Report on the Imaging of Claire Roberts
Date of Birth 10th January 1987

I have been asked by Bernie Conlon, on behalf of the Inquiry into Hyponatraemia-related Deaths, to provide a report on the imaging of Claire Roberts date of birth 10th January 1987.

In preparing this report I have reviewed the following imaging:
X-ray of the chest dated 23rd October 1996 at 03:50
X-ray of the chest dated 23rd October 1996 at 07:15
CT Scan of the brain dated 23rd October 1996.

Both chest x-rays were acquired at RBHSC Belfast. The CT scan was acquired at the Royal Victoria Belfast.
The imaging was provided as scanned hard copy images and viewed in a digital format on the Picture Archiving and Communication System as Alder Hey Children's NHS Foundation Trust.
It should be noted that the CT images were provided as a single scanned sheet of multiple small CT images of the brain and could not be viewed, but not usefully manipulated on the modern imaging viewing system.

I have been provided with the following documentation:
Brief for Expert on Radiology
Limited medical records consisting of imaging request and reports.

Specific Instructions

a) Please report on:
- **i) The chest x-ray taken at 03:50am on 23rd October 1996 (just over 1 and a quarter hours after her respiratory arrest). The hospital informs us that there is not an x-ray report available for this x-ray.**
- **ii) The chest x-ray taken at 07:15am on 23rd October 1996 (approximately 4 and three quarters hours after her respiratory arrest) and the X-ray report attached.**

b) For each chest x-ray
- **i) Report on the state of the lungs. In particular, please state whether the x-ray shows primary lung infection or infection secondary to inhalation.**
- **ii) Identify any abnormalities, explaining the likely cause and significance thereof. Please also state, in so far as it is possible, the time when these abnormalities arose, and in particular whether the abnormalities likely occurred before or after CR's respiratory arrest at approximately 02:30 on 23rd October 1996. Explain the reasons for your view and their significance.**
- **iii) Whether there is any evidence of subcutaneous oedema.**

c) Please describe any differences between the first and second x-rays, and explain the significance of any differences

d) Please identify and describe anything else of note from your examination of the x-rays.

Specific Instructions

a) Please report on:

iii) The chest x-ray taken at 03:50am on 23rd October 1996 (just over 1 and a quarter hours after her respiratory arrest). The hospital informs us that there is not an x-ray report available for this x-ray.

iv) The chest x-ray taken at 07:15am on 23rd October 1996 (approximately 4 and three quarters hours after her respiratory arrest) and the X-ray report attached.

Imaging Findings

Chest X-ray 23rd October 1996 at 03:50

AP view. Portable.

There is an endotracheal (airway) tube in situ with the tip in a satisfactory position above the level of the carina.
There is a nasogastric (feeding) tube in situ with the tip in a satisfactory position (projected below the left hemidiaphragm).

The heart size is within normal limits.
The mediastinal contour is normal.

There is bilateral perihilar air space shadowing (seen as white shadowing around the central part of each lung) with relative sparing of the lung apices and lung bases.
There is no evidence of a pleural effusion.

Chest X-ray 23rd October 1996 at 07:15

AP view. Portable.

There is an endotracheal (airway) tube in situ with the tip in a satisfactory position above the level of the carina.
There is a nasogastric tube in situ with the tip in a satisfactory position (projected below the left hemidiaphragm).
There is a right sided central venous line in situ with the tip in a satisfactory position projected over the superior vena cava.

The heart size is within normal limits.
The mediastinal contour is normal.

There is bilateral perihilar air space shadowing with relative sparing of the lung apices and lung bases.
There is no evidence of a pleural effusion.

CT Scan of the Brain 23rd October 1996

Axial images of the brain without intravenous contrast.

There is asymmetry in the size of the lateral ventricles, with the impression of compression of the left lateral ventricle. The peripheral sulci and basal cistern (fluid spaces around the brain) appear effaced (flattened and difficult to define).
The grey-white matter differentiation is preserved and there is no evidence of intracranial haemorrhage or space occupying lesion.

For each chest xray

iv) Report on the state of the lungs. In particular, please state whether the x-ray shows primary lung infection or infection secondary to inhalation.

Both chest x-rays show bilateral perihilar air space shadowing.
Air space shadowing on an x-ray is an indication of something in the small air spaces of the lungs and is also known as consolidation. Opacification typically occurs as a result of fluid within the air spaces, but the radiograph alone cannot determine the origin of the fluid.
Interpretation of the appearances is determined by the clinical information provided on the request for the investigation.

The perihilar distribution seen on both chest x-rays is typical of pulmonary oedema, but can also be seen in widespread infection.
Inhalation of noxious substances, such as smoke or stomach contents, can cause pulmonary oedema, giving the appearances as seen on the chest x-rays in this case.

It is not possible to differentiate between infection, changes related to inhalation or aspiration and pulmonary oedema from other causes on the basis of the imaging alone.

v) Identify any abnormalities, explaining the likely cause and significance thereof. Please also state, in so far as it is possible, the time when these abnormalities arose, and in particular whether the abnormalities likely occurred before or after CR's respiratory arrest at approximately 02:30 on 23rd October 1996. Explain the reasons for your view and their significance.

The imaging provided was performed after the respiratory arrest.
It is not possible to estimate the time when these abnormalities occurred from the chest x-rays provided.
Without x-rays prior to the event at 02:30 it is not possible to determine from the imaging whether the x-ray changes occurred before or after this event.

vi) Whether there is any evidence of subcutaneous oedema.

The soft tissue planes are preserved on the x-rays provided and there are no features to suggest subcutaneous oedema or soft tissue swelling.
It should be noted that subcutaneous oedema may be present clinically without associated x-ray changes.

d) Please describe any differences between the first and second x-rays, and explain the significance of any differences

There is a difference in the degree of x-ray exposure between the 2 films, and as a result the later film appears blacker than the earlier films. In my opinion there is no significant difference in the appearances between the chest x-ray taken at 02:50 and the x-ray taken 07:15.

e) Please identify and describe anything else of note from your examination of the x-rays.

The changes on the CT scan are suggestive of cerebral oedema (swelling of the brain).
There is no evidence of intracranial haemorrhage or space occupying lesion.

Caren Landes
Consultant Paediatric Radiologist
12.01.12

I, Dr Caren Landes, MBchB MRCPCH FRCR, hold the post of Consultant Paediatric Radiologist at the Alder Hey Children's NHS Foundation Trust. I have been in this post for 4 years. I make this statement, the contents of which are true to the best of my knowledge, and I understand it may be placed before a Court.