CORONERS ACT, 2003

SOUTH  *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide and Port Augusta in the State of South Australia, on the 8th, 27th, 28th, 29th and 30th days of August 2012 and the 18th day of April 2013, by the Coroner's Court of the said State, constituted of Anthony Ernest Schapel, Deputy State Coroner, into the death of Olivia Jean Johnson.

The said Court finds that Olivia Jean Johnson aged 11 months, late of Balcanoona Road, Balcanoona via Copley, South Australia died at Balcanoona via Copley, South Australia on the 30th day of May 2011 as a result of dehydration. The said Court finds that the circumstances of her death were as follows:

1. Introduction

1.1. Olivia Jean Johnson, who was born on 15 June 2010, died on 30 May 2011, being only a fortnight away from her first birthday.

1.2. Olivia was the younger of two children of Melissa Hands and her partner, Wade Johnson, both of whom are indigenous people. The other child of Ms Hands and Mr Johnson is Oshay, a boy, who at the time of these events was nearly 2 years of age. Olivia lived with her parents and her sibling on the Balcanoona Station where Mr Johnson was a construction and maintenance worker[1]. Balcanoona Station is 105 kilometres[2] from Leigh Creek in the north of the State. Leigh Creek is the closest centre with medical services. Although the distance that I have just quoted is not in and of itself huge, the road between Balcanoona Station and Leigh Creek leaves

[1] Transcript, page 118
[2] Transcript, page 156

something to be desired and a vehicular journey between the two locations can take as long as 2 hours.

1.3. Olivia died at the family home at Balcanoona Station on the evening of Monday 30 May 2011 despite frantic efforts on the part of her parents and others to resuscitate her after her collapse from what at autopsy was undoubtedly established as dehydration.

1.4. During the course of this Inquest I heard oral evidence from both Ms Hands and Mr Johnson. I state at the outset of these findings that Olivia's death was not due to any neglect or fault on the part of her parents. That Olivia would succumb to dehydration was the result of her suffering from an acute gastric disorder that involved a number of bouts of vomiting and diarrhoea for which her parents sought medical treatment. As expressed in the post-mortem report[3] prepared by Dr Karen Heath, a forensic pathologist at Forensic Science South Australia, it is entirely possible for an infant to become critically dehydrated within a very short period of time, hours, in the setting of vomiting and diarrhoea. Dr Heath also suggests in the report that in Olivia's case the vomiting and diarrhoea could account for the child's dehydration. For my part the matter appears to be beyond any doubt at all. There is no other explanation for the infant becoming so profoundly dehydrated. I find the cause of Olivia's death to have been dehydration.

1.5. The evidence also demonstrated that Olivia had experienced what is known as hypernatraemic dehydration where due to the dilution of the fluid lost from the body by way of vomiting and diarrhoea, especially from copious vomiting, the concentration of sodium within the tissues increases. In Olivia's case this is evident from the fact that at autopsy she had a marked elevated vitreous sodium level of 171mmol/L. Such a diagnosis in the living patient would lead to a regime of rehydration management than might differ from that associated with conventional dehydration. In addition, the high sodium level might give rise to differing symptomatology such that abnormal skin turgor, an important diagnostic tool usually associated with conventional dehydration greater than 5%, might not be apparent.

1.6. Earlier on the day of her death, Olivia's parents had made the journey from Balcanoona Station to Leigh Creek by 4WD and had attended at the Leigh Creek Hospital and Medical Clinic where Olivia was examined by Dr Geoffrey Cox, a

[3] Exhibit C1a

medical practitioner. Ms Hands had specifically raised with Dr Cox her concerns about the possibility of dehydration but in effect had been assured that at that point in time Olivia was not dehydrated. Indeed, Ms Hands had been so concerned about Olivia to the point where she had fully expected Olivia to be sent to Port Augusta to be seen by the local paediatrician there. Although admission to the local Leigh Creek Hospital would have been another option, in the event Ms Hands was allowed to take Olivia home with advice to keep her fluids up and to bring her back if the diarrhoea persisted. Ms Hands was also provided with Gastrolyte, a rehydrating agent. Ms Hands and Mr Johnson then took Olivia home to Balcanoona Station where that evening she died. As a measure of the difficulty associated with the remoteness of the location, it took police and an ambulance some 109 minutes[4] to travel from Leigh Creek to Balcanoona Station during which time Olivia was constantly administered CPR. Olivia was certified deceased by ambulance officers very soon after their arrival.

1.7. The evidence is that Olivia's death probably could have been prevented if she had been kept at Leigh Creek and been observed at the local hospital. Although in all probability she would ultimately have required retrieval to a hospital that could have provided a greater level of care, with earlier identification of her dehydration and the necessary corrective treatment there is every reason to believe that she could have survived. The Inquest raised important issues as to the type of advice and medical response that ought to be given and implemented in cases where a person, particularly an infant in these circumstances, is discharged knowingly to a remote location at which further more urgent medical intervention may simply not be possible.

2. Olivia's wellbeing before her consultation with Dr Cox

2.1. There was some evidence adduced in respect of Olivia's previous medical history that was relevant in one aspect. Olivia had been born 7 weeks prematurely and in addition had suffered from a hernia that had required surgery. Ms Hands told the Court that medical advice at the time had suggested that upon attaining the age of 1 year, Olivia would have reached a milestone in terms of her wellbeing and survivability, particularly in relation to her lung development. Ms Hands told the Court that she had been led to believe by doctors that Olivia's survival in the first instance had been something of a miracle. In the first year of her life, Olivia was periodically seen by

[4] Transcript, pages 20-21

Dr Han, the paediatrician at Port Augusta. She had travelled to Port Augusta from Balcanoona Station on those occasions. That Olivia had progressed to a state of satisfactory health at the age of 11 months was a matter in which Ms Hands took obvious pride. Ms Hands also has experience in working in Aboriginal infant health care. This is all relevant to demonstrate that Ms Hands took the health of her daughter extremely seriously and it led me to the conclusion that when Ms Hands described in evidence features of her daughter's presentation at the time with which this Inquest is concerned, she did so with a relatively high degree of accuracy. Furthermore, and having seen Ms Hands give oral evidence, it occurred to me as being highly likely that Ms Hands would not have been reticent in expressing whatever concerns she had in respect of her daughter to a medical practitioner.

2.2. Ms Hands provided a statement[5] to one of the police officers who on the night in question had attended at their premises at Balcanoona Station. Ms Hands had signed that statement in the police officer's notebook. In that statement Ms Hands said that Olivia's gastro and vomiting had started the previous night. At 6am the following day Ms Hands and her partner had heard Olivia vomit in her cot which they positioned in their bedroom. Although Olivia appeared to be happy and was mobile shortly after that event, she was not herself. In this initial statement Ms Hands indicated to the officer that in the morning Olivia's eyes had 'looked dark and slightly sunken in'[6]. In addition Ms Hands described Olivia as appearing exhausted. She had a loose nappy with mustard colour watery faeces. Ms Hands indicated that at that point she thought Olivia had been dehydrated. Ms Hands described another nappy change at Nepabunna on the way to Leigh Creek. They were the salient features of Ms Hands' description, as contained in her statement, of Olivia's wellbeing prior to her being seen by Dr Cox. It is of note that she stated that in the morning Olivia's eyes had looked dark and slightly sunken in, which is a sign of some significance when her presentation to Dr Cox, and the possibility that dehydration was already in play at that time, come to be evaluated.

2.3. Ms Hands made a further statement to police[7] on 21 July 2011 that dealt in some detail with Olivia's previous medical history, but did not elaborate upon her description of Olivia's presentation on the day in question.

[5] The typed version of this statement is Exhibit C18
[6] Exhibit C18, page 2
[7] Exhibit C18a

2.4. Ms Hands gave oral evidence at the Inquest. In her oral evidence before the Court Ms Hands provided greater detail in relation to Olivia's condition in the 48 hours prior to her death. On the Sunday afternoon, 29 May 2011, Olivia had what Ms Hands described as a '*power chuck*'[8]. This was her term for what must have been an episode of projectile vomiting. By that time Ms Hands had already changed Olivia's nappy twice for diarrhoea. Ms Hands described the diarrhoea as very watery and so it would not be possible to determine over the next 24 hours or so to what level of frequency or volume the child had been urinating. Ms Hands suggested that the time at which the episode of vomiting had occurred was shortly before 3:30pm or 4pm when she bathed the child. Ms Hands told the Court that Olivia was quite happy for the rest of the day, but that the diarrhoea persisted such that Ms Hands had to change her frequently throughout the rest of the day and night. She took her bottles of formula every 3 hours. That evening Ms Hands and her partner resolved that if Olivia did not improve they would take her to the doctor the following day. Ms Hands' description of the time at which Olivia's difficulties with vomiting and diarrhoea commenced differed from that given in her original statement taken on the night of Olivia's death insofar as the statement suggested that those difficulties had commenced the previous night as distinct from during the day. It is apparent that the statement was given at a time when the stress and grief associated with Olivia's death must have been profound. Furthermore, not surprisingly, the statement speaks for the most part in generalities and not with the precision one might expect after careful reflection. Her oral evidence is also not inconsistent with other evidence in the case. While Dr Cox would tell the Court that he recalled being told by Ms Hands that Olivia had started vomiting the evening before and had developed diarrhoea the evening before[9], he noted in the clinical record[10] that Olivia had started diarrhoea and vomiting 'yesterday'. I accept Ms Hands' oral evidence where it differs from her statement. I accept Ms Hands' oral evidence that the vomiting and diarrhoea had started during the afternoon of Sunday 29 May.

2.5. During the night Ms Hands was aware that her partner had arisen to give Olivia a bottle.

[8] Transcript, page 45
[9] Transcript, page 190
[10] Exhibit C15, page 1

2.6. The next observation of Olivia was the following morning when Olivia vomited in her cot at around 6am. She was cleaned up and it was also evident that Olivia was still experiencing diarrhoea. Ms Hands did not believe that Olivia had a bottle that morning. She did not appear to want it. It was then that Ms Hands examined Olivia and concluded that she was not herself. In this regard Ms Hands told the Court that Olivia had dark rings underneath her eyes and was exhausted. Ms Hands was concerned that she was dehydrating. Importantly, she had never seen Olivia's eyes in that condition prior to this occasion[11].

2.7. Ms Hands and Olivia's father decided that they would take her to Leigh Creek out of concern that the diarrhoea was causing Olivia to dehydrate. Ms Hands packed a bag with things for Olivia and herself in case they were sent to Port Augusta. This decision was made before 8am, as they left the house at about that time. Ms Hands believed that they had to change another nappy prior to leaving.

2.8. Wade Johnson's parents resided at a place called Nepabunna which is on the road between Balcanoona and Leigh Creek. They stopped there to tell Mr Johnson's parents of their intentions. Ms Hands believed that they changed Olivia again at Nepabunna. By that stage Olivia looked tired and was still dark around her eyes.

2.9. Ms Hands believed that they changed Olivia at least three times on the way to Leigh Creek[12].

2.10. Ms Hands stated that from the Sunday afternoon until arriving at Leigh Creek she had changed Olivia on approximately 8 occasions, on each of which it was evident that Olivia had experienced diarrhoea. All this was naturally out of the ordinary in terms of frequency. Later in her evidence Ms Hands told the Court that she believed that she had changed the child on at least 10 occasions during that same period. On each of those occasions Ms Hands' said the bowel actions had been loose and had been wet such that she could not tell whether the child had urinated. In any event it is clear that the child had lost a lot of fluid, although she had been drinking[13]. I accept Ms Hand's oral evidence that she had changed Olivia's nappy on at least 8 occasions.

[11] Transcript, page 50
[12] Transcript, page 54
[13] Transcript, page 87

2.11. Ms Hands also believed that during the consultation with Dr Cox at Leigh Creek she changed the nappy again and the contents were the same as before with watery diarrhoea. In her evidence Ms Hands stated that she was sure that Dr Cox had seen the contents of the nappy. However, in cross-examination Ms Hands indicated that she was not completely certain that the nappy had been changed during Dr Cox's consultation[14].

2.12. The appearance of Olivia's eyes at the time of the consultation is of some significance as sunken eyes are a sign of possible dehydration. Ms Hands testified that at the time of Dr Cox's examination Olivia still had dark rings under her eyes. Ms Hands did say that later that same day, after they had returned from Leigh Creek to Balcanoona Station, the dark rings associated with Olivia's eyes looked darker than what they had during the morning and were more sunken in[15]. In cross-examination by Mr Homburg, counsel for Dr Cox, Ms Hands stated that in the morning Olivia's eyes had not appeared to be sunken although they were dark underneath[16]. She agreed with cross-examining counsel that the obvious sunken appearance of the eyes did not emerge until the Monday afternoon after they had returned from Leigh Creek[17]. On the topic of when it was for the first time that Olivia's eyes had appeared sunken, it will be remembered that Ms Hands' original statement suggested that Olivia's eyes had been slightly sunken during the morning before they left for Leigh Creek. In addition, as will be seen, Dr Cox would state in his evidence before the Court that during the examination at Leigh Creek Ms Hands had specifically asked him whether he thought her Olivia's eyes were sunken at that point in time. To my mind it is clear that at the time of the examination there was something unusual and not right about the state of Olivia's eyes and that this was a source of legitimate concern on the part of her mother. The objective evidence is that when Olivia was examined after death, her eyes could be described as sunken.

2.13. The other salient feature of Olivia's presentation as described by her mother was that she had been lethargic which by comparison to her usual energetic behaviour was out of character. She stated that she pointed that fact out to Dr Cox during the consultation. I will deal with the events of that consultation in another section of these findings.

[14] Transcript, page 96
[15] Transcript, page 74
[16] Transcript, page 91
[17] Transcript, page 92

2.14. Olivia's father, Wade Johnson, also provided the police with a statement on the night of Olivia's death. This statement was recorded by hand in an officer's notebook[18]. The officer in question was Senior Constable First Class Kym Mayger whose statement[19] records that he read the statement to Mr Johnson who then signed it. Mr Johnson also gave oral evidence at the Inquest but many of his answers evinced a less than perfect memory as to detail. To my mind, however, Mr Johnson was an honest witness who did his best to describe relevant matters. My discussion of Mr Johnson's evidence is confined to his account of Olivia's presentation prior to the visit to Dr Cox's practice in Leigh Creek. Mr Johnson's handwritten statement is consistent with his partner's evidence that Olivia had started to experience diarrhoea the day before. His statement reveals that they had changed Olivia's nappy on 5 or 6 occasions from the period beginning that morning to the time they left Leigh Creek following the consultation with Dr Cox. It is apparent that Mr Johnson had not been present during that consultation. The statement also reveals that during the morning at a time prior to their journey to Leigh Creek, he and his partner had spoken together about the way that Olivia appeared and his statement records that Olivia's eyes at that stage looked sunken (although the word he possibly used when speaking to police was 'sunked').

2.15. In his oral evidence Mr Johnson added that the diarrhoea that had been experienced by his daughter had been '*really watery*'[20]. In addition to the 5 or 6 times on which the child had to be changed on the Monday, she had experienced diarrhoea on a few occasions the day before. He also confirmed Ms Hands' evidence that Olivia had experienced an episode or episodes of projectile vomiting. He, like his partner, confirmed that Olivia had been eating and drinking normally notwithstanding her illness.

2.16. As far as Olivia's eyes were concerned, in his oral evidence Mr Johnson described her appearance as being 'dark underneath the eyes'21 and when his reference in his statement to them looking sunken was pointed out to him, he reiterated that the eyes looked 'just tired and looked darkish and tired'22. He supported his partner's evidence that this appearance was uncharacteristic. He had not seen this in Olivia prior to this occasion. Having regard to the evidence as a whole, and specifically the

[18] Exhibit C19
[19] Exhibit C20
[20] Transcript, page 120
[21] Transcript, page 120
[22] Transcript, page 131

fact that Dr Cox states that Ms Hands expressed concern to him during the examination that her daughter's eyes were sunken and that she had used that very term, I think that it is more probable than not, and I so find, that what Ms Hands noticed about her daughter's eyes at the time of the examination was that they were to a degree unusually sunken and that she pointed this out, using that term, to Dr Cox.

3. The consultation with Dr Cox

3.1. Dr Cox is an experienced medical practitioner. He is a general practitioner who is a Fellow of the Australian College of Rural and Remote Medicine. He obtained his original medical qualifications from Monash University in 1984. He has worked extensively in rural practices as well as overseas. At the time with which the Inquest is concerned, he conducted a general medical practice at Phillip Island in Victoria, working 3 weeks a month at that location and 1 week a month at the Leigh Creek Medical Centre. For the other weeks of the month his Phillip Island partners conducted the Leigh Creek practice. This arrangement has been in existence for a number of years now. Dr Cox gave two statements to police[23] and also gave oral evidence in the Inquest. In his evidence he explained that the arrangement for his week at Leigh Creek involved a Friday lunchtime arrival followed by a handover with the outgoing practitioner. He remains for a week during which he is the only doctor in the region. There are no specialist consultants or other doctors who visit Leigh Creek other than his partners on the basis that I have described. There is a hospital at Leigh Creek that is within the same building as the clinic. The hospital has 5 or 6 beds and, as explained by Dr Cox, there are usually 2 to 3 beds available. There is an Accident and Emergency Department within the hospital. The hospital has fulltime permanent nursing staff. Dr Cox explained that the bulk of the work of the hospital is conducted within the Accident and Emergency Department. He also explained that, as one would expect, he has admitting rights to the hospital and that there is usually no difficulty with bed availability.

3.2. Dr Cox also explained that he has had experience in paediatric medicine, including with indigenous children experiencing gastric issues.

[23] Exhibits C15a and C15b

3.3. Dr Cox told the Court that as the only practitioner in the region, he was confined to Leigh Creek while he staffed the medical clinic[24]. Nevertheless, he told the Court that he was generally aware of the location where Olivia and her parents lived and understood that it was, in his words, '*some distance away, an hour, an hour and a half's drive*'[25]. The evidence in this case suggests that it is more like 2 hours. Dr Cox gave the Court the impression that he knew very little about the Nepabunna and Balcanoona area. When asked as to whether he was aware of the fact that the road to Nepabunna was a dirt road, he did not know that but he indicated that he would not be surprised that such was the case. He had not travelled to either location. He was aware of the existence of a health worker facility at Nepabunna, but that it was a 9am to 5pm arrangement.

3.4. Dr Cox had only seen Olivia Johnson on one previous occasion and that was in respect of a rash. This consultation had occurred on 10 February 2011.

3.5. The evidence seems reasonably clear that the consultation with which this Inquest is concerned commenced at 11am and took about 30 minutes. The significant features of Ms Hands' evidence about the consultation are that she expressed concern to Dr Cox about the possibility that Olivia was dehydrated because of the diarrhoea and the episodes of projectile vomiting. She also mentioned to Dr Cox that Olivia was not herself that day and that she had packed a bag for both herself and Olivia in the expectation that they would be sent to Port Augusta. She also told the Court that in response to the Port Augusta contingency, Dr Cox had assured her that Olivia would be alright at home. To this Ms Hands specifically questioned Dr Cox about the darkness under Olivia's eyes. She emphasised to Dr Cox that this was something that was unusual for Olivia. In her evidence Ms Hands did not purport to suggest that she had told or used the word 'sunken' in respect of her daughter's eyes when speaking to Dr Cox. Nevertheless, as already alluded to, when Dr Cox gave his evidence he readily acknowledged that Ms Hands had indicated to him that she thought Olivia's eyes were sunken and had used that word to describe her eyes. In any event, according to Ms Hands, when she posed the question to the effect '*why is she still dark under her eyes*', Dr Cox had looked at the child and did not answer[26]. Regardless of the description used in relation to the appearance of Olivia's eyes,

[24] Transcript, page 235
[25] Transcript, page 206
[26] Transcript, page 62

according to Ms Hands, Dr Cox said that he did not think that Olivia was dehydrated and that he could determine that this was so from her lips, without explaining what it was about the lips that led him to believe that Olivia was not dehydrated. Ms Hands' evidence was that she had mentioned the question of dehydration and the appearance of Olivia's eyes on more than one occasion during this consultation.

3.6. In her original police statement Ms Hands said that she had told the doctor that Olivia had vomited the previous night and that morning. She also told him about the diarrhoea. She told the Court that she was not happy with Olivia because she was not herself and that she had had diarrhoea since the day before. In cross-examination by Mr Homburg, Ms Hands said that she did not think Dr Cox had asked exactly how many times she had experienced diarrhoea, but that she told him that Olivia had not stopped since yesterday afternoon[27]. She said that she did not indicate that Olivia had diarrhoea every few hours, but simply that she had had diarrhoea since yesterday and it had not stopped.

3.7. Ms Hands also told the Court that she had told Dr Cox that she was worried about Olivia because of her history with the hernia and her having been premature. It was on this basis that she thought Dr Cox might send them to Port Augusta. She said that Dr Cox had replied that it was:

> '… just a gastro bug, we'll just give her some Gastrolyte and some Panadol and she'll be alright. Just keep the fluids up, you know, he didn't take it very serious.' [28]

She acknowledged that she had told Dr Cox that Olivia was still eating and drinking well[29].

3.8. Ms Hands also told Dr Cox that the girl's usual boisterous demeanour was absent in that she was '*not being her loud little self*'[30]. She said that she repeated this on a number of occasions during the examination.

3.9. Once Dr Cox had conducted his examination of Olivia he told Ms Hands that if she was to vomit again, then to be concerned and bring Olivia back. One available interpretation of this was that Ms Hands might only be concerned to the point of

[27] Transcript, pages 86-87
[28] Transcript, page 94
[29] Transcript, pages 95-96
[30] Transcript, page 102

bringing Olivia back if Olivia vomited again, but that persisting diarrhoea was not so much of an issue.

3.10. Ms Hands did not in terms ask Dr Cox to admit Olivia to hospital in Leigh Creek. The only contingency upon which admission might be contemplated was Dr Cox's advice to the effect that if Olivia were to vomit she ought to be brought back to Leigh Creek. Ms Hands said that Dr Cox did not say anything about continued and persisting diarrhoea being a matter that might also bring Olivia back to Leigh Creek[31]. Dr Cox did say, however, that he would call them tomorrow to see how Olivia was.

3.11. One matter in dispute and which is of some importance is that in her evidence Ms Hands denied that she had said anything to Dr Cox about their plans for the rest of the afternoon. She denied that she had told Dr Cox that they were going to spend some time in Leigh Creek. She did not contemplate staying in Leigh Creek to see how Olivia progressed following the consultation. In this regard once it was established that Olivia would not be sent to Port Augusta, she was keen to get Olivia back home and back into her own environment[32].

3.12. Ms Hands told Dr Cox that she lived at Balcanoona Station and that it was a 2 hour drive. She said that she had mentioned this in the context of explaining why she had packed some luggage in expectation of being sent to Port Augusta. In cross-examination by Ms Kereru, counsel assisting, Ms Hands stated that if she had been offered admission to hospital that day, she would have agreed to this in order to be on the safe side. She believed that although she had not insisted on hospitalisation, she had made it clear to Dr Cox that she had fully expected it but felt as if she had been talked out of it[33]. She said:

> '… I thought there's no way this doctor is going to let me come home with her. No doctor is going to let me come home with her, not like this, and that's what I wanted. I wanted a doctor to back me up with that.' [34]

3.13. Ms Hands also told the Court that if Olivia had continued to vomit on the way back to Balcanoona Station she more than likely would have brought Olivia back to Leigh

[31] Transcript, page 104
[32] Transcript, page 106
[33] Transcript, page 111
[34] Transcript, page 111

Creek, but this did not happen and it was only the diarrhoea that in the event persisted. She was asked:

> 'Q. Did it occur to you that diarrhoea might not be such a problem or not as great a problem as vomiting if she was able to drink a sufficient amount of fluid; did that occur to you.
>
> A. Yeah, yeah, that's what I thought. If I kept the fluids up and she was eating fine, and she was drinking and eating fine, I didn't think that the dehydration would be much of a problem. I thought the spewing, yeah.' [35]

3.14. Finally, Ms Hands told the Court that after this consultation, and specifically after Dr Cox had told her that Olivia was not dehydrated, she did not worry about dehydration again. Her concerns were therefore allayed to the point that she and her family departed Leigh Creek and made the long journey back to Balcanoona.

3.15. Dr Cox gave evidence about the consultation. He had noted in the patient's record that Olivia's diarrhoea and vomiting had 'started yesterday'. It also records that she had vomited twice. He noted as far as diarrhoea was concerned, that she had experienced watery diarrhoea 'every few hours'. In giving evidence Dr Cox recalled that he was told that the vomiting had stopped during the morning and the child was drinking well. He believed that what he had been told about the diarrhoea was that Olivia had experienced it approximately every 3 hours during the night. From that he presumed that Olivia had experienced diarrhoea possibly 3 or 4 times overnight, that the vomiting had occurred twice but had settled down. There was no indication the diarrhoea had actually stopped. Dr Cox specifically stated in his evidence that he had not been told that between the Sunday afternoon and the time Olivia went to Leigh Creek that Olivia's nappy had to be changed 8 or 10 times. He did say, however, that he would have regarded that kind of information as significant, although the history of vomiting would have been more significant than that of diarrhoea. Dr Cox said:

> 'I think if she'd had diarrhoea for 24 hours and had eight to 10 episodes of diarrhoea I would have admitted her to hospital and I would have insisted on it rather than just discussed it.' [36]

Dr Cox said that he did not consider the question of the possibility of hypernatraemic dehydration in Olivia's case, the significance of which I will discuss in due course. Although Ms Hands could not recall whether Olivia had consumed a bottle during the

[35] Transcript, page 112
[36] Transcript, pages 215-216

consultation, Dr Cox said that she had in fact had a bottle while Olivia had been in the room[37]. She had seemed happy to drink it and did not appear to be on the verge of vomiting[38]. He could not recall any nappy change in his presence.

3.16. Dr Cox specifically noted in the computerised clinical record that on examination Olivia was 'not dehydrated'. It is also noted in that document that her lips were moist and that her 'turgor was okay'. Turgor refers to a condition of the skin caused by dehydration and which manifests itself in the skin not returning to its normal shape upon pinching. The reaction of skin to pinching is one sign that might indicate dehydration, but is of less significance in cases where dehydration is accompanied by hypernatraemia where the skin might take on more of a 'doughy' consistency.

3.17. In his evidence Dr Cox acknowledged that during the consultation Olivia's mother had specifically raised the question of dehydration. It was in this context that after he had examined Olivia and had told Ms Hands what he had found, Ms Hands had said words to the effect of 'do you think her eyes are sunken?'. Dr Cox said that he then re-examined Olivia. He re-examined skin turgor which he found to be normal and then looked at Olivia's mouth, including the lining of the mouth, and he again found that the lips were moist and wet. In his evidence he did not indicate whether he had agreed or not with the mother's proposition that they eyes might be sunken. He did acknowledge, however, that sunken eyes could be a sign of dehydration, although he stated that he did not believe it to be a '*reliable sign*' and could be '*confused with other things*'[39]. Later in his evidence he said that he did not recall observing dark rings under Olivia's eyes although he said that he would not have necessarily made a significant note of that as he would not have considered it particularly important having regard to the fact that dark rings can exist if the child was tired. He said it was not necessarily a sign that he would have focussed on. In cross-examination by Mr Collett, who appeared as counsel for Ms Hands and Mr Johnson, Dr Cox said that he could not recall Olivia's eyes being particularly abnormal even though he was looking for signs that they may have been sunken. He acknowledged that he was not familiar with Olivia's normal appearance whereas her mother would have been. It is apparent that Dr Cox attached little or no weight to what Ms Hands was trying to describe to him in terms of the appearance of the child's eyes. As will be seen when I discuss the

[37] Transcript, page 191
[38] Transcript, page 192
[39] Transcript, page 266

expert evidence that was adduced in the Inquest, this is a matter that has attracted some criticism.

3.18. As far as the possibility of hypernatraemic dehydration was concerned, when Dr Cox was asked as to whether he had considered this as a diagnosis at any point during his consultation, he told the Court '*No, not really*' and went on to explain that he didn't think that the child may have hypernatraemic dehydration[40]. He said that such a diagnosis had not been '*high on his list*' of possible diagnoses, based on his belief that there had only been three or four episodes of diarrhoea overnight[41]. It seems plain to the Court that Dr Cox gave only very limited consideration, if any, to the possibility of hypernatraemic dehydration.

3.19. Dr Cox did not weigh Olivia. He told the Court that he believed that this was an omission on his part. Nevertheless, the child's then weight may not have carried any immediate significance as there was no record of any previous weight by which to make a meaningful comparison.

3.20. Dr Cox had no recollection of Ms Hands saying anything about the possibility of being sent to Port Augusta. He believed he would have recalled that if anything on the topic had been voiced. He did acknowledge that if said, it might have signified a heightened level of concern on Ms Hands' part. I accept the evidence of Ms Hands that she did raise with Dr Cox the possibility that Olivia be sent to Port Augusta. I think it unlikely that she would go to all the trouble of packing things both for Olivia and herself and not mention her thoughts during the consultation. She appears to have shown no reticence generally in expressing her concerns.

3.21. In short, Dr Cox did not believe that Olivia showed any signs of dehydration. He believed that she was suffering from gastro. He believed that Olivia was drinking well.

3.22. Dr Cox's acknowledgement that if he had known of the duration and frequency of episodes of diarrhoea he would have admitted Olivia to hospital, was made against the background that he had believed from the discussion with Ms Hands that the diarrhoea had started only the night before and that there had only been 3 to 4 episodes of diarrhoea in that time. In this regard Dr Cox frankly acknowledged that

[40] Transcript, page 213
[41] Transcript, page 258

he now wished that he had asked exactly how many times Olivia had experienced diarrhoea rather than having extrapolated. In any case it is worthwhile observing that the number of times that the child had experienced diarrhoea may not have been ascertainable. What was ascertainable was the number of times and frequency at which her nappy had to be changed, and naturally this was also a highly relevant benchmark.

3.23. Dr Cox did not accept the suggestion that the moistness of Olivia's lips and mouth could have been due to the fact that she had been drinking during the examination and that that may have masked any dryness[42].

3.24. One matter of particular importance emerging from Dr Cox's evidence was his statement that he had been under the impression that the family was intending to spend the day in Leigh Creek. He said that he believed that they were going to return to their home much later that evening. However, Ms Hands and Mr Johnson, after doing some shopping, returned almost immediately to Balcanoona Station, arriving back in the early to mid afternoon. Dr Cox's asserted belief that the family would remain in Leigh Creek was made in the context of the notion that if the family had remained in Leigh Creek for the rest of the day, there would have been an opportunity for the child's well-being to be monitored by her parents and that if there had been a deterioration, they were not disadvantaged by distance from the hospital. Dr Cox could not recall why he had thought all of that. In his evidence, he did not attribute any particular statement of Ms Hands as having engendered a belief on his part that the family were going to stay the rest of the day in Leigh Creek. In Olivia's progress notes[43] Dr Cox made the following notation:

> 'PLAN: discussed options - For home and fluids - Call me tomorrow with progress - If not holding down fluids then to return and admit - if worried can admit.'

While this entry does not support the notion that Dr Cox believed that the family would be staying in Leigh Creek, it is consistent with a contemplation on his part that a return to the Leigh Creek hospital would occur in the event of a deterioration at home. Regardless of the interpretation to be placed on that entry, I find that Ms Hands gave Dr Cox no reason for him to suppose that the family would be remaining

[42] Transcript, page 227
[43] Exhibit C15

in Leigh Creek for any appreciable period of time. The issue is of major importance because Dr Cox said in his evidence:

> 'If I'd known that they were going straight back, yes, I think I would have again been more suggestive of her coming in and saying 'Look, it's probably easier if you just come straight in now, we can bring you in and we can watch Olivia now, the nursing staff can watch her'. I think I would have been more likely to say that, to put it in those terms rather than saying 'If you're concerned we can bring Olivia in. However, she doesn't show signs of dehydration at the moment'.' [44]

Unfortunately, the suggestion that if Ms Hands was worried about Olivia she could be admitted to hospital was a statement easily made but implementable with only difficulty. This issue naturally highlights the difficulties associated with the discharge of paediatric patients who might already be dehydrated to a degree and who might well become more dehydrated when they are discharged to a place at which medical assistance or other intervention is naturally going to be limited. Even if it was appropriate for Dr Cox to have discharged the patient in the belief that the child was not dehydrated at that point in time, Olivia had been discharged to a situation which had put her beyond the reach of effective medical treatment had that analysis of her condition not been accurate.

4. Events following the consultation with Dr Cox

4.1. After Ms Hands and her family left the medical clinic they had some lunch and also went to the local Foodland supermarket where they purchased some food. Ms Hands bought the Gastrolyte that Dr Cox had recommended. They also stopped at Copley which is only 5 kilometres north of Leigh Creek at which town the dirt road to Balcanoona commences. Ms Hands told the Court that she had to change Olivia's nappy again at Copley. The diarrhoea was still of a mustardy colour. Olivia still looked very tired at that stage. It appears that Ms Hands was quite keen to get Olivia home as soon as possible so that she could be given a bath and freshened up. The journey to Balcanoona Station took about 2 hours. They stopped at Nepabunna for about 45 minutes. They arrived at Balcanoona at about 3:30pm. If the appointment with Dr Cox finished at 11:30am, it appears that Ms Hands and her family did not remain in the Leigh Creek and Copley area for any appreciable duration.

[44] Transcript, pages 243-244

4.2. At Nepabunna Olivia was obviously tired. When they arrived home At Balcanoona Station Olivia drank a bottle and had some custard. She had a bath and was changed. Olivia did not want to have the bath as she was shaking. She had some more Gastrolyte but once she started consuming that she gave up. Ms Hands then became concerned that she would not drink the Gastrolyte which to her seemed to be in an excessive amount in any event, so she just gave Olivia some more of her bottle of formula. Further attempts to give her Gastrolyte, which included attempts by way of a syringe into the mouth, were not successful. Eventually Olivia was put to bed. She failed to go to sleep and simply laid there. Olivia's appearance deteriorated. She began to wheeze and she still had very dark rings associated with her eyes. They looked darker than they had earlier that day and were more sunken in. Ms Hands concluded from her daughter's appearance that something was now seriously wrong. Olivia became unresponsive and stopped breathing. Olivia's parents called an ambulance. Ambulance records state that the ambulance service was called at 7:34pm. Wade Johnson commenced efforts to resuscitate Olivia by means of CPR. Both Ms Hands and Mr Johnson were trained in senior first aid. On the advice of the ambulance service as imparted over the phone, the Aboriginal health worker at Nepabunna was called primarily in order to ascertain whether there was any adrenaline kit available. There was not. In any case the worker drove from Nepabunna to Balcanoona to assist in resuscitative efforts.

4.3. CPR was maintained for the entire duration that it took the police and ambulance to arrive. The ambulance, which had to come from Leigh Creek, arrived at 9:33pm. Further efforts to resuscitate Olivia as administered by the South Australia Ambulance Service were unfortunately unsuccessful. I mention all of that detail to illustrate how hopeless the situation was for Olivia having regard to her distance from any meaningful medical assistance. That is not in any way to derogate from the efforts of the health worker from Nepabunna who was simply ill equipped for such an acute and life threatening event.

5. The expert evidence

5.1. The Inquest was provided with two independent expert reports. Both of these experts also gave oral evidence at the Inquest.

5.2. I add here that I also regarded Dr Cox as an expert and I took his opinions into careful consideration together with the expert views of the two independent witnesses.

5.3. Dr Peter Joyner is a general practitioner who practises at Mannum Medical Associates in Mannum. Dr Joyner obtained his basic medical qualifications from the Adelaide University in 1969. He has a Diploma of Obstetrics and Gynaecology and is a Fellow of the Australian College of Rural and Remote Medicine. Dr Joyner has practised in Mannum since 1976. He has had a significant involvement in the practice of and administration of country general practice. As well as conducting a rural general medical practice, he consults and teaches intern students and general practitioner registrars. He participates in on-call emergency services and he is the Director of Emergency Services for SA Country Health. He is also the Director of Medical Services at the Berri Hospital. He has a role in facilitating medical practitioners undertaking examinations for either the College of General Practitioners or the College of Rural and Remote Medicine.

5.4. The Inquest also heard from Dr Christopher Pearson who until 2011 was the Head of the Department of General Medicine at the Women's and Children's Hospital. Dr Pearson is now a staff specialist at the Women's and Children's Hospital. He is a Fellow of the Royal Australasian College of Physicians with a particular interest in paediatrics.

5.5. Dr Joyner expressed the view that when Olivia was seen by Dr Cox it was likely that she was already significantly dehydrated[45]. In addition he believed it to have been highly unlikely that Olivia was not showing signs of significant dehydration at that time[46]. In his evidence before the Court, Dr Joyner pointed to the duration and quantity of the child's diarrhoea which led him to believe that it was more likely that some degree of dehydration would have been evident during Dr Cox's examination[47]. Dr Joyner also believed that it was probable that Olivia was more than 5% dehydrated

[45] Exhibit C21, page 3
[46] Exhibit C21, page 4
[47] Transcript, page 303

when seen by Dr Cox. The figure of 5% is something of a benchmark insofar as dehydration below that figure might not necessarily be symptomatic. However, regardless of the level of dehydration present at that time, or of the presence of clinical signs of dehydration, there was in Dr Joyner's view a need also to give consideration to the potential for dehydration becoming more established and significant in the period following the consultation. He suggested that even if the child had looked relatively normal and there had been no objective or subjective signs of dehydration, one could not exclude a level of dehydration of up to 5%. As well, one could not effectively rule out the possibility that dehydration might progress to a level of 5% or more and to a level that is of concern[48]. In this regard Dr Joyner believed that it would have been a little hopeful to have expected Olivia's diarrhoea to have completely stopped over the next 12 hours. As well, there would be a need to be concerned if the diarrhoea continued or became worse, or if the child's vomiting recommenced, and that this potential needed to be emphasised to the parents. The need to take into account the potential for dehydration stems in part from the fact that the younger the child the more vulnerable the child might be such that within the space of a few hours they can progress from being relatively well to be dying[49]. In Olivia's case Dr Joyner opined that there must have been some degree of lack of body fluid at the time of Dr Cox's examination and he would have to take into account the possibility that it could be up to 5%, thus:

> '… even what he had assumed was correct would have still put her into a potentially more at risk environment if she became worse.' [50]

5.6. Dr Joyner's views as to Olivia's examination and management when seen by Dr Cox can be summarised as follows:

i) In deciding not to admit Olivia to hospital at Leigh Creek, Dr Cox did not take adequate account of the distance and the duration of journey between her home and Leigh Creek. The required journey ought to have been a factor in deciding whether or not Olivia should have been admitted to hospital for observation. Dr Joyner stated:

> 'The more remote you are the more you've got to do as much as you can to handle the situation appropriately I think.' [51];

[48] Transcript, pages 339-340
[49] Transcript, page 350
[50] Transcript, page 351

ii) In the circumstances Olivia should have been taken straight into hospital from the doctor's surgery, taking into account the child's physical status, the strong history of gastroenteritis, the distance that the child and parents lived from the hospital and the potential for a child to become dehydrated very quickly and severely, particularly a child under the age of 12 months who has a low body weight and limited subcutaneous reserves;

iii) That having regard to the clinical difficulty in being completely certain about the level of dehydration present at the time of the examination, there was a failure to instil in Olivia's parents a complete understanding of the severity of the risk involved, particularly in relation to ongoing diarrhoea;

iv) There was a failure to establish with required precision the number of episodes of diarrhoea that the child had experienced and the period of time over which they had occurred;

v) There was a failure to properly consider how the child's condition could be managed if there was an escalation of her difficulties;

vi) Too much weight was placed upon the skin turgor examination when a change in skin turgor is a late sign of dehydration. There was a need to have considered the possibility that hypernatraemic dehydration was present and that this might involve a lack of symptomatology as far as skin turgor is concerned;

vii) There was a failure to sufficiently take into account Olivia's mother's important assertions that there had been a change in the appearance of Olivia's eyes, bearing in mind that the mother would have been in the best position to assess whether there had been any significant change in the appearance of her own child.

5.7. Dr Joyner told the Court that in the event that Olivia's diarrhoea had persisted with demonstrably more loss of fluid, Dr Cox could have observed and reassessed her in hospital to monitor any changes consistent with significant dehydration. One could have specifically monitored and detected a rising pulse rate and possibly a drop in blood pressure such that the deteriorating child could have been given intravenous

[51] Transcript, page 312

fluids that would have resuscitated her, preventing her death. In the event, Dr Joyner's opinion regarding Olivia's chances of survivability had she been kept in Leigh Creek was as follows:

> 'Yes, I would have to say that Olivia's condition when she was seen by Dr Cox was in his opinion, reasonable, for want of a better word. Between that time and when she unfortunately died, her condition changed. That didn't happen instantly, but slowly, and then possibly accelerating more at the end. I'm simply saying that if she was in a position where her condition was observed objectively by trained people, then that pathway would have been detected and intervention earlier in that pathway should in most cases have been sufficient for her to survive, because as I said, if she was reasonably okay, she certainly wasn't when she died and unfortunately that time span should have been somewhere where that episode could have been observed.' [52]

5.8. Dr Joyner acknowledged that his opinions as to Dr Cox's management would have been different if the erroneous pivotal assumption by Dr Cox that Olivia and her parents were going to stay in Leigh Creek for some appreciable period of time had in fact been correct[53]. For instance, if Olivia had experienced further large and loose bowel motions but had remained in the area, she could have been re-assessed. Similarly, recurrence of vomiting and a reluctance to drink might prompt a response such as:

> 'All we need to do is just pop back and we can re-assess her any time, either at the clinic or the hospital, whatever's appropriate.' [54]

Alternatively, advice could have been given that if the child had experienced more diarrhoea or vomiting on the way home then it might have been feasible to turn her around back to Leigh Creek. Dr Joyner summed up his views as follows:

> 'Well obviously if the child you detected was significantly dehydrated, you would have already admitted the child. So if we discern the child is normal in your assessment, I think so - obviously when you make a statement like that, if the child had had one episode of diarrhoea, was totally okay, you may not be as authoritarian in that situation. But if the child is under 12 months of age, is premature, has had three episodes of diarrhoea, two episodes of vomiting, mother's concerned, she's worried about sunken eyes, she's come all that way, he may not have known she had expected to be admitted, we won't go into that. That all moves into an area of significant concern. So I would say in an ideal world, yes, you either admit or keep the child somewhere where the parents can come back quickly and easily if they're worried, for you to reassess.' [55]

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[52] Transcript, pages 307-308
[53] Transcript, page 357
[54] Transcript, page 357
[55] Transcript, pages 358-359

Of course, there had been no intention on the part of Ms Hands and her family to remain in Leigh Creek for any appreciable period of time. Nor did they remain for such a time. I do not believe that Ms Hands said anything to Dr Cox from which he could reasonably have understood that Ms Hands and her family would be remaining in Leigh Creek for such a time that might have enabled Ms Hands to make an assessment that Olivia had deteriorated and therefore further enabled her to be brought back expeditiously to the clinic or to the hospital.

5.9. Dr Pearson's opinions were not dissimilar to those of Dr Joyner. Dr Pearson expressed the view that Olivia had experienced hypernatraemic dehydration, both at the time of her death as well as when seen by Dr Cox. This was based upon the markedly elevated vitreous sodium level of 171mmol/Liposuction as revealed in the autopsy report and the fact that there had not been sufficient time between the consultation and Olivia's death for hypernatraemic dehydration to have developed. Therefore, it must have been present at the time of the consultation. I elaborate on this observation in the next paragraph. Dr Pearson sought to emphasise this point both in his report[56] and in his oral evidence. He pointed out that typically it is more difficult to identify the level of dehydration in an infant because the subcutaneous tissues have a doughy consistency rather than the typical appearance of the subcutaneous tissues with normal dehydration. This means that the child would be exhibiting relatively normal skin turgor even though he or she might be experiencing a level of hypernatraemic dehydration. Other signs, however, such as sunken eyes might still be evident. Dr Pearson pointed out that hypernatraemic dehydration would be an '*uncommon experience for a GP*'[57]. However, Dr Pearson agreed with the proposition that when examining a baby for signs of dehydration, hypernatraemic dehydration would need to be considered[58]. Dr Pearson was of the view that if a doctor was to suspect hypernatraemic dehydration, urgent measures needed to be taken, including a blood examination, and that the baby or young child should be referred to a hospital as a matter of urgency. He was also of the view that if a doctor did not consider such a diagnosis, sending a hypernatraemically dehydrated child home with advice to give the child an electrolyte solution such as Hydralyte would almost certainly lead to the child's subsequent demise because the management of fluids and electrolytes in this situation would be far too difficult to achieve. On that

[56] Exhibit C22a
[57] Transcript, page 372
[58] Transcript, page 371

basis, Dr Pearson opined that it was most ill-advised to have recommended a course of action that involved Olivia's parents taking her to a place several hours drive away. On the contrary, he believed that the child should have been admitted to the nearest hospital while awaiting retrieval to Adelaide[59].

5.10. In his oral evidence Dr Pearson stated that a person does not become hypernatraemic until one has moderate to severe dehydration[60]. In his view Olivia was experiencing hypernatraemic dehydration at the time of Dr Cox's consultation at 11am on the day of her death because:

> 'In my experience it's a progressive increase in the sodium level which takes place over hours to a day or so and I don't believe that there was sufficient time from when Dr Cox examined Olivia to the time of her death that her to have gone from a normal sodium to a sodium of 170 or thereabouts.' [61]

Dr Pearson thought it extremely unlikely that there had been sufficient time between Dr Cox's examination and Olivia's death for hypernatraemic dehydration to have developed. Thus it is that in his view it was more likely that it was in existence at the time of the examination. He pointed out the difficulty involved in continuing to feed normal food to the hypernatraemic because that is one of the pathways to exacerbation of hypernatraemia.

5.11. Dr Pearson suggested in his evidence that there were a number of matters that a medical practitioner would need to have regard to in assessing the question of dehydration. These included taking a very careful history as to whether there have been excessive losses of fluid, taking into consideration that dehydration can occur notwithstanding that the child might be ingesting a normal intake of fluid; assessing the behaviour of the child and whether his or her behaviour is uncharacteristic; and carefully assessing the impression of the parent, as it is necessary to pay careful attention particularly to what mothers say because they tend to know more than anyone else about what is normal for their child. In this last regard Dr Pearson referred to Olivia's mother's beliefs that there was darkness surrounding the eyes. A prudent doctor would respect that as a '*new phenomenon*' and consider what its significance might be[62]. Recent weights if available should be taken into consideration as should loss of skin turgor, lack of tears and a dry mouth, taking into

[59] Exhibit C22a, page 2
[60] Transcript, page 367
[61] Transcript, page 397
[62] Transcript, page 375

consideration the possibility that recent introduction of liquid into the mouth might mask dryness. Other parameters requiring assessment include the need to investigate an increased heart rate that might be evident with greater than 5% dehydration. In those circumstances there would be a need to listen to heart rate for a minute rather than for a period of 15 seconds and multiplying it by 4, as Dr Cox had done, which is a less precise method of calculation. Dr Pearson suggested that if one was a general practitioner in the city one could possibly afford to '*cut corners a little bit*'[63] due to the obvious backup that is readily available, but:

> '… for someone in a distant country area, one needs to I believe to be more obsessional about gathering information that is readily available.' [64]

5.12. The message that Dr Pearson regards being necessary to impart to medical practitioners can be encapsulated in the following passage from his evidence:

> 'In Olivia's case, she was irritable, difficult to examine, which makes it hard, but has a history of excessive fluid loss and thus, I believe with the availability of an observation centre in the form of the local hospital, it would have been possible to get independent professional assessment of Olivia before sending her on the two-hour journey home, and that is as I heard described previously, the tyranny of distance which has to be taken into account in managing young babies who can change so rapidly, that because of their small blood volume to begin with, young babies are at great risk of decompensating suddenly.' [65]

5.13. One matter that Dr Pearson did place some emphasis upon in his evidence was Olivia's mother's suggestion of the appearance of the child's eyes. He said:

> '… the importance of the dark rings around the sunken eyes cannot be discounted. There's no other reason apart from dehydration for such a sudden change to occur.' [66]

He added that in the context of an appropriate history, any single sign of dehydration is important. He made that statement in response to the suggestion put to him in cross-examination to the effect that there may not be anything of diagnostic value in only one single sign. Dr Pearson regarded sunken eyes as an example as a single relevant objective sign.

5.14. As to the chances of the child's survivability, Dr Pearson suggested in his report that the history given of Olivia's behaviour was typical of a baby with evolving shock secondary to dehydration. From the time Olivia was given a bath on the evening of

[63] Transcript, page 378
[64] Transcript, page 378
[65] Transcript, page 382
[66] Transcript, page 397

her death her progression downhill was rapid and her death became inevitable. However, in his oral evidence he stated his belief that if the child had been admitted to hospital, there had been a good chance of a favourable outcome. He said that in view of the fact that competent hospital staff would have reported her progressive deterioration which ought to have then stimulated further intervention by the general practitioner and this would have been followed by attempts to gain intravenous access and then retrieval to a more suitable hospital[67]. In his evidence Dr Cox did not disagree with the proposition that with proper observation in hospital Olivia's death was probably preventable[68].

5.15. The opinions expressed by Dr Joyner and Dr Pearson are not inconsistent in any material aspect. Dr Pearson is an expert specialising in paediatric medicine. The weight to be accorded to his evidence and to the opinions he expressed is manifest. I make due allowance for the obvious fact that neither Dr Joyner nor Dr Pearson examined Olivia. However, where their independent opinions might differ from those of Dr Cox, I prefer and accept their opinions.

6. Conclusions

6.1. I make the following findings:

1) Olivia Johnson experienced at least 8 episodes of diarrhoea and 2 episodes of copious vomiting between the afternoon of 29 May 2011 and the morning of 30 May 2011;

2) At the time Olivia was examined by Dr Geoffrey Cox at the Leigh Creek Medical Centre, she was experiencing a level of dehydration. I also find that in all probability she was experiencing hypernatraemic dehydration at that time;

3) Dr Cox's examination of Olivia included the taking of a history of Olivia's wellbeing since the day before. The history taking was inadequate in that it did not identify with sufficient clarity the number of occasions on which Olivia had experienced diarrhoea, or had required a change of nappy, and therefore did not establish with sufficient clarity the approximate amount of fluid that Olivia had lost through diarrhoea and vomiting. Therefore, I find that Dr Cox had an

[67] Transcript, pages 392-393
[68] Transcript, page 244

inadequate appreciation of the quantity of fluid Olivia had lost and therefore had an inadequate appreciation of Olivia's level of dehydration at that point in time;

4) I am satisfied that Dr Cox performed a physical examination of Olivia that included a skin turgor test as well as an examination of the dryness of Olivia's mouth and lips. When Olivia's mother pointed out to Dr Cox that she believed that her daughter's eyes were sunken, Dr Cox also examined Olivia's eyes. The test for abnormal skin turgor resulted in a normal reaction. The difficulty, however, was that this test would have been diagnostically misleading having regard to the probability that Olivia was experiencing hypernatraemic dehydration at that point. Any dryness associated with Olivia's mouth may have been masked by the fact that Olivia had consumed liquid during Dr Cox's examination;

5) Dr Cox did not give adequate consideration to the possibility that Olivia may have been experiencing hypernatraemic dehydration. It needs to be taken into consideration, however, that hypernatraemic dehydration is a relatively uncommon condition;

6) I find that at the time of the examination Olivia's eyes were of an appearance that was not normal for her in that either the area around them was abnormally darkened or they were sunken. I find that Dr Cox should have accepted, and acted upon the basis of, Olivia's mother's assertions that the appearance of Olivia's eyes was abnormal and uncharacteristic for her and have found that the appearance was consistent with a level of dehydration in Olivia. I find that this one, single sign ought to have been sufficient for a diagnosis of dehydration to have been made such that it ought to have dictated Olivia's admission to the Leigh Creek hospital for observation and further tests;

7) Regardless of whether Olivia was dehydrated to a level of less than 5%, or was dehydrated to a point where she was hypernatraemic, I find that inadequate consideration was given to the fact that Olivia would be travelling with her family to a location that was possibly as much as a 2 hour drive away from Leigh Creek and was therefore effectively out of reach of urgent medical assistance should Olivia have required it. In this regard I also find that inadequate consideration was given to the possibility that Olivia might

deteriorate and become more dehydrated. I also find that Dr Cox had no reasonable basis for a belief that Olivia and her parents would be remaining in Leigh Creek for any appreciable duration after Dr Cox's examination of her;

8) Dr Cox's management is mitigated by a number of matters including the fact that as a locum practitioner he was confined to the town of Leigh Creek for the duration of a working period and for that reason only had a limited opportunity to familiarise himself with local conditions, that hypernatraemic dehydration is an uncommon condition and that he may have been misled by its atypical symptomatology, his now acknowledgment that it would have been wise to have placed Olivia in hospital for a period of observation and that his current management plan for possible dehydration in infants involves an enhanced degree of care particularly in relation to proper communication with parents. In the light of this Inquest, to my mind it is unlikely that Dr Cox will repeat any error when it comes to the diagnosis and management of dehydration in an infant.

9) I find that if on the morning of 30 May 2011 Olivia had been admitted to the Leigh Creek Hospital and had been observed, it is highly probable that her dehydration would have been successfully diagnosed and treated there. Alternatively, if Olivia had required transfer to a hospital that could have provided a higher level of care, she probably would have been successfully treated at that hospital;

10) I find that Olivia's death was preventable.

7. Recommendations

7.1. Pursuant to Section 25(2) of the Coroners Act 2003 I am empowered to make recommendations that in the opinion of the Court might prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the Inquest.

7.2. I make the following recommendations directed to the Chief Executive Officer of the Royal Australian College of General Practitioners, the Chief Executive Officer of the

Australian College of Rural and Remote Medicine, the Chief Executive Officer of the Women's and Children's Hospital and the Minister for Health:

1) That these findings and recommendations be drawn to the attention of medical practitioners practising throughout metropolitan and country South Australia;

2) That guidelines be promulgated for the use of rural and remote medical practitioners when, in remote locations, examining infants and children who have experienced gastroenteritis. The guidelines should emphasise the need to consider the desirability of admitting the infant or child to the local or nearest hospital or medical centre for observation in respect of possible dehydration, the need to consider the possibility of hypernatraemic dehydration, the need to consider carefully the amount of fluid that the infant or child has lost by way of vomiting and diahorrea, the need to consider when discharging such an infant or child to their home the difficulty that might be involved in urgently providing medical assistance to the infant or child should a deterioration in their condition occur, the need to have proper regard to the views and wishes of the parent of the infant or child particularly in respect of changes in the appearance or behaviour of the infant or child and the need to provide proper and detailed advice to parents when discharging an infant or child to his or her home;

3) That medical practitioners practising in rural and remote areas, particularly those who practice on a locum basis, familiarise themselves with local conditions and circumstances so that they are in a position to make a proper and informed assessment as to whether an infant or child experiencing gastroenteritis should either be admitted to the hospital or discharged to their home;

4) That medical practitioners practising in rural and remote areas be advised that an examination of an infant or child experiencing gastroenteritis requires a careful and comprehensive assessment of the patient and their circumstances, identifying the illness and its severity and working out a management plan with the parents which fully takes into account the additional problems for patients and health provides posed by the tyranny of distance in remote areas;

5) That point of care monitoring for sodium levels be provided to medical practitioners practising in rural and remote areas to enable them to determine whether an infant or child experiencing gastroenteritis has hypernatraemic dehydration;

6) That medical practitioners be reminded of the need to consider the presence of hypernatraemic dehydration in an infant or child experiencing gastroenteritis. A competent practitioner should be aware that hypernatraemic dehydration occurs infrequently, but nevertheless needs to be carefully considered and that a competent general practitioner should be aware that hypernatraemic dehydration involves the test for abnormal skin turgor being of less significance;

7) That the gastroenteritis protocol used at the Women's and Children's Hospital[69] be amended to reflect the fact that an infant or child who might be experiencing only minimal dehydration should be regarded as being at high risk where the child would be discharged to a geographically isolated location.

Key Words: Dehydration; Medical Practitioner; Remote Area

In witness whereof the said Coroner has hereunto set and subscribed his hand and Seal the 18th day of April, 2013.

Deputy State Coroner

[69] Exhibit C22c