral oedema.

(14) **Please provide any further points and/or comments that you wish to make, together with any documents in relation to:**

(a) **Lucy's death and /or the cause(s) of Lucy's death.**

(b) **Lessons learned from Lucy's death and /or the cause of Lucy's death and how that has affected your practice**

Lucy's death has not caused me to alter my practice apart from in general terms that No 18 solution is no longer used

(c) **Current Protocols and procedures**

(d) **Any other relevant matter you may wish to raise**.

References

1. Northern Ireland Paediatric Transfer Form

2. Hyponatraemia Guidance note. April 2011

3. Connect Paediatric Critical Care Transfers

4. Minutes of the Northern Ireland Paediatric Anaesthesia Group Meeting 26th November 2001

5. Parenteral Fluid Therapy for Children and Young Persons (Aged over 4 weeks & under 16 years)

THIS STATEMENT IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF

Signed: J McVaigue Dated: 21/11/12

Northern Ireland Paediatric Transfer Form

Name		Transferring Hospital		DOB	
Hosp. No.		Receiving Hospital		Age	
Address		Referring Consultant		Weight	
		Diagnosis			
		GP Name & Address		Admission Date & Time	
Parental Responsibility					
				Transfer Date & Time	
Tel No.		Religion			
		Attended by clergy		Arrival Time	

OBSERVATIONS		On Admission	On Departure	During Transfer					On Arrival
	Time								
	Heart Rate								
	BP								
	Temperature								
	Resp. Rate								
	Saturations								
	Cap. Refill								
	Colour								
	GCS/AVPU								
	Pupils								
	Blood Sugar								

Airway	Self / Oral Airway / Tracheostomy	**If intubated See Respiratory Section Last Page**

FLUID BALANCE						
	Time of last orals		Naso / Orgastric Tube (yes / no)			
	Arterial line (yes / no, site)		IV lines (list all sites)			
	IV Fluids Insitu					
	Total Intake (Specify others)	Blood	Plasma	Colloid	Oral	
	Total Output	Urine	Aspirate	Drainage	Blood loss	

DRUGS	DRUG	Dose	Route	Time		DRUG	Dose	Route	Time

OS18103

Produced by the Paediatric Benchmarking Nurses' Group in association with Consultant Paediatric Medical Staff 2001 Updated 2011

NSV Code (CAH) WOJ079N (SP) WKA001C (N/M) WOJ082N (NHSC) WHN443N (BHSCT) WOJ003N (Causeway) WSA999N

Northern Ireland Paediatric Transfer Form

NURSING CARE REQUIREMENTS & ACTIVITY	
	Relevant Social Information: (Name of Social Worker):-
	Name of Health Visitor
	Nurse Signature Print Name

TRAVEL				
	Transfer confirmed with receiving hospital		Parents aware of transfer	
	Ambulance booked		Parents transport arranged	
	Equipment checked		Do they need directions	
	Receiving hospital phoned on departure			

BLOOD & XRAYS															
	U& E			FBP			ABG			Coag					
	Time													Guthrie	
	Na			Hb			pH								
	K			PCV			pCO2								
	Cl			Platelets			Bicarb								
	Ca			WBC			B.E.								
	Urea						pO2								
	Creatine						Sao2								
	Bilirubin														
	Glucose														
	Cultures Sent														
	C-Spine			Skull			Chest			Pelvis					
	Collar						USS			CT scan			MRI		

Produced by the Paediatric Benchmarking Nurses' Group in association with Consultant Paediatric Medical Staff 2001 Updated 2011

Northern Ireland Paediatric Transfer Form

RESPIRATORY	ET Tube	Nasal / Oral		Size		Length		
	Time						
	Mode of ventilation						
	FiO2						
	Ventilator Rate						
	Pressure						
	Volume						
	Time I:E						
	Flow						
	Cylinder Air Levels						
	Cylinder O_2 Levels						
	Suction						

MEDICAL HISTORY & EXAMINATION			
	MRSA STATUS		
		Doctors Signature	
		Print	

TRANSFER TEAM	Doctor	
	Anaesthetist	
	Nurse	
	Technician	

Produced by the Paediatric Benchmarking Nurses' Group in association with Consultant Paediatric Medical Staff 2001 Updated 2011

Belfast Health and Social Care Trust

Hyponatraemia Guidance Note

For Children and Young People (aged over 1 month until their 16th birthday)

April 2011

This guidance note accompanies the DHSSPSNI Regional Parenteral Fluid Therapy Wallchart

1. List of triggers for completion of an adverse incident form.
2. Availability of crystalloid intravenous fluids for Children.
3. Sources of advice regarding fluid therapy for clinicians treating children.

Triggers for potential adverse events related to the administration of intravenous fluids. (1)

If any one of these occurs an Incident Report Form must be completed.

CHOICE OF IV FLUID

1. Bolus fluid: use of a solution with sodium concentration of <130mmol/L for treatment of shock.
2. Deficit fluid *: use of a solution with sodium concentration of <130mmol/L for correction.
3. Maintenance fluid: use of a solution with sodium concentration of <130mmol/L in a peri-operative patient (intraoperative period and first 24 hours following surgery).

* In diabetic ketoacidosis and burns: follow departmental protocol

BIOCHEMICAL ABNORMALITIES

4. Any episode of symptomatic hyponatraemia while in receipt of IV fluids.
5. Any episode of hypoglycaemia (blood glucose less than 3mmol/L) while in receipt of IV fluids.
6. Any episode of severe acute hyponatraemia (i.e. sodium level dropping from 135mmol/L or above to < 130mmol/L within 24hrs whilst on IV fluids).

ASSESSMENT

7. Failure to check electrolytes at least once per 24 hours in any patient receiving IV fluids over the majority of that 24 hour period.
8. Failure to record the calculations for fluid requirements on the fluid balance and prescription sheet.
9. Failure to note in the case notes, fluid balance and prescription sheet a serum sodium of <130mmol/L.
10. Failure to document in the case notes the steps taken to correct a serum sodium of < 130mmol/L.

Availability of intravenous crystalloid fluids (500mls) for use in paediatric patients from BHSCT Pharmaceutical Services. (2)

Name of fluid	Comments
Sodium Chloride solutions	
Sodium chloride 0.45%	**Treatment of hypernatraemia**
Sodium chloride 0.9%	
Sodium chloride 1.8%	
Sodium chloride 2.7%	**Emergency treatment of hyponatraemia & head injury**
Combined solutions	
Sodium chloride 0.45% glucose 5%	
Sodium chloride 0.45% glucose 2.5%	
Sodium chloride 0.9% glucose 5%	
Glucose solutions	
Glucose 5%	
Glucose 10%	
Glucose 20%	
Glucose 50%	
Potassium containing solutions	
Sodium chloride 0.18% glucose 10% 10mmol Potassium chloride **Commonly known as Basic Solution**	**Pyloric stenosis patients ONLY**
Sodium chloride 0.45% glucose 2.5% 10mmol Potassium chloride	
Sodium chloride 0.45% glucose 5% 10mmol Potassium chloride	
Sodium chloride 0.45% glucose 5% 20mmol Potassium chloride	
Sodium chloride 0.9% 10mmol Potassium chloride	
Sodium chloride 0.9% 20mmol Potassium chloride	
Sodium chloride 0.9% glucose 5% 10mmol Potassium chloride	**Recommended for DKA protocol**
Sodium chloride 0.9% glucose 5% 20mmol Potassium chloride	**Recommended for DKA protocol**
Sodium chloride 0.9% 10% glucose 10mmol Potassium chloride	**For DKA protocol ONLY**
Sodium chloride 0.9% 10% Glucose 20mmol Potassium chloride	**For DKA protocol ONLY**
Dipotassium hydrogen phosphate in Sodium chloride 0.9% (20mmol potassium : 10mmol phosphate)	**Treatment of hypophosphataemia**
Miscellaneous	
Sodium bicarbonate 1.26% polyfusor	
Sodium bicarbonate 8.4% polyfusor (200mls)	**Emergency use only**
Sodium lactate compound (Hartmann's)	

If it is necessary to prescribe a fluid containing sodium chloride 0.18% then a consultant request form should be completed and sent to Pharmacy.

It can be printed from the Policies and Guidelines section of the BHSCT Intranet, (under Clinical → under Hyponatraemia).

Please note that to avoid any delay to the patient receiving the fluid, Pharmacy must be contacted as soon as possible after the decision is made to prescribe it.

Sources of advice regarding Paediatric fluid therapy (3)

For help and advice regarding
- management of fluid therapy
- especially to prevent and/or treat hyponatraemia

in all children, but especially for those children aged 13 - 16 years old being managed in adult wards.
Please use the following sources of help and advice in the order they appear in the table. Ordinarily, advice should be for complex cases and should be Consultant to Consultant discussions even though contact will often have to be made through trainee on-call rotas.

Team	Address	Ext:
For patients within RBHSC		
RBHSC Paediatric ICU Paediatric ICU		32449
RBHSC Paediatricians Paediatric On Call Rota	Allen Ward	Bleep 2277

For patients outside RBHSC

General Biochemistry	Clinical Biochemistry		
	Inside working hours	Outside working hours	
RVH Tie line: 7222 Ext.33798	Ext.34714	Contact Medical doctor on call either via the laboratory or via switchboard.	
BCH Tie line: 7111 Ext. 2625/2950/3448	Ext. 2625/2950/3448		
MIH Tie line: 7231 Ext. 2391/2325	Ext. 2391/2325		
RBHSC Paediatric ICU	Paediatric ICU		32449
RBHSC Paediatricians	Paediatric On Call Rota	Allen Ward	Bleep 2277

Musgrave Park
Orthopaedic theatre - Anaesthesia team during working hours.

BCH Dufferin theatres
ENT theatre - Anaesthesia team during working hours.

Other sources of help are:

1 APA consensus guideline on perioperative fluid management in Children
http://www.apagbi.org.uk/sites/apagbi.org.uk/files/Perioperative_Fluid_Management_2007.pdf
2 Royal Children s hospital Melbourne Clinical Practice Guidelines: Intravenous fluids
http://www.rch.org.au/clinicalguide/cpg.cfm?doc_id=5203#Other%20Resources
3 Royal Children s hospital Melbourne Clinical Practice Guidelines : Hyponatraemia
http://www.rch.org.au/clinicalguide/cpg.cfm?doc_id=8348

CONNECCT Paediatric Critical Care Transfers

DATE DD ____ MM ____ 2012 INITIAL TEL CALL __:__ 24HR PICU DR TAKING CALL _____

PATIENT DETAILS

NAME _____ DOB: ___/___/___

HOME ADDRESS _____ AGE

GEST AGE (IF PREM)
Multiple birth Y / N

POST CODE _____

GP NAME & ADDRESS _____ WEIGHT _____ KG

ETHNIC CATEGORY ☐ MALE ☐ FEMALE

Referring Hospital _____ Referring Cons _____ Ward / Site in Hosp _____

Referring Dr _____ Spec _____ Grade _____ Contact Te no / bleep _____

PROVISIONAL DIAGNOSIS _____ PICU ADMITTING CONS _____

OBSERVATIONS AT TIME OF REFERRAL

AIRWAY & C-SPINE

CLEAR	COMPROMISED	INTUBATED	TRACHY
ETT:		ORAL	NASAL
ETT SIZE			
ETT LENGTH			

☐ COLLAR ☐ BLOCKS ☐ ORTHO SCOOP STRETCHER

BREATHING

SELF	CPAP/BIPAP	VENTILATED	HFOV
FIO_2		SPO_2	
PIP/PEEP		INSP TIME	
MAP		NITRIC	PPM
RR/HZ		OXY INDEX	

CIRCULATION

HR		FLUID BOLUSES
BP (M)		CRYSTALLOID
		COLLOID
URINE		BLOOD PRODUCTS
MAINT FLUIDS		
INOTROPES		ACCESS
		IV PERIPHERAL
		IV CENTRAL
		ARTERIAL

BLOOD GASES

	ART/V/CAP	ART/V/CAP	ART/V/CAP	ART/V/CAP
Time				
pH				
PCO_2 kPa				
PO_2 kPa				
SBC				
BE				
LACT				
GLU				

DISABILITY

GCS	/15	A V P U
E	/4	PUPILS LT RT
V	/5	SIZE
M	/6	REACTION
☐ SEDATED		☐ MANNITOL ☐ 3% SALINE
☐ PARALYSED		☐ SEIZURES ☐ NGT / OGT

INFECTION

TEMP	C	P
ANTIBIOTICS		
+VE CULTURES & CULTURES PENDING		

RESULTS

DATE				IMAGING	PLAIN X-RAYS	CT / ULTRASOUND / MRI
HB				HEAD		
WCC						
PLT				CHEST		
NA						
K						
UREA						
CR				SPINE		
LFT						
NH3				ABDOMEN		
PT						
APTT				PELVIS		
FIB						
CRP				LIMBS		
TOX						
OTHER						

ANY OTHER RELEVANT HISTORY

DRUG ALLERGIES, MEDICATIONS, IMMUNISATIONS (INCL. TETANUS)

ADVICE GIVEN TO REFERRING TEAM – DATED, TIMED AND SIGNED.

Print name & sign .....

INFUSIONS

TIME :														

OUTPUT

URINE OUTPUT													
NGT LOSS													
CHEST DRAIN													
OTHER LOSSES													

OBSERVATIONS: TIME	O/A											
TEMPERATURE: TEMP C												
P												
SITE(S)												
200												
190												
180												
• HEART RATE: 170												
160												
150												
140												
130												
Λ BLOOD PRESSURE: 120												
V 110												
100												
90												
80												
70												
60												
O RESPIRATORY RATE: 50												
40												
30												
20												
10												
MEAN ARTERIAL BP												
CAP REFILL TIME (CRT)												
VENTILATION:												
RATE												
FIO2												
PIP												
PEEP												
I TIME												
MODE												
O2 SATURATIONS												
ET CO2												
BLOOD GASES: A/C/V												
PH												
PACO2												
PAO2												
S.BIC												
BE												
LACTATE												
BLOOD SUGAR												
NA+												
K+												
CA I												
HB												
NEUROLOGICAL:												
GCS/AVPU												
RT PUPIL												
LT PUPIL												

INTERVENTIONS & FURTHER NOTES

ADVERSE EVENTS & COMPLICATIONS

AMBULANCE/VEHICLE RELATED ☐ RTA	OTHER (INCL. DELAYS & COMMUNICATION PROBLEMS)
PATIENT RELATED ☐ DEATH ☐ CPR/DEFIB ☐ INADEQUATE / LOST VEN ACCESS ☐ ACCIDENTAL EXTUBATION ☐ DISLODGED / BLOCKED ETT ☐ PNEUMOTHORAX ☐ HYPOTENSION ☐ SIGNIFICANT DESAT / BRADY ☐ EXTRAVASATION (ART, IO, VEN)	EQUIPMENT RELATED ☐ VENT ☐ PROPAQ ☐ PUMP ☐ OTHER

TRANSFER TEAM (Name & Grade) 1. 2. 3. 4.

Most Senior Grade of Staff Handing Over .....

Modes of Transport Used Ambulance Dedicated / Frontline / RRV / Taxi / Helicopter / Fixed Wing

Mobilisation And Transport Times

TIME OF DECISION TO ADMIT TO PICU		TIME ARRIVE REFERRING HOSPITAL	
TIME OF DECISION TO TRANSFER		TIME LEAVE REFERRING HOSPITAL	
TIME AMBULANCE BOOKED		TIME RETURN TO RBHSC	
TIME AMBULANCE ARRIVED RBHSC		BLUE LIGHT USED OUT Y / N	RETURN Y / N
TIME OF TEAM DEPARTURE FROM RBHSC		DID PARENT(S) TRAVEL IN AMBULANCE	Y / N

TRANSFER OUTCOME

☐ TRANSFERRED TO PICU	☐ UNABLE TO TRANSFER CHILD (UNSTABLE)
☐ CHILD IMPROVED AT LOCAL HOSPITAL	☐ CHILD DIED DURING TRANSFER
☐ CHILD DIED AT LOCAL HOSPITAL BEFORE TEAM ARR	☐ UNABLE TO TRANSFER – NO PICU BED AVAILABLE.
☐ CHILD DIED AT LOCAL HOSPITAL AFTER TEAM ARR	☐ UNABLE TO TRANSFER – NO TRANSPORT TEAM AVAILABLE

CHILD PROTECTION CONCERNS	YES	NO

IF YES ENSURE REFERRAL MADE TO SOCIAL SERVICES.

NAME OF PERSON REFERRAL MADE TO _____ CONTACT TEL _____

The ROYAL HOSPITALS

THE ROYAL BELFAST HOSPITAL FOR SICK CHILDREN

22 April 2002

Dear Colleague

The next meeting of the Northern Ireland Anaesthetic Group will be held on Wednesday 5 June 2002 (6.30pm for 7.00pm, tea, coffee and sandwiches provided) in:

A & E Seminar Room
Royal Belfast Hospital for Sick Children

I have enclosed the minutes of the last meeting. I have invited Sr Linda Surgenor to speak briefly on "Organisation of Day Care Services in RBHSC". It would be useful if each of us could present something about the organisation of our own day care services so that we can share best practices. If you have any other issues that you would like discussed please let me know.

I would be most grateful if you could confirm your attendance with [redacted] Secretary PICU, RBHSC ext [redacted] If you are unable to attend, could you please send a deputy.

Yours sincerely

Peter Crean

DR P M CREAN
CONSULTANT PAEDIATRIC ANAESTHETIST

Enc.

A meeting of the Paediatric Anaesthetic Group in Northern Ireland was held in Musgrave Park Hospital on Monday 26 November 2001

IN ATTENDANCE

Dr Dimascio	Altnagelvin Area Hospital
Dr Lowry	Craigavon Area Hospital
Dr McKaigue	Royal Belfast Hospital for Sick Children
Dr Renfrew	Ulster Hospital
Dr Crean	Royal Belfast Hospital for Sick Children
Dr Wilson	Musgrave Park Hospital
Dr Allen	Musgrave Park Hospital
Dr Hurwitz	Belfast City Hospital
Dr Turner	Musgrave Park Hospital

APOLOGIES

Dr Carlise	Daisy Hill Hospital
Dr Kelly	Tyrone County Hospital
Dr Ferguson	Antrim Area Hospital
Dr Prasad	Antrim Area Hospital

ITEMS DISCUSSED AT MEETING

A case of hyponatraemic encephalopathy in a child following surgery was discussed. This led on to a wider discussion of preventing hyponatraemia in children receiving intravenous fluids.
The final draft document being prepared by the Department of Health in Northern Ireland 'Prevention of Hyponatraemia in Children Receiving Intravenous Fluids', was presented and discussed.

Thanks were given to Dr Callum Wilson for hosting the meeting at Musgrave Park Hospital. The next meeting will take place in Spring 2002 at the Royal Belfast Hospital for Sick Children.

DHSSPS
Department of Health, Social Services and Public Safety
www.dhsspsni.gov.uk

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

Sept 2007
Amended February 2010

Monitoring & observations essential

ALL CHILDREN

Admission Weight. U&E *(unless child is well & for elective surgery)*

12 Hourly –
Assess In / Output, plasma glucose

Daily – Clinical reassessment. U&E (more often if abnormal; 4-6 hourly if Na^+ < 130 mmol/L).

ILL CHILDREN
May need:
Hourly - HR, RR, BP, GCS. Fluid In/ Output (urine osmolarity if volume cannot be assessed)
2-4 hourly – glucose, U&E, +/- blood gas.

Daily – weight if possible

Each shift
Handover and review of fluid management plan.

If plasma Na^+ < 130 mmol/L or > 160 mmol/L or plasma Na^+ changes > 5 mmol/L in 24 hours ask for senior advice

Is shock present? — YES →

ADMINISTER RAPID FLUID BOLUS
Give 20 ml/kg sodium chloride 0.9% IV or Intraosseous
[10 ml/kg if history of haemorrhage or in diabetic ketoacidosis]
Reassess. Repeat bolus if needed. Call for senior help.
(Up to 60 ml/kg may be needed. Use blood after 40 ml/kg if patient has haemorrhaged)

NO ↓

Can child be managed with oral fluids? — YES →

PRESCRIBE ORAL REHYDRATION SOLUTION

DKA / burns: initiate departmental protocol. Renal / cardiac / hepatic - get senior advice.

Is there a fluid deficit? — YES →

ESTIMATE DEFICIT
FLUID DEFICIT = (% dehydration x kg x 10) as mls of:
sodium chloride 0.9%
The volume of fluid to be prescribed is: fluid deficit MINUS volume of any fluid bolus received
Prescribe this residual volume of deficit separately from the maintenance prescription.
Give over 24 hours (but over 48 hours if Na^+ < 135 or > 145 mmol/L)
ONGOING LOSSES: calculate at least 4 hourly. Replace with an equal volume of:
sodium chloride 0.9% (with or without pre-added potassium)
Be prepared to change fluid type and volume according to clinical reassessment, electrolyte losses and test results

NO ↓

Prescribe Maintenance fluids

PRESCRIBE INITIAL IV MAINTENANCE FLUID AND TIME FOR REASSESSMENT

Patients particularly at risk of hyponatraemic complications:
peri-operative patients; patients with head injuries; gastric losses; CNS infection; severe sepsis; hypotension; intravascular volume depletion; bronchiolitis; gastroenteritis with dehydration; abnormal plasma sodium, particularly if less than 138 mmol/L but also when greater than 160 mmol/L; salt wasting syndromes.

Fluid choices: glucose containing fluid normally required if under 1 year old and may also be required by older children

sodium chloride 0.9% (with/ without pre-added glucose 5%)
or
Hartmann's Solution
or
Solution Corporately Approved at Trust Level

Other Patients:
sodium chloride 0.45% with pre-added glucose 2.5% or 5%
All Patients:
Alter fluid rate according to clinical assessment. Change electrolyte and glucose content of infusion fluid according to test results.
COMMENCE ORAL FLUIDS & DISCONTINUE IV FLUIDS AS SOON AS POSSIBLE

CALCULATION OF 100% MAINTENANCE RATE

(a) for first 10 kg:	100 ml/kg/ day	≡ 4ml/kg/hr
(b) for second 10 kg:	50 ml/kg/ day	≡ 2ml/kg/hr
(c) for each kg over 20 kg:	20 ml/kg/ day	≡ 1ml/kg/hr

[for 100% daily maintenance add together (a) + (b) + (c)]

MAXIMUM: in females 80 mls per hour; in males 100mls per hour.
If the risk of Hyponatraemia is high consider initially reducing maintenance volume to two thirds of maintenance.

Hypokalaemia (< 3.5 mmol/L): Check for initial deficit. Maintenance up to 40 mmol/L IV potassium usually needed after 24 hrs using pre-prepared potassium infusions as far as possible. Consult Trust Policy on IV strong potassium.
Oral intake and Medications: volumes of intake, medications & drug infusions must be considered in the fluid prescription.
Hypoglycaemia (< 3 mmol/L). **Medical Emergency: give 5 ml/kg bolus of glucose 10%.** Review maintenance fluid, consult with senior and recheck level after 15-30 mins. **INTRA-OPERATIVE PATIENTS:** consider monitoring plasma glucose.
Symptomatic Hyponatraemia: check U&E if patient develops nausea, vomiting, headache, irritability, altered level of consciousness, seizures or apnoea. **This is a Medical Emergency and must be corrected.**
Commence infusion of sodium chloride 2.7% at 2 ml/kg/hour initially and get senior advice immediately.