CORONERS ACT, 2003

SOUTH *AUSTRALIA*

FINDING OF INQUEST

An Inquest taken on behalf of our Sovereign Lady the Queen at Adelaide in the State of South Australia, on the 3rd day of September 2019 and the 30th day of October 2020, by the Coroner's Court of the said State, constituted of David Richard Latimer Whittle, State Coroner, into the death of Hank Jakob Velt.

The said Court finds that Hank Jakob Velt aged 65 years, late of 45 Gower Street, Glenelg East, South Australia died at Ashford Hospital, 55 Anzac Highway, Ashford, South Australia on the 6th day of May 2016 as a result of ischaemic and hypertensive heart disease with contributing acute cholecystitis (operated). The said Court finds that the circumstances of his death were as follows:

1. Introduction

1.1. Hank Jakob Velt died at the Ashford Hospital, Ashford on 6 May 2016 aged 65 years. After admission on 29 April 2016, he had a laparoscopic cholecystectomy[1] and commenced recovery in a general ward. He suffered some post-operative complications including fever and shortness of breath, for which he was placed under the care of a general physician. A suspected infection was treated with antibiotics. After making satisfactory progress, he was being considered for release home.

1.2. On the morning of 6 May 2016 Mr Velt suffered chest pain, radiating to his jaw, which he reported to nurses, who conducted observations, which were normal, and then decided to conduct an electrocardiogram (ECG). His pain by then had passed. The two nurses could not properly interpret the graphs or traces shown on the screen and in the ECG printout. However, the machine itself provided an interpretation of the results

[1] Removal of the gall bladder

which included the statements 'Inferior infarct, acute (RCA)'[2] and 'Acute MI'[3], as well as 'abnormal ECG'. The nurses, who doubted whether those typed assertions were correct, decided to undertake another ECG, which stated in the interpretation section 'ST elevation, consider inferior injury' and repeated the words 'abnormal ECG'. Mr Velt was left in the care of a student nurse while the two nurses went to telephone the in-house on-call doctor[4], who asked them to fax him the ECG. There was a delay as the fax failed to send, during which time the student left Mr Velt. Whilst he was alone, Mr Velt's heart stopped. A cleaner noticed Mr Velt did not look well and raised the alarm. Attempts to resuscitate him were unsuccessful.

1.3. Evidence was heard in this inquest to the effect that following his episode of chest pain, early medical attendance and treatment would have given Mr Velt a good chance of long-term survival.

2. Cause of death

2.1. A post mortem examination was conducted by forensic pathologist Dr Cheryl Charlwood, who stated that Mr Velt's cause of death was 'Ia) ischaemic and hypertensive heart disease' and 'II acute cholecystitis (operated)'.[5] I therefore find that the cause of Mr Velt's death was acute ischaemic and hypertensive heart disease with contributing acute cholecystitis (operated).

2.2. To elaborate briefly on the cause of death, Dr Charlwood found mild ventricular hypertrophy and moderate and severe calcific coronary artery atheroma, predominantly in the left circumflex vessel, which was affected by at least 75% stenosis.

2.3. Further evidence was heard from Dr William Heddle, specialist consultant cardiologist, that the likely mechanism of death was that Mr Velt died following a ventricular fibrillation where, as a consequence of myocardial ischaemia, which predisposes the heart to abnormal rhythms, the heart function completely stops and the heart simply quivers, and if not immediately reverted by cardioversion (or defibrillation) the patient dies.

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[2] Right coronary artery
[3] Myocardial infarction
[4] On duty in another ward
[5] Exhibit C2a

3. Issues arising in the inquest

3.1. During the inquest I heard evidence as to the cause and circumstances of Mr Velt's death. On the basis of that evidence, I shall consider the actions of the nurses involved in Mr Velt's care and the doctor whom those nurses called seeking assistance in the interpretation of the ECGs they had conducted. I shall consider the systems and procedures of the hospital in which Mr Velt died with a view to making recommendations which might prevent the occurrence of similar deaths in the future. The systemic issues to be examined include:

- protocols and training of nurses in responding to chest pain;
- protocols and training of nurses in the significance of abnormal ECGs; and
- the criteria for calling a Medical Emergency Team (MET).

4. Witnesses

4.1. Two registered nurses, Nicoline Co and Zhen Xie, as well as student nurse Avril Derwent gave evidence. Also called was Dr Clinton Smyth, who took a telephone call from the nurses and asked them to fax an ECG printout. As it happened, he was also the doctor in charge of the Medical Emergency Team and, if a MET call had been made, would have attended Mr Velt in that capacity. Evidence was also heard from Dr Ashan Khurram, who was the physician called in to manage Mr Velt post-operatively, when he was showing signs of infection. Dr William Heddle, a consultant cardiologist, was called by the Court as an expert witness. He prepared a report and gave oral evidence.

5. Medical history and background to the events of 6 May 2016

5.1. On 29 April 2016, Mr Velt consulted his general practitioner, who referred him to the Ashford Hospital for investigation and opinion regarding acute cholecystitis, which had been causing him strong pain. The general practitioner advised the hospital of Mr Velt's relevant prior medical history, allergies and current medications. Importantly, that history included hypertension, for which Mr Velt was medicated.

5.2. At the Ashford Hospital, an abdominal ultrasound revealed an echogenic sludge obstructing the gallbladder neck. An ECG taken after his admission gave no cause for concern. A surgeon, Dr Trehan, conducted an uneventful laparoscopic cholecystectomy. An intraoperative cholangiogram also revealed a gallstone in the

biliary duct system, which was retrieved in a further procedure the following day. Mr Velt settled well in the High Dependency Unit and on 1 May 2016 was transferred to the Marleston Ward, a general pre- and post-surgery ward, to complete his recovery.

5.3. Two days after the operation, due to concerns about infection, Dr Trehan referred Mr Velt to consultant physician Dr Khurram, who saw Mr Velt on four occasions from 2 to 5 May 2016. Dr Khurram found that Mr Velt had febrile illness, together with lower respiratory tract infection symptoms and raised inflammatory markers found on a blood test. I heard detailed evidence from Dr Khurram regarding his treatment of Mr Velt in the days leading to his death. The principal focus for Dr Khurram's treatment of Mr Velt was the suggestion of pneumonia, for which he was treated with antibiotics. Blood tests were taken and reviewed daily and he regularly communicated with the surgeon, Dr Trehan, about Mr Velt's condition. Mr Velt's condition did improve. By 5 May 2016, Mr Velt was expressing concern to Dr Khurram about losing money every day as a result of being in hospital and not being able to work. He wanted to return home as soon as possible. Dr Khurram told Mr Velt that if remained fever free for at least 24 to 48 hours then he could go home on Saturday 7 May 2016. Dr Khurram ordered bloods to be taken on the next day, 6 May 2016 and planned to see Mr Velt early on the same afternoon.

6. Appropriateness of treatment prior to 6 May 2016

6.1. Mr Velt's treatment until the morning of 6 May 2016 was entirely appropriate and there has been no suggestion to the contrary.

7. Nursing staff responsible for Mr Velt's care

7.1. On the morning of 6 May 2016, Mr Velt's primary nursing care was provided on the Marleston Ward by Registered Nurse Zhen (known as Juliana) Xie. She has a Bachelor of Nursing from Flinders University, gained in 2008. She had worked at Ashford Hospital as a registered nurse for more than seven years, almost all of which was in the Marleston Ward. She was on early shift commencing at 7am. She was responsible for five pre- and post-surgery patients, including Mr Velt.

7.2. Nurse Xie's 'buddy' on the shift was Registered Nurse Nicoline Co, who graduated with a Bachelor of Nursing in the Philippines in 2008 and obtained registration in Australia in August 2012 after conducting a three year bridging program at the

University of South Australia. She too had worked at Ashford Hospital since registration. Nurse Co was also team leader of all the nurses on the ward.

7.3. Working with Nurse Xie was a student nurse, Avril Derwent. She was not inexperienced, having qualified from Flinders University in 1994 and then working as a registered nurse. In May 2016, after a ten-year career break, she was undertaking a three month refresher course with a view to renewing her registration as a nurse. She was undertaking supervised work at Ashford Hospital, in which capacity she was permitted to give medications and undertake observations under registered nurse supervision.

8. Entries in the hospital progress notes for 6 May 2016

8.1. On 6 May 2016, the progress notes include an early morning nursing note containing nothing remarkable, and then a record at 7:45am of a blood sample being taken by a representative of Australian Clinical Labs. Observations are recorded at 8:10am. The next note purports to be made at 8:50am and records a code blue (emergency call). This note also records that Mr Velt was pronounced dead at 9:11am.

8.2. The next note was made at 9:30am by Dr Smyth, who attended at about 8:40am as the lead member of the MET. The note records that he attended Mr Velt after a cardiac arrest and then records details of the resuscitation effort, until death was pronounced at 9:11am.

8.3. Nurse Xie made a nursing note at 12:10pm.

9. Mr Velt experiences pain in his chest and jaw

9.1. Nurse Xie gave evidence that she commenced her shift at 7am. At 7:30am Mr Velt walked out of his room to the nurses' station, chatting, and then grabbed a newspaper. At 7:50am, an enrolled nurse checked Mr Velt’s medications with Nurse Xie, and student nurse Derwent administered them under Nurse Xie’s supervision. It is clear on the evidence that this occurred at or close to 8am.

9.2. At about 8am Mr Velt activated his call bell, in response to which Nurse Xie and student nurse Derwent went to his room. There is some uncertainty about the time. Nurse Xie said in evidence that this occurred at 8:10am, but in her retrospective nursing note made shortly after the event at 12:10pm she said this occurred at 8am. Student nurse Derwent

said it was about 8am. For reasons which will become clear, there has been some confusion about times after the event.

9.3. When they arrived Mr Velt was in a chair and told them he had pain in his chest and in his jaw. To Nurse Xie this signified that he was having angina. She said the protocol was to first check the patient's vital signs.

9.4. Nurse Xie asked student nurse Derwent to remain in the room while she went to get a blood pressure machine. Mr Velt was put back to bed and between them they took and recorded a series of observations, which were within the normal range for Mr Velt. In the column for 'Pain Score', 'chest/jaw pain' was written in the section recording a pain score of 0-4. Mr Velt was connected to oxygen via nasal prongs.

9.5. Nurse Xie said she offered Mr Velt pain relief, which he declined, and asked if he had had such pain before. He said he had not. She knew that chest pain might be indicative of a heart attack. She was unable to give detailed evidence of further questions that she asked, and although she was sure she asked him about the severity of the pain, she could not recall the answer. As to the duration of the pain, Mr Velt told her it had just started, maybe a minute before he rang the bell.

9.6. Student nurse Derwent who, in her previous nursing practice until 2006, had been an experienced cardiac ward nurse, gave evidence that she asked the nurses whether there was a chest pain policy and the response was that there was nothing specific. She said that in the cardiology wards she had worked in there were specific chest pain policies.

9.7. At this stage Nurse Xie asked student nurse Derwent to remain in the room whilst she went and reported these events to the team leader Nurse Co, who came back into the room with her. Mr Velt told Nurse Co about the pain in his chest and jaw. Mr Velt did not seem distressed and was still talking. Each of the registered nurses gave evidence that she suggested an ECG be undertaken. Who suggested it does not matter in this case; they agreed it should occur and Nurse Xie and student nurse Derwent left the room to get the closest ECG machine from the cardiac surgical ward, one level down.

9.8. While Nurse Xie and student nurse Derwent were fetching the ECG machine, which Nurse Co said took less than five minutes, she chatted with Mr Velt. At some stage – at least by the time the ECG was then conducted – Mr Velt reported that he was no longer in pain.

10. Did hospital protocol require a MET call?

10.1. The Medical Emergency Team (MET) would be required to attend immediately upon a patient in the event of a MET call or code blue. The criteria for making a MET call were listed in the Hospital Clinical Manual[6] and were printed on the front page of all patient observation charts[7] as follows:

Response criteria

- Any observations in a red zone on chart
- Respiratory and cardiac arrests
- Threatened airway/severe shortness of breath
- Unrelieved chest pain
- Uncontrolled pain
- Significant bleeding
- Persistent oliguria
- Unexplained or sudden decrease in level of consciousness
- New or unexplained neurological deficit; slurred speech, facial droop or limb weakness
- Unexpected or uncontrolled seizure
- BGL <2
- You are worried about the patient

10.2. Dr Smyth was the lead doctor on the Medical Emergency Team that day. In his evidence he said that if a nurse is suitably concerned or worried about a patient, a MET call could be made. He said he was not aware of any criticism of nurses for making calls later deemed not to have been necessary, and he thought that nurses would be encouraged to err on the side of caution and call a MET if sufficiently worried about a patient. He could also initiate a MET call himself and thereby oblige himself to leave his ICU duty and attend urgently to a patient in his capacity as leader of the MET.

10.3. Nurse Co's evidence was clear that she did not think Mr Velt satisfied the criteria for a MET call, at least prior to the ECGs, because the criterion relating to chest pain required it to be unrelieved, and Mr Velt's pain quickly passed. I observe that this criterion

[6] Exhibit C9, Affidavit of Carol Moore, Annexure CM2
[7] Exhibit C1, page 105

(Unrelieved chest pain) implicitly suggests that nurses might wait (for an unspecified period) to see if the pain passes.

11. The first ECG

11.1. When Nurse Xie and student nurse Derwent returned with the ECG machine, its 10 leads were connected to Mr Velt and the ECG test was conducted. Nurse Co was still there.

11.2. The ECG machine had a screen which displayed certain information as the test was being conducted and then, upon the pressing of a button that said, 'Capture ECG' it produced a printed report, which was contained within the hospital notes.[8] The timestamp on the printout said 8:05:47am. It was wrong (early) by 15 minutes, about which I shall say more later.

11.3. Dr William Heddle, a highly experienced specialist cardiologist, was engaged by this Court as an independent expert to examine the circumstances of Mr Velt's case, provide a report[9] and give oral evidence. His impressive Curriculum Vitae[10] amply demonstrates his qualification to assist the Court with his expert opinions. His evidence was entirely unchallenged and, speaking generally, I accept it without reservation.

11.4. Dr Heddle explained that the printout included the trace or graph of the output of each of the leads and, above the traces, various written interpretations of the signals, produced and printed by the machine. The printout stated, among other things:

> 'Inferior infarct, acute (RCA)
>
> Probable RV involvement, suggest recording right pre-cordial leads
>
> – ABNORMAL ECG –
>
> Unconfirmed Diagnosis
>
> >>> Acute MI <<<'

12. Dr Heddle's interpretation of the first ECG and the required response

12.1. It is convenient at this stage, before turning to the nurses' account of what they made of the ECG report and how they responded to it, to summarise Dr Heddle's account of what the ECG meant.

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[8] Exhibit C3, page 152

[9] Exhibit C8

[10] Exhibit C7

12.2. Firstly, Dr Heddle gave evidence that some of the automated reporting by the machine (which includes the text set out above as well as other details) is subject to a reasonable degree of error. However, if it describes the ECG output as 'normal' or (on the other hand) states that a person is having a heart attack (myocardial infarction, infarct or MI), these are assertions which are made and delivered by these machines with a high degree of accuracy.

12.3. Dr Heddle stated that most of the information provided on Mr Velt's printout falls into the category of that which should be regarded (without reference to the traces) as accurate. He said that 'Inferior infarct, acute (RCA)' is correct, with the proviso that the machine presumed that the inferior infarct was a right coronary (Right Coronary Artery, RCA) occlusion. This is a programmed presumption because 90% of the population have a right dominant circulation where the back surface of the heart is supplied by the right coronary artery, but 10% of the population is supplied by the left coronary artery through the circumflex artery.[11] In other words, the machine presumes that the site of the inferior infarct is that which it would be in 90% of the population. Apart from that, the assertion 'Inferior infarct, acute' was certainly correct. Also, Dr Heddle said, the report '- ABNORMAL ECG -' is correct and that the part of the report which states, with emphasis '>>> Acute MI<<<' is also correct. In other words, the text of the ECG report was asserting, correctly, even without regard to the traces, that Mr Velt was having a myocardial infarction (MI), or heart attack, at the very time the ECG was taken.

12.4. For completeness, Dr Heddle referred to the tracings and explained that in the recorded output from the leads II, III and aVF what is known as an ST elevation could be seen, of a particular form associated with acute myocardial infarct.

12.5. Dr Heddle explained that the ECG report is evidence that Mr Velt was in a life-threatening situation and that time was of the essence. He said that frequency of life-threatening side effects with heart attacks decreases exponentially from the time of onset of the heart attack. The time of greatest risk is when it first occurs and that risk will gradually reduce over days. He explained that the major cause of early death in coronary artery disease with a heart attack, or even when people have not had a heart

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[11] Including Mr Velt, as ascertained at post mortem

attack, is myocardial ischaemia, which means the oxygen supply to the heart muscle is less than it needs for the work it is doing. That predisposes the heart to very abnormal rhythms called ventricular fibrillation, where the heart function completely stops and the heart just quivers, and if it is not immediately reverted, by a procedure called cardioversion or defibrillation, the patient dies.

12.6. Dr Heddle's opinion was that although nursing staff may not recognise from the traces that they were showing an acute myocardial infarction, they should be alerted by the banner '>>>Acute MI<<<' that this was a dangerous situation, requiring action. In his opinion, the action required was that a doctor be contacted and if the doctor caring for the patient is not immediately available, a MET call should be made, so the team in the hospital attends and assesses the patient immediately. He said the MET team does the same as a cardiac arrest team, that is they drop everything, bring their trolley with monitoring and defibrillation equipment and come straight to the patient, arriving within 30 to 60 seconds.

12.7. Dr Heddle also said that if, as a doctor, you were contacted by nursing staff saying they have an ECG they want you to review, the doctor should ask the nurse whether the ECG was normal, in which case the doctor could be there in a few minutes, but if the ECG says acute inferior infarct, you would drop everything and attend straight away. In other words, as a doctor you would attend as if a MET call had been made, or arrange for another doctor who can see the patient immediately, or make a MET call, thereby summoning immediate medical assistance for the patient.

13. Nursing response to the first ECG

13.1. The nurses did not act on the basis that the ECG revealed reliably that Mr Velt was having a myocardial infarction and call for immediate medical assistance. Together Nurses Co and Xie decided to undertake another ECG. Nurse Co said:

> 'We were just concerned because on top of the ECG on the printout it was saying consider infarction or MI, so we just wanted to be sure, we did another one.' [12]

Here, I observe that the word 'consider' did not appear on that first printout at all.

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[12] Transcript, page 17

13.2. Nurse Co was asked by her counsel Mr Bonig whether, at that time, she had any experience in reading or interpreting the traces on the ECG. She said:

> 'Just the basic issues – I'm not really an expert on reading ECG rhythms and printouts.' [13]

When asked if there was anything in the traces which she noticed or had caused her any concern she said:

> 'No, it's just the four words at the top that say, "Abnormal ECG acute MI".' [14]

13.3. Almost two weeks later, Nurse Co made a written statement as to events, which she was asked to prepare by the Assistant Director of Nursing, and which was tendered during the inquest. It was headed, 'This statement is being provided for the purpose of seeking legal advice' and was not produced to the Court until Nurse Co was giving evidence. It was a relatively early account and provides more detail and some illumination of the decision-making process. She stated, (in part):

> 'The patient at this point was completely pain free and chatting to us. As I was putting the ECG dots on the patient, I asked him if he has any cardiac conditions/history. He then replied that a couple of weeks ago he also experienced chest pain, but tests showed nothing and it was just diagnosed as a panic attack. We then proceeded to do the ECG which showed some ST elevation that could possibly suggest an MI according to the printout. We did another one just to be sure and the ECG was almost the same as the previous one. I know that I am not an expert on ECG but looking at the results, the rhythm was still regular and the ST was not overly elevated which would suggest an acute MI. Juliana[15] and I made sure that the patient was completely fine and pain free before leaving him around 830.' [16]

13.4. Ms Cliff, counsel for Dr Smyth, asked Nurse Co about the information on the ECG. Nurse Co said:

> 'Well you can't really rely on the interpretation at the top because most of the time it wasn't really accurate.'[17]

She was being asked about calling Dr Smyth (after the second ECG) and explained that was why she wanted a doctor to look at the actual reading, not just the interpretation at the top.

[13] Transcript, page 20
[14] Transcript, page 20
[15] Nurse Xie
[16] Exhibit C4
[17] Transcript, page 37

13.5. Under questioning by Mr Meegan, counsel for Mrs Velt, there was the following exchange:

> 'Q. When it says 'PR 169 inferior infarct acute RCA' what does that mean.
>
> A. It could mean an infarct that he was having.
>
> Q. It does mean an infarct doesn't it.
>
> A. It could, yeah.' [18]

The witness was pressed:

> 'Q. 'Inferior infarct acute RCA.' That does mean a heart attack doesn't it.
>
> A. Yes, but you can't rely on the interpretation at the top.
>
> Q. Why is that.
>
> A. There could be many artefacts you know, that's why I wanted someone to have a look at the actual rhythm not just the interpretation at the top.
>
> Q. But who told you can't rely on an ECG.
>
> A. It's based on my experience.
>
> Q. Your experience as a nurse.
>
> A. Yes.
>
> Q. How many times have you seen ECGs incorrect.
>
> A. A few times.
>
> Q. Out of what percentage.
>
> A. I can't tell you.' [19]

And further:

> 'Q. And then it's got 'Abnormal ECG.' Do you know what that means.
>
> A. Yes.
>
> Q. What does that mean.
>
> A. Abnormal.
>
> Q. It means there's something wrong.
>
> A. Speaks for itself, yeah.
>
> Q. But if you believed that Mr Velt did have an inferior infarct acute what would you have done.
>
> A. I'd get the doctor to come and review him.
>
> Q. Straightaway.

[18] Transcript, page 45
[19] Transcript, pages 45-46

A. Yes.

Q. Would you have called a code blue.[20]

A. No.

Q. Why not.

A. Because at that time there was no more chest pain, there was no indication to call an emergency team. A review you would have, you know - would have sufficed.' [21]

13.6. Nurse Co then said that it was probably five or ten minutes before they did call the doctor because they did another ECG.

13.7. Under questioning by Mr Kalali, counsel assisting the Court in the inquest, Nurse Co said she was aware that inferior infarct acute means a heart attack, a myocardial infarction, meaning that the heart muscles are dying, which would be critical if it was true and that time would be of the essence, to stop the heart muscles from dying, and also because the heart may go into arrhythmia. She said that she had received some training, maybe last in 2014 or 2015 that in response to an ECG saying acute MI or myocardial infarction you get a doctor to come and review the patient. She could not say whether there was any time limit specified in the training. She was asked:

'Q. So you weren't trained to respond immediately and get a doctor urgently to see the patient or interpret the ECG.

A. No, because during that time he wasn't in any distress or chest pain that would indicate the urgency.' [22]

13.8. Nurse Xie, also, said she knew that the banner, 'Acute MI' would mean, if correct, that Mr Velt was having a heart attack. She said a MET call was not made because Nurse Co said they should take another one and compare. She said the decision not to make a MET call was made by Nurse Co and she was guided by Nurse Co's decision. She said that they were taught that they have to actually interpret the ECG and that they should not just go with the results shown on the machine.[23] She said that she was reassured that because Mr Velt was not in pain, that he was not having a heart attack.

13.9. Even as they (incorrectly) perceived the situation, Nurses Co and Xie knew there was a risk that Mr Velt was having a myocardial infarction and that if he was, that would be

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[20] In its context, I took this to be a reference to a MET call. The answer suggests the witness did also.
[21] Transcript, page 46
[22] Transcript, page 60
[23] Transcript, page 135

a serious situation. Neither their training, nor the hospital policies and procedures, sufficiently guided or prescribed their response to the risk as they perceived it.

14. The second ECG

14.1. Another ECG was undertaken forthwith. The printed report shows the time 8:08:40am[24], almost three minutes after the first. The printout stated, among other things:

> 'ST elevation, consider inferior injury
> - ABNORMAL ECG - ' [25]

14.2. Dr Heddle gave evidence that the printed report should have been very similar to that of the previous ECG, namely, instead of 'consider inferior injury' it should have said 'acute inferior infarct' as, he said, the traces clearly showed. Despite that, he said that '***ST elevation*** (my emphasis) consider inferior injury' should have led the nurses, exactly as when they got the first ECG, to get hold of a doctor immediately, and if they could not get hold of a doctor, to make a MET call and have the MET attend on the patient. He qualified that answer by noting that Mr Velt was in a ward where there would not have been heart monitoring available, and this would be brought by the MET. Dr Heddle gave evidence that he would expect a registered nurse to understand the significance of the report of 'ST elevation' as requiring immediate medical attendance, within no longer than one to two minutes.

14.3. As in relation to the previous report, he said that he would expect any doctor contacted about the ECG to ask for the interpretation and he would expect such doctor, upon learning of the ST elevation interpretation to either see the patient themselves immediately or organise for another doctor to do so, which may mean making a MET call.

15. Events following the second ECG

15.1. The reasons why the nurses did not respond to the first ECG by making a MET call, applied also in relation to the second ECG. As has been seen, Nurse Co and Nurse Xie each wrongly regarded the written interpretation attached to the ECG report as 'most of the time inaccurate'. However, each knew that if correct, the statements on each

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[24] Also reading 15 minutes early
[25] Exhibit C3, page 153

ECG meant that Mr Velt was in fact having a myocardial infarction. Each was influenced in deciding what then to do, by the fact that Mr Velt was no longer suffering chest pain by the time of the first ECG, and that his observations had been normal. Nurse Co said that those factors meant making a MET call was not an option. Nurse Co was nevertheless aware, unlike Nurse Xie, that a person having a heart attack could still be having that heart attack after the pain had dissipated.

15.2. By reference to Nurse Co's later account of events set out in part in paragraph 13.3[26] above, it is clear, and I find, that Nurse Co examined the traces on the ECGs and formed her own conclusion that the ST segment was 'not overly elevated'. In other words, despite her own professed lack of expertise, taking into account her doubts about the accuracy of the written interpretation, she allowed her own assessment of the traces to prevail over the clear statements in the written interpretations on both ECGs to the effect that Mr Velt was having a myocardial infarction. This conclusion is supported by her answers under questioning by counsel assisting, Mr Kalali, that in lead II she could not see an ST elevation and in lead III she could see 'a little bit'.[27] That, I observe, is contrary to the evidence of Dr Heddle who said that the ST elevation in those leads, as well as in the aVF lead, is clear and entirely consistent with the interpretations provided by the machine.

15.3. On Nurse Co's account:

> 'I just wanted to make sure that the ECG was, you know – because I'm not an expert obviously so I just want to have a doctor look at the ECG to make sure there was nothing significant there.' [28]

15.4. This is in clear contrast to what she said she would have done if she believed that Mr Velt was having an acute inferior infarct, namely get a doctor to attend and review him straight away.

15.5. Having made a decision to call a doctor to obtain an expert interpretation of the ECGs, Nurses Co and Xie decided to call the on-call doctor for Marleston Ward, Dr Smyth, who was known to both the nurses. He was working in the Intensive Care Unit (ICU) and had just commenced his shift with a patient-by-patient handover from the doctor who had been on duty in ICU overnight.

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[26] Exhibit C4
[27] Transcript, page 63
[28] Transcript, page 21

16. Mr Velt is left in the care of the student nurse

16.1. Nurses Co and Xie decided to go together to the nurses' station to telephone Dr Smyth. Nurse Co gave evidence that the student nurse:

> '… stayed with [Mr Velt] for a few more minutes to make sure that he was okay, because he wanted to get up, I think, to use the toilet, but we said we don't want him to get up at the moment, so we just gave him a bottle to use.' [29]

16.2. The evidence contains further detail of this decision. Nurse Co conceded that one of the registered nurses should have stayed with Mr Velt. Plainly, part of the basis for that concession was that she was also aware that even though he was not in pain he might have been, and still be, having a myocardial infarction. She said that although one nurse could have made the call to Dr Smyth, it was important to have two people there to ensure instructions were understood correctly. She agreed, with hindsight, that student nurse Derwent should not have been the person left with Mr Velt. I acknowledge that at the time the registered nurses left Mr Velt with the student nurse, they assumed that they would be back after a short time.

16.3. Nurse Xie gave evidence to similar effect, saying it was hospital policy that two nurses should be present to take phone orders from the doctor, particularly for medications, and as they did not want to leave Mr Velt alone, they asked student nurse Derwent to stay. She acknowledged that another nurse could have been called in to assist with making the call or that the call could have been made from Mr Velt's room. She said that student nurse Derwent was considered appropriate because she had been a registered nurse previously, was doing a refresher course and had cardiac experience.

16.4. Furthermore, there was no evidence that student nurse Derwent was told that she must stay with Mr Velt until relieved. Indeed, I find that she was not so told.

16.5. The possibility of a medication order being given did not require two registered nurses to make the telephone call, at the expense of leaving a student nurse with a man who, on the registered nurses' own assessments, might have been having a heart attack, even though they were lulled into a false sense of security by his lack of pain and thought that he was probably not.

[29] Transcript, page 21

17. The telephone call to the in-house on-call doctor

17.1. Nurses Co and Xie went to telephone Dr Smyth from the nurses' station. Although Dr Smyth's primary duty was in the ICU, starting that day at 8am, he was also responsible for providing backup medical help or advice for the Marleston Ward, as well as performing certain minor procedures such as inserting intravenous cannulations and nasogastric tubes. As previously stated, he was also the doctor in charge of the MET.

17.2. Dr Smyth is an experienced hospital doctor, with some 14 years' experience working at Flinders and Ashford private hospitals, almost entirely in intensive care.

17.3. When the nurses called Dr Smyth he was busy taking handover from the overnight ICU staff medical officer (SMO). Dr Smyth said that he had arrived late for his shift, had started handover at about 8:10am and received the call regarding Mr Velt at about 8:20am. His only written note of the phone call, made a week later at the request of the Assistant Director of Nursing, was that this occurred at 8:25am, which is generally consistent as to timing with the evidence of Nurses Co and Xie.

17.4. There is broad agreement as to most of the content of the conversation which then took place, although there are divergences. The main contentious issue in relation to this phone call is whether Dr Smyth was told by Nurse Co of the written interpretation of the ECG or ECGs, and particularly that (the first ECG) stated 'inferior infarct acute' or 'acute MI', or both.

17.5. Both Nurse Co, who made the call to Dr Smyth, and Nurse Xie, who listened to it on speaker, said that they asked Dr Smyth to come and review the patient, in response to which Dr Smyth told them he was unavailable and that they should fax to him the patient's ECG. Dr Smyth said that he was asked to review the patient's ECG but he conceded that if he was asked by the nurses to attend, he would have said he was unavailable and asked them to fax the ECG. I consider it likely that the nurses did initially ask him to attend.

17.6. It is uncontentious that Nurse Co told Dr Smyth that an ECG (at least one) had been taken and that Dr Smyth was told of the patient's age, duration of pain, that the pain had ceased and had not returned, that there were no previous episodes of pain while he was admitted, that he did not have a cardiac history and that his observations were stable

and unremarkable. It was not clear on the evidence whether Nurse Co told Dr Smyth that there was a second ECG, or what it said.

17.7. Nurse Co's evidence was that she told Dr Smyth that they did an ECG 'and it was showing it could be an MI'. Her written statement[30] prepared on 19 May 2016 said that she told him 'it could possibly (sic) an MI'. When Dr Smyth's counsel put to her that she did not tell Dr Smyth this, her answer seemed to admit of uncertainty:

> 'I must have told it to him because I was concerned. That's why I rang him for that, that it was saying that it could be an infarct.' [31]

She maintained that she was sure she did, and was sure that she 'would have'.

17.8. Nurse Xie stated that Nurse Co called Dr Smyth and put it on loudspeaker. She said:

> 'So we told Clinton about this patient and about his chest pain and we did blood pressure. We told Clinton about the figures as well and we also told him we've done an ECG and during the ECG his pain was gone, he was feeling better. "Can you come up and have a look at the patient and also the ECG".' [32]

17.9. She said that Dr Smyth said he was caught up downstairs, would not be able to come to review the patient and to fax the ECG to ICU. When specifically asked whether Nurse Co told Dr Smyth that the ECG had shown a myocardial infarction, she said, 'I think Nics[33] did. Yeah, Nics did'. Her answer also seemed to admit of uncertainty.

17.10. It is significant, in my opinion, that neither nurse gave evidence in unequivocal terms that Dr Smyth was told that the written interpretation said 'inferior infarct acute (RCA)' or 'Acute MI'. The evidence that Nurse Co said it 'could be' or 'could possibly be' an MI suggests she might have expressed it to Dr Smyth as a statement of her interpretation or opinion or concern, or in a way which could be so construed, rather than making plain that it was an assertion made by the written printout on the machine.

17.11. I note that throughout her written account of this matter and in evidence Nurse Co has used the words 'could be' or 'could possibly be' (an MI), whether or not she was specifically referring to what was written on the printout. This correlates with the

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[30] Exhibit C4
[31] Transcript, page 39
[32] Transcript, page 105
[33] Nicoline, Nurse Co

reluctance demonstrated during her evidence to admit that the writing on the ECG constituted a clear assertion that Mr Velt was in fact having a myocardial infarction.

17.12. There is also no dispute that Dr Smyth asked for the ECG results to be faxed to him so he could interpret them.

17.13. Dr Smyth said that when he received the call from a nurse in Marleston Ward, he had just commenced his shift in ICU and was taking handover from the overnight ICU doctor. It was clear from his evidence, and I accept, that the handover was a critical part of his day's work and he was effectively obliged, in the absence of a MET call or a clear higher priority situation on his primary ward, the ICU, to keep attending to that as his primary duty.

17.14. He said he was asked to review an ECG, which he was unable to do by attending the patient personally, as he was in the middle of ICU handover and stated so, quite clearly. He said he sought further specifics about the patient to make up his own mind that things were safe. He was told that the patient had one to two minutes of chest pain which spontaneously resolved, all his observations were stable, he was conscious, he was talking freely, he was not in any distress and the nurses had done an ECG which they sought to be reviewed. Dr Smyth said that as he knew nothing of Mr Velt and his past history, except what he had just been told, (which included that he had no cardiac history). He told the nurse to refer the patient back to his treating specialist. He said she did not seem overly concerned by the situation and was happy to call the treating specialist who, Dr Smyth said, is the appropriate person to make informed decisions about a patient's care during 'sociable hours'.[34] He said he was unaware that the call was on speaker at the other end. I accept that he thought he was talking to one nurse only.

17.15. He was asked about printed information on an ECG, and said that sometimes it can be misleading. Later in his evidence he elaborated, saying that in 15 years or so of experience he had seen many occasions where what was written in the interpretation did not correlate with what the actual ECG was showing. He said that that it was reinforced during university studies and in his subsequent practice that the reliability of automated data on top of the ECG is to be correlated with what is seen in the traces underneath, which are than to be interpreted.

[34] Transcript, page 163

17.16. I observe that as a general proposition this seems appropriate for the practice of a hospital doctor. It is also consistent with the evidence of Dr Heddle.

17.17. In any event, his evidence was that he was not told what was in the written interpretation and he preferred to see the ECG personally and suggested that the nurse he was talking to walk it down or fax it, a common practice at Ashford. He gave the ICU fax number and waited for the ECG, which he expected to have within a minute. He said he was not made aware that there were two ECGs.

17.18. Even though he in his experience the written interpretations on ECGs could be unreliable, Dr Smyth also said that if he was aware that the written interpretation on the ECG stated ‘Acute MI’, or even just ‘Inferior infarct, acute (RCA)’ he would have immediately requested the nurse to make a MET call. He said that he could not recall any instance where in an ECG report statements of that nature had been inaccurate. He conceded that it would have been prudent to ask what the written interpretation said.

17.19. In further evidence later in the inquest, he said that although he did not know which of the hospital ECG machines had been used to undertake Mr Velt’s test, he knew that some of them have the facility of providing a written interpretation. He then agreed with the proposition that he ought to have enquired whether the machine was one of those which delivered a written interpretation, and what that interpretation was.

17.20. This concession must be viewed in its context, namely that Dr Smyth said the reason he did not ask for the written interpretation was that he expected to see the ECG and be able to interpret it for himself soon afterwards. Nevertheless, it is clear that had he asked for the interpretation, as he conceded he ought to have done and as Dr Heddle said a doctor in the circumstances ought to have done, he would have required that a MET call be made, with the result that he (with the MET) would have immediately attended upon Mr Velt, with equipment for cardiac monitoring and defibrillation. That would have ensured that Mr Velt was medically assessed, monitored, not later left alone unmonitored, and could not have had an unwitnessed cardiac arrest.

17.21. Dr Smyth also asked the nurses to telephone Mr Velt’s physician. He then continued his ICU handover, and formulated plans for the ICU patients for the day. During this time, he received two telephone calls from Dr Khurram, Mr Velt’s physician. The first terminated after a few seconds and the second came through – he thought from the switchboard – a few minutes later.

18. Nurse Xie's attempt to fax the ECG results (while Nurse Co calls Mr Velt's physician)

18.1. Following Nurse Co's conversation with Dr Smyth, the two nurses set about following his instructions. Nurse Xie attempted to send one or both of the ECG reports from the Marleston Ward nurses' station fax to the ICU fax, while Nurse Co telephoned Dr Khurram.

18.2. Nurse Xie gave evidence that just before she commenced sending the fax, student nurse Derwent came to the nurses' station and asked for instruction because Mr Velt wanted to use the toilet. Nurse Xie said she told student nurse Derwent to tell Mr Velt to stay in bed and give him a bottle, to make sure he had the call bell in his hand and once he was finished he could ring the bell.

18.3. Nurse Xie said she then placed the documents on the fax and dialled. At a later stage she was not sure whether it went through so she called the ICU ward clerk, who said nothing had arrived. She checked the number and tried again to fax the documents.

18.4. Nurse Xie said that in the meantime Nurse Co called Dr Khurram, putting the phone on speaker so that she could hear, and she heard Nurse Co tell Dr Khurram about Mr Velt's condition, his vital signs and the ECG and she heard Dr Khurram ask to be put through to Dr Smyth. She did not say what was said about the ECG. In later evidence she could not remember whether the ECG was mentioned.[35] Nurse Co then called Dr Smyth as requested by Dr Khurram, and put Dr Khurram through to him.

18.5. It is at least conceivable, on the evidence, that the efficiency of the process of seeing to it that the fax transmitted, was compromised by Nurse Xie's engagement with Nurse Co's telephone calls to Dr Khurram. It is clear that the whole process, including involving herself with Nurse Co's call to Dr Khurram, took some minutes.

19. Mr Velt is left unattended

19.1. Nurse Xie also said that 'while she was on the phone' student nurse Derwent again came to the nurses' station saying that Mr Velt had no pain, at which time another patient of Nurse Xie's rang their bell, so student nurse Derwent answered the bell, as Nurse Xie had not really seen her other patients.[36]

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[35] Transcript, page 121
[36] Transcript page 139

19.2. I observe here that it is not clear on Nurse Xie's account whether this was while she was listening in on the call to Dr Smyth, or the subsequent call to Dr Khurram. What is clear on Nurse Xie's evidence is that she allowed student nurse Derwent to leave Mr Velt alone (or for him to remain alone) to go and see one of Nurse Xie's other patients and indeed sanctioned it. Nurse Xie said Mr Velt was left alone for 10 minutes or less.

19.3. Student nurse Derwent's account of leaving Mr Velt is a little different in that she did not assert that she attended to any of Nurse Xie's patients, although she was not specifically asked. She said that early in the absence of the nurses at the nurses' station she went to get a bottle for Mr Velt, and when she did, she saw the nurses' station very busy and full, so she went back to Mr Velt with the bottle, giving him a call bell and instructing him not to get out of bed until he had been reviewed. She said that he looked well and comfortable and was talking about family, getting out of hospital and perhaps even mentioned a holiday. She had been given no instruction to stay with Mr Velt.

19.4. She said she was uncertain exactly what she did after she left Mr Velt, but remembered being in a nursing handover room with a lot of other students, discussing their shifts, at the time the code blue was called. In her evidence she said that from leaving Mr Velt to the code blue was, 'Maybe 15 minutes, 20 minutes, maybe'.[37]

19.5. Her evidence was entirely honest and her measure of uncertainty was hardly surprising. She was there as an unpaid student, not in a position of responsibility, who was meant to be following the nurses around and learning. She made a note of the day's events in the nursing notes three days later. Presumably she was asked to do so. In that note she said she remained with Mr Velt for five minutes (with a question mark in brackets) and that she left the room at about 830.

19.6. If that is correct then Mr Velt was left alone for about 10 minutes, which was the outer limit of Nurse Xie's estimate. Their evidence is consistent. I accept that Nurse Xie was at least aware, and sanctioned explicitly or implicitly, that student nurse Derwent left Mr Velt alone. Student nurse Derwent deserves no criticism at all.

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[37] Transcript, page 298

20. Telephone conversations between Dr Smyth and Dr Khurram

20.1. Dr Smyth gave evidence that after a first call from Dr Khurram, which terminated for an unknown reason, he received another call a few minutes later, perhaps five to ten minutes. He was aware from the first call that Dr Khurram had spoken to the nurses about Mr Velt. To the best of his recollection Dr Khurram asked him to see Mr Velt and he told Dr Khurram he was waiting for the ECG to be faxed down to review. He also said he was in the middle of ICU ward rounds and would attend on Mr Velt and review him at the conclusion of the ward round. He confirmed with Dr Khurram that Mr Velt did not have a past cardiac history. He said he did not understand Dr Khurram was asking him to urgently review Mr Velt, which he would have referred to the cardiac SMO. Dr Smyth said that he told or led Dr Khurram to believe that he would review the ECG as soon as it turned up. He then waited for the ECG to arrive so he could review it. As I have previously observed, he expected it to arrive very quickly.

20.2. Dr Smyth was questioned by counsel for Dr Khurram about his evidence that he intended to review the ECG immediately (as soon as it was faxed to him) and that he could see Mr Velt later, after he completed his ICU round. He agreed that he told Dr Khurram he would see Mr Velt as soon as possible but conceded that Dr Khurram may have misunderstood his meaning that this could only occur after he completed his ward round. He made the point that from his perspective this was on the proviso that the ECG showed that Mr Velt did not need instant review. It was implicit in what Dr Smyth said that if upon review of the ECG it was clear that Mr Velt needed instant attendance by a doctor, then he would have done so, by the mechanism of making a MET call and then attending in his capacity as the leader of the MET.

20.3. Dr Khurram, who has been a specialist physician since 2013, practices as a consultant in general medicine and geriatrics. He had, and continues to have, patients in many of the private hospitals around Adelaide, including the Memorial Hospital and the Ashford Hospital. As previously referred to, he cared for Mr Velt post-operatively and on 6 May 2016 was considering him for release from hospital on the following day, if he remained free of fever.

20.4. Dr Khurram said that on 6 May 2016 he was seeing three patients at the Memorial Hospital first thing, following which he intended to undertake his regular Friday patient clinic at his Hilton rooms from 9am until after 1pm, and then attend Ashford Hospital

to see Mr Velt. He said he received a telephone call from a nurse who told him Mr Velt had an episode of chest pain that had resolved, that he was feeling better, was stable and not in distress, and that they had informed the SMO at the ICU. He considered a report of chest pain to be a serious issue, even if resolved, knowing that a person may experience a heart attack without chest pain. He said he was not told that the pain radiated to the jaw, which he would regard as more serious. He said he was not told that an ECG had indicated a myocardial infarct. (It is appropriate at this point of the narrative to reiterate that I have not made a finding that Dr Smyth was told this by Nurse Co). Dr Khurram said that had he been so told he would have immediately asked the nurse who called him to call a code blue (MET call), resulting in immediate attendance of a senior medical officer and a nurse trained in advanced life-support, with an emergency trolley.

20.5. Dr Khurram could not specifically recall asking to be transferred to the SMO, being transferred, and the call dropping out, although he could not say that this did not occur. In any event, his evidence was consistent with this having occurred because he said he rang the hospital and asked the switchboard to transfer the call to the SMO. Accordingly, his evidence was consistent with having a second conversation with Dr Smyth, after an earlier brief conversation with Nurse Co and then Dr Smyth.

20.6. He said that having received initial information, it was already his expectation that Mr Velt's vital signs would be checked and that he should be connected to a monitor on the ward and not be left alone until and unless cleared by a medical officer, who would determine the appropriate treatment, including any medications.

20.7. Dr Khurram was relying on an unaided recollection of these phone calls as he did not make contemporaneous notes. He said he asked Dr Smyth whether the nursing staff had asked him to see Mr Velt. The SMO told him that he was waiting for the ECG to be faxed to him, following which he would review it immediately. He also told him he was going to see Mr Velt. Dr Khurram said he did not understand from speaking to Dr Smyth that he was unable to immediately review Mr Velt and if he had been told this, or understood this, he would have asked for that task to be delegated so that Mr Velt could be reviewed immediately, as Dr Khurram considered was required.

20.8. Dr Khurram said that he finalised his work at the Memorial Hospital and called his practice manager to say that he would not be at his rooms as expected at 9am. He then

commenced travelling to Ashford Hospital to see Mr Velt. Taking into account getting to his car, travelling with roadworks, parking and getting into Marleston Ward, he expected this to take 40 to 50 minutes.

20.9. Whilst Dr Khurram was in his car he received a phone call saying that a code blue had been called. He correctly assumed that a MET was in attendance upon Mr Velt and he continued to the Ashford Hospital, where he found that Mr Velt had died and a doctor (this was Dr Smyth) was speaking to members of Mr Velt's family. He spoke briefly to the doctor, who queried the cause of death either as a pulmonary embolism or a myocardial infarction and told him he was involved in the resuscitation effort and would report Mr Velt's death to the Coroner. Dr Khurram did not at that time see any ECG printout.

20.10. Under cross-examination Dr Khurram denied being told by the doctor on the telephone that he was involved in rounds and could not see Mr Velt until after that. Dr Khurram was asked whether he gave any consideration to a MET call and said that he did not, as he was aware that 'the Intensive Care Unit team has already been informed about the patient'.[38] He said he understood that the ICU SMO was the most senior medical officer available on site. It was clear, upon Dr Khurram being pressed, that he could not recall the details of his conversation with the SMO.

20.11. Dr Khurram also gave evidence under cross-examination about the medical investigation he would expect to be undertaken at the hospital and, if he was there, would himself have undertaken in these circumstances. Firstly, he was aware that Mr Velt had not complained of any chest pain during or before his treatment of him and there was no indication of any earlier cardiac event. However, he was at cardiac risk being 65 years of age, post-operative with infection and with a history of hypertension. A post-operative ECG on 1 May 2016 had given no cause for concern. When Mr Velt complained of chest pain, the two most sinister complications he would be concerned about would be acute myocardial infarction and pulmonary embolism. He would first have relieved the chest pain. Then, by taking observations, he would ensure that the patient was haemodynamically stable, without increased heart rate or blood pressure, and that oxygen levels were normal. He would set out to exclude a myocardial infarction by undertaking an ECG. He would order a blood test for cardiac biomarkers

[38] Transcript, page 370

which are indicative of myocardial injury in the setting of an acute myocardial infarction and leave the patient on a cardiac monitor. During these actions, Mr Velt would not be left alone.

20.12. Dr Khurram was also cross-examined about whether the nurse told him that the ECG was showing a possible MI. He denied that he was told this and reiterated that he would have asked the nurse to make a MET call. I have already detailed the evidence given by Nurse Co about what she said to the doctors about the written interpretations on the ECG printouts. Her evidence has led me to consider it unlikely that she told either doctor that the written automated interpretation on the printout stated MI or infarction. I consider it much more likely that, at most, she talked about whether the ECG could be showing an ST elevation, or be indicative of an infarction or MI, without stating that it said so in the written interpretation. I also found the evidence of Dr Khurram compelling when he said that if he was told that the written interpretation stated 'MI' or 'infarction', he would have asked the nurse to make a MET call.

20.13. Dr Khurram said that he did not ask whether there was a written interpretation on the ECG because it was his understanding that, as nursing staff had informed the medical officer on site and he understood that the medical officer was going to review the patient, he trusted that Mr Velt would receive the medical attention that the situation required.

20.14. Dr Khurram also explained that he decided to go immediately to Ashford because it is his practice to review every patient who has had chest pain himself, regardless of whether they had been seen by the medical team. He gave evidence in general terms that at the hospitals he worked at (obviously excluding the Ashford Hospital[39]), chest pains necessitate or warrant a MET call and on most occasions the patient has already been reviewed by the SMO before he would be contacted. Therefore, most calls he would receive about chest pain would be from the SMO rather than the nursing staff. He did not know the policy at Ashford Hospital, but had an expectation that any chest pain should warrant making a MET call.

20.15. Dr Khurram said that he was not concerned about a delay in the SMO receiving the ECG by fax because he assumed that that would take 'no time'. He was cross-examined

[39] My observation

about whether he discussed with the SMO the details of Mr Velt's medical treatment which made him more susceptible to heart attack. He said he did not discuss this.

20.16. Given that Dr Khurram was not on site, his patient was in a hospital, and he knew the SMO had been contacted, in my view it was not unreasonable or inappropriate for Dr Khurram to expect that Mr Velt would receive appropriate medical attention and care, pending his arrival at the hospital. Although Dr Khurram did not ask whether there was a written interpretation on the ECG, or what it said, it was reasonable for him to assume that any assertion such as 'inferior infarct acute (RCA)' or 'Acute MI' would be immediately acted upon and Mr Velt would receive emergency medical attendance.

21. Mr Velt is found unresponsive by a cleaner - code blue

21.1. Nurse Xie, still in the nurses' station, was concerned that the fax had not gone through and told Nurse Co that she was going to check on Mr Velt and then run the ECG to Dr Smyth (two floors down) in the ICU. Before she had a chance to leave the nurses' station to do that, a cleaner came to the nurses' station and asked her to come and look at the man in room 34 as he 'did not look right'.

21.2. The nurses immediately attended Mr Velt's room where he was found unresponsive. It appeared likely he had had an unwitnessed cardiac arrest. A code blue was called at 8:40am. Dr Smyth attended with the emergency team and found CPR being undertaken. He began to hand ventilate Mr Velt. The ICU consultant was called. All appropriate efforts to resuscitate Mr Velt proceeded in accordance with relevant guidelines, to no avail. Mr Velt was pronounced deceased at 9:11am on 6 May 2016.

22. The evidence as to times and timing

22.1. As I have observed, the last contemporaneous nursing note made in relation to Mr Velt before he died was at 7:45am and his observations were noted as occurring at 8:10am on the day of his death. Clearly, in formulating their accounts of events, those involved were required to retrospectively consider the times at which various events of the morning occurred.

22.2. This was rendered exceedingly difficult by the fact that, as the evidence now shows, the ECG machine used by Nurses Co and Xie was set to an erroneous time. The ECG printouts recorded that the first test was undertaken at 8:05:47am and the second test

was undertaken at 8:08:40am. After Mr Velt's death, while preparing her notes of events, one of the nurses noticed that these times were inconsistent with her recollection, and upon checking the ECG machine found the time to which it was set to be 'about 15 minutes' earlier than the actual time.[40] Arrangements were then made to have the ECG machine tested. The service report records, 'Confirmed that time is off by 15 minutes as reported. Adjusted time.'.[41] I should observe that it seems not unreasonable to expect that a service report of this nature should report with precision the time shown on the machine and the actual time at which it was checked. If that had been done, I could confidently make findings as to the exact times at which the ECG tests were undertaken. That said, I accept that the timing on the machine was 'off by 15 minutes' and accordingly I find that the ECG tests were undertaken at 8:20:47am and 8:23:40am respectively.

22.3. There is no evidence before the Court as to how this ECG machine came to be reading an incorrect time or of the service or testing schedules for these devices or other devices which produce important medical records. The need to ensure that such devices are correctly calibrated to local time, so that medical records are reliable, is obvious. The erroneous time-stamps caused confusion and complicated the aftermath of Mr Velt's death.

22.4. In summary, the apparent unreliability of witnesses as to timing, which must have been influenced by the erroneous ECG timestamps, may be readily resolved, once the ECG times are adjusted.

23. Training provided to nurses as to ECG readings

23.1. There was limited evidence before the Court about training provided to nurses such as Nurse Co and Nurse Xie at Ashford Hospital as to how to respond to an ECG. Nurse Co said she was last trained in 2015 or 2014 and she was trained, if an ECG said 'acute MI' or 'infarction' to get a doctor to attend and review the patient. She said that she was not trained to respond immediately and get a doctor to see the patient urgently or interpret the ECG, relating her answer to Mr Velt's circumstances saying, 'No because

[40] Transcript, page 34
[41] Exhibit C9, Affidavit of Carol Moore, Annexure CM1, Service report dated 11 May 2016

during that time he wasn't in any distress or chest pain that would indicate the urgency.'[42]

23.2. Nurse Co said she was not trained to undertake a second ECG after the first one asserts an acute MI and that it was her judgement to do so, just to check.

24. Summary and conclusions

24.1. Mr Velt was admitted to the Ashford Hospital on 29 April 2016 for investigation of acute cholecystitis. A laparoscopic cholecystectomy was undertaken by Dr Trehan. A gallstone in the biliary duct system was retrieved in a further procedure the following day.

24.2. During his recovery Mr Velt experienced symptoms of infection and was treated by physician Dr Khurram. By 6 May 2016 he was being considered for release on the following day, provided he remained free of fever.

24.3. Until the morning of 6 May 2016, Mr Velt's treatment had been appropriate. Although he was at increased risk of cardiac complications post-operatively due to his age, his hypertension and hypercholesterolaemia, and the presence of infection during his recovery, it was not inappropriate that he was in the Marleston Ward where constant cardiac monitoring was not available.

24.4. By the morning of 6 May 2016, Mr Velt had been appropriately attended to overnight and he remained afebrile. Blood was taken at 7:45am. He was given his medications at about 8am. Shortly afterwards he called nurses to his room. To Nurse Xie and student nurse Derwent who answered the call, he complained of chest pain, which he said was radiating to his jaw. He said he had pain for a minute or so prior to ringing the bell.

24.5. At the time, the Ashford Hospital did not have a policy for the guidance of nurses in a general ward responding to chest pain. The MET calling criteria did not, but should have, required a MET call in response to new chest pain on a ward (or patient) without cardiac monitoring. This would have had the effect of immediately pushing Mr Velt's situation up the line to people with sufficient expertise to make a full clinical

[42] Transcript, page 60

assessment.[43] I have heard that such requirement was, at the time, in place at some other hospitals.[44] I note that new chest pain is now included in the MET calling criteria at Ashford Hospital.

24.6. At about 8:10am, in response to his complaint of chest pain, Nurse Xie and student nurse Derwent conducted observations on Mr Velt, which were within his normal ranges. Nurse Xie fetched her shift buddy, Nurse Co and between them they agreed to conduct an ECG test. Although their level of experience was not dissimilar, Nurse Co was the team leader and Nurse Xie was guided by her. Nurse Xie and student nurse Derwent went to the cardiac ward and fetched an ECG machine, which took less than 10 minutes, during which time Mr Velt told Nurse Co that he was by then free of pain.

24.7. After positioning the leads, the first ECG was captured at 8:20:47am. Both of the registered nurses saw the parts of the written reported interpretation stating, 'Inferior infarct, acute (RCA)', 'Abnormal ECG' and 'Acute MI'. Each nurse was aware that if these assertions were correct, Mr Velt needed urgent medical attention. Nurse Co was aware that myocardial infarction could occur or continue in the absence of pain. Each nurse erroneously believed that statements on an ECG printout asserting myocardial infarction were often incorrect, and that they were expected to attempt to interpret the traces instead of act on the emergency asserted by the printout. Despite their lack of sufficient expertise the two nurses, particularly Nurse Co, attempted to interpret the traces on the ECG printout and failed to recognise that they were consistent with the written interpretations. Both nurses were influenced and lulled into a false sense of security by the resolution of Mr Velt's pain, and presumably confused by the only reference to chest pain in the MET calling criteria, namely 'Unrelieved chest pain'. In their minds, they were dealing with chest pain which had been relieved, which excluded it from the MET call criteria. Instead of acting upon the highest, and potentially lethal, presenting risk, which they appreciated, namely that Mr Velt was in fact suffering an acute myocardial infarction, and making a MET call, they together decided to undertake another ECG. The MET calling criterion 'You are worried about the patient', presumably intended as a catch-all, did not provide them with clear or sufficient guidance. They had received no education to disabuse them of their misconception of unreliability of the ECG printed output. Their risk management was found wanting.

[43] Evidence of Dr Heddle, Transcript, page 266
[44] Evidence of Dr Khurram

There is no indication that the hospital where they worked had given them adequate training in assessing and responding to (managing) clinical risks.

24.8. A second ECG was taken at 8:23:40am and the written interpretation on the printout included, 'ST elevation, consider inferior injury' and 'Abnormal ECG'. Nurse Co examined the traces and either did not recognise the ST elevation or considered it, inexpertly, to be 'not overly elevated'. As before, she knew that the written interpretation, if correct, identified a situation requiring immediate attention but again she was influenced by her own doubts about the accuracy of the written interpretation and by the fact that Mr Velt's chest pain had passed. She decided to seek the advice of a doctor, with Nurse Xie acquiescing, in circumstances where the hospital policy for calling the Medical Emergency Team was of limited assistance to them, including no reference to new chest pain and no reference to written ECG interpretations of the very serious type with which they were confronted.

24.9. If the nurses had been taught (as asserted by Nurse Xie), whether at the Ashford Hospital or in their studies, that when confronted with a clear assertion in an ECG report that a patient was having a myocardial infarction, a nurse should then attempt to interpret the traces, such teaching should be abandoned in favour of education that ECG interpretations asserting myocardial infarction and/or ST elevation are generally accurate and should be acted upon immediately. Such misunderstandings about the inaccuracy of these specific written assertions should be dispelled, not just amongst nurses, but amongst the clinical healthcare community generally.

24.10. I find, in accordance with the clear medical evidence, that each ECG in fact showed that Mr Velt was having a myocardial infarction. As a result, he needed immediate medical attendance and assessment, together with cardiac monitoring to ensure that if he suffered ventricular fibrillation (as he later did) regular heart rhythm could likely be restored with cardioversion, which would then have allowed an opportunity for the underlying stenosis of his coronary arteries, particularly the circumflex, to have been treated, offering Mr Velt a good chance of long-term survival.

24.11. Each of the registered nurses had sufficient understanding that Mr Velt may have been suffering or have suffered a myocardial infarction to render it inappropriate that he be left in the care of a student nurse while they both went to telephone the doctor. The possibility that the doctor might prescribe medications was insufficient reason for this to occur.

24.12. It has been said that the appropriate decision would have been to telephone the Visiting Medical Officer, Dr Khurram. However, this decision must be viewed in its proper context. The nurses had no reason to believe that Dr Khurram was in the hospital and, having decided not to make a MET call, which was in fact what the situation required, I conclude that they were both sufficiently concerned about Mr Velt to understand, at the very least, that there should be no delay in enlisting medical assistance, which they did by calling DR Smyth, the on-call in-house Marleston Ward doctor. The decision to call Dr Smyth before Dr Khurram does not warrant criticism.

24.13. Nurse Co telephoned Dr Smyth at a time which could not have been earlier than 8:25am. In all likelihood, allowing a little time for the nurses to discuss the two ECGs after the second one at 8:23:40am, make a decision to call the SMO and make their way to the nurses' station, it was 8:25am or up to a few minutes after that that they called Dr Smyth.

24.14. Dr Smyth was busy taking handover in the ICU, for which he had arrived late and was apologetic to the nightshift SMO. On the balance of probabilities, I find that he was asked by Nurse Co to attend to review Mr Velt and advised that he was unable to do so until handover was completed. He was told that Mr Velt was pain free and about Mr Velt's normal observations. It is also clear that he was told that an ECG had been taken, although I am not able to find that he was told there were two.

24.15. On all of the evidence I cannot find that Nurse Co or Nurse Xie advised Dr Smyth of the very serious written interpretations appearing on the ECG printouts. I am unable to determine whether Nurse Co told him that she was concerned Mr Velt might be having an infarction but if she did, she likely expressed this in a manner which could be misunderstood as her own assessment that it 'could possibly be an MI'. Even if she did, I accept Dr Smyth's evidence that he did not perceive that she was worried about the patient. I consider it likely that Nurse Co was worried about Mr Velt but she did not make it plain, particularly not by the most obvious means available to her, namely to advise of the written interpretations on the ECG printout.

24.16. Despite knowing that the ECG might have been undertaken with a machine giving a written interpretation, Dr Smyth did not ask what that interpretation was. He should

have. I find that had the nurse told him what the ECG said, or had he asked and been told, he would have initiated a MET call and immediately attended Mr Velt with the medical emergency team. This was a missed opportunity to save Mr Velt from the cardiac arrest which ended his life.

24.17. Nevertheless, it must be said that each of Dr Smyth and the nurses expected that he would quickly be able to review the ECG. If the fax had transmitted as intended, it is again likely that life-saving action would have been implemented.

24.18. After the conversation with Dr Smyth, Nurse Xie attempted to send the fax and Nurse Co telephoned Dr Khurram. Although I find that she told Dr Khurram that an ECG had been taken – it is not clear that she told him there were two – I do not find that she told Dr Khurram of the written interpretations on the first or the second ECG. Indeed, I find that she did not. Dr Khurram was put through to Dr Smyth and this call was cut off for some reason. Dr Khurram called back, unknown to the nurses, and was put through to Dr Smyth by the switchboard.

24.19. At 8:30am or later, student nurse Derwent left Mr Velt in circumstances where he seemed comfortable and quite well. If she had then remained with Mr Velt, his cardiac arrest would have been witnessed and, again, an immediate code blue might have provided a better opportunity to save his life. Student nurse Derwent was given no instruction to remain with Mr Velt. Her departure was explicitly or implicitly sanctioned by Nurse Xie who was aware that student nurse Derwent thereafter attended to one or more of her other patients.

24.20. I am unable to find exactly how long Mr Velt was left alone before suffering an unwitnessed cardiac arrest, but I can find that it was 10 minutes or less.

24.21. Whilst alone, Mr Velt suffered ventricular fibrillation as a result of myocardial ischaemia and his heart stopped. I cannot find whether this occurred soon after he was left alone, or just before his condition was noticed by the cleaner and the alarm was raised.

24.22. I find that proper and appropriate resuscitation efforts were implemented once the code blue was called at 8:40am but these efforts were not successful.

24.23. Mr Velt was pronounced deceased at 9:11am on 6 May 2016.

25. Subsequent changes to MET call criteria

25.1. Upon review of the MET calling criteria in February 2017 by the Ashford Hospital, the criterion 'Unrelieved Chest Pain' was amended to read 'New or unrelieved Chest Pain'. In my opinion, to ensure that there can be no misunderstanding, there should be a further amendment by dividing those criteria into two, namely 'New chest pain (even if relieved)' and 'Unrelieved chest pain'. I appreciate that there may be said to be an overlap, but I consider that the circumstances of this case demonstrate that for staff who are not doctors, there must be a clear distinction drawn between an episode of pain which is a new event and one which may be seen as recurrent chest pain or one of a series of ongoing occurrences. In the case of recurrent or ongoing chest pain, it is likely that a patient would already be under cardiac monitoring, probably in a cardiac ward. Chest pain policies would apply and nursing staff would be trained and practising in cardiac management.

25.2. No changes have been made to the MET calling criteria to require nurses caring for patients not on cardiac monitoring to make a MET call if an ECG report asserts in the automated interpretation that a patient is suffering a myocardial infarction or ST elevation. In my opinion this should be added to the criteria.

25.3. I note that each of the registered nurses gave evidence that she considers, with hindsight that a MET call should have been made, particularly after the first ECG. This is unsurprising. They are in the invidious position of having made a poor decision or decisions, with the most serious consequences, but they were made against a background of having inadequate training and policy support from the hospital for which they worked.

26. Further training?

26.1. Neither nurse, at the time of giving evidence, had received any further training as a result of the circumstances of the death of Mr Velt, although each was told by the Assistant Director of Nursing that she could make a MET call if the situation arose again. In my opinion, if Nurse Co and Nurse Xie had received some basic or refresher training in risk management, it is likely that they would have made a MET call when they read the interpretation on the first ECG, even if they felt the situation did not meet the MET calling criteria.

27. Was Mr Velt's death preventable?

27.1. Dr Heddle gave evidence that if Mr Velt was attended immediately by a doctor, or by a MET, his chances of survival were good.

27.2. He observed that Mr Velt had significant problems in one coronary artery but not in the others, and that he probably died as result of a ventricular fibrillation as a consequence of myocardial ischaemia. He noted that at autopsy Mr Velt's heart only showed possible early stages of myocardial infarction rather than any substantial damage, which meant his chances for long-term survival were very good. He said that Mr Velt's myocardial ischaemia, that is the inadequate oxygen supply to the heart muscle for the work that it was doing, predisposed him to an abnormal rhythm, namely ventricular fibrillation, which results in the heart stopping. If the MET was on hand when this occurred they would have had a defibrillator/monitor which could have reverted the cardiac arrest with cardioversion (defibrillation), by the application of electrical energy outside the heart, which breaks the abnormal heart rhythm, returning it to normal.

27.3. In Mr Velt's case, the risk of ischaemia resulted from a 75% stenosis of the circumflex artery, meaning that flow through that artery would be inadequate to give normal oxygen supply. Dr Heddle's opinion was that the stenosis of the circumflex artery was then amenable to treatment. Mr Velt could have been taken to the cardiac catheterisation laboratory and, with a cardiologist on call and catheter laboratory team he would have had an angiogram and then, if required, treatment to re-open blocked arteries. All this was on hand at the Ashford Hospital.

27.4. If there was a MET call or if arrangements were otherwise made for the immediate attendance of a doctor upon Mr Velt when he complained of chest pain, or when the nurses read the interpretation of either the first or the second ECG, or if Dr Smyth had asked Nurse Co what that interpretation was, Mr Velt would have been medically assessed and placed on monitoring equipment, with a defibrillator on hand in the event of ventricular fibrillation.

27.5. With the earlier opportunities to do so having been missed, Mr Velt was then left alone, despite the clear warnings on the ECG reports, ensuring that a code blue could not be immediately called when his heart stopped. Even then, his chance of survival would have been greater.

27.6. I accept Dr Heddle's evidence and find that Mr Velt's death was preventable.

28. Recommendations

28.1. Pursuant to section 25(2) of the Coroner's Act 2003 I am empowered to make recommendations that in the opinion of the Court might prevent, or reduce the likelihood of, a recurrence of an event similar to the event that was the subject of the Inquest.

28.2. I make the following recommendations directed to the General Manager of the Ashford Hospital and the Chief Executive Officer, Hospital Operations, Adelaide Community Healthcare Alliance Incorporated:

(1) That the Medical Emergency Team Calling Criteria be amended:

- to divide 'New or unrelieved chest pain', into two criteria, namely 'New chest pain (whether or not relieved)' and 'Unrelieved chest pain'; and
- to add a further criterion, 'An ECG taken in the absence of a doctor asserts, in the written interpretation, heart attack, infarct or myocardial infarction, or ST elevation.

(2) If recommendation (1) is not fully implemented, that a Chest Pain Policy be developed and implemented to apply to nurses caring for patients who are not subject to cardiac monitoring. The following suggested components should be considered as minimum standards:

a) A medical officer available to attend forthwith should be immediately informed if a patient complains of chest pain.

b) The patient should remain under constant observation until an examination is carried out by the medical officer.

c) A defibrillator should be available during the period of constant observation.

d) An ECG should be conducted.

e) The policy should include staff training in relation to the policy.

f) The hospital should monitor the application of the policy.

(3) That there be programmed training or refresher training of clinical staff in management of clinical risks.

(4) That the policies and procedures in relation to student nurses be reviewed to ensure that that student nurses are subject to appropriate supervision to ensure they are not required to bear responsibility for clinical tasks or decision-making.

Key Words: Hospital Treatment; Monitoring of Patients

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

Seal the 30th day of October, 2020.

State Coroner

Inquest Number 22/2019 (0835/2016)