QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INQUEST

CITATION:	**Inquest into the death of Audrey Yvette Carrick**
TITLE OF COURT:	Coroners Court
JURISDICTION:	BRISBANE
FILE NO(s):	2019/328
DELIVERED ON:	6 December 2024
DELIVERED AT:	Brisbane
HEARING DATE(s):	5 August to 7 August 2024
FINDINGS OF:	Carol Lee, Coroner
CATCHWORDS:	Coroners: Inquest, Health Care, Management of Chronic Cardiac Condition in context of Advanced Age and Comorbidities, Interventional Cardiology: Transcatheter Aortic Valve Replacement, Pacemaker, Expert Opinion.

REPRESENTATION:

Counsel Assisting:	Mr Joshua Liddle and Ms Sarah Ford.
Ms Debra Langdon:	Ms Bianca Stringer, instructed by Caxton Legal.
Metro North Hospital and Health Service (MNHHS):	Ms Sarah Lane, instructed by Metro North Hospital and Health Service (MNHHS).
Dr Jijo Antony:	Mr Christopher Fitzpatrick, instructed by Moray & Agnew Lawyers.

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Introduction

1. Mrs Audrey Yvette Carrick was an 83-year-old woman who lived in a residential aged care facility at Taigum, Queensland with her husband. Mrs Carrick was the full-time carer for her husband, who had advanced Parkinson's disease. Together they had two adult children, Ms Debra Langdon and Mr David Carrick, grandchildren, and great grandchildren. Mrs Carrick was the dearly loved matriarch of a close-knit family.

2. On 15 January 2019 Mrs Carrick underwent a Transcatheter Aortic Valve Implantation ('TAVI') procedure at The Prince Charles Hospital ('TPCH') in Brisbane. Following discharge on 21 January 2019 after a 7-day inpatient admission, she passed away unexpectedly at home on 22 January 2019.

3. On 25 January 2019, an autopsy was undertaken. The attending forensic pathologist, Dr Nadine Forde, found that the cause of death was:

    1(a). Pulmonary thromboembolism, *due to, or as a consequence of*
    1(b). Aortic stenosis (recent transcatheter aortic valve implantation).

4. The coronial jurisdiction was enlivened because Mrs Carrick's death was a '*reportable death*' under the *Coroners Act* 2003 (CA).

5. The coronial investigation was undertaken by the Deputy State Coroner up until January 2024, when I took over carriage of the matter. On 2 April 2024, formal notification was given that an Inquest was to be held.

6. The role of the Coroner is limited to ascertaining what happened, not to ascribe guilt, attribute blame or apportion liability. A Coroner must not include in the findings any statement that a person is, or may be, guilty of an offence or civilly liable for something.

7. The issues I have to determine are:

    a. The findings required by s 45(2) of the CA – the identity of the deceased person, when, where and how she died and the cause of her death.

    b. Whether Mrs Carrick's pre and post procedure heart failure was recognised and treated appropriately.

    c. Whether a failure to implant a pacemaker contributed to Mrs Carrick's death.

d. Whether there are any further recommendations which can be made which could prevent deaths from happening in similar circumstances in the future.

e. Whether the decision to discharge Mrs Carrick on 21 January 2019 was appropriate.

8. Additionally, a Coroner may, whenever appropriate, comment on matters connected with a death investigated at an Inquest and make preventive recommendations concerning public health or safety, the administration of justice or ways to prevent deaths from happening in similar circumstances in the future.

9. A Coroner may also give information about a person's conduct in a profession or trade to a disciplinary body for the person's profession or trade, if the Coroner reasonably believes the information might cause the body to inquire into, or take steps in relation to, the conduct.

10. For reasons that appear later in these findings, I make no comment or recommendations, nor referrals of health care providers involved in Mrs Carrick's health care at TPCH, to their professional regulatory bodies.

11. I thank counsel assisting and the parties' representatives for their assistance during the Inquest and their comprehensive submissions following the hearing; the last of which I received on 1 November 2024.

Coronial Issues

Pre-morbid status

12. The issues to be determined are best understood in the context of the nature and extent of Mrs Carrick's pre-existing conditions and circumstances.

13. At the time Mrs Carrick sought treatment from the TPCH cardiology clinic between May and December 2018, the following factors were relevant to her care:

a. Advanced age.
b. Resident in an aged care facility.
c. Full time carer for her husband (advanced Parkinson's Disease).
d. Severe aortic stenosis.
e. Atrial fibrillation.

f. Moderate Left Ventricular systolic dysfunction.
g. Moderate mitral regurgitation.
h. Hypertension.
i. Gastrointestinal bleeding and associated iron deficiency anaemia.
j. Anxiety.
k. A history of mechanical falls over the preceding 10-year period.
l. Signs of heart failure, including:
    i. Increased shortness of breath.
    ii. Pleural effusions (from December 2018).
    iii. Decreasing ability to undertake activities of daily living.

14. Given these factors, on 20 December 2018 it was determined that for treatment of her condition, Mrs Carrick was not a suitable candidate to undergo high risk open heart aortic valve replacement surgery. However, she was assessed as a good candidate for the less invasive transfemoral approach surgery, being a TAVI procedure.

15. This determination was endorsed by a Multidisciplinary Team ('MDT') comprising peer cardiac professionals with specific expertise in TAVI's at TPCH.

16. Mrs Carrick's TAVI procedure was scheduled to occur on Tuesday 15 January 2019 at TPCH. Arrangements were made for respite care of Mr Carrick.

17. In formally consenting to undergo the TAVI procedure on 14 January 2019, Mrs Carrick acknowledged amongst other things, that:

    a. The risks of the procedure included:

        i. Bleeding at the puncture site.
        ii. Abnormal heart rhythms.
        iii. That permanent pacemaker placement may be required.
        iv. Blood clots.
        v. Pulmonary embolism.
        vi. Death.

    b. The risk of not having the procedure was worsening heart failure and, by implication, death.

18. Without treatment, Mrs Carrick's life expectancy was limited. This treatment was aimed at optimising her quality of life by improving her symptoms of progressive heart failure and reducing the risk of premature mortality.

Facility

19. Mrs Carrick elected to undergo the TAVI procedure at TPCH as a public patient.

20. TPCH is a major tertiary level cardiothoracic referral hospital in Queensland, which Metro North Health says is the largest such unit in Australia. Its Cardiology Program services the single largest cohort of inpatients within the hospital. As a teaching hospital, it has the largest cohort of cardiology registrars in Queensland, ranging from basic physician trainees to fellows, together with other support staff including junior doctors and nurses.

21. Metro North Health predominantly uses a paper based medical record. In alignment with national and international expectations, Queensland Health is currently rolling out an integrated electronic Medical Record (ieMR) across public hospitals in Queensland. TPCH is due to be transitioned in 2027.

Expert Evidence

22. The Court was assisted by expert opinion from two highly qualified, experienced and respected cardiologists. They were Dr Kenneth Hossack and Dr Anthony Camuglia. Ultimately, they gave evidence in a conclave at the Inquest.

23. In essence, Dr Hossack was critical of aspects of Mrs Carrick's care at TPCH whilst Dr Camuglia was not, instead finding that there were no deficiencies in the health care provided to Mrs Carrick and that the health care was of a high quality.

24. Relevantly, the nature and extent to which they were of assistance in this particular case is to be viewed in the context of their respective knowledge, skills and experience, as follows:

    a. Dr Hossack is a senior cardiologist and academic whose primary practice has been in the private sector. He is not an interventional cardiologist, that is he does not perform cardiac procedures. In oral evidence, he acknowledged that he had never performed a TAVI procedure. His practice is in the field of general cardiology in private practice consulting rooms. Support staff (registrars, residents, nurses

etc), which are an integral part of provision of health care in the public sector (such as TPCH), are not ordinarily part of the health care team in such a private practice environment.

b. Dr Camuglia is a senior staff cardiologist who has worked at a tertiary level public hospital in Brisbane akin to TPCH for at least the past 10 years. He sub-specialises in interventional cardiology and has performed over 1000 TAVI procedures in various facilities worldwide. He is involved in teaching on a statewide, national and international basis, with the establishment of procedures, guidelines and research related to this subspecialty.

25. I accept that there are occasions where experts in the same field may hold reasonable differences of opinion. However, where such differences arose in the circumstances of this case, I give more weight to the opinion of Dr Camuglia given his particular expertise in this subspecialty and his experience in a public hospital setting.

Cause of Death

26. Central to the determination of the coronial issues is the cause of Mrs Carrick's death.

27. Dr Forde considered Mrs Carrick's cause of death to have been:

> 1(a). Pulmonary thromboembolism, *due to, or as a consequence of*
> 1(b). Aortic stenosis (recent transcatheter aortic valve implantation).

28. It is common ground between Drs Hossack and Camuglia that pulmonary thromboembolism was the cause of death. Where they differ is whether cardiac arrhythmia played a role in the death.

29. Dr Hossack's opinion was that given the size of the pulmonary thromboembolism, he would not have expected it to cause death in usual circumstances and that, associated co-morbidities, including cardiac arrhythmia, therefore played a more dominant role in causing Mrs Carrick's death. However, in oral evidence, Dr Hossack stated that a cardiac arrhythmia would have been fatal to Mrs Carrick regardless of the presence of pulmonary thromboembolism.

30. On that basis, Mrs Carrick's family submits that cardiac arrhythmia cannot be excluded as the cause of death. In support of that submission, the family also rely on the discussion at the Morbidity and Mortality meeting held at TPCH on 1 March 2019, in which it was thought that the cause of death was probably a cardiac arrhythmia.

31. On the other hand, Dr Camuglia considered cardiac arrhythmia to be an alternative cause of death, rather than as having contributed to death in conjunction with the pulmonary thromboembolism. In oral evidence, Dr Camuglia expanded on his views, explaining that it is possible, although unlikely, that Mrs Carrick had a pulmonary thromboembolism which was subclinical and then had a superimposed, independent cardiac arrhythmia that caused death. Dr Camuglia thought this to be the less likely of the two possibilities based on the autopsy findings.

32. I find that pulmonary embolism was the cause of Mrs Carrick's death, because:

    a. Clear evidence of pulmonary thromboembolism was detected objectively on autopsy, whereas electrical disturbance was not; albeit because the latter was not capable of detection on a postmortem basis.

    b. However, whilst it appears Mrs Carrick was experiencing electrical disturbance leading up to her discharge from TPCH, it is impossible to determine if this persisted whilst at home a day later.

    c. The lack of cellular organisation detected in the thrombus at autopsy suggested to Dr Forde that the pulmonary thromboembolism was acute, being present for potentially only a short time before death but up to '*a couple of days*'.

    d. Mrs Carrick was known to be at risk of developing pulmonary thromboembolism due to her cardiac conditions and her 7-day hospitalisation following a surgical cardiac procedure, namely the TAVI procedure. If the pulmonary thromboembolism was insufficient to cause death, as proposed by Dr Hossack, it could have occurred anytime in this period. The fact that it occurred acutely around the time of death logically makes it less likely to be a coincidental finding.

    e. In support of the acute, sudden and catastrophic nature of pulmonary thromboembolism was the fact that up until the death sometime after

noon on 22 January 2019, no concern was identified about her condition either by or on behalf of Mrs Carrick, save for some non-specific symptoms, having regard to the following:

i. Her daughter had attended to her in person at home on the day of discharge and again the following morning before work.

ii. She was subsequently able to participate in two telephone calls with persons who knew her well, namely her son and the Assistant Manager of the complex where she resided.

iii. She made lunch for herself at home, which was later found to be untouched on her lounge chair in the living room.

iv. She was subsequently located unresponsive on the kitchen floor.

f. Against that background, pulmonary thromboembolism is logically less likely to have been a coincidental finding.

g. The thoughts of the clinicians at the Morbidity and Mortality meeting were reached on a preliminary basis ('*Await coroner's report*'), without the benefit of the subsequent autopsy findings, which found clear evidence of pulmonary thromboembolism.

33. Consequently, I accept that on the weight of the evidence:

a. Pulmonary thromboembolism was sufficient to cause death and was the cause Mrs Carrick's death.

b. Cardiac arrhythmia remains only a possible contributor to Mrs Carrick's death but ultimately, the evidence is insufficient to make a positive finding that it did contribute to her death.

Should anticoagulation therapy have been commenced at an earlier time?

34. Despite interrogation of their evidence in a conclave, the experts were unable to reach agreement about the use of anticoagulant medication (Warfarin, or a Novel Oral Anticoagulants 'NOAC' medication such as Apixaban) on Mrs Carrick prior to the TAVI procedure. Relevantly:

a. Dr Hossack:

   i. Was critical of the fact that Mrs Carrick was not commenced on anticoagulant medication by TPCH staff prior to the TAVI procedure.

   ii. Considers that the delay in commencing anticoagulation was a likely contributor to Mrs Carrick's pulmonary thromboembolism.

   iii. Considers that any bleeding risk by reason of a history of gastrointestinal bleeding and falls was insignificant and that the benefits of anti-coagulation in reducing the risk of thromboembolic complication clearly outweighed the risks.

   iv. Explained his reasoning that Mrs Carrick had a CHADS Vasc score (which he used as a metric for bleeding risk) of 4 or 5.

   v. Conceded in cross examination that contrary to his reliance on the CHADS Vasc score, anti-coagulation medication was indicated because of Mrs Carrick's stroke risk, which coincidentally would have reduced her risk of pulmonary thromboembolism.

   vi. Emphasised that the HAS-BLED score (a metric for bleeding risk) could be compared to the CHADS Vasc score to give a quantitative risk/benefit assessment. Referring to literature, Dr Hossack considered the following to be standard practice in Australia:

> '*The net clinical benefit almost always favours stroke prevention over major bleeding, so bleeding risk scores should not be used to avoid anticoagulation in patients with atrial fibrillation.'*

   vii. Says that the issue of anticoagulant medication should have been raised at the MDT meeting; the implication being that it was not.

b. Dr Camuglia:

i. Was not critical of TPCH staff for not commencing anticoagulants prior to the TAVI procedure.

ii. Agreed that atrial fibrillation can be an indication for anti-coagulation but considered that Mrs Carrick's history of gastrointestinal bleeding, iron deficiency and falls made it reasonable not to commence anti-coagulation.

iii. Considered that Mrs Carrick's previous documented history of iron deficiency anaemia related to aspirin may have been related to a Heyde's syndrome pathophysiology. Heyde's syndrome is an abnormality of blood clotting in patients with aortic stenosis that causes frank or occult insidious blood loss from the gastrointestinal tract that can lead to anaemia associated with a life-threatening low blood count. This underlying condition is addressed by the TAVI procedure.

iv. Considered that the decisions about anti-coagulation had no impact on Mrs Carrick's post-TAVI course.

v. Did not consider the CHADS Vasc score to be a useful metric in assessing the risk of a pulmonary thromboembolism. He, along with treating cardiologist Dr Anthony Putrino, expressed the view that CHADS Vasc scores are not used to assess the risk of pulmonary thromboembolism in practice, but rather the risk of stroke.

vi. Considers the risks and benefits of anticoagulation in the setting of Mrs Carrick's history not to be black and white, and that there is a reasonable basis either to give anticoagulants pre-TAVI or not to.

vii. Ultimately agreed that bleeding risk scores should not be used to justify withholding anticoagulation, but considered that:

> '*What is used is the recommendation of individualised assessment based on literature, clinical assessment and weighing up risks and benefits, and this patient population with severe aortic stenosis is – is an important population*.'

35. I find that it was reasonable not to commence Mrs Carrick on anticoagulation medication prior to the TAVI procedure, because:

a. Although anticoagulation medication is recommended for any female over the age of 75 with atrial fibrillation, there were sound reasons why it was not commenced in Mrs Carrick's case, including:

i. A risk/benefit analysis having been undertaken by the treating cardiologist weighed against this course, given the history of gastrointestinal bleeding and falls. This included the potential for suffering from a catastrophic brain bleed as a result of a fall, noting she had previously had a CT Head scan for a face injury following a prior fall.

ii. The treating cardiologist's intention to arrange the TAVI procedure within a short timeframe from his review in November 2018, which allowed the required workup investigations for which anticoagulation might need to be ceased.

iii. That when the admission was delayed until 13 December 2018, the treating cardiologist concluded at his 14 December 2018 review that Mrs Carrick's bleeding risk was too great to commence her on anticoagulation, but a trial could be considered once her aortic valve had been replaced.

iv. In any case, Mrs Carrick was in fact administered anticoagulant medication during the TAVI procedure. This dose is higher than the typical oral anticoagulant doses administered for atrial fibrillation, and typically lasts anywhere between 6 to 12 hours depending upon renal function. This is primarily to prevent stroke during the procedure.

b. The entries made in the clinical record are sufficient to satisfy me that Dr Putrino did in fact deliberately consider these factors in his clinical decision not to commence anticoagulant medication at the time of his reviews.

c. Equally, I am satisfied that the issue was again discussed at the MDT meeting of wider cardiac professionals occurring at TPCH on 20

December 2018, which is supported by the note of that meeting (*'For ? NOAC re AFib'*).

d. I also accept Dr Putrino's evidence that had Mrs Carrick been started on anticoagulant medication because of her atrial fibrillation pre-procedure, it would not necessarily have been at a therapeutic dose for a blood clot that is a precursor to pulmonary thromboembolism.

e. Ultimately, I cannot ignore the combined effect of the majority view of cardiac professionals that were involved in considering this issue over at least two months in a sub specialist tertiary setting; a view that Dr Camuglia was not critical of. The effect of the majority view was that Dr Hossack's opinion did not enjoy broad support.

f. This view is in alignment with the individualised approach favoured by Dr Camuglia; a view which I accept in these circumstances.

Would anticoagulation have improved Mrs Carrick's outcome?

36. Relevant to this issue are the following factors:

a. As noted at paragraph 35 (a) (iv) above, Mrs Carrick did in fact receive anticoagulant medication intraoperatively.

b. Neither Dr Hossack nor Dr Camuglia were critical of the timing of Mrs Carrick commencing anticoagulation after the TAVI procedure. The development of a left groin haematoma post procedure was the rationale for this.

c. Mrs Carrick's anticoagulation was commenced on 17 January 2019.

d. Therapeutic anticoagulants do not have a '*hangover*' effect. They only provide protection from deep venous thrombosis ('DVT') while they are taken.

e. The evidence of Dr Forde suggests that the pulmonary thromboembolism arose within a short time (a couple of days) of Mrs Carrick's death.

f. Pre-TAVI procedure anticoagulation would therefore only have potentially enabled Mrs Carrick to avoid the pulmonary

thromboembolism if a DVT (being the likely origin of the pulmonary thromboembolism) arose in the period between 28 November 2018 and 14 January 2019.

g. The experts disagreed on the timing of the DVT, as follows:

    i. Dr Camuglia considered that a DVT most likely occurred after the TAVI procedure. He agreed with the suggestion that the surgery (TAVI) and hospitalisation with associated immobility, put Mrs Carrick at greater risk of developing DVT after the TAVI procedure. Dr Camuglia also thought that it was improbable that a DVT was present pre-TAVI (which he classified as an '*unquantifiable small'* chance that it was present) but did not manifest itself clinically, was not established so as to appear on autopsy, and only for some reason embolised after the TAVI procedure.

    ii. Dr Hossack considered that a DVT more likely arose before the TAVI procedure because of her atrial fibrillation, congestive heart failure, and relative immobility at home.

37. I find that the DVT more than likely developed post the TAVI procedure, because:

    a. Risk factors for the development of DVT include immobility and the TAVI procedure itself, amongst other things.

    b. Patients are less mobile in hospital than at home.

    c. Dr Camuglia considers that patients with heart failure who are ambulatory have a lower risk of morbidity and mortality than those who are not.

    d. Although Mrs Carrick had reported reduced activities of daily living pre-procedure, she was still caring for her husband and herself relatively independently at home. On any reasonable view, this level of mobility cannot be comparable to resting in a bed or chair in a hospital post procedure, where a number of services and assistance is provided.

e. Mrs Carrick's atrial fibrillation and congestive heart failure were present both before and after the TAVI procedure. Mrs Carrick was in the early stages of recovery from the TAVI procedure, which was undertaken in treatment for those issues, when she suddenly died.

f. Mrs Carrick was administered an anticoagulant dose during the TAVI procedure. Because she developed a large groin haematoma after the TAVI procedure, further anticoagulation was deferred. In that context, it was appropriate for her to have a period of immobilization and a deferral of the commencement of anticoagulant medication until 17 January 2019.

g. Following discharge from TPCH, Mrs Carrick remained relatively immobile. Her daughter tended to her needs and reported her mother was quiet, either resting in bed or in a chair at home. Mr Carrick was in respite. Thus, her level of mobility was somewhat reduced from her usual level.

h. The relative improbability of a DVT being present before the TAVI procedure, but not being overtly apparent clinically (oedema could have masked the DVT but there was no report of overt calf pain) also makes it more likely than not that the DVT arose after the TAVI procedure.

i. Against that background, the opinion of Dr Camuglia is more persuasive.

38. Consequently, I conclude that while it is possible that anticoagulation medication before the TAVI procedure could have prevented a DVT and the resulting pulmonary thromboembolism, it is more likely that the DVT developed after the TAVI procedure and therefore would not have been prevented by pre-TAVI anticoagulation.

Was Mrs Carrick's pre and post-procedure heart failure recognised and treated appropriately?

39. The experts differed in relation to their opinions on management of Mrs Carrick's heart failure and whether diuretic medication in particular would have improved her outcome.

Pre-TAVI

40. Dr Hossack was critical of TPCH staff for their treatment of Mrs Carrick's heart failure, in particular by not treating Mrs Carrick's build-up of fluid with diuretic medication.

41. The first evidence of Mrs Carrick experiencing heart failure was an CT scan of 11 December 2018, showing moderate bilateral pleural effusions. It appears this progressed with Mrs Carrick developing swelling of her lower legs by about 4 January 2019 (based on the presentation to TPCH Emergency Department (ED) on 7 January 2019 ('*ankle oedema'*).

42. On that basis, if one accepts Dr Hossack's opinion, the first possible opportunity of TPCH to commence Mrs Carrick on diuretic medication was on the following occasions:

    a. Dr Putrino's review of Mrs Carrick on 14 December 2028, where he had available the CT scan results from 11 December 2018 which were reported as showing '*moderate sized bilateral pleural effusions*'.

    b. The telephone call from the Percutaneous Valve Program nurse to Mrs Carrick on 31 December 2018.

    c. The ED presentation on 7 January 2019.

14 December 2018

43. In relation to the first such occasion, namely 14 December 2018, I find that it was reasonable not to commence Mrs Carrick on diuretic mediation at that time, because:

    a. It was uncontroversial that TAVI was the definitive treatment for Mrs Carrick's heart failure symptoms. Mrs Carrick was in the process of having this scheduled on an emergent basis.

    b. In context of chronic heart failure, clinical examination of Mrs Carrick by a cardiologist (Dr Putrino) with the TAVI procedure coordinator on 14 December 2018 did not identify signs or symptoms of overt heart failure. Although the clinical record does not reflect that finding on examination, there is no reason to doubt Dr Putrino's evidence on this issue.

c. Consistent with that assessment is a further assessment undertaken by a cardiothoracic surgeon three days later, on 17 December 2018. A two-page entry in the clinical record relevantly evidences that on physical examination ('*O/E'*), Mrs Carrick's chest was clear on auscultation ('*chest clear'*) with the presence of heart sounds ('*HS 1 ~ 1 Apex'*) consistent with aortic stenosis, and no oedema ('*no oedema'*).

d. A Chest X-ray (CXR) performed one month later on 14 January 2019 was reported as showing '*small to moderate bilateral pleural effusions'*, without Mrs Carrick having had diuretic therapy.

e. Although there were competing theories between Drs Hossack and Camuglia about the amount of fluid build-up dependent upon whether a patient was positioned supine or upright for the imaging, ultimately, I consider this cannot be viewed in isolation. In making an assessment of a patient, clinicians have regard to a number of factors including the patient's presenting problem, their self-report, the results of a clinical examination undertaken and investigations.

f. Dr Camuglia's opinion was that diuretic therapy has not been shown to have any effect on morbidity or mortality, although it may improve symptoms. Low blood pressure from diuresis may also create a risk of falls. Patients like this have narrow aortic valves, meaning that changes in their volume state can have a much more profound effect. On balance, his view was that he would not have commenced diuretics on Mrs Carrick although it would not have been unreasonable to either. In his view, Mrs Carrick probably had heart failure for months and months and value replacement was the therapy she needed.

> '*Whether or not she's got slightly more fluid on one x-ray or another doesn't change the syndrome severe aortic stenosis with-with cardiac failure. And you can make differences in degree of fluid retention based on medication changes or intake even on a day-to-day basis. I-I don't think its material in any way to her assessment or management'*.

I accept that opinion.

Expedition of the TAVI

44. On behalf of Mrs Carrick's family, it was submitted that they should have been involved in discussions to support and advise their mother to remain admitted as per Dr Putrino's suggestion, given her age, frailty, and state of health. Had they been involved, it was submitted they could have assisted in supporting her so that the TAVI could have been expedited.

45. In the absence of evidence that Mrs Carrick lacked capacity to make her own health care decisions, I am unable to accept that submission. On the contrary, the record demonstrates that Mrs Carrick gave consistently clear instructions during her various episodes of care, despite the efforts of TPCH staff to advance the recommended treatment and care.

46. By way of example, it was documented in the clinical record on 24 November 2018 that Mrs Carrick declined admission on that occasion, reporting that she was '*concerned re long stay away from Husband who has Parkinsons & elderly dog- no one to assist'*. The admission was delayed to enable her to make respite arrangements for her husband. This meant that her TAVI procedure work up did not commence until 11 or 13 December 2018. At her subsequent review by Dr Putrino on 14 December 2018, Mrs Carrick again declined admission to explore the possibility of an earlier TAVI, despite an extensive bedside discussion in the presence of a TAVI nurse, so that she could return home to her husband.

47. Thereafter, Mrs Carrick was reviewed by further cardiac clinicians, including a cardiothoracic surgeon and the MDT; none of whom determined that an expedited TAVI procedure was indicated.

48. Further, whilst '*in an ideal world*' Dr Camuglia stated that a TAVI procedure would occur within 30 days, he suspected that TPCH was unable to do so due to resourcing. This is particularly understandable given the time of year these events unfolded.

49. More broadly, neither expert criticised the urgency within which the TAVI procedure was arranged in this case. Dr Hossack's criticism was focused on treating the symptoms of pre-procedure heart failure by diuretic medication. In Dr Camuglia's view, the TAVI was '*eminently timely'*, an opinion which I accept.

50. On that basis, the evidence does not support that the TAVI procedure ought to have been expedited. I find accordingly.

31 December 2018

51. In relation to the telephone call from the Percutaneous Valve Program team member (likely a nurse) to Mrs Carrick on 31 December 2018, Dr Hossack was critical that Mrs Carrick was encouraged to see her GP for *'?diuretics*.' He noted that obtaining an appointment with a GP on New Year's Day was not practical.

52. I do not accept that it was reasonable for TPCH staff to arrange for Mrs Carrick to be commenced on diuretic medication on this occasion, when considering the following context:

    a. It was documented that Mrs Carrick denied that she had peripheral oedema, presumably in response to being questioned about this by the team member.

    b. Two separate cardiology consultant assessments having been undertaken two weeks earlier (14 and 17 December 2018) did not identify symptoms of overt heart failure such that diuretic medication was indicated.

    c. Definitive treatment by TAVI procedure was scheduled for 15 January 2019.

53. Instead, Mrs Carrick was advised to see her GP for consideration of whether diuretic medication was appropriate, not necessarily on that day, which I do not consider to be unreasonable in the circumstances. I find accordingly.

54. In reaching that conclusion, it is worth noting the following:

    a. When Mrs Carrick did consult her GP on 8 January 2019, he documented following an examination '*vhest clear today* (sic)', '*nobvious* (sic) *fluid retention'*, that Mrs Carrick's '*BP low today*' and that she was '*not really candidate for lasix'*.

    b. The CXR findings of 14 January 2019.

7 January 2019

55. In relation to the TPCH ED presentation on 7 January 2019, both Dr Hossack and Dr Camuglia considered that Mrs Carrick's presentation, after she had called the Cardiology Department, was consistent with worsening heart failure.

56. The ED doctor (Dr Peter Rizzo) did not personally attend upon Mrs Carrick but did have information available to him from the ED notes, an electrocardiogram

(ECG) and a discussion with other members of the ED team. Based on that information, he approved discharge of Mrs Carrick.

57. Both experts and the treating cardiologist stated that they would have expected some form of communication (a phone call or discharge letter) about the ED presentation. This *may* have then led to the TAVI being expedited or at the least, administering diuretic medication for symptom relief in the interim.

58. In assessing whether the ED doctor should have diagnosed and treated heart failure at this time, it is appropriate to consider the context of the presentation, as follows:

    a. Mrs Carrick presented to the ED on a Monday evening and was triaged at 17:19 hours, which was ordinarily a busy time in the ED.

    b. Mrs Carrick's daughter had arrived in the ED whilst Mr Carrick was in the queue of patients waiting to be seen by a doctor.

    c. In the interim, Mrs Carrick had been seen by other ED team members including nurses and a social worker, had had investigations undertaken and admitted to the Short Stay Unit for monitoring.

    d. Mrs Carrick was noted to be '*keen to return home to Hsb, stating worried about him & always worries about him'*.

    e. Mrs Carrick advised ED staff that she was seeing her GP the following day for '*fluid of feet*.'

    f. The primary focus of an ED practitioner during a busy evening shift would naturally be on urgent and life-threatening presentations, whereas Mrs Carrick's heart failure was long-standing and progressive, in circumstances where she had definitive treatment (TAVI procedure) scheduled in 8 days' time.

    g. According to Dr Camuglia, TAVI procedures were '*still sort of exotic-ish'* at that time, that there were wait lists and it was relatively under resourced, but it might be reasonable for an ED doctor to know there was specialist follow up for this.

59. Given the context of the presentation, I am not satisfied that it was a missed opportunity to diagnose and treat Mrs Carrick's worsening symptoms of heart

failure, whilst in the ED or by communication to the Cardiology Department, and find accordingly, because:

a. Although Dr Rizzo accepted in cross examination that the presentation and history of shortness of breath (worsening over the previous three weeks) and ankle swelling (which had developed over the previous three days) were sufficient for him to have considered heart failure as a cause of her presentation, it was nevertheless reasonable not to diagnose and treat symptoms of heart failure in circumstances where:

    i. He considered the '*whole package'* of the presentation, including her emotional state which seemed to have been as a result of carer stress. Shortness of breath can be a symptom of anxiety.

    ii. She reported that ankle oedema was '*normal*' for her.

    iii. He was reassured by Mrs Carrick's improved status over the course of a three-hour episode of care in the ED, both from a cardiac and emotional perspective.

    iv. He was aware of the following ongoing care being in place:

        1. She was awaiting an aortic valve replacement on an emergent basis and thus was known to the Cardiology Department. In the context of untreated aortic stenosis, it is not unusual for a patient to present with shortness of breath and swollen feet and ankles.

        2. She reported she would consult her GP the following day.

    v. She reported that she was feeling better and wanted to go home to her husband. In the absence of evidence of incapacity, there was no basis to detain her. The ED is '*not a prison*'.

    vi. A call to the Cardiology Department would unlikely have changed anything that night. The Cardiology Department would have become aware of the ED presentation by:

1. The ED entries in the clinical record.

2. His discharge summary of the presentation.

3. Her self-report, in communications with the Cardiology Department.

b. The Cardiology Department through the TAVI procedure nurse (confirmed by Dr Putrino to be part of the Cardiology Department), was in fact aware of the ED presentation, because:

i. Mrs Carrick called the Cardiology Department about her shortness of breath on 7 January 2019, and was advised to call 000 which led to her ED presentation.

ii. By way of follow up, the TAVI nurse called Mrs Carrick on 8 January 2019, at which time it was documented that Mrs Carrick reported that she was '*feeling improved'*, and that she was '*happy to proceed*' with her admission for the TAVI procedure scheduled for 14 January 2019.

c. According to Mr Carrick's treating cardiologist, Dr Putrino:

i. TAVI nurses are '*very experienced, diligent'* and escalate when necessary.

ii. Mrs Carrick looked well and her oxygen saturation levels in the ED were acceptable.

60. After the hearing a statement was tendered on behalf of TPCH, stating that there was a cardiology Principal House Officer/Registrar available to accept referrals from the ED at the time, had such a referral been made. However, given the timing of this evidence, this was not explored with Dr Rizzo.

61. In any case, I am not satisfied that a failure to diagnose and treat symptoms of heart failure made any difference to the outcome, and find accordingly, having regard to the following additional factors:

a. Mrs Carrick also saw her GP on 8 January 2019, who did not consider her a candidate for diuretics because of her blood pressure (see paragraph 54 above). Mrs Carrick's GP knew her well, having been her

regular GP for many years, and as such was best placed to know Mrs Carrick's general state of health.

b. The evidence does not go so far as to say that a doctor in the Cardiology Department, with knowledge of Mrs Carrick's condition over time, would have made a different decision on that occasion. Nor is there specific evidence on the state of the TAVI procedure list and available procedural cardiologists informing on the option to undertake an additional procedure in advance of 15 January 2019, had it been indicated. This is particularly so at that time of year.

c. Ultimately, even if Mrs Carrick had been commenced on a diuretic at the time of, or soon after, her ED presentation on 7 January 2019, it would only have added less than a week of pre-procedural diuresis. Given the uncertainty expressed by Dr Hossack about how much earlier diuresis would have contributed to a better outcome, bearing in mind Dr Hossack was considering the effect of diuresis from about 14 December 2018, the evidence leaves it only as a possibility that pre-TAVI procedure diuresis would have altered Mrs Carrick's outcome. I rely on my findings above about the overall utility of diuresis, in the context of definitive treatment (TAVI procedure) scheduled on an emergent basis.

d. Relevantly, Dr Hossack did not go so far as to state that Mrs Carrick's presentation warranted the scheduling of a TAVI procedure on an emergency basis between 7-14 January 2019. The TAVI procedure was the definitive treatment for Mrs. Carrick's heart failure.

Post TAVI

62. In addition to the failure to administer diuretic medication in treatment of Mrs Carrick's heart failure, Dr Hossack was also critical of TPCH staff for failing to treat Mrs Carrick with percutaneous drainage.

63. Percutaneous drainage is an invasive treatment where a needle is inserted into the chest under imaging guidance, in order to drain fluid off the lungs. The procedure is associated with risks and complications, notably bleeding. In the context of anticoagulation, this could be risky.

64. Dr Camuglia noted that percutaneous drainage would require cessation of anticoagulation. In oral evidence, Dr Hossack said that first stage treatment of

fluid retention due to heart failure would be diuretics and if that did not work, then he would consider drainage. Dr Putrino said that percutaneous drainage is almost never performed in practice and carries substantial risks which make it unsuitable (‘*a dangerous practice’*).

65. Ultimately, Dr Hossack did not advocate that Mrs Carrick should have been progressed to percutaneous drainage post her TAVI procedure, and Dr Camuglia’s evidence of the need to stop anti-coagulation to do so makes it less likely that this was a real option.

66. On that basis, I do not consider that percutaneous drainage was a viable option, and otherwise rely upon my findings above in paragraphs 43, 49, 50, 53, 59 and 61. I find accordingly.

Did a failure to implant a pacemaker contribute to Mrs Carrick’s death?

67. Dr Hossack opined that Mrs Carrick should have had a pacemaker inserted following the TAVI procedure and that this would have increased the likelihood of Mrs Carrick surviving a pulmonary thromboembolism. Dr Camuglia considered that pacemaker decisions involve sub-specialist electrophysiological knowledge and that he would defer to the judgment of the electrophysiologist involved in Mrs Carrick’s care, cardiologist Dr Russell Denman.

68. Dr Denman stated that, had he reviewed two ECGs taken on 21 January 2019, he would have recommended that Mrs Carrick remain admitted to TPCH and have a pacemaker inserted. Given his expertise together with Dr Hossack’s opinion on a pacemaker being indicated, I accept this issue and conclude that as at 21 January 2019, Mrs Carrick was a suitable candidate for a pacemaker.

69. Expert evidence on whether having a pacemaker would have changed the outcome differed to some extent, and is relevantly summarised as follows:

    a. Dr Denman:

        i. Agreed with Dr Hossack, to some extent, that a pacemaker could have improved Mrs Carrick’s chances of surviving a pulmonary thromboembolism.
        ii. Also stated however, that it may not have.

iii. Also stated that, if arrhythmia was the cause of Mrs Carrick's death (which cannot be excluded), a pacemaker would likely reduce the likelihood of this occurring.

iv. Qualified this in cross-examination, explaining that, if pulmonary thromboembolism was the cause of death, he suspected that a pacemaker would not have made an enormous difference to her chance of surviving, but it was hard to say. If an arrhythmia caused Mrs Carrick's death, the effectiveness of a pacemaker would depend on the type of arrhythmia. A bradyarrhythmia (slowing of the heart until it stops) would have been helped by a pacemaker, although he did not think that was a likely course. On the other hand, a rapid ventricular arrhythmia would not have been prevented by a pacemaker.

b. Dr Camuglia agreed with Dr Denman's ultimate conclusion that a pacemaker most likely would not have prevented death from a pulmonary thromboembolism.

70. I have found that pulmonary thromboembolism was the cause of Mrs Carrick's death. The evidence suggests that a pacemaker, of itself, would not have prevented Mrs Carrick's death on 22 January 2019. It would remain only a possibility, based on the inability to exclude an arrhythmia as Mrs Carrick's cause of death. However, Dr Denman could only state with confidence that a bradycardic arrhythmia would have been prevented by a pacemaker, but that a bradyarrhythmia is unlikely to have occurred. On the state of the evidence on this issue I find that ultimately, a pacemaker would only have left Mrs Carrick with a small increased chance of having her life prolonged beyond 22 January 2019.

71. It may be that, had Mrs Carrick remained in hospital on 22 January 2019 awaiting or following the pacemaker insertion, her chances of survival might have improved by virtue of being in hospital. However, this would only be coincidentally related to her having a pacemaker inserted.

72. I acknowledge the submissions made on behalf of the family to the effect that further communication from TPCH about care arrangements following discharge would have resulted in someone being present when Mrs Carrick collapsed at home on 22 January 2019, thereby increasing her prospects of

survival from pulmonary thromboembolism and/or cardiac arrhythmia. However, because discharge planning was not within the scope of coronial issues, it was not explored at Inquest by way of factual or expert evidence. The family can, however, take some comfort from the evidence of Dr Graham, that a Communicating for Safety Policy: 002043 effective July 2022, is in place. Relevantly, it specifies that carers and families are to actively contribute to plans and communications about their care.

Was the decision to discharge Mrs Carrick on 21 January 2019 appropriate?

73. The question of whether Mrs Carrick should have been discharged on 21 January 2019 involves two aspects:

    a. Whether Mrs Carrick's heart failure contraindicated discharge.

    b. Whether Mrs Carrick should have remained admitted for further electrophysiological review prior to discharge.

74. Both Dr Hossack and Dr Camuglia agreed that, had Mrs Carrick been in hospital at the time of suffering a pulmonary thromboembolism, her chances of surviving would have been improved, but the extent to which such outcome would have been improved remained in dispute.

Did Mrs Carrick's heart failure contraindicate discharge?

75. The experts differed in their opinions on this issue as follows:

    a. Dr Hossack stated that it would have been prudent to prolong Mrs Carrick's hospitalisation until her heart failure had resolved completely. He agreed that a weight loss of three kilograms over the course of Mrs Carrick's week-long admission indicated that diuretics (and the TAVI procedure) were having an effect, but he disagreed that this was a good effect given Mrs Carrick's ongoing swelling. Based on his experience, Dr Hossack thought that additional rest in hospital would have been very beneficial to helping Mrs Carrick's heart failure resolve.

    b. Dr Camuglia considered it '*not unreasonable'* to discharge patients home before being euvolemic, referring to a normal baseline body fluid state. He emphasised the risks of keeping people in hospital when the treatment to be provided, being medication and leg elevation, can be

given in the community. He noted that the risks of remaining in hospital, based primarily on it being an environment that discourages mobilising, include DVT and pulmonary thromboembolism.

76. Factual evidence informing on this issue is relevantly summarised as follows:

a. Dr Jijo Antony, cardiology registrar, who attended Mrs Carrick for the discharge review, stated (based on his review of the records, without an independent recollection) that by 21 January 2019, Mrs Carrick's fluids had significantly reduced, as evidenced by his note in the records that she had lost 3 kilograms during her admission. Dr Antony acknowledged that Mrs Carrick's pedal oedema had not fully resolved at the time of discharge but considered this to be manageable in the community with oral medication. This is consistent with Dr Camuglia's opinion.

b. Dr Dale Murdoch's evidence was that the overall impression was that Mrs Carrick's oedema was improving. Ultimately, his evidence as a whole was that he was not critical of the decision to discharge Mrs Carrick, except insofar as the 21 January 2019 ECGs was concerned.

c. At discharge, Mrs Carrick's family state that her feet were unable to fit into larger size shoes that Ms Langdon had bought for her. Mrs Carrick was led out of TPCH in a wheelchair, although Dr Antony noted that patients are often transported inside the hospital in a wheelchair, something that I observe is not unusual in ordinary experience.

d. A nursing note from 18 January 2019 documents that Mrs Carrick was '*independent with ADLs* [activities of daily living]' at that time but needed a small level of assistance getting in and out of bed. Dr Antony considered that the observation of Mrs Carrick being independent with ADL to be the more relevant fact, given pneumatic hospital beds can be difficult to get in and out of.

e. A nursing note on 21 January 2019, following Dr Antony's review stated '*pt seems ?inappropriate at times/confused'*. Neither Dr Hossack nor Dr Camuglia thought that this was material to the decision to discharge given there had not been any broader concerns about Mrs Carrick's mental state. Ms Langdon, who saw her mother in the morning of 22

January 2019, did not observe her mother to be disoriented that day, but rather tired. Dr Camuglia stated that delirium is a risk for elderly patients in unfamiliar environments such as a hospital and that familiar environments assist with this.

77. I do not accept the submission on behalf of the family that Mrs Carrick's heart failure had not resolved by the time of discharge such as to contraindicate her discharge, in circumstances where:

    a. The medical record does not substantiate the family's account of the additional symptoms reported by Ms Langdon.

    b. The medication chart evidences that Mrs Carrick was administered 40mg intravenous diuretics on 16 January 2019, the first day after her TAVI procedure. Further doses were administered thereafter.

    c. A CXR undertaken on 20 January 2019 was reported as showing a reduction in the volume of the left basal effusion compared with the CXR performed on 14 January 2019, which was to be expected as a result of the TAVI.

78. Whilst with the benefit of hindsight, it may have been beneficial for Mrs Carrick to have remained in TPCH whilst continuing to recover from her heart failure symptoms, the following factors are relevant:

    a. The decision to discharge needs to be viewed in light of Dr Camuglia's unchallenged evidence that the average length of stay after a TAVI is 2.5 nights, which is down to 1.5 nights at Metro South Hospital and Health Service where he works. Seen in this context, Mrs Carrick had in fact remained admitted at TPCH well beyond the usual timeframe after her TAVI procedure, before she was discharged.

    b. It is significant that Mrs Carrick presented to Dr Antony (based on his note in the record) as being '*desperate to go home'*. There is no evidence that she lacked capacity to make her own health care decisions. Against that background, there was no basis to keep her at TPCH against her will. Dr Camuglia agreed that such a decision is made in consultation with the patient and that there was nothing to suggest that Mrs Carrick lacked competence to make decisions. The submission by the family about the accuracy or representation of Dr Antony's entry

of Mrs Carrick wanting to go home is not accepted, when viewed in the context of Mrs Carrick having to recover post procedure without having care commitments.

79. Even if, as Dr Hossack suggests, it would have been beneficial for Mrs Carrick to have further time in hospital, I accept the evidence of Dr Camuglia that this needs to be weighed against the reasons why it was not in Mrs Carrick's interests to remain in hospital. Additionally, careful consideration needs to be given to the equitable use of resources in public sector health facilities where resources are not unlimited.

80. On that basis, I agree that there was justification for Dr Antony (possibly in consultation with consultant Dr Murdoch) agreeing to Mrs Carrick's request to be discharged home having regard to the state of her heart failure and find accordingly.

Should Mrs Carrick have remained hospitalised for electrophysiology review?

81. Dr Denman stated that the electrophysiology team should have continued to review Mrs Carrick's clinical course following his review on 18 January 2019. Based on Dr Denman's opinion, it is apparent that Mrs Carrick likely would have been fitted with a pacemaker had she remained at TPCH for further electrophysiological review.

82. Dr Denman frankly admitted that his note of his electrophysiology review of Mrs Carrick was suboptimal in terms of a failure to clearly articulate that a pacemaker was not required '*at this stage*', when he ought to have documented that she was to undergo a further electrophysiology review before a final decision was made prior to discharge. Given his entry was likely to be followed by more junior staff, he acknowledged the need for clarity in his handwritten entry was greater. I acknowledge and accept that admission, which Dr Denman made against interest.

83. Dr Denman's note of 18 January 2019 is also significant because, based on Dr Denman's evidence, an ECG taken on 21 January 2019, about an hour before Dr Antony's discharge review, contained significant abnormalities. In particular, Dr Denman stated:

    a. The ECG indicated shows atrial fibrillation, complete heart block, prolonged QT interval, T wave inversion and complex ventricular ectopy.

b. If he had reviewed or seen the ECG of 21 January 2019, before Mrs Carrick was discharged, he would have in all probability recommended a pacemaker prior to discharge.

84. The context in which Dr Antony came to review Mrs Carrick at about 14:00 hours on 21 January 2019 insofar as the consultant and expert evidence is concerned, is as follows:

a. Dr Denman clarified in oral evidence that, of the two ECGs taken on 21 January 2019 (at 12:57:15 and 12:57:45 respectively) the ECG of 12:57:15 '*really*' concerned him.

b. Treating Cardiologist Dr Murdoch agreed that the ECGs of 21 January 2019 were concerning, should have informed a decision to discharge, and warranted being brought to a consultant's attention.

c. Dr Camuglia, comparing the ECGs of 21 January 2019, and an ECG of 17 January 2019 (prior to Dr Denman's review) did not think that the difference was so substantial that it would justify him asking for a further electrophysiological review when one had been done on 18 January 2019.

d. Dr Hossack, on the other hand, thought that the heart rate of 45 was very abnormal given it had been 60 on 17 January 2019.

85. Dr Antony's evidence is as follows:

a. His signature is shown on the ECG of 12:57:45 on 21 January 2019. Dr Antony did not recall signing the ECG but accepted that he had. He could not say when he did so but was unable to offer any reason why he may have done so after Mrs Carrick's review at 14:00 hours and accepted it is most likely that he looked at the ECG of 12:57:45 at or before 14:00 hours. The fact the ECG of 12:57:45 shows a heart rate of 45, which matches the heart rate documented in Dr Antony's note of 14:00 hours, lends further support for a conclusion that he viewed that ECG at about the time of reviewing Mrs Carrick. I accept that is so.

b. He was unable to say, based on having signed the ECG of 12:57:45, whether he also viewed the ECG of 12:57:15. He thinks that, had he reviewed both, he would have initialled both.

c. Dr Antony disagreed that the ECGs of 21 January 2019 contained new clinically significant information. He stated that the ventricular ectopy shown at 12:57:15 on 21 January 2019 was also seen on an ECG printed on 18 January 2019 at 03:28:01 (the time of which is unstated on the ECG itself).

d. Dr Antony also noted that an ECG of 15 January 2019 was very similar to the ECG of 21 January 2019 in that it showed bradycardia (52 bpm on 15 January 2019, as compared to 45 bpm on 21 January 2019), a right bundle branch block, and atrial fibrillation.

e. Dr Antony noted that an ECG on 16 January 2019 showed a left bundle branch block whereas the ECGs of 15 January 2019 and 21 January both showed right bundle branch blocks. This instability was consistent with electrophysiology review being requested around that time. He further noted that records on 18 January 2019, prior to Dr Denman's review, referred to Mrs Carrick being bradycardic, and formed the view that Mrs Carrick's bradycardia was stable.

f. Dr Antony also, relevantly, says that his practice at the time of his review on 21 January 2019 was to discuss each patient with a consultant before discharge. This is despite Dr Antony, at that time, having qualified as a cardiologist (being a Fellow of the Royal Australasian College of Physicians), and being about to commence a position as a fellow in advanced digital echocardiography (a role in which Dr Antony would be trained in a sub-specialist capacity). Unfortunately, Dr Antony did not make any written record of having spoken to a consultant about Mrs Carrick, when he should have.

86. While it seems that there is no formal assignment, Mrs Carrick was admitted under Dr Murdoch's name as the cardiologist that performed her TAVI procedure (with Dr Karl Poon). Dr Murdoch was working at TPCH at the time of Mrs Carrick's discharge and was the most likely consultant that Dr Antony would have spoken to.

87. Dr Murdoch stated that practice was variable with respect to registrars speaking to consultants before approving discharge of a patient. He stated that this reflected the wide range of skill levels and training experience of registrars, with some further along in their training being more confident in their decision-

making. Dr Murdoch said that, if such a discussion occurred, there would usually be a record of it at TPCH, in his experience.

88. It was Dr Putrino's experience that patients would be discussed with a consultant when discharged.

89. I find that both ECGs of 21 January 2019 were clinically significant, because:

    a. Drs Denman and Murdoch both agreed that they were. In Dr Denman's case, this admission is against interest, given his concessions about not communicating the expectation of further electrophysiological review. Dr Murdoch was of course the treating cardiologist ultimately responsible for Mrs Carrick's care.

    b. Dr Camuglia's opinion, insofar as it disputed the clinical significance of the 21 January 2019 ECGs, is less compelling than the evidence of Dr Denman, given it is against interest, and in particular given Dr Denman's sub-specialist practice in electrophysiology. This is particularly so given Dr Camuglia deferred to Dr Denman's expertise in this respect.

    c. Dr Hossack views them as abnormal such that he would have asked for a pacemaker to be inserted.

90. The fact Dr Denman considered the ECG of 12:57:15 more concerning than the ECG of 12:57:45 is significant because Dr Antony did not sign the ECG of 12:57:15. It is ultimately difficult to positively conclude that Dr Antony saw it. While it intuitively seems sensible that, having reviewed one of two ECGs taken in close succession, he would review the other, the only fact from the ECGs which made it into his notes seems to be the bradycardic heart rate of 45 shown on the 12:57:45 ECG. In support of the proposition that Dr Antony did not see it, is the fact that he did not sign the 12:57:15 ECG. Why he would sign one and not the other could be explained by him not having seen it and hence not being aware of it. On balance, I therefore conclude that Dr Antony probably did not see the ECG of 12:57:15.

91. It is equally difficult to make any concluded finding about whether Dr Antony discussed the discharge with Dr Murdoch. Dr Antony says he would have, but he was also as senior as a registrar could be at the time and Dr Murdoch's evidence was that some of his registrars, particularly more experienced

registrars, were able to make such decisions independently. In any case, given Dr Murdoch's view that the ECGs of 21 January 2019 were significant, and Dr Antony's view that they were not, I find it is more likely than not that, if Dr Murdoch was contacted, he was not given all of the information contained in the ECGs.

92. Having reached the above conclusions, it is important to view Dr Antony's role in the context of Dr Denman having already reviewed Mrs Carrick 3 days earlier, with known electro-conduct abnormalities post TAVI procedure, and not having indicated that she should receive further electrophysiological review. Had Dr Denman communicated his intention more clearly, Dr Antony would not have been put in the position of conducting a discharge review on a patient with electrical disturbances who, from his perspective, had been determined by an electrophysiologist not to require a pacemaker at that time. Dr Denman himself acknowledges this. Against that background, Dr Denman's note might more properly be regarded as a root cause of Mrs Carrick being discharged without further electrophysiological review.

93. Additionally, what remains unexplained in evidence is the state of the clinical record at the time, considering the limitations and filing delay associated with paper-based records, namely whether both ECGs were in fact contained within the clinical record at the time of Dr Antony's review.

94. Having regard to those factors, I am unable to conclude that Dr Antony failed to appreciate and communicate relevant clinical information to a consultant before discharging Mrs Carrick. Based on Dr Murdoch's evidence, this likely led to Mrs Carrick being discharged earlier than she otherwise would have.

95. Ultimately however, as found above at paragraphs 70 and 71, a pacemaker is unlikely to have prevented Mrs Carrick's death from pulmonary embolism on 22 January 2019, but it is possible her presence in hospital to undergo and recover from the pacemaker implant may have improved her chance of survival. As to the extent of such survival, I accept Dr Camuglia's opinion that it would have been very limited.

Recommendations in accordance with Sections 46 CA

96. It is possible that with the benefit of hindsight, some aspects of Mrs Carrick's care and treatment could have been improved which in turn may have improved Mrs Carrick's outcome. In my view, these centre around communication:

    a. Dr Denman's ambiguous note in the record on 18 January 2019 set the scene for incorrect interpretation by more junior staff. He frankly admitted this, against interest, stating that a more accurate reflection of his review was '*not for pacemaker at this stage'*. Had this been appreciated from an accurate note, it would have led to a further review before discharge and the insertion of a pacemaker.

    b. Dr Antony, had he appreciated the significance of the 21 January 2019 ECGs, could have escalated the information to Dr Murdoch or Dr Denman and prompted the further electrophysiological review prior to Mrs Carrick's discharge.

Dr Denman

97. The ambiguity in Dr Denman's note, being whether a decision '*at this stage*' was conclusive for the purposes of Mrs Carrick's referral to him, is perhaps more apparent in hindsight than it would have been to Dr Denman at the time.

98. It is commendable that Dr Denman was frank in his evidence about his role in the circumstances and the opportunity to reflect and improve on his practice. Relevantly, in his statement dated 1 August 2024, he stated:

> *'There are clearly opportunities to improve this ongoing review process from a consultation and documentation point of view and changes have been made in my practice in relation to this. This includes changes in way I document in the charts to make it clear to all that definitive decisions have not been made. Changes in how my registrars follow patients following initial consultations, I have made it very clear to them that ongoing review is expected until definitive management decisions have been made This includes a brief electronic database of all consultations with a diagnosis and an outcome recorded. (Excel spreadsheet). I have attempted to increase the education around ECG interruption.'*

99. Confounding communications between staff is the fact that the records at TPCH in January 2019 were largely paper based. It was suggested to Dr Denman that an electronic medical record would have improved the legibility

and understanding of his note of 18 January 2019. Dr Denman agreed insofar as it might have been more legible, but fairly pointed out that the underlying issue of ambiguity arose from the content of his record, not its legibility.

100. In any case, Dr Graham, on behalf of TPCH, has confirmed that the ieMR is presently being introduced across Queensland Health facilities and that TPCH is scheduled to implement this technology in 2027. The effect of this is that healthcare professionals across the service can simultaneously access and update patient information in typewritten form, which in turns provides clinicians with relevant, up to date and legible information within which to make accurate and timely care and treatment decisions.

101. An ieMR system has broader application in terms of potential improvements to other communications which occurred in the various episodes of care in this case, which might have otherwise been avoided by paper-based delays.

102. I acknowledge the submission made on behalf of Mrs Carrick's family for the ieMR system to be expedited as a matter of priority (before 2027). As this issue was outside the scope of the issues for Inquest, the practicalities and resourcing associated with such expedition as against other competing priorities were not explored in evidence. However, according to an internet search on this issue, the Queensland Health rollout has been significant with multiple facilities across Queensland already having ieMR implemented. TPCH remains one of the facilities targeted as a future site. In the circumstances, I am unable to take this any further.

103. Having regard to the evidence of Dr Denman concerning improvements in his communication, change in practice and his leadership role in education, and the evidence that an ieMR system is being introduced at TPCH, I do not consider any recommendations are necessary in respect of these matters.

Dr Antony

104. Insofar as Dr Antony's role in discharging Mrs Carrick is concerned, as stated above, it must be viewed in the context of Dr Denman's review and note in the clinical record.

105. Dr Graham has stated that TPCH is developing a procedure, Escalation of Clinical Concerns by Medical Officers. However, I note that Dr Graham has also referred to the Royal Australasian College of Physicians' Curriculum

Standards for Advanced Training in Cardiology (Adult Internal Medicine) which provides:

> *'The Curriculum Standards provide guidance around the accepted standards for supervision of trainees and clearly articulate the relationship between trainee Cardiologist and Consultant. It emphasises a graded approach to developing an independent functioning Consultant by the end of their training. Consistent with the Curriculum Standards, it is expected that decision-making by a trainee progresses to being autonomous, without needing vetting by a Consultant.'*

106. This passage is consistent with Dr Antony, given he had in fact finished his training requirements to be a cardiologist, being a suitable person to make an independent decision about Mrs Carrick's discharge, if that is in fact what occurred. His experience and level of supervision does not, in my view, present as a significant issue in this case.

107. Metro North Health has otherwise introduced other continuous improvement initiatives relevant to Mrs Carrick's case, including particular training for cardiology registrars on the interpretation of ECGs.

108. Insofar as the limitations of a paper-based record is concerned, I repeat and rely upon my finding above insofar as they are relevant to Dr Antony's access to both ECGs before discharging Mrs Carrick.

109. I also acknowledge that the issue of the clinical significance of the ECGs arose quite late in these proceedings (2 business days before the Inquest opened), giving Dr Antony little time to prepare and present evidence about this highly technical issue in Court.

110. With this in mind, the authorities give guidance that I must exercise caution before any comments of an adverse nature against a person are made. Given the identified root cause of Mrs Carrick's discharge, I am not satisfied to the requisite standard that the making of any comment affecting Dr Antony could safely be made.

111. Ultimately, Dr Denman (to whom Dr Camuglia deferred) accepted that he was not critical of Dr Antony in discharging Mrs Carrick if the first of the two ECGs was not seen. Dr Murdoch agreed.

112. Additionally, it is not lost on me that Dr Antony was not the only staff member of the wider cardiac team who had access to the ECGs before discharge and

did not escalate. However, Dr Denman stated that the level of ECG competency is variable, dependent upon practitioner scope of practice.

113. Having regard to the above, I consider there are no matters which could be meaningfully addressed by the making of recommendations. Instead, I would encourage staff involved in Mrs Carrick's care to take the opportunity to reflect on their clinical practices, as already done by Dr Denman.

Concluding Comments

114. Mrs Carrick underwent a TAVI procedure to improve her quality of life and extend her life expectancy, against the background of progressive heart failure and other comorbidities. The procedure was undertaken at a specialised public hospital facility within about one month of a MDT endorsement that a TAVI procedure was indicated, despite the intervening Christmas/New Year period. Tragically, after a 7-day inpatient admission during which a wide number of cardiology professionals were involved in her care, Mrs Carrick suddenly passed away at home on the day after discharge, due to pulmonary thromboembolism; one of the many risks inherent in embarking on this treatment course.

115. In memory of Mrs Carrick, a collage of photographs was displayed whilst Mrs Carrick's daughter read out a family statement on the last day of the Inquest. Suffice to say that the statement was heartfelt and sincere. It is clear that the loss of Mrs Carrick has had a devastating impact on those left behind.

116. I offer my sincere condolences to Mrs Carrick's family and loved ones. To the extent that it is able, it is hoped that these proceedings have addressed any concerns and assists in bringing a measure of healing.

Findings required by s. 45(2) CA

I make the following findings:

Identity of the deceased – Audrey Yvette Carrick

How she died – Sometime between 12:33 hours and 15:11 hours on 22 January 2019, while at home on the first day following discharge from TPCH to undergo a TAVI procedure, Mrs Carrick experienced a medical event related to her underlying cardiac pathology.

Place of death – The Village, Unit 147/274 Roghan Road TAIGUM QLD 4018 AUSTRALIA

Date of death– 22 January 2019

Cause of Death 1(a) Pulmonary thromboembolism, *due to, or as a consequence of*
1(b) Aortic stenosis (recent transcatheter aortic valve implantation)

Conclusion

I close the Inquest.

Carol Lee
Coroner
BRISBANE