



## FINDING OF INQUEST

*An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 30<sup>th</sup> day of June 2009, the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> days of July 2009 and the 1<sup>st</sup> day of April 2010, by the Coroner's Court of the said State, constituted of Anthony Ernest Schapel, Deputy State Coroner, into the death of James Gordon Halloran.*

*The said Court finds that James Gordon Halloran aged 52 years, late of Unit 2, 4 Thomas Street, Nailsworth, South Australia died at the Royal Adelaide Hospital, North Terrace, Adelaide, South Australia on the 16<sup>th</sup> day of December 2006 as a result of hypoxic–ischaemic encephalopathy due to cardiac arrest due to unknown aetiology. The said Court finds that the circumstances of his death were as follows:*

### **1. Introduction and reason for Inquest**

- 1.1. James Halloran was 52 years of age when he died at the Royal Adelaide Hospital (RAH) on 16 December 2006.
- 1.2. Mr Halloran had been a patient in the RAH since the evening of Thursday 14 December 2006. Earlier that evening Mr Halloran had collapsed while undergoing chiropractic treatment at a clinic in Prospect. During that treatment Mr Halloran had suffered a cardio respiratory arrest and had subsequently been conveyed by ambulance from the Prospect clinic to the RAH. Prior to his transfer to the RAH, ambulance personnel of the South Australian Ambulance Service (SAAS) had resuscitated Mr Halloran to the extent that his heartbeat had been restored to a normal rhythm. However, spontaneous breathing could not be restored. Mr Halloran would remain artificially ventilated until his eventual death. The cardio respiratory arrest,

involving as it did a significant period of hypoxia (deprivation of oxygen), had resulted in unsurvivable brain damage and Mr Halloran was ultimately declared brain dead shortly before his death on Saturday 16 December 2006.

- 1.3. Mr Halloran's previous medical history consisted of dengue fever in 1999, neck, shoulder and knee difficulties, bilateral shoulder reconstructions and post traumatic stress disorder. Prior to his attendance at the chiropractor in Prospect he had recently been experiencing dizzy spells and pain in the region of his shoulder and neck. He had regularly been attending a chiropractor in Darwin where he had been working. There is no evidence that Mr Halloran had any history of heart disease or of cardiovascular disease in general. However, he was a smoker and according to the statement of his mother, Mrs Nancy Halloran<sup>1</sup>, there was a family history of heart disease. These two matters are known risk factors for heart disease. Nevertheless, Mr Halloran's collapse and cardio respiratory arrest was quite unexpected.
- 1.4. A post-mortem examination that was undertaken in order to identify Mr Halloran's cause of death, was conducted by Dr John Gilbert, a forensic pathologist at Forensic Science South Australia. Before discussing the detail of the post-mortem examination and what it revealed, I should say something about Mr Halloran's clinical picture as it existed between his collapse and death. Mr Halloran's clinical course is explained in the statement of Dr Samuel Alfred who is a specialist in emergency medicine in the Emergency Department of the RAH<sup>2</sup>. The statement deals with Mr Halloran's presentation before he was ultimately admitted to the Intensive Care Unit.
- 1.5. Upon Mr Halloran's arrival at the Emergency Department Dr Alfred noted that although Mr Halloran's pulse was regular he was not breathing spontaneously. This presentation was in keeping with the partial resuscitation that the SAAS crew had achieved. His pupils were fixed and dilated and there was no movement in any limb in response to pain. He was neurologically unresponsive. Dr Alfred's impression was that Mr Halloran had suffered a vascular event secondary to neck manipulation during a chiropractic procedure, that he had stopped breathing as a result and had suffered a cardiac arrest due to the consequent deprivation of oxygen.
- 1.6. A number of investigations were arranged that included blood tests, a CT scan of the brain and neck and an ECG that tests heart function. The ECG and blood test results

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<sup>1</sup> Exhibit C8a

<sup>2</sup> Exhibit C7a

were consistent with Mr Halloran having suffered a cardiac arrest. Dr Alfred examined the CT scans with a radiologist. The CT scans of the brain and neck were interpreted as showing firstly, a dissection of the left vertebral artery with a clot occluding the vessel to the basilar tip and secondly, loss of grey/white differentiation above the tentorium. No bony fracture was identified. The impression of a vertebral artery dissection would prove to be inaccurate. More of this in a moment. However, the undoubted loss of grey/white differentiation was a sign that the whole brain, not confined to the area supplied by the left vertebral artery, had lost blood supply for a period of time. According to Dr Alfred this was most likely related to loss of blood supply during the time of the cardiac arrest. The overall clinical impression was that of an ischaemic brainstem stroke due to vertebral artery dissection complicated by a possible more generalised hypoxic-ischaemic brain injury. Whatever the precise aetiology of Mr Halloran's cardiac arrest and brain damage, a matter that was examined in this Inquest, Dr Alfred was correct of the view that Mr Halloran's prognosis was very poor.

- 1.7. Mr Halloran was admitted to the Intensive Care Unit of the RAH where, as indicated earlier, brain death was ultimately diagnosed both clinically and radiologically. During the afternoon of 15 December 2006 Mr Halloran experienced a generalised seizure accompanied by a fall in blood pressure. There was clinical evidence which was subsequently confirmed at autopsy that Mr Halloran had suffered a recent myocardial infarction. A myocardial infarction is a heart attack in which the muscle tissue of the heart is damaged due to an acute deprivation of blood supply.
- 1.8. Mr Halloran failed to regain spontaneous respiration or consciousness at any stage prior to his death. A formal diagnosis of brain death was made. Mr Halloran's ventilator was switched off at 6:30pm on 16 December and he died.
- 1.9. Mr Halloran's initial clinical impression gave rise to the belief that he had suffered a stroke that had been caused by the chiropractic treatment that he had earlier received. This belief was fuelled by the known connection between cervical spine (neck) manipulation and dissection of the vertebral arteries and its sequelae. The matter was reported to the State Coroner and a detailed investigation and Inquest that involved consideration of a large body of expert evidence ensued. That investigation and Inquest examined the question as to whether or not Mr Halloran's chiropractic treatment had caused or contributed to his death.

## 2. **The post-mortem examination**

- 2.1. I have already alluded to the radiological impression of a dissected vertebral artery. I should firstly say something here about the physiology of the vertebral arteries. There are two vertebral arteries that supply blood, and therefore oxygen, to the brain and in particular to the brain stem. The vertebral arteries originate from the subclavian artery and ascend through the cervical spine at the level of the neck. At the base of the skull the arteries take an approximate 90° deviation and then conjoin and form the basilar artery. One issue that required consideration in this Inquest was whether Mr Halloran's chiropractic treatment by one mechanism or another, and one that possibly involved a mechanical insult to a vertebral artery, had caused or contributed to his collapse and death. In his post mortem report, Dr Gilbert has referred to the fact that vertebral artery dissection has been reported as a complication of chiropractic neck manipulation. He points out that the history surrounding Mr Halloran's collapse and the clinical CT scan findings and interpretation had been thought to be highly suggestive of this. However, the radiological diagnosis that Mr Halloran had suffered a dissection of the vertebral artery was shown at autopsy not to be the case. Neuropathological examination of the brain and left vertebral artery conducted by Professor Peter Blumbergs, who is a neuropathologist at the Institute of Medical and Veterinary Science, painted a different picture from what had been understood clinically before Mr Halloran died. On Professor Blumbergs' examination, neither vertebral artery had suffered a dissection and in particular the left vertebral artery that had been clinically diagnosed as exhibiting a dissection, exhibited no such dissection pathologically. There were no abnormalities of the lining of the vertebral artery consistent with a dissection.
- 2.2. Professor Philip Thompson is the Professor of Neurology of the University of Adelaide and Head of the Department of Neurology at the RAH. Professor Thompson, among other things, was instructed to review the pathology with the neuropathologist, Professor Blumbergs. In Professor Thompson's opinion there is no likelihood that a vertebral artery dissection was missed during the course of Professor Blumbergs' examination. Professor Thompson stated that there is no doubt that Professor Blumbergs' findings are accurate<sup>3</sup>. He is also of the view that the CT scans that had formed the basis of the original conclusion that there had been a dissection of

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<sup>3</sup> Transcript, page 186

the vertebral artery do not in fact show evidence of dissection. Taking all of that into account, I am satisfied that there was no vertebral artery dissection in Mr Halloran's case.

- 2.3. However, the autopsy identified an abnormality of a different kind in respect of the left vertebral artery. The autopsy revealed that the left vertebral artery was occluded by a small thromboembolus (blood clot). As well, thromboemboli were noted in the basilar artery. The thrombus in the left vertebral artery and those in the basilar artery could not be explained by insitu formation due to an injury to those arteries. The clots would have originated in another part of the body. No obvious source for them was ever found, however. In particular no clots were located in the heart or in the aorta proximal to the left vertebral artery. The possible origin of the thromboemboli, and their role in Mr Halloran's collapse if any, was a matter that was examined during the course of the Inquest.
- 2.4. Dr Gilbert's assertion that there is a causal relationship between neck manipulation and vertebral artery dissection, probably resulting from overstretching and tearing of the lining of the vertebral artery, is supported by literature, is well recognised and is not in contention. However, as a possible mechanism for Mr Halloran's collapse, vertebral artery dissection to my mind can be dismissed on the simple basis that there was no such dissection found at autopsy. This mechanism is to be contrasted with a thromboembolism of the vertebral artery which was the case here at post-mortem. This would most likely be the result of passage into the vertebral artery of a previously formed blood clot arriving from some abnormality elsewhere in the cardiovascular system. As to the latter scenario having a possible connection with chiropractic neck manipulation, Dr Gilbert states in his report as follows:

'Such an event may or may not have been provoked by neck manipulation. Depending on the anatomical site of origin of the clot, which it must be stressed was not identified in this case, such an event could potentially occur spontaneously and thus causation by the neck manipulation cannot be proven.'<sup>4</sup>

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<sup>4</sup> Exhibit C15, page 3

2.5. Yet Dr Gilbert expresses the cause of death as follows:

'Hypoxic-ischaemic encephalopathy due to cardiac arrest due to thromboembolic occlusion of left vertebral artery following chiropractic neck manipulation.'<sup>5</sup>

2.6. When Dr Gilbert gave evidence in the Inquest he explained that the reference to chiropractic neck manipulation in his stated cause of death was not meant to imply that there was a direct association between that procedure and Mr Halloran's death. Rather, it simply provided the context for Mr Halloran's collapse. But there is another facet of Dr Gilbert's stated cause of death that is open to question and that is whether the cardiac arrest in any event was due to thromboembolic occlusion of the left vertebral artery. This proposition was also the subject of inquiry during the course of the Inquest and I return to that. However, there is no doubt at all that the cause of Mr Halloran's death was hypoxic-ischaemic encephalopathy due to cardiac arrest. There is no doubt that Mr Halloran experienced a cardiac arrest at the chiropractic clinic and there is no doubt that as a result of that cardiac arrest, and its resulting deprivation of blood and oxygen to the brain, that Mr Halloran suffered an hypoxic-ischaemic insult to the brain and died as a result. What is still in contention is the origin of the thromboembolic occlusion, whether this had any connection with the chiropractic procedure, whether the cardiac arrest was due to thromboembolic occlusion of the left vertebral artery and, indeed, whether the cause of the cardiac arrest can be identified in Mr Halloran's case at all. And there is yet another complication to which I have already alluded. At autopsy an area of recent myocardial ischaemia in the lateral wall of the left ventricle of the heart was discovered. According to Dr Gilbert's report, microscopic examination of the heart confirmed the presence of patchy ischaemic changes in the lateral wall of the left ventricle that were approximately 12 to 24 hours old, that is to say sustained 12 to 24 hours prior to death. Notwithstanding Dr Gilbert's opinion as to the age of these pathological findings, suggesting as they do that a heart attack was experienced while Mr Halloran was in hospital, his findings nevertheless gave rise to debate as to whether or not a heart attack may have precipitated Mr Halloran's original collapse in the chiropractor's clinic. Compounding the debate was the fact that there was no significant coronary atherosclerotic disease that might obviously have accounted for an acute heart attack.

2.7. There is one other pathological finding that I should mention at this point. On neuropathological examination there was no evidence of brainstem infarction (stroke).

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<sup>5</sup> Exhibit C15, page 1

The condition of the brain upon neuropathological examination was consistent with global ischaemia as a result of a cardiac arrest. There was patchy infarction of the midbrain and pons that was consistent with a severe hypotensive episode such as a cardiac arrest. However, there was no evidence of ischaemia or stroke to any part of the brain that involved delivery of blood by the left vertebral artery. Professor Thompson confirms that the global distribution of pathological change within the cerebral cortex of the brain was clearly related to the cardiac arrest and cannot be explained by vertebrobasilar ischaemia. Thus there is no pathological finding involving the deceased's brain that would support a conclusion that there had been an insult to the vertebral artery.

- 2.8. I return later to a more detailed discussion of Mr Halloran's death, but it is first appropriate to discuss what happened to Mr Halloran and what preceded his collapse.

### **3. Dr Mario Forte and his chiropractic practice**

- 3.1. Dr Forte is in his mid 50s and his first qualification was the receipt of a diploma in sports massage obtained in 1976. He worked for a number of years as a self-employed part-time masseuse. In 1978 he commenced chiropractic training which consisted of training with a qualified chiropractor for 3 years. In 1978 he established his own chiropractic practice at the Labrina Avenue, Prospect address. Initially he was still working part-time with his trainer. In 1979 he was accepted as a member of the United Chiropractors' Association of Australasia Limited. He became registered as a chiropractor under the Chiropractors Act 1981 and has remained as a registered chiropractor since that time. He has a St Johns first aid qualification from several years ago.
- 3.2. Dr Forte's title of Doctor does not imply that he has any academic medical qualification. He does not. It is a courtesy title only and, ethically, is only utilised in the context of his chiropractic practice.
- 3.3. Dr Forte is blind. As a school student he had some sight but over time it deteriorated. By the mid 1980s he could only recognise light and shade. He now has no sight at all and this has been the case since about 1997. I take it that even at the time of Dr Forte's training he had limited sight, albeit some sight. In any event he has practised as a chiropractor for much of his professional life without the benefit of sight.

- 3.4. Dr Forte has always practised as a sole practitioner and does not employ any assistance, professional or administrative. The clinic situated at 13 Labrina Avenue, Prospect is in a building that stands on the same block as the residence occupied at the time of these events by Dr Forte's elderly parents. Dr Forte's father, Giuseppe Forte, has died since these events. The chiropractic clinic is situated at the end of the driveway of the premises. When one examines photographs taken of the premises, to all intents and purposes the establishment consists of a suburban dwelling plus the clinic. At the gate to the driveway of the premises there is a sign with the word 'Chiropractor' displayed on it with an arrow pointing towards the rear of the premises. In the photograph the sign appears to be illuminated.
- 3.5. Photographs of the interior of the clinic reveal an administrative desk, what appears to be an adjustable massage table or similar, various professional certificates that include a certificate of compliance with the prerequisites for registered membership of the United Chiropractors' Association of Australasia Limited, a certificate of registration of the Chiropractors Board of South Australia dated 5 December 1984 and a certificate of the registration of a business name, namely that of Forte's Chiropractic Clinic, the proprietor being Mario Forte. Within the clinic there appears to be a telephone landline and there is other equipment on a trolley that is of an unspecified nature.
- 3.6. Mr Halloran had not consulted Dr Forte prior to the occasion in question. It is not known whether, at any time prior to Mr Halloran's arrival at Dr Forte's clinic, Mr Halloran had any appreciation of the fact that Dr Forte was blind, but it would have been obvious once he arrived.
- 3.7. I add here that Dr Forte maintains that his blindness did not in any way hamper his ability to perform chiropractic treatment in a competent, therapeutic and safe manner. I was informed that in 26 years of practice Dr Forte had no complaint recorded against him. This was confirmed by the Chiropractic and Osteopathy Board of SA.

#### **4. Dr Forte's chiropractic treatment of Mr Halloran**

- 4.1. Dr Forte has given an account of his treatment of Mr Halloran leading up to the point of Mr Halloran's collapse. The treatment that Dr Forte administered to Mr Halloran did not take place in the presence of any other person. Dr Forte's father Giuseppe Forte only came into the clinic at a time after Mr Halloran had collapsed.

- 4.2. Dr Forte gave evidence in the Inquest. He gave a detailed account of his treatment of Mr Halloran complete with demonstrations on an associate who accompanied him to Court. As it happens, Dr Forte recorded the commencement of this consultation on audio. A transcript of the audio was made available to the Inquest<sup>6</sup>. The recording begins with Dr Forte apparently announcing the time of 5 o'clock which was in fact the time of Mr Halloran's appointment. Notwithstanding this announcement, Dr Forte maintained that Mr Halloran was late for his appointment and the time was closer to 5:30pm when he arrived. During the Inquest there was some agitation about whether Dr Forte was telling the truth about that, the suggestion being that Mr Halloran's collapse had occurred at a time somewhat before Dr Forte said it did. All I can say is that the evidence does not allow me to resolve the issue. The transcript reveals that Mr Halloran told Dr Forte that he had been suffering from vertigo and a click in his neck. He also revealed that he had recently been suffering from a virus. There is also a 1970s motorcycle accident described in which Mr Halloran had landed on his head and shoulder. There was also some discussion about his having seen a chiropractor in Darwin. Mr Halloran also spoke to Dr Forte about his suffering headaches and told him that he had experienced a headache that day which had had an effect on his vision. The tape and transcript reveals that Dr Forte performed a vertebral artery test with respect to Mr Halloran that he described in his evidence. It is a test designed to determine vertebral artery 'sufficiency'. The test involves the positioning of the head and neck in a certain manner, but it does not involve any manipulation or adjustment of the neck. There was some discussion in the Inquest that cast some doubt about the diagnostic value of this test, but according to Dr Forte at any rate, there was no evidence of any insufficiency in Mr Halloran's case. The tape then ends.
- 4.3. I do not need to recite the entirety of Dr Forte's description of what treatment he performed in respect of Mr Halloran. The salient feature of his evidence is that he denied performing any neck or cervical manipulation on Mr Halloran and denied that he had any clinical or therapeutic reason for performing such a procedure on him. It is this type of manipulation that has been associated with vertebral artery trauma, and in particular dissection. Dr Forte explained that he really had no need to manipulate Mr Halloran's neck in any way at all. What work he did do was confined to the T1 vertebra which is the first thoracic vertebra below the neck and he also performed

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<sup>6</sup> Exhibits C16 and C16a

some traction. Dr Forte also denied that he had applied any force to the area of Mr Halloran's carotid arteries.

## 5. **Mr Halloran's collapse**

- 5.1. Dr Forte described Mr Halloran's collapse. He said it began when Mr Halloran's whole body started to convulse. It began gradually and became worse. At one point in his evidence Dr Forte described Mr Halloran's body as reacting '*fairly violently*'<sup>7</sup> and that he was snorting. He thought that Mr Halloran may have been experiencing a seizure or an epileptic fit. Although Dr Forte maintained that he did not believe that his patient's life was in any danger at that time, one would have thought that Mr Halloran's collapse would have been alarming to any person regardless of whether that person had the power of sight or not. One's own confidence in whether or not the patient was experiencing a life threatening event would have to be seriously evaluated. I am bound to say that I had my doubts about whether Dr Forte thought it was an epileptic fit as he seemed to have little difficulty in placing Mr Halloran into the coma position on the table, and notwithstanding Mr Halloran's uncontrolled movements, he did not fall from the table. Nevertheless, I proceed on the basis that Dr Forte thought that Mr Halloran was having an epileptic fit. Dr Forte maintained that he regularly checked Mr Halloran's vital signs including his breathing and pulse. He placed him into the coma position. It is apparent from Dr Forte's description of what followed that Mr Halloran remained in a state of unconsciousness and unresponsiveness, although he made some snorting noises. Dr Forte's evidence about the sequence of events was influenced by his erroneous recollection that he had telephoned the ambulance service only the once when in fact, as was revealed during the course of the Inquest, and only as the result of the laudable and persistent investigative endeavours of counsel assisting me, Ms Naomi Kereru, there had been two such calls made by him. In any case, it appears that Dr Forte's position is that, notwithstanding his collapse and ensuing unconsciousness, Mr Halloran did not experience an obvious cardiac or respiratory arrest until several minutes had transpired after his collapse and that therefore in the beginning there had been no need to view Mr Halloran's presentation as life threatening. As will be seen, this position proved to be a two edged sword for Dr Forte as it meant that if an ambulance had been called earlier at the time of Mr Halloran's collapse, this may have impacted upon

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<sup>7</sup> Transcript, page 111

his chances of survival as it may have meant that the paramedics would have been present at the time of the arrest and been on hand to do something about it.

## **6. An evaluation of Dr Forte's evidence**

- 6.1. Dr Forte at times in his evidence had a reluctance to give a responsive answer to the question asked of him and was unduly intractable and argumentative. He was also demonstrably incorrect on at least one issue, such as the number of times he had telephoned the SAAS, to the point where I had difficulty relying on anything Dr Forte told me unless it was independently supported by other evidence.
- 6.2. Dr Forte was also at loggerheads with another witness on a matter that gave the Court cause for concern. The intensive care paramedic who attended the clinic after Mr Halloran's collapse was a woman by the name of Stacey Solomou. Ms Solomou gave evidence at the Inquest. Ms Solomou was an impressive professional individual and indeed an impressive witness. Ms Solomou told me that when she walked into the clinic before she started treating Mr Halloran by way of resuscitation, she had asked Dr Forte whether he had been performing any manipulation upon Mr Halloran's cervical spine. Ms Solomou was adamant that she had this conversation with Dr Forte and that she had used the word 'manipulation'. To this she said that Dr Forte had answered in the affirmative. He had become distressed after this exchange. That Ms Solomou would ask that question of Dr Forte is not surprising in view of the known association between cervical manipulation and the collapse of a patient. In his evidence Dr Forte denied that he had admitted to any cervical manipulation. He even denied that Solomou had asked him whether he had applied cervical manipulation. In the event I accepted the evidence of Ms Solomou on this matter. The conversation, and Dr Forte's admission within it, had clearly struck a chord with her. In the official SAAS report that was compiled in respect of this incident Ms Solomou recorded the fact of cervical manipulation having been performed. I have regard to the self serving nature of this entry in the report, but it is an entry that is consistent with Ms Solomou's evidence and one that she would be expected to make had she had any exchange along those lines with Dr Forte. The information that formed the basis of this entry could only have come from Dr Forte if it had been imparted to her at all. I have thought very carefully as to whether I should regard Dr Forte's admission to Ms Solomou as positive evidence that he performed cervical manipulation on Mr Halloran. There is no witness to Dr Forte's treatment. In his testimony he denied any

such cervical manipulation. There is no evidence that would demonstrate a need on Dr Forte's part to perform cervical manipulation as part of Mr Halloran's treatment. Dr Forte had told a professional colleague, Dr Rose, whom he telephoned for assistance after Mr Halloran had collapsed, that he had not performed any adjustments to the patient's neck. As will be seen, there is in any case no pathological or other medical evidence that would substantiate an application of force to the cervical spine, and so the point may be academic in any event. In the event, I have not needed to resort to the evidence of the admission to make any finding about whether Dr Forte applied force to the cervical spine, but I do say that Ms Solomou's evidence raises a nagging doubt in my mind as to whether Dr Forte was being completely frank with the Court.

- 6.3. In short, when I take into account Dr Forte's demeanour as well, I do not have sufficient confidence in any description that Dr Forte gave in this Court about what he did or did not do to Mr Halloran to enable me to make any finding in that regard. I really do not know what it was that he did to Mr Halloran. All I know is that Mr Halloran did not suffer a neck injury or an insult to the vertebral artery, such as a dissection, that is known on occasions to result from cervical manipulation. But I make no finding in respect of what Dr Forte did or did not perform by way of chiropractic treatment on Mr Halloran or how competently or otherwise he performed it.

## **7. The cause of Mr Halloran's death**

### **7.1. The evidence of Dr Gilbert – forensic pathologist**

In his evidence before me Dr Gilbert postulated a number of possibilities that might have explained Mr Halloran's cardiac arrest. Naturally, the mechanism of a vertebral artery dissection from a chiropractic procedure could be eliminated on the basis that there was no dissection detected post-mortem. As well as that there was no evidence of stroke which Dr Gilbert suggested was the usual mechanism by which vertebral artery dissection might lead to death. Dr Gilbert did suggest to me that it was something of a coincidence that the embolus within the left vertebral artery was in the position in which dissections of that artery are classically located. The difficulty of drawing any conclusion from that fact, however, is that the embolus did not originate at that location but had travelled from some other part of the body. In any event Thompson disagrees with Dr Gilbert's assertion that the embolus was situated in a

significant location. As to whether any occlusion caused by that embolus may have led to Mr Halloran's cardiac arrest, Dr Gilbert suggested that this would be possible, but he noted that Professor Thompson's report suggested otherwise. Dr Gilbert did pose as a possibility that the clot in the left vertebral artery had firstly caused a respiratory arrest followed by a cardiac arrest as a consequence of the respiratory arrest. There is no reliable evidence as to whether or not Mr Halloran stopped breathing at any appreciable time before his heart stopped beating or whether they occurred simultaneously.

- 7.2. Dr Gilbert also posited the possibility of a cardiac arrest having occurred as a result of pressure on the neck on one side or both, particularly in the region of the upper parts of the carotid arteries. Dr Gilbert suggested that this can cause slowing of the heart and in some cases cardiac arrest, although he pointed out that it was an uncommon phenomenon. As I understood Dr Gilbert's evidence, what has sometimes been referred to as 'vagal inhibition'<sup>8</sup> comes into the same category. In any event this would require pressure to the area of the neck in the vicinity of the carotid arteries. Dr Forte denied that he placed any pressure on Mr Halloran's neck as part of his chiropractic procedure and there is no evidence to the contrary.
- 7.3. Also posited as a possibility by Dr Gilbert was that Mr Halloran had experienced a spasm of the vertebral artery as the result of a temporary blockage of it. It is fair to say that Dr Gilbert regarded this mechanism as a theoretical possibility only and one which he had not actually heard of in real terms.
- 7.4. In the event, Dr Gilbert was unable to offer any opinion that would lead me to find on a balance of probabilities what the mechanism was by which Mr Halloran suffered a respiratory arrest or cardiac arrest in whatever order they occurred. It is also apparent from Dr Gilbert's evidence that as far as he was concerned the role of the clots found in the vertebral and basilar arteries was uncertain.
- 7.5. One thing that Dr Gilbert was certain about was that the global brain injury suffered by Mr Halloran was entirely consistent with his cardiac arrest and the consequent lack of oxygen delivery to the brain during that hypoxic period. Dr Gilbert suggested that a brain could survive without oxygen and not be damaged for a period of the order of 2 to 3 minutes. At periods of 3 to 4 minutes one would be expecting the possibility of

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<sup>8</sup> Transcript, page 62

significant deficits if circulation were to be restored<sup>9</sup>. Various other scenarios based on hypoxic ‘down-time’ were put to Dr Gilbert. For instance, he was asked what the position might be if Mr Halloran had suffered a cardiac arrest and an ambulance had arrived 9 minutes later and whether severe brain damage could be expected in those circumstances. Dr Gilbert said that this depended on whether he was obtaining effective cardio pulmonary resuscitation (CPR) in the interval. If he was obtaining effective CPR, the 9 minutes that had been suggested might not be regarded as a full 9 minutes of hypoxia. The damage to the brain might not be as extensive as it would be if there had been a period of 9 minutes without CPR. Nine minutes of deprivation of oxygen would, however, involve a lethal insult to the brain and would cause a global severe anoxic injury incompatible with life<sup>10</sup>. Another time of about 12 minutes was posed to Dr Gilbert and clearly the outcome would be the same, again depending upon whether or not there had been effective CPR in the interim. I return to the question of effective CPR in due course and how and when it was administered for the first time. All that said, it will be remembered that whatever the position was, Mr Halloran did suffer a severe global anoxic brain injury which signifies very strongly that there was a significant period of time following his cardiac arrest during which he was receiving no oxygen regardless of the competence of any CPR.

- 7.6. The final matter that Dr Gilbert commented upon was the existence of the ischaemic damage to Mr Halloran’s heart. In Dr Gilbert’s opinion the myocardial infarction (heart attack) that Mr Halloran suffered had occurred while he was in hospital. Microscopic examination indicated that the damage to the heart was about 12 to 24 hours old. It will be remembered that Mr Halloran died approximately 48 hours after his collapse. The changes that Dr Gilbert viewed microscopically were not those that one would expect if the infarction had occurred 48 hours before death. Dr Gilbert was of the firm view that the myocardial infarction had not been suffered concurrently with Mr Halloran’s collapse. Dr Gilbert believes that the myocardial infarction was the product of a period of low blood pressure and seizures that Mr Halloran had experienced while in hospital. In expressing his views about the origin of the myocardial infarction, Dr Gilbert was very much impressed by the fact that there was no anatomical or structural abnormality in respect of Mr Halloran’s heart or coronary arteries that would explain why he would lose, under normal circumstances, blood

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<sup>9</sup> Transcript, page 51

<sup>10</sup> Transcript, page 53

supply to areas of his heart. Accordingly, there was no reason to believe that he had suffered an acute myocardial infarction that would classically involve, say, blockages of his coronary arteries. I add here that an expert cardiologist who was called as a witness during the Inquest did not wholly agree with Dr Gilbert's assessment in this regard. I will come to that evidence in a moment.

7.7. When Dr Gilbert's evidence is carefully evaluated, in my view it did not elucidate the mechanism of Mr Halloran's cause of death other than by identifying the role of the cardiac arrest and the hypoxic brain injury that had been clearly understood clinically in any case.

7.8. The evidence of Dr Heddle - cardiologist

Dr William Heddle is a cardiologist. He obtained his initial medical qualifications in 1972. He is the Senior Consultant in Cardiology at the Flinders Medical Centre and is an expert in the field of cardiology. Dr Heddle was asked to provide an expert overview of the circumstances of Mr Halloran's death from a cardiological standpoint. Prior to the preparation of his report he was asked to consider a number of questions based upon the information as it was then known. Dr Heddle provided a report which was tendered at the Inquest<sup>11</sup>. As well, he gave evidence. Dr Heddle expressed the opinion that Dr Gilbert's assessment that Mr Halloran experienced a myocardial infarction only on 15 December 2006 in conjunction with a period of hypotension and seizures was incorrect. There were a number of matters that pointed to the heart attack having occurred at about the time of Mr Halloran's collapse. In particular, the results of certain tests conducted upon Mr Halloran's admission to hospital suggested that it had occurred much earlier than Dr Gilbert's suggested time for the event. However, the timing of Mr Halloran's heart attack was in some senses not particularly relevant because Dr Heddle thought it more likely that the heart attack and its consequent myocardial damage occurred as a consequence of Mr Halloran's cardiac arrest and that it was less likely that it preceded or caused the cardiac arrest. In his report, Dr Heddle suggested that the myocardial damage having preceded the arrest was only a 'small possibility'<sup>12</sup>. In his evidence before me, Dr Heddle reiterated that the heart attack occurred probably within a short time after the collapse. I should add here that Dr Heddle did not view the lack of any pathology relating to Mr Halloran's coronary arteries as being any sure indicator that there had not been an

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<sup>11</sup> Exhibit C22

<sup>12</sup> Exhibit C22, page 2

acute heart attack at or around the time of his collapse, a point that Dr Gilbert believed was an indicator that the heart attack had occurred in conjunction with a hypotensive episode experienced in hospital. Given Dr Heddle's opinion that it was only a small possibility that the heart attack preceded and caused the cardiac arrest, it is impossible for me to find that this is what had precipitated Mr Halloran's cardiac arrest. It remains only as a possibility that in Dr Heddle's opinion could not be absolutely excluded. It does not indicate anything positive as far as the mechanics of Mr Halloran's cardiac arrest is concerned. I add here that even if Mr Halloran had experienced a cardiac arrest as a result of an acute heart attack, there is no evidence that this could in any sense be attributed to anything Dr Forte did to Mr Halloran.

- 7.9. In his report Dr Heddle also suggested that another possible mechanism for Mr Halloran's collapse may have been related to the thromboembolic occlusion of the vertebral artery and basilar artery<sup>13</sup>. Dr Heddle concluded in his report that an insitu small plaque may have been inadvertently missed by the autopsy, but in my view this possibility can be dismissed on the basis of the evidence of Professor Thompson to which I have already referred and to the post-mortem examination<sup>14</sup>. Dr Heddle on the other hand said that the occlusion could have come from the heart or the aorta but there were no findings to suggest that this was the case. Dr Heddle in his evidence did not really develop how the occlusion to the vertebral artery or basilar artery may have precipitated a cardiac arrest. His evidence is inconclusive as to the role of the thromboembolic occlusion of the vertebrobasilar arterial system<sup>15</sup>.
- 7.10. The only other matter that was relevant in Dr Heddle's evidence was his referral to the possibility of a heart arrhythmia being caused by carotid sinus pressure applied during the course of chiropractic manipulation. This was the same possibility that Dr Gilbert had posited. Dr Heddle suggested, as had Dr Gilbert, that this was an uncommon event.
- 7.11. Dr Heddle suggested that it was more likely that Mr Halloran's cardiac arrest had as its basis a cardiac problem rather than a cerebro vascular problem, but his evidence in my view did not elucidate what exactly had caused the cardiac arrest.

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<sup>13</sup> Conclusion 2 in his report, Exhibit C22

<sup>14</sup> Conclusion 3 in his report, Exhibit C22

<sup>15</sup> Transcript, page 323

7.12. In the course of the preparation of Dr Heddle's report he was asked the following question and gave the following answer:

'(4) *Can you express any opinion as to the relevance of Dr Forte's treatment of Mr Halloran to the cause and circumstances of Mr Halloran's death?*

No, there is no definite evidence as to whether or not the treatment was related to the death of Mr Halloran.'

7.13. Dr Heddle gave some further evidence concerning recommended resuscitative measures and equipment that might have been put to good use in the circumstances. I deal with this subject later in these findings.

7.14. The evidence of Professor Thompson – Professor of Neurology

Professor Thompson was asked to provide a report<sup>16</sup> and he gave evidence. In his report Professor Thompson states as follows

'The temporal relationship of the neck manipulation (it is not clear what was done) to subsequent developments is very suggestive of a causal relationship, however none can be proven on the findings outlined above. The brain pathology of severe global anoxic ischaemic brain injury was caused by cardiac arrest'.

7.15. The findings that Professor Thompson is referring to in the above quotation taken from his report include the lack of any vertebral artery dissection and the lack of any evidence of stroke that might be accounted for by a vertebral artery insult. The opinion that a causal relationship between the chiropractic procedure and the subsequent adverse outcome cannot be proven, is that shared by both Dr Gilbert and Dr Heddle.

7.16. In his report Professor Thompson expressed the opinion that the site of the origin of the thromboembolism within the vertebral artery was not determined except that its position suggested that it originated in its lower extremities. He expressed a different view in his report from that of Dr Gilbert in so far as Professor Thompson suggested that the segment in which the thromboembolism was found was the least often affected by dissection due to neck manipulation. He suggested that it was possible that the period of cardiac arrest (ventricular stasis) may have led to the formation of the thrombus (blood clot) that subsequently dislodged and embolised once cardiac rhythm returned and cardiac output was gained. However, he pointed out that there

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<sup>16</sup> Exhibit C18

was no evidence of residual thrombus in the left ventricle at post mortem. In any event, he expressed the view that it was most unlikely that vertebral basilar embolism (the migration of the clot in the blood stream) had caused the cardiac arrest. He said this because cardiac arrest is not a recognised presentation of occlusion of the vertebral or basilar arteries. Professor Thompson said in this regard that it was very rare for brain stem ischemia, that might be caused by an embolism, to produce a cardiac arrest<sup>17</sup>. This was a view that again was different from that expressed by Dr Gilbert.

- 7.17. However, Professor Thompson suggested that it was possible that an embolism firstly caused a respiratory arrest in Mr Halloran which in turn caused a cardiac arrest. While agreeing that a respiratory arrest resulting from an embolism was possible, Professor Thompson in his evidence expressed the view that Mr Halloran's pathology was more consistent with a global ischaemic event rather than there being focal areas of particular ischemia in any one arterial territory, meaning of course the territory of the brainstem that is serviced by the vertebral arteries. In other words, there was no pathology to suggest that Mr Halloran's brain stem had acutely been deprived of blood supply or oxygen.
- 7.18. All of this of course begged the question as to what in Professor Thompson's opinion caused the cardiac arrest. He said that he did not know what caused it<sup>18</sup>.
- 7.19. It is fair to say that Professor Thompson's views as to the cardiac arrest causing a global anoxic insult of the brain was the same as the other experts, but that he was unable to elucidate why it was that Mr Halloran experienced the cardiac arrest in the first instance.
- 7.20. The evidence of Dr Kelly – Chiropractor  
Dr Kelly is an experienced chiropractor who conducts a practice in New South Wales. Dr Kelly practiced for several years either as a sole chiropractic practitioner or in a practice with other practitioners. Latterly he has been practising in association with general medical practitioners. He attended the Sydney College of Chiropractic between 1975 and 1977. He obtained his diploma of chiropractic in 1979. Dr Kelly had a number of undergraduate teaching postings between 1979 and 2001 including a lectureship in functional neurology at the Macquarie University, Centre for

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<sup>17</sup> Transcript, page 185

<sup>18</sup> Transcript, page 194

Chiropractic. Between 1982 and 1985 he was the principal of the Sydney College of Chiropractic. In 2006 he became an inaugural fellow of the Australian College of Chiropractors. Dr Kelly has received a number of awards in respect of the practice of chiropractic. Dr Kelly has published and presented widely in relation to chiropractic practices. Between 1986 and now he has provided expert opinion in relation to several matters. He has provided written reports as has given evidence in court on several occasions.

- 7.21. Dr Kelly was engaged by the Crown Solicitor's Office to provide an opinion in relation to and an overview of Mr Halloran's treatment at the hands of Dr Forte. In the course of his work he had occasion to consider the possible mechanisms that might have accounted for Mr Halloran's collapse. Dr Kelly is not a medical practitioner, but I was satisfied that his experience and expertise was such that he could express opinions not only as to the appropriateness or otherwise of Dr Forte's treatment, but also in relation to possible mechanisms that might give rise to unfavourable chiropractic outcomes.
- 7.22. Dr Kelly provided a written report to the Crown Solicitor that was in due course furnished to the Office of the State Coroner<sup>19</sup>. His report describes himself as a chiropractor and Medico-Legal Consultant. I called Dr Kelly to give oral evidence to the Inquest.
- 7.23. I deal with certain aspects of Dr Kelly's evidence later in this finding, but at this point I simply mention some of the salient features of Dr Kelly's opinions regarding the general topic of Mr Halloran's cause of death. I need not dwell on Dr Kelly's evidence concerning the connection between chiropractic procedures and stroke by way of damage to a vertebral artery as no such damage was found at autopsy.
- 7.24. Dr Kelly considered the issue as to whether there may have been a connection between Mr Halloran's symptoms as they existed prior to his appointment with Dr Forte, including vertiginous symptoms such as dizziness, and the presence of the emboli in Mr Halloran's vertebral and basilar arteries. Dr Kelly gave some detailed evidence about that but, as his report more succinctly states, it would be impossible to confirm whether the clot may have been present at the time of the commencement of Mr Halloran's symptoms. He points to the fact that Mr Halloran's wife, Ms Gail

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<sup>19</sup> Exhibit C19a

Tomkins, suggested that her husband's vertigo had been diagnosed as stress induced which raises the possibility that it may have been present for some time. In any case, there is a body of evidence to suggest that a possible explanation for the thromboemboli found at autopsy was Mr Halloran's cardiac arrest followed by the resuscitation of his heart beat. To my mind there is no evidence that would conclusively demonstrate that Mr Halloran's collapse was reflective of his earlier symptoms.

7.25. Dr Kelly discussed other possible mechanisms for Mr Halloran's collapse including a spasm of the vertebral artery that might involve a momentary restriction of blood flow and which might cause ischaemic symptoms such as nausea, double vision and ringing of the ears. However, he suggested that if those symptoms had been caused by spasm of the artery, such symptoms are very short lived. In any case Dr Kelly said that he had never heard of such a spasm giving rise to a cardiac arrest<sup>20</sup>.

7.26. Dr Kelly's evidence in my view did not assist in the identification of the mechanism that led to Mr Halloran's cardiac arrest.

7.27. Mr Halloran's cause of death

In my opinion having regard to all of the expert evidence that was adduced during the course of this Inquest, the mechanism of Mr Halloran's cardio respiratory arrest has not been established to the necessary degree of proof, namely on the balance of probabilities. There are a number of theoretical possibilities, but none of them can be said to have been proven to a degree that would enable me to make any positive identification of that mechanism. In particular, it has not been established that the cardiac arrest was due to thromboembolic occlusion of the left vertebral artery following chiropractic manipulation. Accordingly, my finding is as follows: the cause of Mr Halloran's death is hypoxic – ischaemic encephalopathy due to cardiac arrest due to unknown aetiology.

**8. Timeline of events following Mr Halloran's collapse**

8.1. The following is a timeline of events following Mr Halloran's collapse. The events described can be independently substantiated either from telephone records or from a reconstruction based upon the duration of tape recorded telephone calls to the SAAS and on the times recorded by the first ambulance crew that arrived at Dr Forte's clinic.

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<sup>20</sup> Transcript, page 210

The times set out below in relation to the first 6 events are taken from Exhibit C14 which consists of the records of Dr Forte's mobile telephone account<sup>21</sup>. The remaining times are developed from a reconstruction of events based upon SAAS records. The patient report form relating to the attendance of Ms Solomou's crew was tendered in evidence<sup>22</sup>. It records, and I have no reason to doubt the accuracy of this, that the SAAS crew was despatched at 1757 and that they arrived at the scene at 1806. It also records that the crew arrived at the patient at 1807. It is clear that Dr Forte made two separate calls to SAAS and spoke to two different operators, one male and one female. Tendered in evidence were transcripts of both telephone conversations<sup>23</sup>. The duration of the first call to SAAS was 3 minutes and 52 seconds and the duration of the second call was 5 minutes and 59 seconds. If the SAAS crew was despatched at about the same time that the first call was terminated, as appears to be the case, and working back from the time of 1757 when those events occurred, Dr Forte instigated the first call to SAAS at approximately 1753, the same minute during which he had endeavoured to call the Florey Clinic. A similar exercise can be undertaken in relation to the second call to SAAS. It is clear from the transcript of the second call that the call was terminated at about the time of the arrival of the SAAS crew at 1806. Working back from that it would mean that Dr Forte instigated that call to SAAS at approximately 1800.

<b>Time</b>	<b>Event</b>
17:44:31	Dr Forte calls Dr Robert Rose (duration of call 4:09)
17:48:40	Call to Dr Rose terminated
17:48:50	Dr Forte calls All Care Clinic (duration of call 1:34)
17:50:24	Call to All Care Clinic terminated
17:53:08	Dr Forte calls Florey Clinic (duration of call 0:03)
17:53:11	Call to Florey Clinic terminated
17:53 (approx)	Dr Forte calls SAAS - first occasion (duration of call 3:52)
17:57 (approx)	Call 1 to SAAS terminated SAAS crew despatched to 13 Labrina Avenue, Prospect
18:00 (approx)	Dr Forte calls SAAS - second occasion (duration of call 5:59)
18:06	Call 2 to SAAS terminated At approximately the same time the SAAS crew arrives at 13 Labrina Avenue, Prospect
18:07	SAAS crew arrives at patient, Mr Halloran

- 8.2. It will be noted from the timeline that approximately 9 minutes elapsed between Dr Forte's call to Dr Robert Rose and his first call to the ambulance service. It will also

<sup>21</sup> Exhibit C14, page 11

<sup>22</sup> Exhibit C17, page 82

<sup>23</sup> Exhibit C20 and C25a

be observed that approximately 10 minutes elapsed between the despatching of the SAAS crew and their arrival at the patient.

- 8.3. It is clear that Dr Forte was aware that Mr Halloran was in difficulty at the very latest at 1744 when he telephoned Dr Rose for assistance. Dr Rose was another chiropractor who conducted a practice at Gilberton which is not far from Prospect. An interview that the Government Investigator, Mr Andrew Hill, conducted with Dr Rose on 23 October 2008 was tendered to the Inquest<sup>24</sup>. According to Dr Rose, Dr Forte told him during the telephone conversation at 1744 that Mr Halloran was unconscious but was breathing and making an unusual noise. Dr Rose advised Dr Forte to place him on his side so that he could breathe properly. Dr Rose also advised Dr Forte to seek the assistance of Dr Forte's father who was in the house at that time. Dr Rose also asserted that he had said to Dr Forte that if Dr Forte was really worried he should obtain the assistance of a doctor or ring triple zero, meaning of course the ambulance service. Dr Forte denied that Dr Rose had advised him to contact the ambulance service<sup>25</sup>. Be that as it may, contacting the ambulance service at that juncture was clearly an option that was available to Dr Forte and one that would have required serious consideration. Dr Rose was unable to attend at Dr Forte's clinic as he had his own patients to administer to at that time. As well, Dr Rose had not believed that the matter was serious enough to warrant his attendance. His impression was that Dr Forte's patient had merely fainted. In addition, he believed from what Dr Forte had said that the patient was breathing. Furthermore, Dr Rose in his own mind had eliminated the possibility that something more serious was taking place because he had specifically asked Dr Forte if he had performed any adjustments of the patient's neck and Dr Forte had denied it. Dr Rose's interview gives one to understand that a possible dissection of the vertebral artery, which can be the product of cervical manipulation or adjustment, can be a 'very major concern'<sup>26</sup>
- 8.4. At 1748 Dr Forte terminated his call with Dr Rose and called what he believed to be the Allcare Medical Centre. This call, which terminated at 1750, also appears to have been unproductive in terms of any assistance, except that Dr Forte acknowledged in

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<sup>24</sup> Exhibit C23

<sup>25</sup> Transcript, page 256

<sup>26</sup> Exhibit C23, page 21

his evidence that it culminated in the telephonist suggesting that he call an ambulance. When Dr Forte was asked during his evidence the obvious question as to why he did not do so at that point, after a very long hesitation Dr Forte said that in essence that he did not know<sup>27</sup>. It is clear that during all this time Dr Forte continued to remain alone with Mr Halloran. At 1753 there appears to have been an aborted or truncated call to the Florey Clinic lasting approximately 3 seconds. What transpired between the termination of Dr Forte's call to the Allcare Medical Centre at 1750 and his aborted call to the Florey Clinic is not certain except to the extent that it is clear that no resuscitative measures occurred during that period of time, that Dr Forte still continued to remain alone with the unconscious Mr Halloran and that Dr Forte still did not call an ambulance. Dr Forte endeavoured to explain this hiatus by saying that he would have been checking Mr Halloran's vital signs and that it took him time to call his father from inside the residence<sup>28</sup>. In fact, the calling of his father did not occur at this time. It only occurred after Mr Halloran had called SAAS for the first time and only occurred at the SAAS operator's suggestion.

- 8.5. At approximately 1753 Dr Forte called the SAAS for the first time. It is clear from the transcript of this telephone conversation that Dr Forte was concerned about Mr Halloran's presentation. He told the operator that Mr Halloran was not talking but had just started to snort. He said to the operator that the patient was on a bench in the coma position. At one point in the conversation Dr Forte pointed out to the operator that he was a blind person and added:

'So I wouldn't be ..... I don't know. See, that's my, that's my, that's, I can't really check any of his vitals ...'

He said that the patient was not coherent, that he was snorting and half babbling. The operator advised Dr Forte to keep an 'ear out' on his vital signs and his breathing. To this Dr Forte said that by then he could no longer hear Mr Halloran even snorting. He then revealed to the operator for the first time that his parents were inside the house. To this the operator naturally advised Dr Forte to get one of them to look at the patient and to check his breathing and also suggested, if it became necessary, that she could advise them over the telephone how to perform CPR. Dr Forte said in response to this 'sure'. It is clear that at the time of termination of this conversation Mr Halloran was still unconscious and had stopped making snorting noises, that Dr Forte

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<sup>27</sup> Transcript, page 139

<sup>28</sup> Transcript, page 139

had not performed any resuscitative measures apart from placing Mr Halloran on his side and had not obtained any assistance from his father. The passage reproduced above also suggests that Dr Forte was also experiencing difficulty checking Mr Halloran's vital signs because of his blindness. In his evidence before me, Dr Forte said that this is not what he had intended to say. What he had meant was that he had been unable to check things such as pupil dilation, but in fact he had been able to check pulse and respiration. This telephone call terminated at approximately 1757.

8.6. Dr Forte then made his way into the house and obtained the assistance of his elderly father who then came into the clinic. The evidence is not clear as to the exact point in time at which Mr Halloran actually stopped breathing, but when Dr Forte again rang the ambulance service at approximately 1800, Mr Halloran was no longer breathing. This much is clear from the transcript of this conversation<sup>29</sup>. Of course at that time the ambulance had not arrived but was on its way. It was not to arrive for another 6 minutes approximately. When Dr Forte announced himself to the operator during this second conversation he said, almost immediately, that the patient had appeared to have stopped breathing and the transcript also suggests that by then Dr Forte had detected that the patient was pulseless as well. Notwithstanding this, Dr Forte suggested in his evidence that Mr Halloran still had a pulse when he rang the SAAS the second time<sup>30</sup>. This assertion is somewhat undermined by the terms of his recorded conversation with SAAS and by his originally unshakeable and demonstrably wrong contention that there had only been the one call to SAAS.

8.7. It is clear from the transcript of the second phone conversation that by then Dr Forte's father was on the scene. Also clear from this conversation is that at that point in time Mr Halloran was still on his side as he had been since Dr Forte had placed him there and was still unconscious. All of these revelations prompted the operator to tell Dr Forte to roll the patient onto his back and to check his breathing. By this time, the conversation had been occurring for 1 minute and 5 seconds and it is not until approximately 54 seconds later that Dr Forte comes back to the operator and confirms that Mr Halloran is not breathing and has no pulse. Thereupon the operator advised Dr Forte to perform CPR. There is some discussion about how that should be administered and the ambulance operator advised Dr Forte to conduct CPR at the rate of 30 compressions to 2 breaths. Dr Forte immediately repeats that information to the

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<sup>29</sup> Exhibit C25a

<sup>30</sup> Transcript, pages 265-266

operator. To my mind it is plain, and I so find, that up to that point in time CPR had not been performed or attempted at any time since Mr Halloran's collapse, and this notwithstanding the fact, as Dr Forte reveals in this telephone conversation, that Mr Halloran had 'been like this for awhile'<sup>31</sup>.

- 8.8. At a point in time 2 minutes and 45 seconds into the conversation it appears that for the first time Dr Forte and his father commence CPR. At a point in time 5 minutes and 42 seconds into the conversation Dr Forte asks the operator, who has remained on the line, 'are you there'<sup>32</sup>. It is at that point that Dr Forte suggests that the ambulance has arrived at the premises. The operator confirms this and suggests that it would be appropriate for Dr Forte to hang up but to continue CPR until the crew actually arrives at the patient. The time is then 1807.
- 8.9. To my mind it is clear from the transcript of this second conversation with SAAS that Dr Forte had little idea of what was required in the way of resuscitation and essentially took his cue from the ambulance operator in this regard. Even before the conversation commenced at about 1800, it is clear that Mr Halloran had stopped breathing and was pulseless and was still in the coma position on his side. Notwithstanding this, no CPR was commenced until approximately 2 minutes and 45 seconds into the conversation which was approximately 4 minutes prior to the arrival at the patient of the ambulance crew. It therefore appears that CPR was not commenced until approximately 1803. It will be remembered that Mr Halloran had been unconscious since before 1744 when Dr Forte called Dr Rose. Mr Halloran therefore had been collapsed and unconscious for nearly 20 minutes before any resuscitative measures were undertaken. The only other first aid measure that had been undertaken was the moving of Mr Halloran onto his side into the so-called coma position.
- 8.10. Ms Solomou, an experienced intensive care paramedic, told me that when she arrived Mr Halloran was '*very blue*'<sup>33</sup>. When she walked into the clinic his extremities and lips were '*very, very blue*'<sup>34</sup> and she presumed from this fact that ventilations had not been undertaken as part of any resuscitative measures that had been administered prior to her arrival. In any case it appears that what resuscitative efforts had been

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<sup>31</sup> Exhibit C25a, page 6

<sup>32</sup> Exhibit C25a, page 6

<sup>33</sup> Transcript, page 283

<sup>34</sup> Transcript, page 283

administered had not been particularly effective. In an interview that Ms Solomou gave to the Government investigator on 21 November 2008<sup>35</sup> she said that she had presumed from the colour of Mr Halloran's skin that potentially he had been without oxygen for a considerable period of time, and possibly greater than 5 minutes.

- 8.11. The other relevant matter that is established from the timeline is that from at least 1744 to some time between approximately 1757 and 1800, Dr Forte had been alone with Mr Halloran. I say this because it was not until after he had terminated his first call to SAAS at about 1757 that he sought the assistance of his elderly father. The significance of all of this is that for that approximate period of 13 to 16 minutes Dr Forte was to a greater or lesser extent relying on intuition and senses other than sight to determine whether or not Mr Halloran was still breathing or still had a pulse. Certainly by approximately 1800 neither vital sign could be detected. I reject Dr Forte's evidence that when he rang SAAS the second time that Mr Halloran still had a pulse. I infer that the reason Dr Forte again rang the ambulance service at that time was because by then become it had become clear to him that Mr Halloran was not breathing and did not have a pulse. In my view it cannot be established for how long this state of affairs had existed. There was insufficient evidence that would have supported any conclusion that Mr Halloran's cessation of breathing or his cardiac arrest or both had occurred at the time of his collapse, but the possibility of that having occurred has not been negated. I did not view Dr Forte's assertions as to the existence or otherwise at any given time of respirations or pulse as reliable. I regarded it as remarkably coincidental that on Dr Forte's account, Mr Halloran's cessation of breathing and pulse was only detected after his sighted father's arrival in the room.
- 8.12. It is clear to me, and I so find, that irrespective of whether or not Dr Rose had advised Dr Forte to seek ambulance assistance as early as 1744 or thereabouts, the securing of paramedic expertise was precisely what was required at that time. That conclusion is inescapably reached not merely with the benefit of hindsight. Regardless of whether or not Mr Halloran had stopped breathing or was pulseless at that time, he was certainly unconscious, unresponsive and was making unusual noises and the situation regarding his wellbeing was not improving. These signs, detected as they were by Dr Forte himself, in themselves ought to have presented a picture of crisis in respect of

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<sup>35</sup> Exhibit C6b

Mr Halloran's wellbeing. Dr Forte's lack of decisiveness and sense of urgency in the circumstances is, particularly given the nature of his profession, perplexing even making due allowance for his disability. He could have had no confidence that Mr Halloran was in anything other than in serious difficulty. Certainly the contrary could not be assumed. All of this was complicated by the fact that Dr Forte was sightless and in no real position to determine what was in Mr Halloran's best interests other than by concluding that the ambulance service should immediately be called. Instead, Dr Forte procrastinated and made unproductive phone calls for several minutes.

- 8.13. Mr Miller appeared as counsel for and on behalf of Mr Halloran's wife, Ms Tomkins. In his final address to the Court he made a submission that requires close consideration. He points out that if one were to accept Dr Forte's account of the sequence of events, Mr Halloran did not suffer his cardio respiratory arrest until very late in the piece, and possibly sometime between 1757 and 1800, the period between the termination of his first SAAS call and the commencement of his second when for the first time he told the operator that his patient was not breathing and did not have a pulse. Accordingly, Mr Miller points out that if instead of calling Dr Rose at 1744 Dr Forte had called the ambulance service and the ambulance had been despatched without further delay, and if one assumes that the ambulance would have taken around the same amount of time to arrive as they eventually did take, the paramedics probably would have arrived before Mr Halloran experienced his cardio respiratory arrest. Mr Miller argues that had that been the case, Mr Halloran's chances of successful resuscitation without any brain damage would have been very much improved, particularly having regard to the fact that even with the significant period of hypoxia that undoubtedly had occurred following his arrest, the ambulance service with all the measures at their disposal, which included the administration of adrenalin, were successfully able to restore a systolic heart beat, albeit without independent respiratory effort. If on the other hand Mr Halloran had arrested in their presence, they would have been on hand to deliver immediate expert resuscitative measures with the likely avoidance of the severe hypoxic ischaemic insult that was to cause his death. On that analysis, Mr Miller argues that Dr Forte's failure to call the ambulance service immediately after Mr Halloran's collapse was a missed opportunity for Mr Halloran to be successfully resuscitated. If one acts on the basis that Dr Forte has accurately stated that Mr Halloran's cessation of breathing and pulse occurred within the timeframe that he says it occurred within, one is compelled to agree with Mr

Miller's submission to this extent, namely that the period of hypoxic down time could well have been minimised and even possibly avoided if the intensive care paramedic Ms Solomou had arrived earlier. As to whether this would have assured Mr Halloran of a completely successful resuscitation and outcome cannot be determined. I would only add that at whatever time Mr Halloran experienced his cardio respiratory arrest, and even if it had occurred before the earliest time the ambulance could have arrived if Dr Forte had immediately called them at 1744, clearly the earlier the arrival of the ambulance the better.

**9. Comments of Dr Kelly concerning the actions of Dr Forte**

- 9.1. Dr Kelly made a general comment that I should mention at this point. Dr Kelly was of the view that sight impairment should not preclude a practitioner from delivering chiropractic procedures. In his report Dr Kelly said that he knew of at least three other blind chiropractors currently practising within Australia, and indeed Dr Kelly himself had been taught by one during his own chiropractic training. Dr Kelly viewed the chiropractor who had taught him as an excellent practitioner who conducted a fulltime practice in addition to fulfilling a teaching role at the Sydney College of Chiropractic. In light of the fact that there is no demonstrated connection between Dr Forte's treatment of Mr Halloran and Mr Halloran's collapse and death, and in the absence of any evidence that would suggest that a blind chiropractor is at a disadvantage when it comes to the administration of competent treatment, it would not be appropriate for this Court to comment on the appropriateness or otherwise of the delivery of chiropractic procedures, including manipulation of the cervical spine, by a sight impaired person. The question of sight impaired chiropractors being in a position to be able to administer effective cardio pulmonary resuscitation is another matter that I comment on below.
- 9.2. In his report Dr Kelly recites Dr Forte's treatment of Mr Halloran as he believed it to be. He opined that none of the treatment procedures that had been described would have been contraindicated in a patient presenting with Mr Halloran's history or physical examination findings. Dr Kelly pointed out that although Dr Forte had undoubtedly performed a vertebral artery test, this was a diagnostic procedure only and did not involve in and of itself, or necessarily imply, any intended manipulation of the neck. Dr Kelly suggested in his report that from the information that he had been provided, it would appear that the history, examination and treatment procedures

undertaken by Dr Forte were reasonable and appropriate in the circumstances. In expressing his view he added:

'Having only one version of events to interpret it would appear that a conservative form of treatment was provided in a manner which would be considered standard within the profession.'

I repeat that from my part I did not find Dr Forte's version of events to be one that I could wholly rely upon. That said, I emphasise that this does not mean to say that Dr Forte performed any procedure that was likely to have caused Mr Halloran any injury and there is no evidence that Mr Halloran suffered any injury that could be attributed to chiropractic treatment, competently administered or otherwise.

- 9.3. Dr Kelly also commented upon Dr Forte's performance as far as securing medical assistance for Mr Halloran was concerned. In his report Dr Kelly reproduces what he believed to be an accurate timeline as far as the events following Mr Halloran's collapse was concerned. In that timeline he has described Dr Forte's telephone call to Dr Rose as being initiated at approximately 5:55pm. In fact as we've seen above, he contacted Dr Rose at 5:44pm. The opinion that Dr Kelly expresses in his report was that in all the circumstances there was no way that Dr Forte could have acted in a more timely fashion, and this would include the timing of his initial phone call to the ambulance service. Dr Kelly does recognise that Dr Forte could have contacted the ambulance in the first instance rather than calling Dr Rose. Mr Miller acting on behalf of Mr Halloran's widow asked Dr Kelly this question:

'Q. So far as the circumstances of this particular case, would you expect that upon the patient collapsing, jerking violently, making snorting sounds, would provoke a phone call to 000?'

A. Yes, once you were - well the answer is yes, you would want to be reasonably confident about what you were telling 000 had happened.'<sup>36</sup>

However, later in his cross examination Dr Kelly suggested that if one had believed that the patient was having an epileptic fit one would not necessarily dial an ambulance straight away, but would monitor the person 'extremely closely'<sup>37</sup>. In addition, Dr Kelly when confronted with a more accurate picture as far as the timeline was concerned, revealing as it does that Dr Forte first called Dr Rose at 1744 and first made contact with the ambulance service at 1753, he still suggested that Dr Forte's

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<sup>36</sup> Transcript, page 229

<sup>37</sup> Transcript, page 231-232

action was as timely and as swift as could have been expected, even allowing for the period between the conclusion of his aborted call to the second medical clinic and the calling of an ambulance, a period of between 2 and 3 minutes.

9.4. For my part I have to record my disagreement with Dr Kelly on this issue. Although Dr Forte may have believed that Mr Halloran was experiencing nothing more than an epileptic fit, this was a serious matter in itself. The difficulty, however, is that there was no means by which Dr Forte could establish with any degree of confidence that that is what Mr Halloran was actually experiencing. In my view it is not being wise after the event to suggest that Dr Forte should have worked on a worst case scenario, having regard to the fact that Mr Halloran became not only convulsive but was unconscious and unresponsive and making alarming noises. Furthermore, there was no suggestion in any of Mr Halloran's medical history as told to Dr Forte that Mr Halloran was epileptic and prone to fitting. It is worthwhile observing that even to Dr Forte himself, Mr Halloran's presentation was alarming enough to prompt him to ring a professional colleague and then a medical service. One wonders, therefore, why an ambulance was not called in the first instance. The other matter that calls for comment is that, as earlier alluded to, the 2 to 3 minute hiatus was something that really was not in any sense explained properly by Dr Forte. He explained it by reference to an event that did not occur in that period, namely the obtaining of the assistance of his father.

9.5. Dr Kelly also referred in his evidence to the question of whether a person's blindness might act to anyone's disadvantage in performing CPR. This of course is not a chiropractic question, but as a matter of common sense Dr Kelly rightly pointed out that one would know more about a patient's status if one was able to see their face and assess matters such as the colour of lips, the presence of saliva and so on. He did suggest that the mechanics of CPR in terms of ventilation and chest compression could be performed equally well by either a non sighted or sighted person<sup>38</sup>.

## 10. Competence of resuscitation efforts prior to the arrival of the South Australian Ambulance Service

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<sup>38</sup> Transcript, Page 218

- 10.1. I have already referred to some of the evidence on this topic. Ms Solomou was struck by the fact that Mr Halloran was very blue which lead her to believe that there had been a significant period of hypoxia prior to her arrival. So much is in any event evident from the severe hypoxic brain injury that Mr Halloran had undoubtedly suffered and which caused his death. We know that Dr Forte did not commence any CPR until he had reported in the second telephone conversation to SAAS that Mr Halloran had stopped breathing and was pulseless. During the telephone conversation CPR was administered for the first time. The rate that had been suggested by the ambulance operator was 2 breaths to 30 compressions. Ms Solomou told me that when she entered the clinic she observed that although compressions were taking place at the hands of Mr Forte senior, no breaths were being administered by Dr Forte who was merely standing at a position near the head end of the massage table. This lead Ms Solomou to believe that no respirations or breaths had in fact been administered as part of the CPR process. If so, this state of affairs would naturally have compromised the effectiveness of CPR. In fairness, however, if CPR was being administered at the rate that the ambulance service operator had suggested, it may well be that Dr Forte's intermittent administration of 2 breaths was something that Ms Solomou would not necessarily have seen in any case. CPR was taken over by the members of the ambulance team soon after the room was entered. Dr Forte said that he had been administering breaths while his father had performed chest compressions. Be all that as it may, in Ms Solomou's opinion the compressions that Mr Forte senior were administering were very shallow and that in any case the table was too high having regard to Mr Forte senior's height. This meant that he would not have been able to achieve adequate compression.
- 10.2. Ms Solomou's observations of Mr Halloran's colour and presentation prompted her to ask why CPR had not been commenced earlier and a response was given that they had believed Mr Halloran had been asleep.
- 10.3. CPR was delivered for the first time 2 minutes and 45 seconds into the second conversation that Dr Forte conducted with the SAAS. The time by then would have been about 1803. Mr Halloran's cardio respiratory arrest had been identified at some point in time before Dr Forte made this second call. If Mr Halloran had experienced his cardiac arrest at or about the time of his collapse, the delivery of CPR after the several minutes that transpired between 1744 when Dr Forte called Dr Rose and about 1803 when CPR was commenced, would have been virtually futile. There was in any

event an undue delay in administering CPR after the arrest had been identified. To my mind this is reflective of the fact that Dr Forte and his father had little or no idea as to what to do or how to do it effectively.

- 10.4. I should add here that Dr Forte believed that his father had acquired first aid skills through his work place.
- 10.5. Ms Solomou, who is a professional exponent of first aid measures, in her evidence described the common failings in non expert administration of CPR. She referred to the possibility of under ventilation or administering ventilation at too slow a rate or too vigorously such that patients might be over ventilated with air being pushed into the stomach. There are also common pitfalls involved in being unable to achieve a proper angle of the head. I have already referred to some of the matters that Dr Kelly thought might compromise the administration of CPR by a sight impaired person such as the inability to detect colour of the patient. All of this naturally leads one to think that a sight impaired person is at some disadvantage in being able to administer competent CPR. Certainly, measures that might include more sophisticated delivery of CPR with devices such as defibrillating equipment might not be available to be used by a sightless person.
- 10.6. Dr Heddle referred to some initiatives that would result in the better delivery of resuscitative measures in a health care setting such as a chiropractic clinic. Dr Heddle told me that he would have expected people acting as health care professionals to have an ability to undertake at least basic life support and have regular training in such and to be able to recognise cardio respiratory arrest, even if they are not trained in advanced life support. This would include knowledge of what services could and should be called to assist if a patient experiences a serious difficulty. He spoke of a team approach where in a clinical setting there might be a diverse set of skills possessed by the staff employed in medical and allied health care clinics, for example where the administrative staff can administer basic life support. He suggested additional measures such as the presence in a clinic of an automatic defibrillator that is a commonly used, safe and relatively inexpensive device.

## **11. The involvement of the Chiropractic and Osteopathy Board**

- 11.1. It was revealed to me during the Inquest that an official complaint had been made by Ms Tomkins, Mr Halloran's widow, about Dr Forte's treatment of her husband. As I

understand the position, it was in respect of this complaint that the Chiropractic and Osteopathy Board (the Board), through the agency of the Crown Solicitor and the Government Investigator, had investigated the matter and it was to this end Dr Kelly's report was obtained. In a written submission to me, the Board advises that it concluded that Dr Forte had not acted unprofessionally, and in particular that there was nothing to support a conclusion that Mr Halloran's death had been caused by Dr Forte's treatment. It was also said that there was no evidence to support a conclusion that the treatment that Dr Forte provided was not of an appropriate standard. Accordingly the complaint was not formally laid before the Board.

- 11.2. The Board's written submission had been prompted by the delivery of a written submission that was put before me by Ms Tomkins during the course of the Inquest. Ms Tomkin's submission, among other things, concerned Dr Forte's treatment of Mr Halloran and the Board's alleged inaction in respect of the complaint that she had made about Dr Forte's treatment of Mr Halloran. Given this Court's conclusions as to the cause of Mr Halloran's death and the lack of any evidence of Dr Forte's role in it, I can say no more about Ms Tomkin's complaint.
- 11.3. However, there does remain a question as to whether chiropractors and in particular those who are sight impaired should have assistance and expertise at their disposal to enable them more efficiently and competently to deliver resuscitative measures such as CPR and whether the Board should exercise control over this issue. In the Board's written submission it is stated that practitioners are presently not required to submit proof of CPR and first aid training. However, the Board concedes that there is merit in the idea and suggests that the matter be the subject of consideration.
- 11.4. Finally the Board submission deals with the issue of sight impaired practitioners in general. I observe that the Chiropractic and Osteopathy Practice Act 2005 (the Act) requires a natural person who applies under the Act for registration as a chiropractor to satisfy the Board that he or she is medically fit to provide chiropractic treatment. The Board may nevertheless grant limited registration to a person who might not in the opinion of the Board be medically fit to provide chiropractic treatment of a kind authorised by registration. In such circumstances the Board may impose certain conditions that include limiting the kind of chiropractic treatment that is administered and requiring the person to be supervised by a particular person or a person of a particular class. The Board points out that there are believed to be approximately 5

practitioners in Australia who practice with a visual impairment. As far as the Board is aware, Dr Forte is the only practitioner in South Australia with a visual impairment and that in any case in the last 26 years the Board has received no complaints about Dr Forte's conduct or practice.

- 11.5. As I have already stated, I should not make any finding about the suitability of visual impaired persons to administer chiropractic treatment in general or specifically in relation to procedures that might involve the cervical spine. I say this because there is no evidence in this case that Mr Halloran's death was caused by any procedure relating to the cervical spine. It naturally follows that there is no evidence that Dr Forte's visual impairment had anything to do with Mr Halloran's suffering any relevant injury in that regard. Whether visually impaired practitioners should be performing procedures that place the cervical spine and its vascular components at risk remains entirely a matter for the Board in the exercise of its registration procedures. However, I do observe that under the Act a person or body in making a determination as to a person's medical fitness to provide chiropractic treatment must have regard to the question of whether the person is able to provide chiropractic treatment personally to a patient without endangering the patient's health or safety.<sup>39</sup> One would think that an individual person's sight impairment would be a matter to be considered within this requirement. If so, it would be within the Board's power to impose conditions upon such a person's ability to practice, including conditions that the person not practice as a sole practitioner or engage in treatment that carries an identifiable risk of inflicting harm on a patient.

## **12. Summary and conclusions**

- 12.1. The deceased, Mr James Halloran, aged 52 years, experienced a cardio respiratory arrest when he was receiving chiropractic treatment at the hands of Dr Mario Forte at Dr Forte's clinic at Prospect. The precise cause of Mr Halloran's cardio respiratory arrest has not been identified. I can conclude, however, that Mr Halloran did not suffer a vertebral artery dissection as the result of neck manipulation.
- 12.2. The cause of Mr Halloran's death is hypoxic – ischaemic encephalopathy due to cardiac arrest due to unknown aetiology.

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<sup>39</sup> Section 4, Chiropractic and Osteopathy Act 2005

- 12.3. There is no evidence that Dr Forte's chiropractic treatment of Mr Halloran, in whatever form it took, and however competently or otherwise it was administered, caused or contributed to Mr Halloran's death.
- 12.4. I make no finding or comment as to whether blindness or any other sight impairment is an intrinsic impediment to the safe, effective and therapeutic administration of chiropractic treatment.
- 12.5. The cardio pulmonary resuscitation (CPR) delivered to Mr Halloran by Dr Forte and his father Mr Forte lacked effectiveness and it was late on any version of events. If Mr Halloran had experienced his cardiac arrest at or about the time of his collapse, CPR was not delivered until a time at which it would have been virtually futile.
- 12.6. I find for the reasons set out within that Dr Forte unduly delayed his decision to call the South Australian Ambulance Service to attend to Mr Halloran.
- 12.7. I find that Dr Forte should have called the South Australian Ambulance Service immediately after he had detected Mr Halloran's lack of consciousness and lack of responsiveness.
- 12.8. The delay in delivering resuscitative measures to Mr Halloran could have been avoided if the ambulance service had been called immediately.
- 12.9. The time at which Mr Halloran experienced his cardiac arrest is not established with exact precision.
- 12.10. If it is to be accepted, as Dr Forte asserts, that Mr Halloran was still breathing and had a pulse until the time he phoned the ambulance service for the second time, there is a strong possibility that if Dr Forte had called the ambulance service immediately after Mr Halloran's collapse, the ambulance paramedics would have been present at the time of Mr Halloran's cardio respiratory arrest. If so, the failure to call the SAAS immediately upon the detection of Mr Halloran's collapse meant that there was a missed opportunity for Mr Halloran to receive immediate resuscitative efforts.
- 12.11. I am unable to determine with any certainty whether more timely paramedic intervention would have resulted in Mr Halloran's death being prevented or would have resulted in no permanent cognitive deficit or brain injury being sustained.

12.12. I should make it plain that for obvious reasons the efforts of bystanders in delivering CPR should very rarely if ever be criticised. My comments are also not to be taken as criticism of the late Mr Giuseppe Forte who no doubt did everything he could to resuscitate Mr Halloran. Dr Mario Forte could not be regarded as a mere bystander. He was delivering health care and on his own version of events his need to administer CPR may have been avoided if he had called an ambulance earlier.

### 13. **Recommendations**

13.1. By virtue of section 25(2) of the Coroners Act 2003 the Court may add to its findings any recommendation that might, in the opinion of the Court, prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the inquest.

13.2. I make the following recommendations:

(1) That the Chiropractic and Osteopathy Board of SA consider implementing and enforcing a requirement that chiropractors have at their disposal the necessary measures, skills and equipment to deliver effective first aid and resuscitation in the event of a cardio respiratory arrest of a patient including the following:

- i. CPR skills, with regular recertification
- ii. The employment of a personal assistant with CPR skills, especially in cases of sight impaired practitioners
- iii. The installation of automatic defibrillating equipment within a chiropractic clinic
- iv. The installation of oxygen delivery equipment within a chiropractic clinic
- v. The implementation of a crisis management plan that would describe the necessary action to be taken in an emergency including the cardio respiratory arrest of a patient.

(2) That the Chiropractic and Osteopathy Board of SA instruct registered and practising chiropractors immediately to call for the assistance of the South Australian Ambulance Service in the event of a patient losing consciousness and responsiveness while undergoing chiropractic treatment.

*Key Words: Hypoxia; Chiropractic Procedures; Cardio Respiratory Arrest; Cardio Pulmonary Resuscitation; South Australian Ambulance Service;*

*In witness whereof the said Coroner has hereunto set and subscribed his hand and*

*Seal the 1<sup>st</sup> day of April, 2010.*

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*Deputy State Coroner*

Inquest Number 15/2009 (1858/2006)