Witness Statement Ref. No. 224/1

NAME OF CHILD: Claire Roberts

Name: Brian Herron

Title: Dr

Present position and institution:
Consultant Neuropathologist and Histopathologist
Royal Victoria Hospital, Belfast Trust.

Previous position and institution:
[As at the time of the child's death]
Senior Registrar, Neuropathology, Royal Victoria Hospital, Belfast.

Membership of Advisory Panels and Committees:
[Identify by date and title all of those between January 1995- November 2011]
2009 – Committee Investigating Head Injuries in Children.
Centre for Maternal and Child Enquiries

Previous Statements, Depositions and Reports:
[Identify by date and title all those made in relation to the child's death]
Deposition to Coroner – 2006-referred to on this document.

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

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

I. QUERIES ARISING OUT OF YOUR AUTOPSY REPORT

With reference to your Autopsy Report dated 11th February 1997 (Ref: 090-003-003), please provide clarification and/or further information in respect of the following:

Please refer to Question 25d before reading further

(1) State the date when you were first appointed as a Neuropathologist by the Department of Neuropathology, Institute of Pathology and describe your experience as a Neuropathologist in the Department of Neuropathology and any other department/hospital in which you worked prior to 21st October 1996.

I was appointed as a Registrar in Neuropathology in August 1991 and a Consultant in Neuropathology in September 1998.

Prior to 1996 I trained in general aspects of Neuropathology in the Royal Victoria Hospital.

(2) Describe your work commitments to Department of Pathology, particularly over the period 21st October 1996 to 11th February 1997.

I was a Senior Registrar during this period, and I was also preparing to sit my final exam in Neuropathology in Spring 1997.

(3) Please identify all notes, records, photographs and images relating to Claire's autopsy that you made or were made on your instruction and provide a copy of them.

(a) State whether you took any photographs during Claire's autopsy, specify when, and explain what you photographed and why.

I have no recollection of taking any photographs during Claire's autopsy, but photographs were taken during the brain cut. This would be routine procedure.

(4) State how you first became aware of the death of Claire, from whom and when you found out this information.

I don't recall this information specifically.

(5) State the date when you carried out Claire Roberts' autopsy which was limited to brain only.

The date recorded for this autopsy was the 24/10/1996

(6) *"Clinician: Dr Webb / Dr Steen"* **(Ref: 090-003-003)**

(a) **State whether you had any communications about Claire's case with:**

(i) **Dr Webb**

(ii) **Dr Steen**

(iii) **Or any other person**

prior to completing the autopsy report. If so, identify with whom you had those communications and who else was present and state when they took place, their content and where they are recorded.

I have no recollection whether I did or did not speak to any of the above named. I did have a clinical summary from Dr Heather Steen (see Q10 below).

(b) **Identify who you considered to be the clinician in Claire's case with primary responsibility for her care and treatment between her admission to RBHSC and her death. Explain your reasons why.**

I do not recall whom I considered to be the clinician with primary responsibility in Claire's case

(7) *"Date of Admission: 22/10/96 ...*

Time of Death: 6.25 hrs" **(Ref: 090-003-003)**

(a) **Identify the source of your statement that the date of Claire's admission was *"22/10/96"*.**

As I was not the author of the final report, I would defer this question, although the date of admission 22/10/1996 is recorded on the Royal Victoria Hospital Autopsy Request Form.

(b) **Identify the source of your statement that the time of death was *"6.25 hrs"* and explain whether you mean 06.25hrs or 18.25 hrs.**

As I was not the author of the final report, I will defer this question

(8) *"Date of Necropsy: 24/10/96*

Time of Necropsy: 11:30am

11/2/97" **(Ref: 090-003-003, 090-003-005)**

(a) **State the date and time when you removed Claire's brain for examination.**

The date 24/10/1996 and the time 11.30am is recorded.

(b) **State the date and time when you first cut Claire's brain after fixation.**

28/11/1996 Time not recorded.

(c) **State the date and time when you created the histology slides of Claire's brain.**

I did not create the histology slides, these would have been created by the Biomedical Scientists. There is an indication they were prepared on 23/01/1997.

(d) **Explain why it took between 23rd October 1996 and 11th February 1997 to complete Claire's post mortem report.**

There are many complicated procedures necessary in the preparation of a Neuropathology report. It took until 11/02/1997 for these to be completed.

(e) **State what would have been the normal or average period of time in October 1996 between a paediatric patient dying and the results of the post mortem being available.**

I do not have data to give a precise answer to this, but the time frame for preparation of this report would not have been considered exceptional.

(9) *"ANATOMICAL SUMMARY"* **(Ref: 090-003-003)**

(a) **Please identify and furnish a copy of the 'Anatomical Summary' in relation to Claire that was provided to you prior to the post mortem and identify its author. If there was no document explain the source of your information for the 'Anatomical Summary' of Claire's case. If there was such a document but you no longer have it, then describe its contents and explain what has happened to it.**

For clarification the Neuropathologist understands the Terms "Anatomical Summary" and "Clinical Summary" to have different meanings. The term Anatomical Summary is used by the Neuropathologist to summarise the post mortem examination findings after its completion and therefore would not be available prior to the post mortem. Clinical Summary – see below.

(10) *"CLINICAL SUMMARY"* **(Ref: 090-003-003)**

(a) **Please identify and furnish a copy of the *'Clinical Summary'* in relation to Claire that was provided to you prior to the post mortem and identify its author. If there was no**

document explain the source of your information for the *'Clinical Summary'* of Claire's case. If there was such a document but you no longer have it, then describe its contents and explain what has happened to it.

Document enclosed, author Dr Heather Steen.

(b) **State whether you had Claire's medical notes available to you for the post-mortem. If so, state the information you gained from them. If not, explain why not.**

I have no recollection whether or not the medical notes were available in part or in totality before the post mortem.

(c) **Explain what you mean by *"there was a query of inappropriate ADH secretion"*. Specify whether, and if so, to what extent, you consider it caused or contributed to Claire's cerebral oedema and/or death and explain the reasons for your answer.**

This statement *"there was a query of inappropriate ADH secretion"* is copied from the Royal Victoria Hospital Autopsy Request Form.

Whether or not it contributed to Claire's cerebral oedema and/or death is better answered by the Expert Witnesses employed to give opinions in this case, in particular Professor Young. As a Neuropathologist I can only address the Neuropathological aspects of the case.

(d) **State what you mean by *"iatrogenic"* epilepsy.**

I can answer this in general terms-iatrogenic epilepsy simply means epilepsy which is caused by the treatment of the patient, but as I did not write the final report this is perhaps better addressed by its author.

(11) ***"BRAIN DESCRIPTION"*** **(Ref: 090-003-004)**

(a) **State the date and time when you weighed and recorded Claire's brain for your record of *"fixed brain weighs 1606g"*.**

28/11/1996 – Time not recorded.

(b) **State whether you weighed Claire's brain before fixation. If so, state that weight. If not, explain why not.**

There is no recording of the brain weight before fixation. Paediatric brains are extremely fragile at the time of autopsy and easily damaged by handling. They are often transferred directly into fixative without any further analysis in order to protect their structure.

(12) *"COMMENT:*

In summary, the features here are those of cerebral oedema with neuronal migrational defect and a low grade subacute meninoencephalitis." (Ref: 090-003-005).

(a) **Explain what you mean by *"low grade"*.**

(b) **Explain what you mean by *"subacute"*.**

(c) **Specify the evidence you found of *" a low grade subacute meninoencephalitis"*.**

(d) **In light of the degree of brain swelling noted clinically (including papilloedema and CT scan), state what evidence of encephalitis, meningo-encephalitis or meningitis you would have expected to have been evident by 24th October 1996 or in Claire's post mortem, and explain the basis for your answer.**

(a-d) As I was not the author of this final report I cannot answer these questions.

(13) *"No other discrete lesion has been identified to explain epileptic seizures"*. (Ref: 090-003-005).

(a) **Specify all neuropathological sequelae of status epilepticus present.**

(b) **If Claire had been in status epilepticus since her admission or the morning of 22nd October 1996, specify all neuropathological sequelae of status epilepticus which you would have expected to observe.**

(c) **State whether you would have expected to observe damage to the hippocampus in Claire's case, and explain the reasons why. Specify whether you did note any such damage in the autopsy and explain the significance of the presence/absence of such damage.**

(a-c) I was not the author of the above statement I cannot comment specifically with respect to Claire Roberts.

(14) *"As this was a brain only autopsy, it is not possible to comment on other systemic pathology in the general organs."* (Ref: 090-003-005)

(a) **State how you were first asked to perform a limited *"brain only autopsy"*, and from whom and when you found out this information.**

Although I am not the author of the above statement, nonetheless I was involved in the initial stages of the autopsy. The consent for the autopsy indicated that it was to be a limited post mortem and the limitation was "brain only". The consent was signed by Claire's father with an indication that Dr Heather Steen was the Consultant.

(b) **Explain why a limited *"brain only autopsy"* was requested in Claire's case, who had responsibility for making this decision and when this decision was made.**

The decision to limit the autopsy to brain only was the responsibility of the relevant clinicians.

(c) **State whether you discussed with anyone:**

(i) **the decision to limit the scope of the autopsy with anyone**

I have no recollection whether this decision was or was not discussed

(ii) **whether the Coroner should be informed of the decision to limit the scope of the autopsy before proceeding.**

I have no recollection of whether or not involvement of the Coroner was discussed.

If so, state the nature and outcome of any discussion, and when and with whom you discussed it. If you did not, explain why.

(d) **State whether on reflection, the Coroner should have been informed of the decision to limit the scope of the autopsy before proceeding. Explain the reasons for your answer.**

In the documentation that I have seen-the clinical summary and the consent form-there is no reason for this case to have been referred to the Coroner.

(e) **State whether in the light of your findings, you would have preferred to have had the opportunity to carry out a full autopsy. Explain the reasons for your decision.**

In as far as I was involved with this autopsy there would be no specific reason to have extended this to a full autopsy. The autopsy was done to address the presence or absence of status epilepticus and encephalitis. The limited consent for the autopsy was adequate to address these issues.

II. QUERIES ARISING OUT OF YOUR DEPOSITION

With reference to your Deposition to the Coroner taken on 25th April 2006 (Ref: 096-006-032) please provide clarification and/or further information in respect of the following:

In order to prevent confusion I need to clarify a further issue in this case. When the Coroner's deposition was taken it was assumed that I had actually been the author of the final report and that is Ref 090-003-003. When retrieving documentation subsequent to this it has become apparent that I was not the author of this final report. The deposition therefore was made under these circumstances. See 25d

(15) *"I found cerebral oedema which is an end stage of many diseases. I had been aware of the low sodium (hyponatraemia) - but this may be caused by other diseases. There was mild inflammation of the brain. I did not find any virus to cause this though this does not exclude a virus. A pathologist cannot exclude epilepsy. I was not thinking fluid management but SIADH. The main pathology finding was cerebral oedema with a little inflammation in the brain. In a typical case of encephalitis the degree of inflammation is more severe"* (Ref: 096-006-035)

(a) **Explain what, in your opinion, was the most likely cause of Claire's *"cerebral oedema"*.**

(b) **Explain what, in your opinion, was the most likely cause of Claire's *"low sodium (hyponatraemia)"*.**

(c) **Explain why *"hyponatraemia"* was not mentioned in your autopsy report (Ref: 090-003-003).**

(d) **State whether, and if so, to what extent, you considered hyponatraemia might have caused or contributed to Claire's cerebral oedema and/or death and explain your reasons.**

(a,b and d) As a Neuropathologist it is more appropriate for me to describe pathological findings and leave it for the expert clinicians to come to overall conclusions in this specific case.

(e) **Explain precisely what you mean by:**

(i) ***"There was ... inflammation of the brain".***

(ii) ***"mild".***

(iii) ***"a little".***

(c and e) As this was not my final report I cannot comment on these questions.

(f) **Explain whether and how Claire's fluid management between her serum sodium concentration results of 121mmol/L at 23.30 on 22nd October 1996 and approximately 04.00 on 23rd October 1996 and her death could have affected the degree of inflammation of Claire's brain at the time of the autopsy report, and state the reasons for your answer.**

As I am not an expert on fluid management I do not have the expertise to answer this question.

(g) **Explain:**

(i) the likely cause and

(ii) the significance

of the *"inflammation of the brain"* being *"mild"* rather than *"severe"*.

As I was not the author of the final report I defer answering this question.

(h) **Explain why you were *"not thinking fluid management but SIADH"*, and explain what difference it would have made if you had considered *"fluid management"* at the time of your report.**

(i) Identify what diseases can cause SIADH.

These have been identified in the report by Dr Evans:

CNS Disorders:-

Head trauma, stroke, neonatal hypoxia, brain tumour, hydrocephalus, cerebral abscess, meiningitis, encephalitis, subarachnoid haemorrhage, delirium tremens, Guillain Barre, acute intermittent porphyria.

Malignancy:

Lung, brain, pancreas, prostate, ovary, lymphoma, leukaemia, thymoma.

Pulmonary Disease:

Pneumonia, tuberculosis, empyema, abscess, asthma, chronic obstructive pulmonary disease, cystic fibrosis, pneumothorax, acute respiratory failure, positive pressure ventilation.

Endocrine Disorders:

Hypothyroidism, glucocorticoid deficiency.

Drugs:

Analgesics, antidepressants, antineoplastics, barbiturates, carbamazepine, cyclophosphamide, clofibrate, diuretics, neuroleptics, oral hypoglycaemics, antibiotics.

Nausea

Pain

Surgery

Idiopathic

(ii) **State whether you were aware at the time of the autopsy of the findings of the chest x-ray (Ref: 090-033-115). If so, state whether you took the chest x-ray into account in your autopsy findings and if so, state how and explain why. If not, state whether you would have altered your autopsy report in light of that chest x-ray, and if so, state how and explain why.**

I have no recollection if I did or did not know of the findings of a chest x-ray at the time of autopsy. As I was not the author of the final report I cannot answer the second and third part of this question (ii).

(iii) **In particular, state whether the knowledge of the chest x-ray ought to have led to a further post mortem examination including examination of the lungs in order to ascertain the likely sequence of events leading to Claire's death.**

I have no recollection whether I did or did not know the chest x-ray findings. The autopsy was performed to investigate the presence of status epiliepticus and underlying encephalitis and was therefore adequate to address those questions.

(iv) **State whether lung disease can provoke SIADH.**

Yes

(i) **State whether it is possible that Claire did not have encephalitis in all the circumstances, and if so what would have been the cause of death in those circumstances.**

As a Neuropathologist I can only address neuropathological issues in this case. It is possible that Claire did not have encephalitis in all the circumstances, but I cannot comment on the specifics of her cause of death.

(16) *"I weighed the brain. It was heavier than normal but there had been abnormal development of the brain. 1300 grams would have been expected - Claire's was 1606. That is higher than I would have expected."* **(Ref: 096-006-033)**

(a) **State the basis for your opinion that *"1300 grams would have been expected"* in Claire's case.**

I have examined the brains of thousands of children and adults and there are standard published brain weights for individuals. It is from this information that I base my opinion.

(b) **Explain, in your opinion, the most likely cause for Claire's brain weight being *"higher than [you] would have expected"*.**

Cerebral oedema.

(17) *"I cannot recall what medical records I had available at the time."* **(Ref: 096-006-035)**

(a) **State what medical notes and records you would usually have considered before**

(i) commencing the autopsy and

(ii) subsequently writing the autopsy report.

(i and ii) Before commencing an autopsy the Pathologist usually has a consent form and a clinical summary. Often, but not always, some or all of the clinical notes are available. If the case is a Coroner's case there will also be a form P16 from the Coroner and occasionally GP notes. Subsequent to the autopsy more information may become available from clinicians.

(b) **If you would not have considered all of Claire's medical notes and records of her care and treatment between 21st October and 23rd October 1996, explain why.**

(c) **State whether there were any protocols/guidelines/practices/procedures for:**

(i) considering medical notes and records prior to commencing an autopsy and

(ii) conducting an autopsy.

(b and c) When there is a death, particularly a death of a child, it is important that the autopsy is performed in a reasonable time. This not only facilitates the burial and funeral arrangements, but also prevents decomposition of the body. The longer the period of time between the death and the autopsy, the greater the degree of decomposition and the less reliable will be the pathological results. The Pathologist is guided by the clinicians as to the important aspects of any particular case. While it may be considered preferable to have all of the notes and time to read all of the notes in every case, this is neither possible nor practical. Many of the tests done in life are not yet reported or the reports have not yet reached the patient's file (it is important that this was in 1996 when computer systems were not as integrated into the hospital management system as they are now). Many charts, particularly in someone with a long history of illness may run to several volumes and hundreds if not thousands of pages of detailed medical information and test results. If the Pathologist was expected to read and dissect these in detail it could be several weeks before any autopsy was performed.

(18) *"In addition there was some brain inflammation – possibly a viral infection. That could have resulted from a gastro-intestinal infection. I would have expected an infection to be the underlying cause. A metabolic cause could not be excluded. It is difficult to say what part, if any, her epilepsy played in her death."* (Ref: 096-006-035)

(a) **Explain to what extent the alleged history of diarrhoea had an impact on your conclusion that you *"expected an infection to be the underlying* cause" of the brain inflammation which *"resulted from a gastro-intestinal infection."*.**

As this statement was made during my deposition to the Coroner I feel I can answer this. The child presented with diarrhoea and vomiting. It was clinically suspected that she had encephalitis. Infections that cause diarrhoea are also causes of encephalitis in children and therefore the history of diarrhoea was relevant for this reason.

(b) **Identify any metabolic causes which may have caused Claire's cerebral oedema and /or death and state the basis for your answer.**

There was cerebral oedema and there are most likely hundreds of causes of cerebral oedema. As a Neuropathologist it was important to document the evidence of cerebral oedema, but the specific metabolic causes would be better addressed by experts in that field.

(c) **State whether it is possible that epilepsy played no part in Claire's cerebral oedema and/or death, and the reasons why.**

As a Neuropathologist, I record the neuropathological findings in a case. The causes and consequences of epilepsy are not specific and it is difficult in any case to include or exclude entirely from any diagnosis.

III. ADDITIONAL QUERIES

(19) Identify all evidence of acquired infection.

Although I did not write the final autopsy report I was involved in the original autopsy and took samples of CSF which I understand did not show any specific infection.

(20) Identify the immediate cause of Claire's death and explain the basis for your answer.

(21) State all causative factors of that cause of death which have been positively identified.

(20 and 21) As a Neuropathologist I can only comment on the neuropathological findings. She had enough brain swelling to be considered fatal, but the precise cause of this may be debated by others.

(22) Prior to 23rd October 1996:

(a) **State your knowledge and awareness of the case of Adam Strain, his inquest and the issues that arose in it.**

(b) **State the source of this knowledge/awareness and the date/time when you acquired this knowledge.**

(a and b) I am not aware that I knew anything of the case of Adam Strain before 23rd October 1996.

(23) Since 23rd October 1996:

(a) **If you did not know about the Adam Strain case prior to your post mortem report on Claire, state whether you have since learned about the case. If so, state your knowledge and awareness of the case, his inquest and the issues that arose in it.**

I have become aware of the case of Adam Strain since 23rd October 1996. I was forwarded a letter from the Inquiry that was sent to the State Pathologist's Department dated 12th August 2011. I have no further specific knowledge of the case of Adam Strain, although I am aware that his case is one that is being dealt with by the Hyponatraemia Inquiry.

(b) **State the source of this knowledge/awareness and the date/time when you acquired this knowledge.**

See (a) above

(c) **Describe how this knowledge/awareness has affected your work.**

I have no specific knowledge/awareness of the precise details of the case of Adam Strain.

(24) Describe in detail the education and training you received in fluid management (in particular hyponatraemia) and record keeping through the following, providing dates and names of the institutions/bodies:

(a) **Undergraduate level**

Fluid management was taught during surgical attachments in 3rd, 4th and 5th year of the medical curriculum of QUB (1985, 86 and 87).

(b) **Postgraduate level**

I have passed a Royal College of Pathologists post graduate exam in Chemical Pathology in 1990.

(c) **Hospital induction programmes**

When I graduated in 1987 there were no specific hospital induction programmes and fluid management was taught by the more senior nurses and doctors on the ward.

Continuous professional development

I am aware of posters in the wards of the RVH/RBHSC and that there has been training for medical students and junior and senior doctors. I do not know specific dates

(25) Provide any further points and comments that you wish to make, together with any documents, in relation to:

(a) **Record keeping**

I am happy to provide copies of documents held regarding the case of Claire Roberts in the department.

(b) **Lessons learned from Claire's death and how that has affected your practice**

(c) **Current Protocols and procedures**

(d) **Any other relevant matter**

At the time of Claire's death and autopsy I was a Senior Registrar in Neuropathology. My work was supervised by a Consultant Neuropathologist. With specific regard to Claire's autopsy, I was involved in the initial stages of the autopsy and the brain cut. Until I retrieved the documents that allowed me to prepare this report, I assumed I had also written the final report referred to in this deposition. It now seems this is not the case and it was written by one of the Consultants in the Department at the time.

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

Signed: Brian Herron Dated: 19/12/11

ROYAL VICTORIA HOSPITAL
AUTOPSY REQUEST FORM

NAME: Claire Roberts. AUTOPSY No: A 114/96.

D.o.B.: 10-1-87 SEX: F HOSPITAL No. 328770.

CONSULTANT: Dr Webb / Dr Stean. WARD: ICU HOSPITAL RBHSC

DATE OF ADMISSION: 22-10-96. DATE OF DEATH: 23-10-96.

DATE OF AUTOPSY: TIME OF AUTOPSY:

TIME COMPLETE REQUEST RECEIVED IN MORTUARY:

CLINICAL PRESENTATION: (major symptoms)

9½ year old girl c a history of mental handicap admitted with increasing drowsiness and vomiting.

HISTORY OF PRESENT ILLNESS: Well until 72 hours before admission. Cousin had vomiting and diarrhoea. She had a few loose stools and then 24 hours prior to admission started to vomit. Speech became slurred and she became increasingly drowsy. Felt to have sub clinical seizures. Treated c rectal diazepam / IV phenytoin / IV valproate. Acyclovir + cefotaxime cover given. Serum Na^+ dropped to 121 @ 23-30hrs on 22-10-96. ? Inappropriate ADH secretion. Fluids restricted. - Respiratory arrest 0300 23-10-96. Intubated + transferred ICU - CT scan - cerebral oedema. Brain stem death criteria fulfilled @ 0600 + 18.15 hrs. Ventilation discontinued 18-45 hrs.

PAST MEDICAL HISTORY (incl drug therapy):

Mental handicap

Seizures from 6 months - 4 years.

INVESTIGATIONS: (include laboratory, ECG, X-ray etc).

See chart.

CLINICAL DIAGNOSIS Cerebral oedema 2° to status epilepticus

? underlying encephalitis