IN THE CORONERS COURT
OF VICTORIA
AT MELBOURNE

COR 2022 000978

FINDING INTO DEATH WITHOUT INQUEST

Form 38 Rule 63(2)

*Section 67 of the **Coroners Act 2008***

*Amended pursuant to Section 76 of the **Coroners Act 2008** on 1 May 2024**

Findings of:	Coroner Simon McGregor
Deceased:	Adelaide Wilson
Date of birth:	10 June 1935
Date of death:	7 February 2022
Cause of death:	1(a) Cardiogenic shock 2 Coronary artery disease and hypertension / high cholesterol
Place of death:	Austin Hospital 145 Studley Road, Heidelberg, Victoria, 3084
Keywords:	Colac Area Health, Colac Urgent Care Centre, Austin Hospital, Type-II Myocardial Infarction, i-STAT, Point-of-Care-Testing, point-of-care testing

*Recommendation (iv) amended to invite response from the National Pathology Accreditation Advisory Council.

INTRODUCTION

1. On 7 February 2022, Adelaide Wilson (**Adelaide**) was 86 years old when she passed away at the Austin Hospital in Heidelberg (**the Austin**). At the time of her death, Adelaide lived at 11/1 Oldstead Road, Greensborough, Victoria with her husband, Allan Wilson (**Allan**).

2. Adelaide's medical history included hypertension, hypercholesterolaemia, spondylosis, osteoporosis, osteoarthritis, diverticulitis, depression, and reflux. She was prescribed telmisartan, citalopram, diltiazem, meloxicam, paracetamol, vitamin D pantoprazole and used a walking aid to assist with her activities of daily life.[1]

THE CORONIAL INVESTIGATION

3. Adelaide's death was initially deemed to be a non-reportable death, with a 'Medical certificate of cause of death of a person aged 28 days or over' (**MCCD**) being lodged with the Registry of Births, Deaths, and Marriages by her treating practitioner, Dr Nicholas Sng (**Dr Sng**).

4. Following identification of a misinterpreted pathology result[2] her death was reviewed and reported to the Coroner on 21 February 2022, as it was deemed to be within the definition of a reportable death in the *Coroners Act 2008* (**the Act**). Reportable deaths include deaths that are unexpected, unnatural or violent or result from accident or injury.

5. 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.

6. 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.

[1] Medical records, Sherbourne Road Medical Clinic.
[2] This will be discussed later in this finding.

7. This finding draws on the totality of the coronial investigation into the death of Adelaide Wilson including evidence contained in Adelaide's medical records and statements obtained from her treating practitioners. 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. In the coronial jurisdiction, facts must be established on the balance of probabilities.[3]

8. In considering the issues associated with this finding, I have been mindful of Adelaide's 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.

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

Circumstances in which the death occurred

9. On 6 February 2022, Adelaide attended the Colac Area Health Urgent Care Centre (**UCC**) with a history of two days of central chest ache radiating to her left side and through to her back, and one episode of vomiting whilst visiting family in the area. She was given Gaviscon, however this did not completely relieve her pain.[4]

10. An electrocardiogram (**ECG**) was performed but this did not show any evidence of acute coronary syndrome. Her troponin[5] levels were also tested using the facility's point-of-care testing i-STAT device and were found to be 0.4 ng/L[6], which was interpreted as normal. Adelaide was discharged with a diagnosis of gastritis and returned home to Melbourne.[7]

11. On 7 February 2022, Adelaide woke in the early hours of the morning with shortness of breath and chest pain. An ambulance attended and found her to be in an altered conscious state with low blood pressure. Adelaide was transported to the Austin Hospital, arriving at 2.18am.[8]

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

[4] Medical records, Colac Area Health.

[5] A biochemical marker found in blood that, if raised, indicates myocardial (heart) damage. A troponin test is a biochemical marker that indicates myocardial damage. It is used as part of the screening process for acute coronary syndrome in every emergency department and urgent care department across Australia. There are a variety of types of troponin assays (troponin-I, troponin-T, High-Sensitivity-Troponin-T) each with different cut-offs for different machines/pathology services.

[6] A normal range for troponin is <0.05 Ug/L

[7] Medical records, Colac Area Health.

[8] Medical records, Austin Health.

12. On arrival, a bedside ultrasound and chest X-ray indicated acute heart failure with a complete heart block[9] however no ischaemic changes were evident and so an emergency angioplasty (stent) was not performed. Her troponin levels were found to be 329ng/L which indicated that she had likely suffered a type-II myocardial infarction (heart attack).[10]

13. Adelaide's prognosis was discussed with her, and Adelaide stated she did not want cardiopulmonary resuscitation (**CPR**) to be performed if her heart stopped or intubation if she stopped breathing but was open to other interventions if they were deemed to be of potential benefit.[11]

14. Adelaide was admitted to the Intensive Care Unit under the cardiology team, however her condition continued to deteriorate and she passed away at approximately 7.00pm on 7 February 2022.[12] An MCCD was electronically completed and lodged with the Registry of Births, Deaths, and Marriages.

15. On 18 February 2022, Dr Niamh Tobin reviewed Adelaide's UCC pathology results and noted that they had been misinterpreted as being normal when they had in fact been elevated. On 21 February 2022, Dr Tobin contacted Allan, who informed him that Adelaide had passed away.

16. Adelaide's death was then reported to this Court as a reportable death within the meaning of the Act.

Identity of the deceased

17. Adelaide Wilson, born 10 June 1935, was visually identified by Dr Sng, who provided an MCCD to this effect.

18. Identity is not in dispute and requires no further investigation.

Medical cause of death

19. On 21 February 2022, the Court was provided with an MCCD signed by Dr Sng.

[9] A condition in which the heart's normal pumping function is interrupted by cessation ("blocking") of its normal electrical impulses.
[10] Medical records, Austin Health.
[11] Medical records, Austin Health.
[12] Medical records, Austin Health.

20. Dr Sng noted the cause of death as "Cardiogenic shock 1 day" with "Coronary artery disease 1 year" listed as an antecedent cause and "Hypertension/High cholesterol" as signification conditions contributing to the death.

21. The MCCD was reviewed by Dr Matthew Lynch, Forensic Pathologist at the Victorian Institute of Forensic Medicine, who was also of the opinion that this was the most likely cause of death.

22. I accept Dr Lynch's opinion.

CPU REVIEW

23. To assist with my investigation into Adelaide's death, I directed that the Coroners Prevention Unit (**CPU**)[13] undertake a review of the care that Adelaide received, specifically with reference to any systemic issues regarding the missed elevated troponin level at the UCC, and to provide advice as to whether any prevention opportunities could be identified.

Colac Area Health incident review

24. A statement was received from Dr Ian McKay (**Dr McKa**y), Director of Medical Services at Colac Area Health (**CAH**) in which Dr McKay noted that whilst Adelaide's death was not initially reported to Safer Care Victoria (**SCV**) as a sentinel event, following enquiries by the CPU, CAH elected to report the incident to SCV. Regardless, a review by two external emergency physicians was conducted. The review noted the following contributing factors:

    a) Patient factors: Adelaide's medical history included several risk factors for ischaemic heart disease, including hypertension and hypercholesteraemia.

    b) Staff factors: Adelaide's abnormal vital signs were not escalated by nursing staff to medical staff; medical staff did not document that they had reviewed the nursing assessment notes or vital signs; medical staff did not document a broader differential diagnosis list that would be appropriate for an 86-year-old with a presenting complaint of chest pain; medical staff did not document the use of a risk stratification score to

[13] 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.

assist with diagnostic decision-making; and medical staff misinterpreted the troponin result value.

c) Equipment factors: The i-STAT machine does not flag an abnormal troponin result.

d) Process factors: It was unclear who was responsible for checking/validating the i-STAT troponin result, and it was not until 12 days after Adelaide's attendance at the UCC that her results were checked.

e) System factors: Whilst nursing vital signs are recorded electronically with normal reference ranges listed, there is no visual alert to indicate when a vital sign is outside of this range; it was unclear what level of supervision was available to the medical staff member involved in Adelaide's care; it was unclear if chest pain presentations fall under the scope of an urgent care centre model (the UCC website indicates a more limited scope of practice).

25. Following the CAH review, the following recommendations were made:

a) Education be provided to all relevant clinical staff about:

i. the recognition of abnormal vital signs and how to escalate these to a senior decision-maker;

ii. common life-threatening chest pain presentations;

iii. review of nursing actions/documentation;

iv. risk stratification of chest pain presentations (using validated decision tools; documenting decision-making in more detail particularly in regard to relevant positive and negative clinical findings); and

v. normal troponin ranges for all troponin testing modalities;

b) CAH should source an i-STAT machine that provides reference ranges and flags/highlights abnormal results on the machine or print outs;

c) There should be a requirement for two clinical staff to check (and document) i-STAT results; and the result checking process should occur daily;

d) The electronic medical record should have a function to highlight/flag abnormal vital signs;

e) If workforce availability allows, registrars should be supervised by a GP or specialist emergency doctor; and

f) Consideration should be given to whether a policy on chest pain assessment and management is required at the UCC, with a focus on identifying higher risk patients who should be transferred to an emergency department for ongoing assessment and care, and/or whether a telehealth consultation with more specialist centre can be provided.[14]

26. With the exceptions of b) and e) above, I note that all these recommendations have been completed/implemented at the time of this finding.

Review of contributing factors

27. Adelaide's symptoms at the time of her presentation to the UCC raised the possibility of acute coronary syndrome. An ECG and blood analysis was appropriately conducted; unfortunately, her troponin results were incorrectly interpreted as normal instead of elevated.

28. point-of-care testing (such as the i-STAT test performed on Adelaide at the UCC) are common in facilities that do not have 24/7 pathology services available to them. These machines (and similar devices) provide a printed test report but do not provide a reference range to aid a clinician to interpret the results. A printout of reference results was available next to the UCC machine however it appears this failed to draw attention to Adelaide's abnormal result.

29. Whilst the relevant ISO standard[15] does not provide any specific requirements for point-of-care testing designs, in situations where the printout from the point-of-care testing device does not include reference, values, it is expected that relevant information (including reference values) is available to the analyser in an easily accessible format.

[14] CAH's policies and pathways regarding chest pain management were reviewed by the CPU and assessed as being consistent with national guidelines. Escalation policies were also assessed as being reasonable.

[15] ISO 15189, which is the international standard that specifies the requirements for quality and competence of medical laboratories. It covers both technical and management criteria which must be considered.

30. I note that the National Pathology Accreditation Advisory Council (**NPAAC**) states "operators must have received training in the recognition of high-risk results and the need to communicate them immediately to the attending medical officer"[16].

CPU Conclusion

31. Given Adelaide's age, frailty, two-day history of chest pain[17] and lack of appropriate interventions available to clinicians for a type-II myocardial infarction (including stenting), the CPU advised that it was not possible to conclude that Adelaide's death was preventable.

32. With regards to the interpretation of Adelaide's i-STAT results by clinicians and the use of similar point-of-care testing devices however, the CPU identified several possible prevention opportunities, including making reference ranges and other cognitive aids more available to interpreting clinicians, the distribution of case learnings to health services, and the adjustment of current point-of-care testing guidelines to include the provision of reference ranges on printouts and final reports.

33. I agree with this advice and intend to make recommendations accordingly.

FINDINGS AND CONCLUSION

34. The standard of proof for coronial findings of fact is the civil standard of proof on the balance of probabilities, with the *Briginshaw* gloss or explications.[18] Adverse findings or comments against individuals in their professional capacity, or against institutions, are not to be made with the benefit of hindsight but only on the basis of what was known or should reasonably have been known or done at the time, and only where the evidence supports a finding that they departed materially from the standards of their profession and, in so doing, caused or contributed to the death under investigation.

35. Pursuant to section 67(1) of the *Coroners Act 2008* I make the following findings:

[16] NPAAC Tier 3A Document, 'Requirements for the Communication of High-Risk Pathology Results' (First Edition 2020), S2.6, page 6

[17] Likely indicating cardiac damage prior to presentation to UCC.

[18] *Briginshaw v Briginshaw* (1938) 60 CLR 336 at 362-363: 'The seriousness of an allegation made, the inherent unlikelihood of an occurrence of a given description, or the gravity of the consequences flowing from a particular finding, are considerations which must affect the answer to the question whether the issues had been proved to the reasonable satisfaction of the tribunal. In such matters "reasonable satisfaction" should not be produced by inexact proofs, indefinite testimony, or indirect inferences…'.

a) the identity of the deceased was Adelaide Wilson, born 10 June 1935;

b) the death occurred on 7 February 2022 at Austin Hospital 145 Studley Road, Heidelberg, Victoria, 3084, from *cardiogenic shock* with *coronary artery disease and hypertension / high cholesterol* as contributing factors; and

c) the death occurred in the circumstances described above.

36. Having considered the circumstances, I am satisfied that Adelaide's death occurred in the circumstances so described. With regards to the misinterpretation of her troponin results, given Adelaide's history, comorbidities, and limited treatment options, it is not possible to conclude whether earlier recognition and possible referral to a tertiary cardiology centre would have prevented her death.

37. I note the conclusions of the CAH review and remedial actions taken since Adelaide's death and find that they are reasonable and appropriate and will hopefully reduce the likelihood of a similar occurrence in the future.

RECOMMENDATIONS

Pursuant to section 72(2) of the Act, I make the following recommendations:

(i) *I recommend that Abbott point of care diagnostics consider a software update for i-STAT-1 machines that includes reference ranges, interpretation of result and other cognitive aids.*

(ii) *I recommend that CAH and Australian Clinical Labs reconsider a point-of-care testing machine whose print-out/interface contains reference ranges and other cognitive aids.*

(iii) *I recommend that Safer Care Victoria consider distributing the learnings of case to health services that utilize i-STAT-1 machines.*

(iv) *I recommend that the National Association of Testing Authorities and the National Pathology Accreditation Advisory Council consider whether current guidelines for point-of-care testing should be changed so that biological reference intervals or clinical decision values be included on point-of-care testing printouts as well as final reports.*

I convey my sincere condolences to Adelaide's family for their loss.

Pursuant to section 73(1A) of the Act, I order that this finding be published on the Coroners Court of Victoria website in accordance with the rules.

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

Allan Wilson, Senior Next of Kin

Robyn Shea, Austin Health

Abbott Point of Care Diagnostics

Jodyanne See, Safer Care Victoria

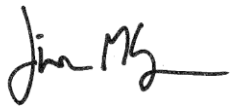
Dr Ian McKay, Colac Area Health

Dr Tony Landren, Australian Clinical Laboratory

David Turner, National Association of Testing Authorities

First Constable Danielle Merlino, Victoria Police, Reporting Member

Signature:



Coroner Simon McGregor

Date : 08 April 2024

NOTE: Under section 83 of the ***Coroners Act 2008*** ('the Act'), a person with sufficient interest in an investigation may appeal to the Trial Division of the Supreme Court against the findings of a coroner in respect of a death after an investigation. An appeal must be made within 6 months after the day on which the determination is made, unless the Supreme Court grants leave to appeal out of time under section 86 of the Act.