2010 FAI35

SHERIFFDOM OF TAYSIDE, CENTRAL AND FIFE AT DUNFERMLINE

DETERMINATION

of Sheriff John Craig Cunningham McSherry in Fatal Accident Inquiry concerning the death of Zion Nthanda Satha under the Fatal Accidents and Sudden Deaths Inquiry (Scotland) Act 1976.

18th March 2010

The Sheriff, having resumed consideration of the cause, Determines:-

1. In terms of section 6(1) (a) of the Fatal Accidents and Sudden Deaths Inquiry (Scotland) Act 1976 (the Act), that Zion Nthanda Satha, (Zion), whose date of birth was 6th October 2008, latterly residing at 16, St. Peter's Court, Inverkeithing, KY11 1QA, died in the Intensive Care Unit, Royal Hospital for Sick Children, Edinburgh at 1442 hours on 8th November 2008.
2. In terms of section 6(1) (b) of the Act, that the cause of death was Respiratory Compromise and Respiratory Syncytial Virus Infection, (RSV).

3. In terms of section 6(1) (c) of the Act, there were no reasonable precautions whereby the death might have been avoided.
4. In terms of section 6(1) (d) of the Act, there were no defects in the system of working, in the Scottish Ambulance Service or in any of the various other medical agencies involved, which contributed to Zion's death.
4. In terms of section 6(1) (e) of the Act, there were some other facts relevant to the circumstances of Zion's death.

NOTE

In this enquiry the Crown was represented by Mrs Catriona Dalrymple, the Procurator Fiscal, and the Scottish Ambulance Service was represented by Mr McLeod, Solicitor, There were eight witnesses who gave evidence over three days.

The Facts and Circumstances surrounding Zion's Death.

On 4th November 2008, Mrs Claire Satha said that Zion seemed to have a bad cold and was making grunting noises when breathing. She took Zion to be weighed and was advised that if she was worried about the child she should see a doctor. He was settled at that time. Mrs Satha was breast feeding Zion. Later that evening Zion again made noises when breathing and Mrs Satha telephoned NHS24 around midnight. One reason for her concern was that her elder child had been hospitalised with viral colds and she was understandably worried that Zion may have a similar condition. She was advised to contact the local hospital's out of hours service.

Queen Margaret Hospital Out of Hours Service.

On 5th November 2008, around 0030 Mrs Satha attended at the Queen Margaret Hospital Out of Hours Service and explained her concern about Zion's breathing. Zion was examined by Mrs Ann Mathieson, a registered general nurse and urgent care practitioner. When giving evidence she was referred to the SIGN Guidelines which lay down the parameters for children presenting out of hours. Mrs Satha told her of the noises, which had settled at examination. She carried out a head to toe examination of the child. Zion was a well looked after child. There were no signs of respiratory problems. She recorded his heart rate and listened into the three zones of his chest. He had good muscle tone and handled well. He was breast feeding well during day and night. His respiratory rate and heart rate were all within the normal parameters for a child of his age. His oxygen circulation was excellent at 99 per cent. There were none of the warning signals such as poor feeding, lethargy, history of stopping breathing, poor respiratory rate or chest wall recession, where a child was struggling for breath. Mrs Mathieson noted that Zion had been prescribed nasal drops by the health visitor and took no issue with this. Mrs Satha was told to watch for changes in Zion. At the time, she was relieved with what she had been told by Mrs Mathieson. In her evidence she said that she thought that if she had been worried enough to take Zion up to the hospital in the middle of the night, that her concerns about a link between Zion's condition and that of his elder brother should have been taken more seriously. She also said that only Zion's elder brother's record appeared on Mrs Mathieson's computer. Mrs Mathieson said that she did not recall being told

about Zion's elder brother being hospitalised. His name had not come up on her computer as she recalled. She would have taken family history into consideration but from her examination of Zion and taking account of Dr Gibson's comments below about respiratory problems being quite common amongst young children, I do not believe such history would have affected her conclusion.

Dr Neil Gibson, a Consultant in Paediatric Respiratory Medicine at the Royal Hospital for Sick Children, Glasgow was of the view that Mrs Mathieson had carried out an entirely appropriate sequence of examination and assessment of Zion. She had looked at Zion's colour, posture, breathing and temperature. He said that a monitoring of oxygen levels in the blood of mid 90s per cent or higher is good. In Zion's case it was 99 per cent. He placed emphasis on whether Zion was feeding properly. It was noted that he was. Zion was not using his accessory muscles along the chest wall and neck which are obviously being used by a child with respiratory difficulties but not obvious in a child, who was breathing quietly and normally. Mrs Mathieson had carried out an assessment of Zion's muscle tone and his temperature was normal. She had listened to Zion's chest and his breathing was in order. If the chest had been tight, there would have been less air taken in and breathing would be quieter than normal. This was not the case here. It was appropriate to reassure Mrs Satha and allow Zion home. It was good practice for Mrs Mathieson to have given Mrs Satha examples of changes in Zion to be noted, such as breathing becoming more laboured or feeding becoming less good. Dr Gibson said that all checks, which should have been done, were done by Mrs Mathieson. As regards family history, he said that at least fifty per cent of all children will have respiratory infection at some stage. Accordingly, it would not be

unusual to find a common finding of such infection between siblings such as Zion and his brother. Regarding hospitalisation of Zion, although this was not thought necessary, Dr Gibson said that he knew of babies with RSV collapsing in hospital and not surviving, even where intensive care was available within minutes.

Emergency Treatment.

On 5th November 2008, Mrs Satha said that Zion was still feeding normally during the night and did not appear worse. She woke him up at 0800 hours to give herself half an hour to feed before she took her elder son to nursery for 0900 hours. He was going on a trip. Zion seemed fine when feeding. The nursery was situated only a couple of minutes walk away across the road. She put Zion in a papoose type sling and as she was walking to her front door he cried a little. She gave him a dummy and he settled down asleep. She dropped her elder son off at nursery. As she was walking back to her house she looked down at Zion and saw blood coming from his nose. She took him out of the papoose and he was all floppy. she tickled him but he did not move. At 0904 hours she dialled 999. Following the instructions given to her, she lay Zion down on a hard surface, the living room floor, and compressed his chest and gave him mouth to mouth resuscitation as part of Cardio Pulmonary Resuscitation (CPR). Zion did not start moving or breathing again. She did not think that she was doing the CPR correctly. It seemed like ages until the paramedic arrived. He asked her why there was blood from Zion's nose. She replied that she did not know. She stopped giving CPR as she thought the paramedic would do it better. He knelt in front of Zion but did not give him CPR. Mrs Satha then continued to give CPR. The

paramedic did not have a baby's mask and told her he had to go back to his vehicle for one. He left her attending to Zion. When he was away she saw another ambulance man at her living room window and had to leave Zion to let him in the front door. The paramedic had entered by the back door. She said that the time lapse between the first paramedic leaving and the second arriving was a couple of minutes. The second paramedic came in, grabbed Zion and took him out to the ambulance. He did not use CPR on Zion in the house. Mrs Satha threw her house keys at the first paramedic, who then came back into the house. Mrs Satha main concern was that she thought that the paramedics should have taken over CPR from her. Instead she was left to do it herself. At first, the ambulance was driven in the direction of Dalgety Bay but turned round to go to Queen Margaret Hospital, Dunfermline. On arrival, the paramedic ran into the hospital with Zion. He had told Mrs Satha that it did not look good.

Michael Lumsden was the first paramedic to arrive. He had 13 years experience as a paramedic and had been with the Scottish Ambulance Service for 23 years. He said that he part of his duties was to check his equipment at the start of his shift. He was seated in a rapid response vehicle. Amongst the equipment in the vehicle was a paediatric response bag containing *inter alia* a paediatric breathing mask and a smaller breathing mask for an infant. He said that he had checked that both masks were in the bag. His task was to get to an incident as quickly as possible. The type of call received by him was coded. A code red call required arrival within 8 minutes, amber within 12 minutes and green immediate with no time limit as such. He was positioned at Hillend Railway Station carve park when he received a call at 0904. This was shown to be 0905

but he said he had noted it as the former. His call sign was FIF 399. Call details were logged by his Control. Mrs Satha's address was 1.5 miles from where Mr Lumsden was parked. He had information that a baby was aged 4 weeks and had possible cardiac/ respiratory arrest. This was Code Purple. He took 3 minutes to arrive at Mrs Satha's address. He lifted his immediate response and paediatric response bag from his vehicle and a defibrillator, which monitors heart rhythms and can deliver shock to a patient to restart the heart. He entered by the back door and kitchen and found Mrs Satha bent down beside a child doing CPR. He told her to keep on doing this. His priority was to check the child's vital signs. There was no pulse and no physical breathing. The skin was cyanosed showing a lack of oxygen and was blue around the finger nails. Zion was cold to touch. He attached the defibrillator to Zion. Mrs Satha was putting air into Zion's lungs as both sides of his chest were filling up. Mr Lumsden believed that Mrs Satha was administering CPR effectively. He said that he had carried out chest compression as Mrs Satha carried out mouth to mouth. He was about to attach a breathing mask to Zion when he found that he did not have an infant's breathing mask in his bag but had two paediatric masks. He had to go back to his vehicle for the other mask. He said that he was away for seconds but in this time the other ambulance men had arrived and Mrs Satha had left Zion on the floor to let them in by the locked front door. When he returned one of the ambulance crew had Zion in his arms and took him out to the ambulance. The ambulance crew arrived at 0912, 5 minutes after Mr Lumsden arrived. Mr Lumsden said that when he arrived Zion was ostensibly dead. He had locked up the house and returned the keys to Mrs Satha at Queen Margaret Hospital.

Mr Gerald Egan a Consultant paramedic in clinical decision making employed by the Scottish Ambulance Service said that Mr Lumsden had been in error in that he had not properly checked that there were the appropriate breathing masks present in his paediatric bag. There should have been one paediatric mask and one infant mask. The infant mask is smaller. The symbol on the paediatric bag was yellow and that on the infant bag was green. Mr Lumsden on arrival should have taken over the resuscitation of the child and the breathing mask was the most effective way of getting oxygen into a child.

Dr Neil Gibson, aftermentioned, was concerned that Mr Lumsden had taken into the scene a selection of unsuitable masks. He initially thought that the Scottish Ambulance Service ought to revisit the equipment it had to hand but was 'greatly assured' by the new Vehicle and Equipment Check Sheet used by the Accident and Emergency Ambulance personnel, which highlights the paediatric section in purple and shows *inter alia* one paediatric mask and one for an infant.

Mr Lumsden arrived within 3 minutes of receiving the call and this was well within the target time of 8 minutes for such a call. He did fail to check properly his equipment and this resulted in his leaving Mrs Satha alone with Zion, while he returned to his vehicle for the infant's mask. It also caused her to have to leave the child on the floor unattended so that she could let the other ambulance men into the house. If he had had the proper mask, he ought to have taken over the administration of CPR from Mrs Satha and administered oxygen to Zion. However, while Mrs Satha was rightly concerned at being expected to carry on with CPR, which she felt she was doing incorrectly, as there was no response from Zion, he was ostensibly dead at that point. The same situation applied, when she had to

leave Zion alone to go to the front door. Dr Margaret Evans, aftermentioned, did not believe that the immediate availability of the infant mask would have made a significant difference in the circumstances of this case.

David Stark was an ambulance technician with 22 years' service. He and a trainee probationer Michael Slater were on duty when they received a purple code call at 0905. Code purple indicates that a child may well be dead. They were mobile at 0906 and arrived at Mrs Satha's home at 0913. Mr Stark went to front door which was locked he looked in and saw Mrs Satha with Zion. She opened the door and the child was on the floor. He was not breathing and had blood around his mouth. He described the operation and 'scoop and run', that is to take the child as quickly as possible to hospital. Mr Slater had entered but was told to go back out and turn the ambulance round which he did. Mrs Satha and Mr Stark were in the rear of the ambulance. The ambulance left at 0921. Mr Stark used CPR and had attached a paediatric breathing mask to Zion. The normal hospital for paediatric emergencies was the Victoria in Kirkcaldy and the ambulance did head there but turned around towards the Queen Margaret Hospital, Dunfermline, which was closer. Zion vomited en route and he patted him on the back to clear the airway. Medical assistance on arrival had been arranged and at 0936 he ran with Zion into the resuscitation unit.

Michael Slater confirmed that he remembered a defibrillator attached to Zion as he was carrying his own into the house. He and Mr Stark confirmed that the practice was to check their vehicle and all equipment at the start of each shift.

Mrs Satha was concerned that the ambulance had headed in the direction of Kirkcaldy and then turned round for Dunfermline. The time involved in getting

to Queen Margaret Hospital was 15 minutes. When shown the ambulance patient report, Dr Evans, Consultant Paediatric Pathologist, said that Zion had, in layman's terms, died. I do not know the extent of any delay caused in heading for Kirkcaldy but given the medical evidence in this case, sadly Zion was already ostensibly dead before taken into the ambulance. Dr Julie Freeman had no criticism to make of the ambulance crew. Dr Margaret Evans said that in her opinion there was very little that the ambulance crew could have done in the circumstances. They got Zion to hospital but, in layman's terms, he had died. Dr Gibson said that, while there were issues about the precise and ready availability of all the paediatric equipment needed by the paramedic, reasonable resuscitation attempts were made and the response of the ambulance crew was appropriate in the circumstances.

Hospital Treatment

Mrs Satha was told by hospital staff at Queen Margaret Hospital that a lot of drugs had had to be used to bring Zion back and that a cat scan was being carried out to see what damage had been caused. A recovery ambulance was sent from the Royal Hospital for Sick Children, Edinburgh and Zion was transferred into its intensive care unit. Mrs Satha was told that, because of the time Zion had been without oxygen, there might not be a good outcome. Dr Julie Freeman attended to Zion and after 48 hours she found that Zion was not testing for any vital signs. She advised Mrs Satha of this and that Zion was being kept alive by the machine. He could not survive on his own. Mrs Satha and her husband took the decision to turn off the machine.

Dr Julie Freeman was a Consultant in Paediatric Intensive Care at the Royal Hospital for Sick Children, Edinburgh. Zion was referred there and arrived at 1015 by retrieval service transportation. This paediatric intensive care unit covers Fife. On arrival Zion was found to have no cardiac output, was blue and there was no pulse. As the ambulance report indicated at 0910 that Zion was not breathing and had no cardiac output, approximately 40 minutes had elapsed without cardiac output. The cause of the cardiac arrest was not clear. His chest x–ray indicated changes in keeping with bronchiolitis, a lung problem caused by RSV. Zion was kept overnight. With the lapsed time there was no evidence of recovery. The breathing was in gasps rather than normal breathing movements. There was no brain stem function. Zion had all the hallmarks of brain injury. He was RSV positive. On 8th November 2008, she discussed Zion's case with Mr and Mrs Satha and a decision was taken to take Zion off the ventilator as treatment was futile. She certified Zion dead at 1442 on 8th November 2008. She confirmed that babies can deteriorate quickly with this virus. It was more common for a baby to be put to bed and not wake up. The child tends to stop breathing with a blocked nose and mucous secretions which are difficult to clear. This could have happened to Zion even if he had been in his cot. The prognosis for an out of hospital cardiac arrest is very poor. Even if breathing stops, a robust heart can carry on for sometime, possibly 3 minutes. After this period, with heart stopped and no breathing, little could be done.

Dr Margaret Evans was a Consultant in Paediatric Pathology at Edinburgh Royal Infirmary. She carried out the post mortem on Zion. She found nothing to cause her any suspicion as to the cause of death. Zion was well grown and cared

for. He had a severe hypoxic brain injury secondary to cardiac arrest. His lungs were full of mucous indicating a degree of underlying infection. He had lymph and plasma cells linked to viral infection. There was evidence of RSV. There was widespread evidence of haemorrhage in the alveoli. This occurs where there is a significant degree of upper airways obstruction. She had amended her report to show the cause of death to be respiratory compromise and RSV.

She noted that Zion had been carried in a papoose and thought that Zion's ability to breath may have been compromised by being close to Mrs Satha's enlarged breasts in a similar fashion to overlaying. If a child did not have RSV there would be no problem. Both Dr Gibson and Dr Freeman disagreed with this. Dr Gibson thought that, because Mrs Satha was so close to Zion, she would have noticed him being in difficulty and did not believe the papoose to be a factor in causing his death. Dr Freeman was of the view that the papoose had been used correctly for Zion's size and age and also did not think that it had been a contributory factor in the cause of death.

I am inclined not to regard the manner of carrying Zion in a papoose as a factor in the cause of his death.

Respiratory Syncytial Virus.

Mrs Satha believed that mothers such as she were unaware of this virus and thought that this enquiry might be of benefit in highlighting the condition. I do sympathise with her in this respect but, from the medical evidence, it is clear that there would appear to be very little a parent can do if the child, such as Zion, has this virus. A difficulty is that this virus shares symptoms with other viruses. The

chest may be sucked in indicating that the child is finding it hard to breath. There would be a prominent grunting sound. The child usually will not feed or suck well. The main reason for taking a child into hospital would be that it was not feeding well, according to Dr Gibson. There is no treatment for a viral infection unlike a bacteriological one. Dr Freeman along with the other doctors said that RSV is very seasonal from November through to March. It affects children particularly up to 6 months of age. Many thousands of babies may fall ill each year but many have mild symptoms and do not require hospital treatment. Dr Evans was not aware of any deaths in 2009 and in 2008 there were 2 including Zion. Death was accordingly very rare. In a UK study the RSV attributed death rate in the UK was 8.4 per 100,000. It can occur very quickly. RSV is a common cause of sudden infant death syndrome. From the medical evidence, unless oxygen gets to the brain within the space of 3-5 minutes, there will be massive brain damage. This is not a cause of death but the child would be profoundly mentally handicapped. The child has to begin to breathe on its own. This did not happen in Zion's case. Viral bronchiolitis may be caused by RSV but not all cases are. The bronchioles are small tubes in the airways feeding into the lungs. Dr Gibson likened them to twigs leading to the leaves of a tree. Inflammation or irritation (itis) of these bronchioles makes the tubes narrower than normal. It starts out with symptoms of a cold. The child is 'snuffly' with a mild fever and a bit of a cough. The cough becomes more troublesome as it progresses and this would be obvious to the parent. The child has to work harder to breathe through these narrower than normal tunes. This produces signs of muscular evidence. 20 breaths per minute is normal while bronchiolitis may require 40-60. This affects the child when feeding

as the child finds it more difficult to suck and feeds less well and for shorter periods. Zion fed normally approximately one hour before Mrs Satha noted that something was wrong.

Zion had developed viral bronchiolitis with RSV as the infecting organism.

Submissions and Conclusion.

The Procurator Fiscal asked me to find that while the availability of the infant mask was not a causal factor in Zion's death it should be noted. I have done so. She went on to submit that the system employed by the Scottish Ambulance Service had failed on this occasion, because a distraught mother had to administer CPR, while a paramedic looked for his equipment. I do not agree with her. There was a system in place where there was a duty on a paramedic to fully check his equipment at the start of his shift. In this case, Mr Lumsden failed in this duty. I do not regard an individual's failure in this respect to amount to a systemic failure. Mr Stark and Mr Slater confirmed that the system in place at the material time was that a full check of vehicle and equipment was to be carried out at the start of each shift by the personnel concerned. Mr Egan also confirmed this. He said that a full check would be carried out that all equipment was in place, clean and up to date. The Scottish Ambulance Service kept the equipment carried under review. The vehicle checklist was updated regularly by clinicians. In accordance with this, the masks and bags, within the next couple of months, will be marked by colour, sign and a symbol.

I asked Dr Gibson, having taken the time to examine the various reports and other evidence in this case, if, in his opinion, there was anything anyone

could have done to have prevented Zion's death. He replied in the negative. This tragic case, accordingly, was a very rare case of RSV causing death by the cessation of breathing and an out of hospital cardiac arrest.

While the attention of the court was concentrated principally on the actings of emergency ambulance personnel and medical staff, it is worthy to note that Mrs Satha acted perfectly appropriately not only in her care of Zion before the fatal incident but also afterwards in contacting promptly emergency services and administering CPR as instructed. As stated in open court, I would again express my deepest sympathy to Mr and Mrs Satha and wider family, who attended each day with a new baby.

John Craig Cunningham McSherry

Dunfermline,

Thursday, 18th March 2010