Witness Statement Ref. No. 224/2

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

Membership of Advisory Panels and Committees:
[Identify by date and title all of those between January 1995 - November 2011]
Member of Committee Investigating Head Injuries in Children (CMACE) 2009.

Previous Statements, Depositions and Reports:
[Identify by date and title all those made in relation to the child's death]
Statement to Coroner 2006
Witness Statement Reference Number 224/1.

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

Ref:	Date:	
224/1		Witness Statement to the Inquiry

GH 23/12/14

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.

I FURTHER 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 see Statement 224/1. I was involved during the initial stages of the autopsy and the brain cut. When the paperwork was retrieved to prepare these depositions, it was discovered that one of my colleagues(Dr M Mirakhur) was the author of the final report. There will therefore be parts of the autopsy report on which I can comment and others that are more appropriately addressed by Dr Mirakhur.

(1) Explain the significance of the fixed brain weight of 1606g.

The brain was weighed at the time of the brain cut. Its weight is as recorded. This is heavier than would normally be expected. There are a number of reasons why a brain may be heavier, the most common of which is due to increased fluid in the brain tissue, a condition called cerebral oedema.

(2) Explain the meaning and the significance of the presence of each of the following during Claire's autopsy:

(a) ***"Subacute inflammation meninges in perivascular space"*** **(Ref: 090-003-003)**

Defer to author of final report.

(b) ***"Neuronal migration disorder"*** **(Ref: 090-003-003)**

Defer to author of final report.

(c) ***"Symmetrical brain swelling"*** **(Ref: 090-003-004)**

The brain was swollen. The swelling affected the right and left sides of the brain equally.

(d) ***"Effacement of gyri"*** **(Ref: 090-003-004)**

When the brain swells the small ridges (gyri) on the surface of the brain become expanded and this is called effacement of gyri.

(e) ***"Uncal prominence"*** **(Ref: 090-003-004)**

There is a structure on the undersurface of the brain called the uncus. When there is swelling of the brain this may become prominent.

(f) *"Diffuse brain swelling"* **on sectioning of the brain (Ref: 090-003-004)**

The swelling may affect a small part of the brain or all of the brain. In this case the swelling was diffuse ie. affecting all of the brain.

(g) *"White matter swelling with effacement of the IIIrd ventricle"* **on sectioning of the brain (Ref: 090-003-004)**

The brain tissue may be described as grey matter (mostly on the surface) or white matter (deeper in the brain tissue). The deepest part of the brain tissue is called the ventricles. The ventricles contain clear fluid. In this case there was swelling of the white matter that had caused compression or effacement of these central fluid filled clear spaces.

(h) *"Unremarkable"* **cerellum. (Ref: 090-003-004)**

No pathology was seen in the cerebellum.

(c)-(h) I have been asked to explain the significance of the presence of the above findings. They merely indicate that the brain was swollen. There are hundreds of causes of brain swelling and no specific cause was identified in this part of the description.

(i) *"Focal meningeal thickening, and a cellular reaction in the meninges and perivascular space in the underlying cortex"* **and** *"in the deep white matter focal collections of neurones are present arranged in a haphazard manner"* **in the histology of the cortex and white matter (Ref: 090-003-004)**

(j) *"Generally good neuronal preservation"* **in the histology of the basal ganglia (Ref: 090-003-004)**

(k) *"Focal collections of neuroblasts in the subependymal zone suggestive of a migration problem... generally good neuronal preservation... in the periventricular grey matter and mammillary bodies... small foci of necrosis... in the periventricular grey matter which are probably a consequence of cerebral oedema"* **in the histology of the perventricular grey matter, hypothalamus and mammillary bodies (Ref: 090-003-004)**

(l) *"Some rarefaction and occasional ischaemic neurones ...in the pyramidal cell layer"* **in the histology of the hippocampi (Ref: 090-003-004)**

(m) *"Dentate nuclei are preserved"* **in the histology of the cerebellum (Ref: 090-003-005)**

(n) *"Focal haemorrhagic necrosis"* **in the histology of the brain stem (Ref: 090-003-005)**

(o) *"Neuronal migrational defect"* **(Ref: 090-003-005)**

(i)-(o) Defer to author.

(3) **Explain the meaning and the significance of the absence of each of the following during Claire's autopsy:**

(a) ***"Cortical venous thrombosis"* (Ref:090-003-004)**

There are a number of blood vessels that run across the surface of the brain. These may be arterial or venous. There are rare conditions in which these veins may become blocked or thrombosed, a condition called cortical venous thrombosis. There was no evidence of cortical venous thrombosis in this case.

(b) ***"Meningeal exudate"* (Ref:090-003-004)**

A meningeal exudate means an abnormal deposit on the surface of the brain. There are a number of causes of this condition, the most common of which is bacterial meningitis. There was no meningeal exudate to suggest the diagnosis of bacterial meningitis.

(c) ***"Necrosis"* (Ref:090-003-004)**

It is unclear from this question exactly what is being asked. It may relate to the sentence 'there is uncal prominence but no necrosis,' if this is the case it describes the fact that the unci were swollen but had not reached the stage of being irrevocably damaged.

(d) ***"Evidence of cortical necrosis, either laminar or focal"* on sectioning the brain (Ref: 090-003-004)**

The cortex is the surface of the brain. It may be affected by a number of conditions that can cause cortical necrosis (death of the cortex). This damage can either affect a small part (focal) or a longer length of the cortex (laminar). Neither was present in this case.

(e) ***"Evidence of shift at the midline"* on sectioning the brain (Ref: 090-003-004)**

If the swelling of the brain is asymetrical ie. there is a focal abnormality that affects one side of the brain more than the other, the central portion of the brain will be pushed to the side opposite the abnormality and the midline structures of the brain will be shifted to the normal side.

(f) ***"Evidence of necrosis"* in the *"paraventricular structures including the mammillary bodies"* on sectioning the brain (Ref: 090-003-004)**

There are a number of conditions that can affect the central structures (paraventricular structures) and the mamillary bodies (a tiny area on the lower part of the brain). These include a condition called Leigh's disease. They may also be affected by a number of conditions that damage these tissues.No tissue damage (necrosis) was present

(g) ***"Basal ganglia or diencephalon lesion"* on sectioning the brain(Ref: 090-003-004)**

The basal ganglia and diencephalon are structures deep in the brain. They may be affected by congenital or acquired conditions. None was present.

(h) *"Evidence of brain stem haemorrhage to suggest Leigh's disease"* on sectioning the brain stem (Ref: 090-003-004)

Leigh's disease is a rare metabolic condition in children, that may be associated with bleeding into the part of the brain that connects the spinal cord to the cerebral hemispheres (brain stem). There was no haemorrhage in this case.

(i) *"Cortical necrosis"* in the histology of the cortex and white matter (Ref:090-003-004)

(j) *"Pigmentation or calcification"* in the histology of the basal ganglia (Ref: 090-003-004)

(k) *"Vascular proliferation... in the perventricular grey matter and mammillary bodies"* (Ref: 090-003-004)

(l) *"Displaced neurones or Ammon's horn sclerosis.."* in the histology of the hippocampi (Ref: 090-003-004)

(m) Identification of a tumour in the histology of the hippocampi (Ref: 090-003-004)

(n) *"Significant cell loss in Purkinje cell or granule cell layer...cerebellar cortical dysplasia"* in the histology of the cerebellum (Ref: 090-003-005)

(o) *"Myelinolysis"* in the histology of the brain stem (Ref: 090-003-005)

(p) *"Discrete lesion ...to explain epileptic seizures"* (Ref: 090-003-005)

(q) Identification of *"other structural lesion in the brain like corpus callosal or other malformations"* (Ref: 090-003-005)

(i)-(q) Defer to author of final report.

(4) *"The reaction in the meninges and cortex is suggestive of a viral aetiology ..."* (Ref: 090-003-005)

(a) Specify the *"reaction in the meninges and cortex"* to which you refer.

(b) Explain why that reaction *"is suggestive of a viral aetiology"*.

(a)-(b) Defer to author of final report.

(5) *"...although a metabolic cause cannot be entirely excluded."* (Ref: 090-003-005)

(a) Identify the *"metabolic cause[s]"* which *"cannot be entirely excluded"* and explain the reasons for your answer. (Ref: 090-003-005).

Defer to author of final report.

(6) **State whether the pulmonary abnormality identified on the chest X-ray (Ref: 090-033-115) would likely have occurred:**

(a) **Before**

(b) **As a result of and/or**

(c) **After**

Claire's respiratory arrest at approximately 02.30 on 23rd October 1996. Please explain the reasons for your answer and the significance of that abnormality.

As a Neuropathologist I must confine my answers to Neuropathological issues and it would be inappropriate for me to comment.

(7) **State whether you were aware of the post mortem cerebral spinal fluid analysis (Ref: 090-030-095) when you were compiling your autopsy report.**

(a) **If not, explain why you were not aware of this analysis, and comment on whether these results would have had any impact on your findings in your autopsy report, and what that impact.**

The CSF would have been taken at the time of the autopsy and may have taken some days to analyse. As I did not compile the final autopsy report I cannot answer this question further.

(8) **Explain the meaning and significance of the post mortem cerebral spinal fluid (CSF) analysis (Ref: 090-030-095), and, in particular, the following results:**

(a) **The cerebro-spinal fluid appeared *"bloodstained"***

(b) **Protein of *"95.0"* g/L**

(c) **Leucocytes of *"4,000"* cells/uL**

(d) **The ratio of erythrocytes to leucocytes (300,000:4,000)**

8 (a)-(d) & 9 I will address this as a general comment. I have no experience in interpreting CSF white cell counts as this is done as a test by microbiology. However I have experience of taking CSF samples at autopsy. This is not always a simple procedure. A needle is put down the front of the brain into a pool of CSF at the base of the brain. There is an opportunity here for contamination by blood if the needle goes through a vessel or it may nick brain tissue and introduce that into the syringe. This may account for a high protein level.

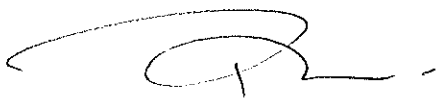
(9) **State whether the post mortem leucocyte count of *"4,000"* cells/uL shown in the CSF analysis (Ref: 090-030-095) could be attributed to death related changes. If so, state to what extent this can be attributed and explain the reasons for your answer.**

See above.

(10) **State whether you were aware of the initial haematology analysis taken on Claire's admission to Royal Belfast Hospital for Sick Children (RBHSC) on the evening of 21st October 1996, and in particular, the leucocytes result of "16.52" (Ref: 090-032-108). If you were not aware of it, please comment on these results and any significance they have for Claire's autopsy report.**

I do not recollect if I did or did not know about the leucocyte result. I have no specific expertise in the interpretation of leucocyte counts in children.

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

Signed:  **Dated:**