CHRONOLOGY OF EVENTS: RAYCHEL DOB 4th February 1992
CLINICAL

Date	Time	Event	Source
2001			
07.06	15.20	Raychel returned home from school and went out to play as normal	Mrs. Ferguson's Deposition (Ref: 012-028-144).
	16.30	Raychel entered the house complaining of stomach pains	As above
	16.45	Raychel ate her dinner normally and went outside to play but returned a few times complaining of stomach pains	As above
	17.46	At about this time Mrs. Ferguson made Raychel a bed on the sofa and Raychel lay down complaining of pain around her 'belly button'	As above
	18.30	At around this time Rachel began to go grey and Mrs. Ferguson drives to Altnagelvin Area Hospital A&E Department collecting Mr. Ferguson from work along the way.	As above
	20.00	A nurse, possibly SN McGonagle, records in an observation sheet *"c/o of abdominal pain, onset 6pm Tender++ c/o pain on urination. No vomiting, Colour pale."* Bloods were ordered	Observation sheet (Ref: 020-016-031)
	20.05	Raychel is seen by SN McGonagle in A&E, who records in the triage notes: *"Abdominal pain, sudden onset"* She is also seen by Dr. Kelly (SHO) Temperature is recorded as 36°c, blood pressure 126/76, and weight *"approx 26kg"*. The history recorded is of *"sudden onset of abd pain – 4.30pm"* with pain *"increased in severity since, nauseated"* but with no vomiting. The "PMH" (past medical history), it is recorded as *"nil of note."* Raychel was recorded as: *"tender, rebound+ guarding+"* with guarding over McBurney point and *"pain on urination."* Diagnosis recorded as *"appendicitis?"*	A&E Sheet (Ref: 020-006-010)
	20.20	2mg Cyclomorph administered intravenously by Dr.	A&E Sheet (Ref:

Date	Time	Event	Source
		Kelly	020-006-010)
	21.41	Raychel admitted on to Ward 6 - details taken by SN Daphne Patterson. Mr. Makar (surgical SHO) examines Raychel on ward 6. He diagnoses acute appendicitis. Mrs. Ferguson signs the 'Consent form' for an appendicetomy. IV fluids were prescribed	Admission Record (Ref: 020-001-001) Clinical notes (Ref: 020-007-012) Consent form (Ref: 020-008-015)
	Not timed	4-hourly TPR Sheet (Temperature, Pulse and Respiration) describing Raychel's condition on admission, which indicates that *"on admission, patient was afebrile, BP was 103/61, weight was 25kg"*	(Ref: 020-015-028) & Dr. Loughrey's report (Ref: 014-006-014)
	22.15	Solution No. 18 started at a rate of 80ml/hour.	Parenteral nutrition fluids prescription sheet (Ref: 020-021-040)
		Pre-assessment by Dr. Gund	Anaesthetic Record (Ref: 020-009-017)
	23.19	Urinalysis printout indicated proteinuria 2+	Urinalysis report (Ref: 020-015-30).
	23.20	Raychel arrives in theatre for appendicectomy, to be performed by Mr. Makar, with Drs. Gund and Dr. Jamison as the anaesthetists, SN Ayton as the scrub nurse and SN McGrath as the Checking Nurse	Theatre Nursing Care Plan (Ref: 020-012-020)
	23.40	Raychel administered with voltarol suppository (12.5mg) and paracetamol suppository (500mg)	Intra-operative Nursing Care (Ref: 020-013-021)
	Not timed	Anaesthetic record indicates that Raychel received 2mg ondansetron, 50mg total fentanyl, 100mg propofol, 30mg scoline, 5mg cyclimorph, 2mg mivacurium, 250mg metronidazole	Anaesthetic Record (Ref: 020-009-016)
	Not timed	Anaesthetic record states *"Fluids total: Hartman's 1L"* There is then a note signed off by Dr. Jamison (SHO) and witnessed by Dr. Nesbitt (Consultant): *"Retrospective note dated 13 June 2001. Patient only received 200 mls of noted fluids below when in theatre. Litre bag removed prior to leaving theatre."*	Anaesthetic Record (Ref: 020-009-016)
	Not timed	Mr. Makar reports the findings: *"mildly congested appendix. Peritoneum clean"*	(Ref: 020-010-018)

Date	Time	Event	Source
08.06	00.45 – 01:05	Raychel is asleep, but responsive to stimuli, breathing spontaneously, oxygen saturations 99%, BP 117/65, pulse 116 She is also observed to be asleep with broadly similar observations at 12:55 and 01:05 Her airway is recorded as clear at 01.05 – the ET tube having been removed	Recovery Area Care (Ref: 020-014-022)
	01.15 – 01:30	Raychel is awake, responsive to stimuli, breathing spontaneously, airway clear, oxygen saturation 99%, respiratory rate 20, BP 116/66, pulse 111, peripheral circulation good. No pain indicated Similar observations recorded at 01:30	Recovery Area Care (Ref: 020-014-022)
	Not timed	Dr. Gund states: "*Before transferring [Raychel] to the ward I prescribed her intramuscular Cyclimorph, Paracetamol, Diclofenac and Ondansetron on as required basis. I had discarded the remaining fluid in the bag and left the prescription of fluids on ward protocols*"	Dr. Gund's Deposition (Ref: 012-033-162-3)
	01.55	Temperature/respiratory rate/pulse/blood pressure recorded on Raychel's return from theatre, half-hourly until 04:00, then at 05:00 and at 07:00, then every 4 hours during the day. Signed off by SNs Patterson, Noble, Hewitt and Gilchrist	(Ref: 020-015-029)
	01:55	Raychel returns to the Children's Ward	(Ref: 020-027-064)
	07.00	Raychel is given 500mgs flagyl rectally as prescribed by Dr. Makar and voltarol 25mgs for pain	(Ref: 020-017-033)
	07.50	Sister Millar comes on duty	SN Millar's Deposition (Ref: 012-041-202)
	08.00	Nurses' handover The fluid balance for IV fluids commenced – records input until 04.00 hours on the 8 June 2001 A vomit is recorded	Fluid Balance for IV Fluids (Ref: 020-018-037)
	Not timed	Ward round by Mr. Zafar. Clinical notes record: "*Post appendectomy. Free of pain. Apyrexial. Continue observation*"	(Ref: 020-007-013)
	Post ward round	Visit by Mr. Makar	

Date	Time	Event	Source
	10.30	Raychel has a *"large vomit"* and passed urine – *"PU"*	(Ref: 020-018-037)
	12.10	SN McAuley asks Dr. Butler (SHO - paediatrics) to write up for another bag of IV fluids No. 18 Solution as the bag which had been running from the previous night had run out	Parenteral nutrition fluids prescription sheet (Ref: 020-019-038)
	13.00	Raychel *"vomited ++"*	(Ref: 020-018-037)
	15.00	Raychel *"vomited ++"*	(Ref: 020-018-037)
	16.30	SN McAuley attempts to contact a doctor to come and give Raychel some IV anti-emetic for her vomiting	Sister Millar's Deposition (Ref: 012-041-203)
	18.00	Dr. Devlin administers Zofran (the anti-emetic), which Dr. Gund had prescribed on the day of Raychel's surgery "If required"	(Ref: 063-032-076) Drug sheet (Ref: 020-017-034 & 35)
	20.00	Nurses' handover SN McAuley reports that Raychel had micturated but had vomited a few times during the day.	SN Noble's Deposition (Ref: 012-043-208)
	21.00	Raychel *"vomiting coffee grounds ++"*	(Ref: 020-018-037)
	21.15	SN Gilchrist records: *"Colour flushed→ pale Vomiting ++ c/o headache"*	Paediatric unit record sheet (Ref: 020-015-029)
	21.25	Mr. Ferguson informs SN Noble that Raychel has a headache and 500mg rectal paracetamol is administered	(Ref: 020-027-057)
	22.00	Raychel vomits small amount x 3	(Ref: 020-018-037)
	22.15	SN Gilchrist contacts the surgical JHO (Dr. Curran), who attends and administers intra-venous Cyclizine to treat Raychel's nausea.	(Ref: 012-044-212)
	23.00	Raychel has *"small coffee ground vomit"*	(Ref: 020-018-037)
09.06	00.35 approx	Raychel vomits *"a mouthful"* but this is not noted in the records.	SN Gilchrist (Ref: 012-044-213)
	00:40[1]	Raychel's parents leave advising staff to ring if Raychel woke up.	Mrs. Ferguson's Deposition (Ref: 012-028-146)

[1] SN Gilchrist says in her Deposition that Raychel's parents left at 23:30 – Ref: 012-044-212

Date	Time	Event	Source
	01:00-02:00	IV bag of Solution No.18 changed	Fluid balance chart (Ref: 020-018-037)
	02:00	SN Gilchrist checked Raychel and found that her vital signs were unremarkable, and that she was asleep but rousable	SN Gilchrist (Ref: 012-044-213)
	03.00	SN Noble attended and observes that Raychel is lying in a left lateral position, is not cyanosed, but has been incontinent of urine and is in a tonic state. Her hands and teeth are tightly clenched	Observation sheet (Ref: 020-016-032)
	03.05	SN Noble asks Dr. Johnston (paediatric SHO) to attend Raychel urgently. He attends,and prescribes and administers 5mg Diazepam rectally Raychel is recorded as still fitting	Drug sheet (Ref: 020-017-034) (Ref: 020-016-032)
	03.15	Raychel's oxygen saturation is recorded as being in the high nineties. Dr. Johnston administers 5mg Diazepam rectally and then 10mg IV Diazepam after 15 minutes. Dr. Johnston calls Dr. Curran (Surgical JHO), and asks him to contact his surgical registrar and senior house officer urgently	Observation sheet (Ref: 020-016-032) Drug sheet (Ref: 020-017-034) Dr. Johnston's note (Ref: 020-007-013
	03:30	Dr. Curran, at Dr. Johnston's request, obtains blood for investigation and sends sample to the laboratory	Blood results (Ref: 020-022-042)
	Not timed	Dr. Curran calls his senior colleague Dr. Zafar (Surgical SHO).	
	Not timed	Dr. Johnston performs a 12 lead ECG while awaiting the senior members of the surgical team and the biochemistry results.	(Ref: 020-007-013)
	03:30	Dr. Curran, at Dr. Johnston's request, obtains blood for investigation and sends sample to the laboratory Raychel cool to touch, temperature 36.6, still agitated and oxygen is continued via a face mask.	Blood results (Ref: 020-022-042) Observation sheet (Ref: 020-016-032)
	03.45[2]	Hospital telephones parents to advise that Raychel is having a seizure. Mr. Ferguson goes to the Hospital.	Mrs. Ferguson's Deposition (Ref: 012-028-146)

[2] SN Noble puts this earlier – at 03:15 (Ref: 012-043-209)

Date	Time	Event	Source
	04.10	Raychel's pulse is recorded as being 124 and her blood pressure as 104/73	Observation sheet (Ref: 020-016-032)
	04.00/04.15	Dr. Johnston goes to the neonatal intensive unit to discuss Raychel with the Paediatric Registrar (Dr. Trainor). He asks her to review Raychel. Dr. Johnston is 'bleeped' by staff on ward 6 and told that Raychel is looking more unwell	Dr. Johnston's Deposition (Ref: 012-040-199)
	04.15 approx	Dr. Trainor goes to ward 6. She notes Raychel's serum sodium is 119 and her potassium is 3. She records in a retrospective note written at 06:30 that Raychel: *"looks very unwell, unresponsive, pupils dilated + unresponsive … Face flushed + widespread macular rash. Petechiae on neck + upper chest probably [from] vomiting"*. She found that the chest *"sounds rattly"* and her "limbs flaccid". Her impression is recorded as: *"? seizure 2°electrolyte problem ?cerebral lesion"*.	Laboratory Results (Ref: 020-022-044) Dr. Trainor's note (Ref: 020-015-023) .
	04.30 approx	Raychel is transferred to the treatment room and connected to a "Pro-Pak" monitor while Dr. Trainor explains Raychel's condition over the 'phone to Dr. McCord (Consultant Paediatrician on call). He is asked to come to the ward immediately	Dr. Trainor's Deposition (Ref: 012-035-167)
	04:35	Further repeat blood sample taken. The results of the repeat electrolytes later show Raychel's serum sodium at 118mmol/L and her magnesium 0.59	Laboratory Results (Ref: 020-022-043)
	04.40	Sample of Raychel's blood is processed on the arterial blood gas machine in the neonatal intensive care unit.	Dr. Johnston's Deposition (Ref: 012-040-199)
	04.40 approx	Second IV line for antibiotics is inserted and to take 2 more blood samples for meningococcal pcr and antibodies. Dr. Johnston administers antibiotics Cefotaxime 2.5gms and Benzypenicillen 1.2gms as directed by Dr. Trainor.	Dr. Johnston's Deposition (Ref: 012-040-200) (Ref: 020-017-034)
	04.40 approx	Raychel is desaturated to 70% and goes apnoeic while in the treatment room Dr. Trainor fast bleeped the Anaesthetic Registrar (Dr. Date) and commences bag and mask ventilation	Clinical notes (Ref: 020-015-024) Clinical notes (Ref: 020-023-048)

Date	Time	Event	Source
		Dr. Date arrives and finds Raychel cyanosed and still vomiting. Raychel is intubated and copious dirty secretions are sucked out.	
	04.45 approx	Dr. McCord arrives with Raychel being intubated and manually ventilated. She was perfused but unresponsive. Her pupils were fixed and dilated	Dr. McCord's Deposition (Ref: 012-036-170)
	Not timed	Raychel's fluids are changed to 0.9% sodium chloride at the reduced rate of 40mls per hour. Dr. Trainor gives Raychel 1ml of magnesium sulphate intramusculary and catheterised her with a size 10 foley Arrangements are made for a brain scan	Clinical notes (Ref: 020-015-024)
	05.00	Mr. Zafar attends Mr. Bhalla receives phone call to attend ward and attends.	Mr. Zafar's WS (WS-025/2, p.12) Mr. Bhalla's PSNI Statement (095-017-075)
	05.30	Dr. Trainor accompanies Raychel to the x-ray department for the CT Scan.	Request to radiologist (Ref: 020-025-054)
	05.30	Dr. Nesbitt (Clinical Director and Consultant Anaesthetist) attends Raychel whilst the CT scan is taken – Dr. Date having asked him to come to the Hospital	Dr. Nebitt's Deposition (Ref: 012-037-173) Dr. Date's Statement (Ref: 012-018-122)
	07.00 approx	After completion of CT scan Dr. Trainor takes Raychel to Intensive Care where she is anointed by a priest	Mrs. Ferguson's Deposition (Ref: 012-028-146)
	08.51	The initial impression of CT scan was one of subarachnoid haemorrhage with raised intracranial pressure A second CT scan (contrast scan) was arranged at the request of the Neurological Unit of the Royal Victoria Hospital. This scan was performed by Dr. Morrison (Consultant Radiologist) at 08:51, and it demonstrated that a sub-arachnoid haemorrhage was unlikely. A Dr. Stephen McKinstry, with whom Dr. Morrison discussed the images, felt that the appearances were more in keeping with cerebral oedema.	Report on enhanced CT scan (Ref: 020-026-055) Clinical notes on the scans (Ref: 020-015-026); Clinical notes (Ref: 020-023-049)

Date	Time	Event	Source
	10.10	Evaluation sheet completed in Altnagelvin ICU	(Ref: 020-023-051)
	11.10	Raychel leaves Altnagelvin for the RBHSC by ambulance and with a police. She is accompanied by Dr. Nesbitt. She was hypothermic with a negative fluid balance of one litre.	Transfer Referral and Record Sheets (Ref: 020-024-052) Transfer Letter (Ref: 063-005-010)
	12.10	Raychel arrives at RBHSC[3] after uneventful journey and having been ventilated and monitored throughout	Evaluation Sheet (Ref: 020-023-050)
	12.30	Raychel arrives at paediatric intensive care unit (PICU). The reason for admission is recorded as: *"for neurological assessment and further care"* Raychel's temperature was 35◦, heart rate 109, blood pressure 80/54. Her Glasgow coma scale was rated at 3 and pupils were size 7 and unreactive.	PICU Nursing Admission Record (Ref: 063-015-035)
	13.50	Admitted into the PICU in the RBHSC under Dr. Crean (Consultant) Raychel was intubated on arrival and fully ventilated. She had no purposeful movement and her pupils were dilated and unreactive to light. She had evidence of diabetes insipidus which was causing a high urine output and she was treated for this. Her sodium serum level was 130mmol/l on admission. The plan was to ventilate, to restrict fluid to two-thirds maintenance, and for Dr. Crean and Dr. Hanrahan to review. Dr. O'Donoghue records: "*Overall there appears to be no evidence of brainstem function – her limb movements are not, in my opinion, of cerebral origin. Rachel (sic) seems to have coned with probably irreversible brain stem compromise. She will need a repeat battery of brain stem tests.*"	Clinical Notes RBHSC (Ref: 063-009-018) (Ref: 063-009-023)
	17.30	Brain stem death test performed by Dr. Crean and Dr. Hanrahan , which is negative. The 'diagnosis' records: "*Hyponatraemia cerebral oedema*"	Diagnosis of Brain Death Test (Ref: 063-010-024)
	Not timed	Parents advised of brain stem tests – that the brain stem was no longer working and that there was no brain activity – and that further tests were to be done	Relative counselling record (Ref: 063-

[3] A full and detailed chronology of all care provided to Raychel at RBHSC is available at Ref: 063-038-096

Date	Time	Event	Source
		in the morning. The record shows: *"parents very upset but understand all that is said to them"*	022-049)
	18.20	Fluid balance sheet on Raychel faxed from Altnagelvin (Dr. Gumaa) to PICU at RBHSC.	(Ref: 063-008-015)
10.06	09.45	Second brain stem death test is performed by Dr. Crean and Dr. Hanrahan, which is negative	Diagnosis of Brain Death Test (Ref: 063-010-024)
	Not timed	Results of second brain stem test discussed with Raychel's parents - that they are negative and that there is nothing else that the Hospital could do	PICU Careplan (Ref: 063-016-040) Relative counselling record (Ref: 063-022-049)
	10.05	Coroner's Office is contacted	Clinical notes (Ref: 063-012-026)
	11.35	Ventilatory support is switched off and Raychel is nursed on her mother's knee.	PICU Careplan (Ref: 063-016-040)
	12.09	Raychel is confirmed dead in the presence of her parents and relatives	PICU Careplan (Ref: 063-016-041)
11.06	10.00	Autopsy performed by Drs. Al-Husaini and Herron	(Ref: 014-005-006)
19.06		Histopathology report by Dr. J. Crosbie, Altnagelvin: *"Histology of the entire appendix confirms the presence of a faecolith and Gram Stains show Gram Positive Cocci within the faecal material."* The diagnosis is stated as: *"Appendix: faecolith"*	(Ref: 020-022-047)
03.09		Dr. Herron (Consultant Neuropathologist) asks Dr. Loughrey to provide an opinion concerning the cause of the hyponatraemia	(Ref: 012-063g-322)
24.10		Dr. Clodagh Loughrey (Consultant Chemical Pathologist, Belfast City Hospital) provides a report to Dr. Herron commenting on the causes of the cerebral oedema which he had noted at autopsy.	(Ref: 014-006-014)
20.11		Dr. Herron signes off on the Autopsy Report. He notes that at autopsy Raychel: "*had cerebral oedema and aspiration pneumonia from which she died."* He refers to the expert opinion provided by Dr. Loughrey and states: *"The summary of this was that the oedema was caused by rapid fall in plasma sodium*	(Ref: 014-005-006)

Date	Time	Event	Source
		concentration as a result of net sodium loss, coupled with hypotonic fluid administration in a situation (i.e. Post operative state +/- vomiting) where a normal physiological response inhibited the effective excretion of the excess free water. The abnormality of sodium balance and thus the cerebral oedema which led to her death was thought to be caused by three main factors: - 1. Infusion of hypotonic fluids, 2. profuse vomiting, 3. Anti-diuretic hormone (ADH) secretion." He goes on to state: *"The relative combination of these factors are unknown and as a combination they led to the brain swelling which eventually led to her death."*	
04.12		Dr. Herron signs off on a Clinical Summary in which he records: *"Disease or condition directly leading to death: Ia. Cerebral oedema due to, b. Hyponatraemia."* He again refers to the opinion of Dr. Loughrey: *"It suggested the low sodium was due to a combination of three causes including infusion of fluids post operatively which contained a low sodium combination. Other factors were the vomiting in the post operative period and the stress of surgery causing secretion of other chemicals. The expert stated that the relative contributions of these factors are unknown and as a combination they led to this brain swelling which eventually led to her death."*	(Ref: 014-005-013)
04.12		Coroner writes to Dr. Sumner asking him to *"investigate on my behalf another death of a child where the underlying cause was dilutional hyponatraemia."*	(Ref: 012-067u-365)
2002			
02		Dr. Sumner's report for the Coroner	(Ref: 012-001-001)
29.03		Solicitors acting on behalf of the Altnagelvin Hospitals H&SST write to the Coroner, pointing out: (a) Trust accepts that death was caused by cerebral oedema due to hyponatraemia (b) Use of Solution 18 was a contributory factor in bringing about a reduction in the concentration of sodium (c) Hospital had taken steps to address the risks posed by dilutional hyponatraemia (d) Trust is concerned about certain factual inaccuracies in Dr. Sumner's report around timing (e) Trust "strongly disputed" Dr. Sumner's view that Raychel experienced very severe and prolonged vomiting (f) that Dr. Sumner's	(Ref: 012-070-401)

Date	Time	Event	Source
		opinions go beyond what is appropriate in the context of an inquest	
5-7& 10.02		Inquest into the death of Raychel Ferguson	
10.02		Verdict on Inquest *"Findings:* *On 7 June 2001 the deceased was admitted to Altnagelvin Hospital complaining of sudden onset, acute abdominal pain. Appendicitis was diagnosed and she underwent an appendectomy the same day. Initially, post-operative recovery proceeded normally. However, the following day she vomited on a number of occasions and complained of a headache. The next day, 9 June, she suffered a series of tonic seizures necessitating her transfer to the Intensive Care Unit of the Royal Belfast Hospital for Sick Children where she died the following day. A subsequent post-mortem investigation established that she died from cerebral oedema caused by hyponatraemia. The hyponatraemia was caused by. a combination of inadequate electrolyte replacement in the face of severe post-operative vomiting and water retention resulting from the inappropriate secretion of ADH (Anti-Diuretic Hormone)"*	(Ref: 012-026-139-140)