IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2017 2583

FINDING INTO DEATH WITHOUT INQUEST

Form 38 Rule 60(2)
Section 67 of the Coroners Act 2008

Findings of:	Simon McGregor, Coroner
Deceased:	**Keith Walter Sharp**
Date of birth:	21 June 1953
Date of death:	2 June 2017
Cause of death:	Cerebral infarction complicating vertebral artery dissection following motor vehicle collision (driver)
Place of death:	Royal Melbourne Hospital, 300 Grattan Street, Parkville Victoria 3050

INTRODUCTION

1. Keith Walter Sharp was a 63-year-old man who lived at 537 Kalimna Crescent, Lavington New South Wales 2641, at the time of his death.

2. On 29 May 2017, Mr Sharp was driving a truck which left the road and rolled over. As a consequence of his injuries, he died on 2 June 2017.

THE PURPOSE OF A CORONIAL INVESTIGATION

3. Mr Sharp's death was reported to the Coroner as it appeared unexpected, unnatural or to have resulted, directly or indirectly, from an accident and so fell within the definition of a reportable death in the *Coroners Act 2008.*

4. The role of a coroner is to independently investigate reportable deaths to establish, if possible, identity, medical cause of death and surrounding circumstances. Surrounding circumstances are limited to events which are sufficiently proximate and causally related to the death. The purpose of a coronial investigation is to establish the facts, not to cast blame or determine criminal or civil liability.

5. Under the Act, coroners also have the important functions of helping to prevent deaths and promoting public health and safety and the administration of justice through the making of comments or recommendations in appropriate cases about any matter connected to the death under investigation.

6. The Coroner's Investigator Constable Tristan Binns prepared a coronial brief in this matter. The brief includes statements from witnesses, including family, the forensic pathologist who examined Mr Sharp, treating clinicians and investigating officers.

7. After considering all the material obtained during the coronial investigation, I determined that I had sufficient information to complete my task as coroner and that further investigation was not required. Whilst I have reviewed all the material, I will only refer to that which is directly relevant to my findings or necessary for narrative clarity.

8. I have based this finding on the evidence contained in the coronial brief. In the coronial jurisdiction facts must be established on the balance of probabilities.[1]

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[1] This is subject to the principles enunciated in *Briginshaw v Briginshaw* (1938) 60 CLR 336. The effect of this and similar authorities is that coroners should not make adverse findings against, or comments about, individuals unless

9. In considering the issues associated with this finding, I have been mindful of Mr Sharp's basic human rights to dignity and wellbeing, as espoused in the *Charter of Human Rights and Responsibilities Act 2006*, in particular sections 8, 9 and 10.

BACKGROUND

10. Mr Sharp was married to Lesley Sharp and he had three daughters. Mr Sharp had worked in the Australian Defence Force as a vehicle recovery mechanic. He was discharged following a back injury, and commenced work as a truck driver.[2]

11. Mr Sharp's medical history included diabetes mellitus type 2, ischaemic heart disease with an acute myocardial infarction ("heart attack") in 2005, and coronary artery bypass surgery in 2016. He was medicated with aspirin, metoprolol, pantoprazole, linagliptin/metformin, and ezetimibe/atorvastatin.[3]

CIRCUMSTANCES IN WHICH THE DEATH OCCURRED

Collision on 29 May 2017

12. At around 6.00am on 29 May 2017, Mr Sharp was driving a Freightliner truck west along the Riverina Highway approximately ten kilometres east of Berrigan, New South Wales. Mr Sharp lost control of the vehicle, causing it to leave the road. Although he attempted to return the truck to the road, the momentum of the truck caused it to collide with a culvert then roll and jack-knife.[4]

13. The cabin of the truck was crushed down upon Mr Sharp but he was able to climb out from the wrecked cabin.[5]

14. At around 6.20am, Natasha Hillier was driving along the highway and saw Mr Sharp's truck lying across the road. Ms Hillier contacted emergency services and New South Wales Ambulance paramedics were called out to the incident at 6.21am.[6]

15. Another driver, Garry Ellis, stopped and approached Mr Sharp's truck. Mr Ellis found Mr Sharp outside of the truck, leaning against the fuel tank. Mr Ellis asked if Mr Sharp was

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the evidence provides a comfortable level of satisfaction as to those matters taking into account the consequences of such findings or comments.

[2] Police Summary, Coronial Brief.

[3] Albury Wodonga Family Medical Centre Medical Records.

[4] New South Wales Police Force Case Report C 65369729.

[5] Ibid.

[6] Statement of Natasha Hillier dated 28 September 2017, Coronial Brief; Statement of Mick Wane dated 3 September 2017, Coronial Brief.

alright, but Mr Sharp 'mainly moaned back at' Mr Ellis rather than providing a coherent response. Mr Ellis assisted Mr Sharp in lying down beside the truck and covered him with a blanket.[7]

16. Paramedics, Mick Wane and Ross Twemlow, arrived at the scene at 6.49am.[8]

17. Mr Wane assessed Mr Sharp's injuries. Mr Sharp could not recall the collision, and Mr Wane found that there was a high potential for a head injury. He also noted that Mr Sharp had sustained a neck injury along the right shoulder and a wrist injury.[9]

18. After immobilising Mr Sharp's spine and pelvis, paramedics moved Mr Sharp into an ambulance. They then provided pain relief medication, treated his wounds and supplied him with oxygen therapy.[10]

19. Mr Sharp was transferred to Albury Base Hospital by ambulance. The ambulance left the scene of the collision at 7.39am and arrived at the hospital at 9.15am.[11]

Albury Base Hospital

20. At 9.17am, Mr Sharp was examined by Emergency Department (ED) Registrar, Dr Rahul Gaur. Dr Gaur assessed Mr Sharp's level of consciousness using the Glasgow Coma Scale and recorded the highest possible score, 15. He noted however, that Mr Sharp did not appear to remember the collision.[12]

21. Dr Gaur noted tenderness in Mr Sharp's right arm, in his C4, T7 and T8 vertebrae and in the left upper quadrant of his abdomen.[13]

22. At 9.30am, Mr Sharp was seen by a surgical registrar who recommended a full-body CT scan. This scan was ordered at 9.45am. Mr Sharp was then stabilised for transport and taken to the imaging facility. The scan began at 10.17am and the last reconstruction image was completed at 10.44am.[14]

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[7] Statement of Garry Ellis dated 27 August 2017, Coronial Brief.
[8] Statement of Mick Wane dated 3 September 2017, Coronial Brief.
[9] Ibid.
[10] Ibid.
[11] Ibid.
[12] Expert Certificate of Dr Rahul Gaur dated 7 September 2017, Coronial Brief.
[13] Ibid.
[14] Statement of Dr Augustus Kigotho dated 10 April 2019.

23. After preparing a report, radiologist Dr Susan Singh discussed the results of this scan with Dr Gaur at 11.15am. There is no indication that Dr Gaur discussed the report with the ED Specialist on the floor.[15]

24. No action was taken to substantially progress Mr Sharp's treatment or transfer between 11.15am and 3.37pm, although the various notes reveal the following ancillary activity: [16]

    a. Mr Sharp was relocated by nurses and had a soft collar applied and a catheter inserted,

    b. Mr Sharp had an occupational therapy assessment; the surgical registrar considered the CT scan reports and transfer to Melbourne, as well as

    c. fluid infusion, neurological assessment, abbreviated Westmead PT Scale assessment, observations, antiemetics and analgesia administration.

25. At 3.37pm, Dr Gaur requested a CT angiogram and an MRI of Mr Sharp's brain and spine. At 4.30pm, Mr Sharp was transferred to the imaging department for these scans.[17]

26. The MRI scan began at 4.37pm and the last image was taken at 4.58pm.[18]

27. At around 5.15pm, before the CT angiogram began, a technician heard Mr Sharp gurgling and noted that he seemed to be less conscious. Mr Sharp was transferred back to the ED and placed in a resuscitation cubicle. He was intubated for airway protection at 5.24pm.[19]

28. The films from Mr Sharp's MRI were sent for reporting at 5.30pm and the reporting began at 6.31pm. The report was distributed at 6.42pm, but there is no indication that it was verbally reported to clinical staff at that time.[20]

29. The CT angiogram scout view began at 7.24pm, and the last images were taken at 7.34pm. The images were sent for reporting at 7.52pm, and the report was completed and returned to the ED at 8.51pm. The findings were discussed with Senior ED Medical Officer, Dr Kimaleen John, at 8.12pm.[21]

30. The findings from the MRI report included:

    a. Hyperextension injury with disruption to the C5/6 disc and presumably the anterior longitudinal ligament; and

    b. Further presumed traumatic bone marrow oedema involving C6, C7, T1 and T2 vertebral bodies with minor compression suggesting further impact to the cervical spinal (possibly due to axial load).[22]

[15] Ibid.
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Medical records.
[20] Statement of Dr Augustus Kigotho dated 10 April 2019.
[21] Ibid.

31. The results of the CT angiogram of the cervical spine included:

    a. Right vertebral artery dissection/occlusion associated with the fracture through the foramen transversum of C5 and C6 facets; and

    b. Acute thrombus at the proximal basilar/terminal left vertebral artery.[23]

32. Around this time, Dr Gaur began making attempts to arrange for Mr Sharp to be transferred to a tertiary medical centre where his emerging condition could be treated. He first contacted Austin Health and St Vincent's Health, but neither accepted Mr Sharp as a patient. At 6.13pm, Dr Gaur contacted Adult Retrieval Victoria (ARV), who agreed to transfer Mr Sharp to The Royal Melbourne Hospital for treatment.[24]

Adult Retrieval Victoria and The Royal Melbourne Hospital

33. At 6.40pm, the ARV coordinator dispatched an ARV team for the retrieval, including ARV Retrieval Physician, Dr Luke Smith, and MICA flight paramedic, Peter Scott.[25]

34. The team travelled by helicopter from Essendon to Albury and arrived at 8.41pm. Mr Sharp was loaded into the helicopter for transfer back to Melbourne. He was ventilated and given a morphine and midazolam infusion.[26]

35. The helicopter arrived back in Essendon at 11.06pm and Mr Sharp was transferred into a road ambulance. He was taken to The Royal Melbourne Hospital and was handed over to the ED team at 11.52pm.[27]

36. The Royal Melbourne Hospital clinicians, including a stroke consultant, investigated Mr Sharp. They determined that he had sustained sufficient neurological damage that he would not survive. After discussion with his family, Mr Sharp was palliated.[28]

37. Mr Sharp died in the Intensive Care Unit at 10.00pm on 2 June 2017.[29]

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[22] Medical records.
[23] Ibid.
[24] Statement of Dr Augustus Kigotho dated 10 April 2019, Coronial Brief.
[25] Statement of Dr Lucia Le-Kim dated 3 November 2017, Coronial Brief.
[26] Ibid.
[27] Ibid.
[28] Statement of Dr Brianne Lauritz dated 28 September 2017, Coronial Brief.

IDENTITY AND CAUSE OF DEATH

38. On 2 June 2017, Lesley Sharp visually identified the body of her husband, Keith Walter Sharp, born 21 June 1953. Identity is not in dispute and requires no further investigation.

39. On 5 June 2017, Dr Matthew Lynch, a Forensic Pathologist practising at the Victorian Institute of Forensic Medicine, conducted an external examination of Mr Sharp's body and reviewed a post mortem computed tomography (CT) scan along with medical records from The Royal Melbourne Hospital. Dr Lynch completed a report, dated 6 June 2017, in which he formulated the cause of death as '*I(a) Cerebral infarction complicating vertebral artery dissection following motor vehicle collision (driver)*'.

40. I accept Dr Lynch's opinion as to the medical cause of death.

REVIEW OF CARE

41. In a statement dated 10 April 2019, the Director of the Albury Base Hospital ED, Dr Kigotho, said that Mr Sharp's case was classified by them as an ISR-2[30] event so was reviewed as an in-depth case review. I have considered this review as part of my investigation. Issues identified in the review were:

    a. Poor documentation by ED medical staff;

    b. lack of recognition for the potential for deterioration by the ED registrar;

    c. lack of supervision by senior ED medical staff;

    d. poor knowledge of state-wide trauma referral pathways, which had not been formally incorporated into local hospital policy; and

    e. nursing staff did not stay with Mr Sharp in the MRI because of workload issues in the department.

42. The resulting recommendations of the review included:

    a. Education of medical staff regarding their medico-legal obligations regarding documentation;

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[29] E-Medical Deposition of Dr Zheng Zhang dated 2 June 2017, Coronial Brief.

[30] Incident Severity Rating 2. Victorian Incident Management System classifies incidents based on their severity which in turn determines the level of investigation.

b. Development of a policy that category 1 trauma cases are overseen by the senior ED doctor;

c. Incorporation of trauma referral pathways into local policy including the display of ARV posters in the resuscitation rooms; and

d. Updating policy for nurses and doctors to stay with critically ill patients when patients are transported out of the department.

43. Whilst not listed to be contributory factors in the in-depth case review, in his statement, Dr Kigotho also conceded that:

a. There was a significant delay (approximately four and a half hours) in ordering subsequent imaging; and

b. the emergency physician in charge of the shift was unaware of the initial CT results, the delays in ordering the subsequent imaging, or the unsuccessful referrals by the registrar.

44. This matter was referred to the Coroners Prevention Unit (CPU)[31] to advise whether the care afforded to Mr Sharp was appropriate. In correspondence to the court, Mr Sharp's daughter Kristy Sharp, outlined concerns about the medical management of her father. CPU included consideration of Kristy's concerns in their advice to me.

45. Unfortunately for Mr Sharp, his injuries were of a type that are often difficult to diagnose and then also difficult to successfully treat once a diagnosis is made.

46. Extracranial blunt traumatic cerebrovascular injuries are rare. Most patients with this type of injury have no obvious neurological manifestations at presentation. The average time for stroke symptoms to present varies from two hours to one week, but most strokes occur between 12 and 75 hours. The incidence of strokes in untreated vertebral artery injuries (VAIs) is greater than 50%. Mr Sharp had bilateral injuries which occur less commonly than unilateral VAIs, and carry significantly greater risk of stroke both with and without treatment.

[31] The Coroners Prevention Unit (CPU) was established in 2008 to strengthen the prevention role of the coroner. The unit assists the Coroner with research in matters related to public health and safety and in relation to the formulation of prevention recommendations. The CPU also reviews medical care and treatment in cases referred by the coroner. The CPU is comprised of health professionals with training in a range of areas including medicine, nursing, public health and mental health.

47. Treatment of diagnosed blunt traumatic cerebrovascular injury is complicated by the traumatic setting. If there are no neurological symptoms and no active bleeding, antiplatelet agents (such as aspirin) can be commenced to reduce the risk of stoke from a single vertebral artery. Mr Sharp was already taking aspirin for his ischaemic heart disease at a dose considered therapeutic for stroke prevention in this case. Stronger blood thinning agents are contraindicated in trauma patients because of the risk of bleeding from other injuries. If there are neurological signs such as a stroke, standard treatment such as thrombolysis is also contraindicated in trauma patients due to the risk of uncontrolled bleeding.

48. Whilst mechanical thrombectomy ('clot retrieval') is a potential treatment, the research supporting its use is limited and its success rates have been moderate at best. Further, mechanical thrombectomy is limited to certain tertiary centres, and Royal Melbourne Hospital is the only facility that performs this procedure 24/7. Whilst there is no time based cut off for intervention, as collateral flow affects the brain viability, any delay involving a period of hours is likely to be unsurvivable. The usual retrieval time from Albury to Melbourne would be in the range of three to four hours or greater.

49. Albury Base Hospital conceded that there was a significant delay (approximately four and a half hours) in Mr Sharp's investigations, which in turn resulted in a delay in retrieval. CPU advised that this may have been a contributory factor to his death, however it was not possible to ascertain exactly how much the delay may have contributed to Mr Sharp's death. CPU noted that:

    a. It is standard practice for stable trauma patients (such as Mr Sharp) to be investigated as much as possible at the referring centre (in this case Albury Base Hospital) in order not to overwhelm the recourses of the receiving major trauma centre.

    b. The logistics of transferring patients by air (availability of plane, suitable team, weather, pilot safe flight hours) vary from hour to hour. Whilst it seems there was little delay in ARV responding when finally contacted in the evening, it does not follow that an equally fast retrieval would have happened earlier in the day if there were sicker patients to be retrieved at the time.

    c. An earlier retrieval of Mr Sharp would only have been of benefit for Mr Sharp if he was transported to Melbourne and completed uneventful corrective surgery before his stroke occurred at approximately 5.00pm. Given the logistics of arranging and

completing all imaging, transfer, and surgery, this was unlikely to have occurred. Further, the surgery itself would have been very high risk with one of the complications being stroke and death.

d. While the Royal Melbourne Hospital does have interventional radiology ('clot retrieval') for posterior circulation strokes providing an opportunity for recovery if a stroke occurred before surgery, the success rate for this is relatively poor for normal ischaemic strokes and likely to be far worse for similar strokes where the vessels have been damaged.

50. Whilst it is apparent from my investigation that there were delays in both the referral process and obtaining supporting imaging, it is also apparent that I could not safely find that an earlier referral would have prevented this death. The investigation has, however, revealed systemic shortcomings in the healthcare provided to Mr Sharp.

COMMENTS PURSUANT TO SECTION 67(3) OF THE ACT

51. This investigation has identified inadequacies in the internal review conducted by Albury Wodonga Health. Whilst the review determined what did and did not happen, it did not appear to explore *why* things happened as they did. In this context, I am not satisfied that the review has sufficiently remedied the systemic issues that were identifiable in the treatment provided to Mr Sharp.

52. Mr Sharp's death was categorised as an ISR-2 event. Under the current Safer Care Victoria Sentinel Event Reporting Categories unexpected deaths where there are systems contributors to that death are usually classified as an ISR-1 and registered as a sentinel event with Safer Care Victoria. The subsequent ISR-1 review has an external specialist panel member and the results are reviewed by Safer Care Victoria as a quality assurance measure. I acknowledge that the inclusion of an external specialist panel member was not a requirement in place at the time of Mr Sharp's death. The advantage of an external expert is that they can identify deficiencies and improvements in circumstances where a local review may assume that 'that is just the way things are done.' The incident review team at Safer Care Victoria indicated to CPU that, based on the current guidelines, it would have been reasonable for Mr Sharp's death to be registered as a sentinel event.

53. The internal review did not consider the concessions noted by Dr Kithogo and listed in paragraph 43. CPU also identified systems and process issues involving the radiology department, which were not considered in the review, including:

a. Whether the CT pan-scan images can be quickly screened by the radiologist while the patient is still in the CT scanner, so if further imaging is needed it is done immediately, rather than in stages. This is a common process in other facilities.

b. Whether a CT angiogram and not an MRI would have sufficed.

c. Whether potentially critical CT results should be communicated directly to the emergency physician in charge.

54. When given the opportunity to respond to my proposed comments about the inadequacies in their internal review process, Albury Wodonga Health noted that it was incidents identified in their medical imaging department that triggered the in-depth case review, and when commenced, the lead reviewer was not aware that Mr Sharp had died after leaving Albury Wodonga Health's care. As such the review was focused on events whilst Mr Sharp was in Albury Hospital ED and Medical Imaging. This was also the basis for the ISR-2 rating. Notwithstanding these explanations, I am of the view that a more thorough review would be of benefit to public safety.

55. Whilst the internal review did appropriately identify some practice improvements, the superficiality of the review findings in the context of Mr Sharp's subsequent death meant the resultant recommendations were 'weak actions'[32] in terms of preventing recurrence. Without deeper systems changes to give the departments the capacity to follow these policies, I am not confident that these recommendations will be effective.

RECOMMENDATIONS PURSUANT TO SECTION 72(2) OF THE ACT

56. I recommend the Albury Wodonga Health Safety and Quality Department repeat their investigation with an external expert in emergency department trauma process management in order to identify better opportunities for system improvements.

FINDINGS AND CONCLUSION

57. Pursuant to section 73(1A) of the Act, I direct that this finding be published on the Internet.

58. I express my sincere condolences to Mr Sharp's family for their loss.

59. Having investigated the death, without holding an inquest, I make the following findings pursuant to section 67(1) of the *Coroners Act 2008*:

a. The identity of the deceased was Keith Walter Sharp, born 21 June 1953;

b. The death occurred on 2 June 2017 at Royal Melbourne Hospital located at 300 Grattan Street, Parkville Victoria 3050, from Cerebral infarction complicating vertebral artery dissection following motor vehicle collision (driver); and

c. The death occurred in the circumstances described above.

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[32] Safer Care Victoria 'Sentinel Event Program – Root Cause Analysis'. Recommendations hierarchy classifies recommendations as either strong, moderate, or weak actions in terms of preventing recurrence. Education and policy changes are considered weak actions.

60. I direct that a copy of this finding be provided to the following:

d. Mrs Lesley Sharp, senior next of kin;

e. Kristy Sharp;

f. Royal Melbourne Hospital;

g. Albury Wodonga Health;

h. Safer Care Victoria;

i. Trauma Victoria; and

j. Constable Tristan Binns, Coroner's Investigator.

Signature:

SIMON McGREGOR

CORONER

Date: 28 February 2020