IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

Court Reference: COR 2018 2691

FINDING INTO DEATH WITHOUT INQUEST

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

Findings of:	**CORONER DARREN J BRACKEN**
Deceased:	**HELEN ANNE WELSH**
Date of birth:	16 MARCH 1955
Date of death:	6 JUNE 2018
Cause of death:	ESCHERICHIA COLI SEPTICAEMIA IN A LADY WITH MULTIPLE COMORBIDITIES.
Place of death:	AUSTIN HEALTH, 145 STUDLEY ROAD, HEIDELBERG, VICTORIA 3084

TABLE OF CONTENTS

HIS HONOUR:

BACKGROUND

1. Mrs Helen Anne Welsh was 63 years old when she died on 6 June 2018 from Escherichia coli septicaemia[1] in the setting of having multiple comorbidities. Immediately prior to her death, Mrs Welsh lived with her husband, Robert Welsh, at 57, Anglesey Street, Seymour.

2. Mrs Welsh had a complex medical history which included asthma, type 2 diabetes, chronic kidney disease, diastolic heart failure, hypertension, chronic back pain, chronic urinary tract infections, morbid obesity and tracheal stenosis[2]/tracheal web[3] for which she required repeated bronchoscopies and tracheal dilatation procedures. Since 2004, she had been treated by Associate Professor Sivendran Seevanayagam, thoracic surgeon.

3. On 24 April 2018, Mrs Welsh underwent an elective bronchoscopy and tracheal dilatation at the Austin Hospital ("**the Hospital").** The procedure was uneventful and Mrs Welsh was discharged the following day.

4. On 2 June 2018, Mrs Welsh presented to the emergency department at the Hospital due to increasing dyspnoea[4] and associated stridor[5]on exertion. She underwent another uneventful bronchoscopy and dilatation later that day and was scheduled to be discharged the following day.

5. On 3 June 2018, Mrs Welsh's dyspnoea continued, she had a mild respiratory wheeze and possible mild atelectasis[6] or fluid overload[7] and so her discharge was postponed. By 4 June 2018, Mrs Welsh's respiratory impairment had improved although she continued to be short of breath.

6. By 5 June 2018, Mrs Welsh no longer required oxygen therapy, however, she developed a productive cough and reported some dizziness. A blood test revealed a haemoglobin level of 70g/L[8](indicating anaemia) which was treated with a transfusion of two units of red blood cells. Diuretics were also administered to treat moderate lung and lower limb fluid overload.

[1] Sepsis is an acute life-threatening complication precipitated by a localised infection in the body (such as a urinary tract infection) entering the blood stream and a patient's own infection-fighting cells being unable to suppress the infection.
[2] Narrowing of the tracheal lumen (airway).
[3] A thin layer of tissue that narrows the tracheal lumen (airway). A tracheal web does not completely obstruct the trachea.
[4] Difficulty breathing.
[5] An abnormal high-pitched sound on breathing resulting from turbulent air flow in the larynx or bronchus due to narrowing or partial obstruction.
[6] Partial or full lung collapse due to deflation of the alveoli, the small air sacs in the lung fields.
[7] Characterised by excessive fluid volume.
[8] Haemoglobin, found in red blood cells, carries oxygen from the lungs to the capillaries.

Mrs Welsh's dyspnoea was considered to be due to a combination of anaemia[9], obesity and possible chronic respiratory and cardiac disease.

THE CORONIAL INVESTIGATION

Coroners Act 2008

7. Mrs Welsh's death was a "*reportable death*" pursuant to section 4 of the *Coroners Act 2008* (Vic) (**the Act**) because her death occurred in Victoria, was unexpected, and not from natural causes.[10]

8. The Act requires a coroner to investigate reportable deaths such as Mrs Welsh's and, if possible, to find:

   (a) The identity of the deceased;

   (b) The cause of death; and

   (c) The circumstances in which death occurred.[11]

9. For coronial purposes, "*circumstances in which death occurred*",[12] refers to the context and background of the death including the surrounding circumstances. Rather than being a consideration of all circumstances which might form part of a narrative culminating in the death relevant circumstances are limited to those which are sufficiently proximate to be considered relevant to the death.

10. The Coroner's role is to establish facts, rather than to attribute or apportion blame for the death.[13] It is not the Coroner's role to determine criminal or civil liability,[14] nor to determine disciplinary matters.

11. One of the broader purposes of coronial investigations is to contribute to a reduction in the number of preventable deaths, both through comments made in findings and by making recommendations.

[9] A decrease in the number of red blood cells.
[10] *Coroners Act 2008* (Vic) s 4.
[11] *Coroners Act 2008* (Vic) preamble and s 67.
[12] *Coroners Act 2008* (Vic) s 67(1)(c).
[13] *Keown v Khan* [1999] 1 VR 69.
[14] *Coroners Act 2008* (Vic) s 69 (1).

12. Coroners are also empowered to:

    (a) Report to the Attorney-General on a death;[15]

    (b) Comment on any matter connected with the death investigated, including matters of public health or safety and the administration of justice;[16] and

    (c) Make recommendations to any Minister or public statutory authority on any matter connected with the death, including public health or safety or the administration of justice.[17]

Standard of Proof

13. Coronial findings must be underpinned by proof of relevant facts on the balance of probabilities, giving effect to the principles explained by the Chief Justice in *Briginshaw* v *Briginshaw.*[18] The strength of evidence necessary to so prove facts varies according to the nature of the facts and the circumstances in which they are sought to be proved.[19] The principles enunciated by the Chief Justice in *Briginshaw* do not create a new standard of proof; there is no such thing as a "*Briginshaw Standard*" or "*Briginshaw Test*" and use of such terms may mislead.[20]

14. Facts should not be considered to have been proved on the balance of probabilities by inexact proofs, indefinite testimony, or indirect inferences,[21] rather such proof should be the result of clear, cogent or strict proof in the context of a presumption of innocence.[22] Proof of facts underpinning a finding that would, or may, have an extremely deleterious effect on a party's character, reputation or employment prospects demands a weight of evidence commensurate with the gravity of the facts sought to be proved and the content of the finding based on those facts.[23]

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[15] *Coroners Act 2008* (Vic) s 72(1).
[16] *Coroners Act 2008* (Vic) s 67(3).
[17] *Coroners Act 2008* (Vic) s 72(2).
[18] (1938) 60 CLR 336, 362-363. See *Domaszewicz v State Coroner* (2004) 11 VR 237, *Re State Coroner; ex parte Minister for Health* (2009) 261 ALR 152 [21]; *Anderson v Blashki* [1993] 2 VR 89, 95.
[19] *Qantas Airways Limited v Gama* (2008) 167 FCR 537 at [139] per Branson J but bear in mind His Honour was referring to the correct approach to the standard of proof in a civil proceeding in a federal court with reference to section 140 of the *Evidence Act 1995* (Cth); *Neat Holdings Pty Ltd v Karajan Holdings Pty Ltd* (1992) 67 ALJR 170 at pp170-171 per Mason CJ, Brennan, Deane and Gaudron JJ.
[20] *Qantas Airways Ltd v Gama* (2008) 167 FCR 537, [123]-[132].
[21] *Briginshaw v Briginshaw* (1938) 60 CLR 336, at pp. 362-3 per Dixon J.
[22] *Briginshaw v Briginshaw* (1938) 60 CLR 336, at pp. 362-3 per Dixon J.; *Cuming Smith & CO Ltd v Western Farmers Co-operative Ltd* [1979] VR 129, at p. 147; *Neat Holdings Pty Ltd v Karajan Holdings Pty Ltd* (1992) 67 ALJR 170 at pp170-171 per Mason CJ, Brennan, Deane and Gaudron JJ.
[23] *Anderson v Blashki* [1993] 2 VR 89, following *Briginshaw v Briginshaw* (1938) 60 CLR 336, referring to *Barten v Williams* (1978) 20 ACTR 10; *Cuming Smith & Co Ltd v Western Farmers' Co-operative Ltd* [1979] VR 129; *Mahon v Air New Zealand Ltd* [1984] AC 808 and *Annetts v McCann* (1990) 170 CLR 596.

MATTERS IN RELATION TO WHICH A FINDING MUST, IF POSSIBLE, BE MADE

Identity of the Deceased - Section 67(1)(a) of the Act

15. On 6 June 2018, Robert Welsh identified the deceased as his wife, Helen Anne Welsh, born on 16 March 1955.

16. Mrs Welsh's identity is not in dispute and requires no further investigation.

Cause of death - Section 67(1)(b) of the Act

17. On 12 June 2018, Dr Yeliena Baber, a Forensic Pathologist practising at the Victorian Institute of Forensic Medicine, conducted a post-mortem examination upon Mrs Welsh's body. Dr Baber provided a written report in which she opined that the cause of Mrs Welsh's death was '*Escherichia coli septicaemia in a lady with multiple comorbidities."* I accept Dr Baber's opinion.

18. Toxicological analysis of post-mortem samples was negative for common drugs or poisons other than those consistent with Mrs Welsh's medical treatment.

Circumstances in which the death occurred - Section 67(1)(c) of the Act

19. On 6 June 2018, Mrs Welsh's haemoglobin had increased to 90g/L and she was to be discharged after undergoing an iron infusion, with follow up in the outpatients' department to investigate the cause of her anaemia, shortness of breath.[24]

20. Throughout the morning, Mrs Welsh had symptomatic mild to moderately low blood sugar levels which were managed by supplemental glucose and withholding her regular insulin medication. An iron infusion commenced at 12.30pm.

21. At approximately 2.55pm Mrs Welsh fell from a chair as she attempted to stand. She was immediately attended by a nurse who had seen her fall and noted that Mrs Welsh did not hit her head in the fall. Following the fall Mrs Welsh's vital signs and blood sugar level (**BSL)** (4.2mmol/L) were recorded as being unremarkable and she was returned to bed.

[24] An ambulant electrocardiography device used to monitor heart activity.

22. During a subsequent medical review, Mrs Welsh's Glasgow Coma Score (**GCS)**[25] was noted as 15 and she showed possible rigors[26]. A septic screen was requested, but not then collected. At 4.30pm Mrs Welsh complained of nausea and her temperature was noted as being slightly elevated (37.4C).

23. At approximately 5.35pm blood was taken for testing. Mrs Welsh's conscious state gradually declined to GCS 9-10. At 5.40pm. a Stroke Call[27]was initiated, however the Stroke Call team considered that a stroke was unlikely and documented differential diagnoses of an underlying metabolic process, internal bleeding or sepsis with a plan to "*treat as sepsis with IV fluids, IV antibiotics, blood cultures"* and for a CT brain scan when Mrs Welsh was haemodynamically stable.

24. At 5.50pm a MET[28] call was initiated. Additional clinical issues which arose during the MET call including mild hypoglycaemia[29] (BSL 3.3mmol/L), mild tachycardia[30] (115 beats per minute), intermittent hypotension[31] (systolic blood pressure as low as 81-90mmHg) and hypoxia[32](oxygen saturations down to 87-89%). Mrs Welsh continued to have rigors which worsened although her core body temperature was once again within normal limits, 36.4C. She was given oxygen, naloxone[33](she had been prescribed oral opioids), intravenous (**IV)** glucose and fluids which resulted in an improvement in vital signs but had no effect on her conscious state.

25. At approximately 6.19pm further blood was taken for cultures as part of a septic screen. When her blood pressure improved, Mrs Welsh was taken for CT scans of her brain and pulmonary arteries. Both scans were reported as normal.

26. Immediately following the scans and whilst still in the CT room, Mrs Welsh became bradycardic[34]and unresponsive. A Code Blue[35]was initiated at 6.50pm for a PEA cardiac arrest[36]and advanced life support protocol was commenced.

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[25] An objective scale of neurological assessment, ranging from 3 (deeply unconscious) to 15 (no impairment). A score of less than 8 is universally accepted as the level of a coma in which a person is likely to be unable to protect their own airway from saliva and at risk of obstruction.
[26] Shivering or tremors.
[27] Similar to a MET call, a Stroke Call enables urgent review by a stroke specialist doctor for assessment and consideration for appropriate intervention.
[28] A hospital-based system designed to alert and call other staff for help when a patient's vital signs have fallen outside set criteria.
[29] Low blood sugar level.
[30] Elevated heart rate.
[31] Low blood pressure.
[32] Inadequate tissue oxygenation.
[33] An opioid antagonist given to reverse the effects of opiate overdose.
[34] Slow heart rate.
[35] An emergency call for assistance in the management of a patient having, or anticipated to have, a cardiac arrest. The Code facilitates near immediate review and resuscitation by senior medical and intensive care doctors and nurses.
[36] An organised heart rhythm without sufficient mechanical contraction to produce a palpable pulse or measurable blood pressure. This is a medical emergency which requires initiation or continuation of cardiopulmonary resuscitation.

27. The cause of the deterioration in Mrs Welsh's condition remained unclear with differential diagnoses, identified by the Code Blue team, as a cardiac event, neutropenic[37] sepsis or a gastrointestinal bleed.

28. After 40 minutes of unsuccessful cardiopulmonary resuscitation and multiple emergency medications, resuscitation was discontinued, and Mrs Welsh was declared deceased at 7.31pm.

COMMENTS PURSUANT TO SECTION 67(3) OF THE ACT

Family concerns:

29. Letters expressing concerns about Mrs Welsh's treatment were submitted to the court by Mrs Welsh's husband, Mr Robert Welsh (dated 11 June 2018) and her daughter, Mrs Kathryn Rohde (dated 23 October 2018). The issues raised by Mr Welsh and Mrs Rohde were :

> *Family members state they were not informed about Mrs Welsh's fall on 6 June 2018 (**the fall**) and then only found out about it when they questioned staff directly. They were not asked to sign off on an accident report about the fall. There were no falls risk messages on the whiteboard near Mrs Welsh's bed despite her being categorised as a falls risk in the emergency department.*
>
> *Mrs Welsh and her neighbouring patients all reported that she hit her head on the ground when she fell. This is at odds with the description of the fall by the nurse who witnessed it and reported no head strike.*
>
> *During the MET call, Mrs Welsh's family alerted medical staff to her history of chronic urinary tract infections which had been successfully treated in the past with the antibiotics (trimethoprim and norfloxacin), including on one particular occasion when Mrs Welsh had become unresponsive. Family members were concerned about why antibiotics were not administered despite Mrs Welsh having persistent rigors and a low blood pressure and under investigation for possible sepsis?*
>
> *Family members were advised at the time that Mrs Welsh's blood test results, including inflammatory marker levels were normal but have since learnt that the levels were elevated. Mrs Welsh did not have an intravenous infusion until after her death and family*

[37] A life-threatening complication which refers to overwhelming systemic infection in a patient who does not adequate levels of neutrophils to fight infection.

members were advised that this was inserted "to keep her body warm while we say goodbye".

30. Given these concerns, I referred the matter to the Coroners Prevention Unit (**CPU)**[38] and requested a review of the hospital's management and treatment of Mrs Welsh.

31. Following a review of the coronial brief, clinical records, correspondence from Mrs Welsh's family and additional statements from Associate Professor Seenavayagam, the CPU provided a report.

The fall

32. In relation to the fall, the CPU noted that this occurred at 2.55pm. and that prior to the fall the plan was for Mrs Welsh to be discharged that day. Mr Welsh arrived at the hospital at 3.30pm to collect his wife. The CPU advised me that it was not unreasonable that nursing staff did not inform Mr Welsh of the fall between when it occurred and him arriving at the hospital and that the hospital had no protocol requiring family members to provide written acknowledgement of being informed of such incidents.

33. Mrs Welsh was independently mobile on the ward, with and without a walking stick. On 5 June 2018, she had reported some dizziness and difficulty mobilising. When assessed medically following the fall on 6 June 2018, Mrs Welsh denied dizziness or chest pain. A falls risk message on a whiteboard was unlikely to have prevented the fall, which was unrelated to her death.

34. Registered Nurse Xerri, Nurse Unit Manager (NUM) of Ward 5 West reviewed the hospital's falls risk policy and its application to Mrs Welsh. Nurse Xerri provided a statement to the Coroner's Investigator in which she advised that a risk assessment for Mrs Welsh was completed following her transfer from the emergency department to the thoracic surgery unit on 2 June 2018. The assessment indicated that Mrs Welsh was not a falls risk. It was noted that her mobility was assisted by the use of an aid, a single point stick, however, she was independent with activities of daily living. The nursing care plan completed on 2 June 2018 documents that Mrs Welsh required supervision with transfers but was otherwise independent with a single point stick with regard to her mobility.

[38] The role of the CPU is to assist coroners investigating deaths, particularly deaths that occur in a healthcare setting. It is staffed by healthcare professionals, including practising physicians and nurses, who are independent of the health professionals and institutions under consideration.

35. Nursing care plans completed by each shift of nursing staff on Ward 5 West document that Mrs Welsh was assessed as independent in both transfers and mobility, assisted with a single point stick. The frequency of these assessments falls within the requirements of the guideline and consistently indicate that Mrs Welsh was not a falls risk during this admission.

36. With regard to the assessment of falls risk, the guideline states that "A patient is identified at risk of falling when they (a) have had two or more falls in the past two months; (b) have been admitted to hospital with a fall or (c) require supervision or assistance to transfer or mobilise; **and** (d) are confused, agitated, disorientated or unable to follow instructions.

37. NUM Xerri noted that, according to the risk assessment, medical record notations and nursing care plans, Mrs Welsh did not meet these criteria during the admission of 2-6 June 2018.

38. The registered nurse who witnessed Mrs Welsh's fall on 6 June 2018 provided a statement to the Coroner's Investigator in which she described seeing Mrs Welsh fall. She stated that Mrs Welsh was sitting in a chair beside her bed waiting for her husband to pick her up. She tried to stand up to get something when she fell, landing on her legs. She did not hit her head. The nurse assisted Mrs Welsh to lie on the ground before returning her to bed using a mechanical hoist. No intracranial injury was identified on CT scan or at autopsy.

39. There is no evidence that Mrs Welsh's fall had anything to do with her death.

Inflammatory markers

40. The CPU advised me that there are various inflammatory marker blood tests which are non-specific indicators for inflammatory or infective processes. The markers are not diagnostic tools but rather, are used to assist formulation of a diagnosis. Infective or inflammatory processes may also exist in the absence of an abnormal tests result.

41. The CPU advised me that inflammatory marker results from blood tests performed at approximately 7.58am on 6 June 2018 were all within normal limits. While Mrs Welsh's initial white cell count and neutrophil levels were borderline low on admission to hospital five days earlier, the significance of those results is unclear and the levels subsequently returned to within the normal range. None of the inflammatory markers tested were ever elevated during the admission.

42. The CPU advised me that the blood tests taken at 5.35pm on 6 June 2018 during the MET call revealed an acute moderately severe neutropenia (decline in neutrophils/white blood cells), which can significantly increase the risk of a life-threatening infection. The results from these blood tests would likely have been available approximately one hour after collection. The CPU considered that the significance of these abnormal results and how they related to Mrs Welsh's condition acutely declining was unclear. The CPU noted that progress notes record that during the MET call consideration was given to whether the neutropenia was related to Mrs Welsh's carbimazole medication[39](a known although rare side effect). CPU notes that there are also many other causes for neutropenia, including bacterial and viral infections, allergic disorders, autoimmune disorders and cancers.

Insertion of IV

43. The CPU advised me that during the MET call on 6 June 2018 intravenous fluids were administered to Mrs Welsh in an effort to improve her blood pressure. During the Code Blue resuscitation an intraosseous needle[40] was inserted to enable further fluid resuscitation. IV fluids would not be administered to a recently deceased person to keep the body warm and there is no evidence of this having occurred.

Blood cultures

44. At an unknown time between 3.38pm - 4.29pm, the doctor who reviewed Mrs Welsh following the fall requested blood cultures. The CPU advised me that, with no other explanation for the fall, nausea and feeling cold, it was prudent to investigate whether Mrs Welsh had sepsis. However, as Mrs Welsh appeared to be otherwise well at that stage and was to be imminently discharged, the nurse caring for Mrs Welsh would reasonably not have considered obtaining the results as an urgent priority when balancing the needs of patients. Only with the benefit of hindsight could Mrs Welsh's slightly elevated temperature at 4.30pm be considered a "*red flag"* for sepsis.

45. By 5.05pm, with a gradual deterioration in Mrs Welsh's conscious state, patient care during the MET call prioritised emergency management of her new cluster of symptoms and when Mrs Welsh's conscious state did not improve after her deranged vital signs were restored, the focus of care turned to a stroke.

[39] Medication used to treat hypertension.
[40] A needle inserted into bone marrow for administration of fluids.

46. The CPU advised me that a blood sample was taken at 5.35pm during the MET call but the blood sample for culturing which requires a slightly more complex procedure, was not collected until 6.15pm. Venepuncture, blood sampling has the potential to be a difficult procedure and can take a significant amount of time to perform.

47. I am unable to say how difficult it was to obtain blood from Mrs Welsh although the history of diabetes, chronic kidney disease and morbid obesity may have made this procedure more difficult.

Antibiotics

48. The information regarding Mrs Welsh's history of urinary tract infections and the antibiotic treatment previously prescribed for treatment was noted in the Stroke Call documentation.

49. For ease of reference a brief chronology of the sequence of significant events on 6 June 2018 leading up to Mrs Welsh's death is:

- 2.55pm: Mrs Welsh fell from a chair as she attempted to stand.
- Between 3.38pm and 4.29pm: Mrs Welsh was reviewed by the thoracic team doctor who, following assessment, found no clinical abnormalities other than possible rigors. Mrs Welsh reported feeling nauseous and cold. The doctor requested a septic screen, including blood cultures.
- 4.30pm: Mrs Welsh's temperature was slightly elevated at 37.4C
- 5.05pm: MET call initiated for gradual decline in conscious state. During the MET call, Mrs Welsh was treated for low blood sugar, low blood pressure, low oxygen levels and elevated heart rate.
- 5.35pm: Blood taken for pathology testing (not including cultures)
- 5.40pm: Stroke call initiated during the MET call as Mrs Welsh's conscious state remained poor. After review, a stroke was considered unlikely and differential diagnoses included metabolic disturbance, internal bleeding or sepsis, with the plan being to "*treat as sepsis with IV fluids, IV antibiotics, blood cultures:* Mrs Welsh's blood pressure was eventually stabilised.
- 6.19pm: Blood taken for cultures. Shortly afterwards, Mrs Welsh was taken for CT scan (brain and pulmonary arteries) to investigate a possible stroke, intracranial haemorrhage or pulmonary embolism.

- 6.50pm: immediately following completion of the scans and whilst still in the CT room a Code Blue was initiated as Mrs Welsh sustained a cardiac arrest. Resuscitation was commenced.
- 7.31pm: Mrs Welsh was declared deceased.

50. In an additional statement provided in response to specific questions from the CPU, Associate Professor Seevanayagam advised that it is accepted practice to delay administering antibiotics until blood cultures are performed in order to maximise the chances of obtaining a positive culture result leading to identification of the organism responsible for the sepsis. Shortly after the blood cultures were taken, Mrs Welsh underwent a CT scan. Mrs Welsh died before she could be returned to the ward to be treated with IV antibiotics.

51. Associate Professor Seevanayagam stated that Mrs Welsh's death was reviewed as part of the hospital's weekly surgical audit process and also by the Surgical Audit Review Committee. No prevention opportunities or system issues were identified following these reviews.

52. Associate Professor Seevanayagam explained that it was recognised that Mrs Welsh developed severe gram-negative septicaemia in the setting of presumed urosepsis. She was taking steroids for asthma and this immunosuppression, along with her extensive comorbidities and rapid fulminant sepsis resulted in a state from which she could not be resuscitated.

53. Associate Professor Seevanayagam opined (and the CPU concurs) that a single dose of IV antibiotics administered prior to Mrs Welsh's transfer to the CT scanner may not have prevented her death. The CPU referred me to a study undertaken in 2017[41] which demonstrated that the increase in absolute mortality associated with a one-hour delay in antibiotic administration for patients diagnosed with severe sepsis was 0.4%. Mrs Welsh had multiple chronic comorbidities that likely contributed to the inability of her body to cope with the systemic infection and her rapid clinical decline. However, the CPU considered that the judgement of clinical staff to prioritise scans over antibiotic administration was incorrect in light of the provisional diagnosis of sepsis following the MET and Stroke calls.

54. From review of the medical records and statements, it was unclear to the CPU whether Austin Health has or had a sepsis clinical pathway to support the requisite rapid management of patients with suspected sepsis. The CPU advised me that the *2017-2018 'Think sepsis. Act fast.'*

[41] Liu VX et al,2017, "The timing of early antibiotics and hospital mortality in sepsis". American Journal of Respiratory Critical Care Medicine, 196 (7): 856-863

scaling collaboration[42] established by Safer Care Victoria (SCV) and funded by Better Care Victoria (BCV) involved Melbourne Health and 11 other Victorian Health services but not Austin Health.

55. Each health service involved implemented a sepsis clinical pathway used to improve outcomes for patients with suspected sepsis through earlier identification and rapid management. Over a three to four-month period, the collaboration achieved a 50 per cent decrease in mortality, a 34 per cent decrease in ICU admissions and an estimated reduced total hospital length of stay of 3781 bed days; a 55 per cent increase in antibiotics administered within 60 minutes in the setting of suspected sepsis and many other patient benefits and health management cost savings.

56. Key recommendations from the SCV evaluation of the collaboration were:

- the BCV Board and SCV continue to support further expansion of the sepsis pathway across Victoria
- the sepsis pathway be introduced across the health system
- the SCV Infection Clinical Network oversee the expansion and adoption of the sepsis pathway across Victoria including the system support required to sustain ongoing improvements

57. While the collaboration's clinical pathway did significantly reduce the mortality rate for patients with sepsis during the trial period, it did not reduce the mortality rate for patients with septic shock.

58. On the afternoon of 6 June 2018, Mrs Welsh developed severe sepsis which rapidly progressed to septic shock prior to her death. The CPU advised me that it could not determine whether a sepsis clinical pathway would have prevented Mrs Welsh's death. Nonetheless, the CPU recommended I support the expansion of the SCV sepsis clinical pathway to Austin Health (as currently advised this has not yet occurred) as well as across all remaining Victorian health services.

59. The CPU also commented that in September 2019, the federal government committed funding toward a joint project between the George Institute for Global Health and the Australian Commission on Safety and Quality in Health Care, to determine the most effective means of

42 Program evaluation: 2017-2018 'Think sepsis. Act fast.' scaling collaboration, Safer Care Victoria, August 2019.

delivering improved sepsis treatment outcomes in Australia, including through the development of clinical guidelines.[43]

60. Austin Health advised, through its legal advisers, that it does not have an organisation wide sepsis pathway although it has a 24-hour infectious diseases on call system for antibiotic advice and selection in the critically unwell. Further there is a sepsis antibiotic guideline that is provided on all MET-call's reminding doctors of antibiotic utilisation. There are also pathways and processes that facilitate review of patients who have sepsis (organ dysfunction) by the ICU. An audit of this process showed a high degree of compliance with key elements of this pathway. In addition, all interns and HMOs receive ICU led education and training in relation to recognition and early management of sepsis.

CONCLUSION

61. On 6 June 2018 Mrs Welsh developed sepsis and became severely unwell. That sepsis progressed to septic shock. Within a tight timeframe, treating staff elected to seize the opportunity for Mrs Welsh to undergo a CT scan (when the scanner became available) to assist in diagnosis delayed the administration of antibiotics. With the benefit of hindsight, administration of antibiotics should have been given priority – however, neither the CPU nor Associate Professor Seevenayagam are able to say with any certainty that antibiotics would have prevented Mrs Welsh's death.

62. With regards to the sepsis pathway, I make the recommendation below.

63. There are no suspicious circumstances and my investigation has not revealed any prevention opportunities.

64. I am satisfied, having considered all of the available evidence, that no further investigation into Mrs Welsh's death is required**.**

[43] https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/support-for-world-sepsis-day

RECOMMENDATION

Pursuant to section 72(2) of the *Coroners Act 2008*, I recommend:

That Austin Health consider implementing the SCV clinical sepsis pathway.

FINDINGS

65. Having investigated the death, without holding an inquest, I find pursuant to section 67(1) of the *Coroners Act (*2008) that:

a. The identity of the deceased was Helen Welsh, born on 16 March 1955;

b. Mrs Welsh's death occurred;

i. On 6 June 2018 at Austin Health, 145 Studley Road, Heidelberg;

ii. from Escherichia coli septicaemia on a background of multiple comorbidities; and

iii. in the circumstances described in paragraphs above.

(v) I direct that a copy of this finding be provided to the following:

a. Mr Robert Welsh, senior next of kin;

b. Ms Pauline Chapman, Austin Health; and

c. First Constable Sarah Lynch, Coroner's Investigator, Victoria Police.

Signature:

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DARREN J BRACKEN

CORONER

Date: 29 August 2022