Coroners Act 1996
[Section 26(1)]

Western  ***Australia***

RECORD OF INVESTIGATION INTO DEATH

Ref No: 42/17

I, Evelyn Felicia Vicker, Deputy State Coroner, having investigated the death of ***Roderick Leslie CARTER*** *with an Inquest held at Northam Coroners Court, Northam Court House, 118 Wellington Street, Northam, on 9 November 2017, find the identity of the deceased was* ***Roderick Leslie CARTER*** *and that death occurred on 13 October 2014 at Cunderdin Hospital as the result of Atherosclerotic Heart Disease in the following circumstances:-*

Counsel Appearing:

Ms F Allen assisted the Deputy State Coroner
Ms B Burke (Australian Nursing Federation) appeared on behalf of registered nurses B Mafu and R Chimbaira
Ms R Kelly (United Voice) appeared on behalf of enrolled nurse J Buegge
Ms A Preston-Samson (State Solicitors Office) appeared on behalf of WA Country Health Service (WACHS)

Table of Contents

INTRODUCTION

On the late evening of 12 October 2014 Roderick Leslie Carter (the deceased) presented to the Cunderdin Hospital (CH) and was admitted into the emergency department (ED) for investigation of his symptoms. In the process of those investigations commencing he suffered a cardiac arrest and died in the early minutes of 13 October 2014.

The deceased was 63 years of age.

Review of the incident by Western Australian Country Health Service (WACHS) raised some systemic concerns with respect to processes in place in CH to deal with sudden cardiac arrests and the Northam Coroner referred the matter to the Office of the State Coroner (OSC) for an inquest pursuant to section 22 (2) of the *Coroners Act 1996* (WA) on the grounds he believed an inquest to be desirable, but did not have the resources to conduct the appropriate enquiry himself.

BACKGROUND

The Deceased

The deceased was born on 23 March 1951 in Cunderdin, Western Australia, and had lived in Cunderdin for all of his life. He was a self-employed farmer and resided along the Doodenanning Road with his wife. He had an adult son.

The deceased had a past history of injuries related to his occupation as a farmer and more recently suffered hypertension. At the time of his death he was taking a course of antibiotics for a urinary tract infection (UTI). He was reported to be allergic to morphine.

Both the deceased and his wife, Wendy Carter, were well known members of their local community and the hospital staff. The deceased was President of the Shire of Cunderdin and had been involved in delivering the Primary Health Care Demonstration Site at the hospital.[1]

Cunderdin Hospital

In 2014 CH provided emergency services, acute inpatient services, community based services and high care residential services to its local community. There were nine residential aged care beds for five high care and four low care residential patients, plus nine acute beds and two emergency department bays, totalling the availability of 20 beds at different levels of care. There was no after hours on call general practitioner (GP) for staff in CH in October 2014 and that is again the situation in 2017. Both in 2014 and currently CH has access to only one local GP who is credentialed to work at the hospital.

On the night of the deceased's death there was no available on call GP and, while a new doctor had come to town, he was not credentialed to work in CH. The credentialed GP

[1] Ex 1, tab 14

lived 30 minutes' drive away from Cunderdin and was not available for after hours on call duties. There were locum doctors who worked in the town from time to time, but were not credentialed to provide services to CH for the emergency department or residential aged care patients.[2]

In 2014 CH provided three nursing shifts rostered each day;

- 7.00 am to 3.00 pm
- 1.30 pm to 9.30 pm
- 9.15 pm to 7.30 am

Those nurses covered the nine residential aged care beds, the nine acute beds and the two emergency department bays. There were a combination of nursing configurations during those shifts with two nurses on each shift comprising either two registered nurses (RNs) or a registered nurse and an enrolled nurse (EN).

On some occasions an RN would conduct a shift on his or her own with an unregulated staff member, but with a nurse rostered to be on clinical on-call.

In the event there was a need for an on-shift nurse to have medical practitioner involvement out of hours there were a number of options available;

[2] Ex 1, tab 14

- Contact and receive advice from the Northam Regional Hospital (NRH) on-call doctor;
- Contact the Emergency Telehealth Service (ETS);
- Contact the Royal Flying Doctor Service (RFDS) duty doctor;
- Contact one of the metropolitan tertiary hospitals.

Northam Regional Hospital

NRH is just under 100km north east of metropolitan Perth in the Avon Valley. It is about 58km west of CH. Apart from the Shire of Northam with an estimated population of approximately 11,500 covering over 1400 sq km, NRH also supports the smaller district hospitals within the Western Wheatbelt comprising Wyalkatchem, York, Toodyay, Goomalling, Wongan Hills and Beverley townsites as well as Cunderdin.

General Practitioners available or willing to be rostered for emergency department work in the Western Wheatbelt usually service the Western Wheatbelt by being rostered into the NRH on-call roster for the whole area and operate out of NRH for on-call duties. Out of usual business hours there is only one on-call doctor in NRH.[3]

Emergency Telehealth Service

Since 31 December 2012 CH has been able to utilise the ETS which is a telemedicine service provided by the Fellows

[3] t 9.11.17, p79

of the Australian College for Emergency Medicine (FACEMs) using high definition videoconferencing equipment installed in CH ED.

The hours of availability for that service were restricted in October 2014. It was available 5.00 pm to 11.00 pm Monday to Thursday and 9.00 pm to 11.00 pm on Fridays. On Saturday, Sunday and Public Holidays it was available from 8.00 am to 11.00 pm.

The advantage of ETS was that a nurse could contact ETS and be immediately provided with a consultant via a high definition video-conferencing screen to assist with medical intervention. ETS was then also responsible for documentation, leaving the nurse free to carry out directions. This was available for Australian Triage Scale (ATS) of 1 or 2, requiring a patient to be seen immediately or within 10 minutes. For ATS of 3, 4 or 5 the nurse would fax a consultation request to ETS and the consultant would then make contact when available by telephone.

The ETS consultant was then responsible for the patient's care in CH unless handed to another doctor. If the ETS believed it was necessary the patient be transferred to another consultant, the ETS consultant would facilitate that transfer in the manner of a normal medical transfer. In less serious situations, where ETS consider transfer to NRH would be sufficient, then the ETS consultant would liaise

with the doctor at NRH and provide that doctor with a medical handover, while CH nurses would arrange the actual transfer.[4]

At CH the practice was to seek emergency medical advice from NRH after hours when there were no local GPs available and ETS was not operating.

Royal Flying Doctor Service

In the event the nurses at CH were unable to contact NRH and ETS was unavailable, the nursing staff would contact the RFDS for assistance. This was by way of telephone advice without a video facility and the on duty RFDS doctor would receive information from CH nurses and relay instructions, including arrangements for transfer where necessary. Assistance would depend on the availability of the duty RFDS doctor.

Metropolitan Tertiary Hospitals

While there is the option for contact with the metropolitan tertiary hospitals where there are always consultants on call, this is often perceived as daunting for remote nurses. It is only utilised as a last option in the event the previous three options have not produced immediate consultant or medical practitioner input. There may be delays when trying to access input from tertiary centres.

[4] Ex 1, tab 14

Nurses on duty Sunday 12 October 2014 through to Monday 13 October 2014

The nurses on duty on night shift at CH from the Sunday through to Monday 13 October 2014 were registered nurse Buhlebenkosi (Bea) Mafu (RN Mafu) and enrolled nurse Janet Buegge (EN Buegge).

RN Mafu qualified as a registered nurse in 2002 in Zimbabwe and was employed in 2014 as an RN at the Wongan Hills Hospital, where she had been since September 2010. RN Mafu had previously worked at CH for approximately a fortnight as part of her training rotation and this night shift in 2014 at CH was her fourth shift at CH on this occasion, where she was relieving due to an RN shortage at CH.[5] She had not received orientation to CH site in 2014.[6]

EN Buegge qualified as an enrolled nurse in Queensland in 1978 and had been working at CH since 1979 when she moved to Western Australia. EN Buegge also has an advanced skills qualification and her mandatory hospital training included manual handling, basic life support and high hygiene which were refreshed approximately every 12 months.[7]

[5] t 9.11.17, p17
[6] t 9.11.17, p18
[7] Ex 1, tab 15

PRESENTATION OF THE DECEASED TO CH ED

The deceased and his wife arrived at CH by car at approximately 10.54 pm on 12 October 2014. On presentation the deceased was complaining of chest pain and stated he had been experiencing chest pain for the past three hours.[8] The deceased was let into the hospital and taken into the ED. He was speaking in sentences and RN Mafu commenced assessment for triage at approximately 11.00 pm while EN Buegge retrieved the deceased's file and performed a basic set of preliminary observations.

RN Mafu's note on the triage form indicated the deceased presented as a 63 year old man complaining of shivering attacks and pain on the left and right side of his chest. She recorded he did not have neck pain and did not have pain radiating to his left arm. He complained of numbness in both his upper and lower limbs from approximately 9.00 pm that evening and also indigestion. RN Mafu noted the deceased was a smoker and had a smokers cough and was on antibiotics for a UTI. When the deceased was asked to provide a pain score he assessed his pain as 6/10. The deceased's vital observations at the time were within normal limits.[9]

[8] Ex 1, tab 15
[9] Ex 1, tabs 15, 16

RN Mafu gave the deceased an ATS 2 which warranted the obtaining of advice from a medical practitioner via either NRH or ETS if available.[10]

In view of his symptoms RN Mafu commenced completing the WACHS emergency chest pain assessment pathway which included taking ECGs.

The protocols in place at CH required ECGs to be faxed to a doctor for interpretation and instructions as to how to manage the patient. Being a Sunday evening there was no doctor available to CH in the local area and the ETS was no longer operating. RN Mafu understood the ECGs needed to be faxed to whoever was to be the consulting doctor. Her intention was to obtain assistance from NRH.[11]

RN Mafu believed she needed to complete the referral into the hospital telephone communication record[12] to enable her to fax them to NRH for medical input. While RN Mafu was organising the ECG documentation to fax to NRH, EN Buegge was attending to the deceased.

RN Mafu's evidence is that at approximately 11.03 pm, as she was attempting to complete the form in order to fax the ECG once complete, the deceased's condition suddenly changed.[13]

[10] t 9.11.17, p21
[11] t 9.11.17, p19
[12] Ex 1, tab 9
[13] t 9.11.17, p19

The deceased started shivering and gave RN Mafu a different history. She was now informed the deceased was using a urinary catheter to void and was on oral antibiotics. RN Mafu asked the deceased how his chest pain was and he said that it was subsiding. RN Mafu noted he was still talking in full sentences and was coherent and appropriate. RN Mafu examined the deceased's abdomen for dissention and palpitated his bladder. EN Buegge was still checking the deceased's vital signs which were still within normal limits. As a result of the deceased's shivering RN Mafu attempted to reassure the deceased and explained she was intending to send a fax of his ECG to the doctor for advice.[14]

The ECG recorded as occurring at 11.04 pm gave a reading of acute myocardial infarct and, as an abnormal ECG, added the note it was an unverified diagnosis. Written on the copy in the file is recorded that following the ECG, aspirin at 100mg and GTN spray were administered to the deceased.[15] The deceased's troponin level was measured and gave a negative result. The deceased's oxygen saturations were still good.

The fax machine was very close to the ED, but outside the ED room. As RN Mafu was again on her way to the fax machine at approximately 11.12 pm the deceased again started complaining about indigestion and his wife

[14] t 9.11.17, p22
[15] Ex 1, tab 18

commented that maybe they had a problem with their evening meal. RN Mafu sent EN Buegge to the pharmacy to get Mylanta for the deceased and the medication chart indicated he was provided with Mylanta at 11.20 pm.[16]

RN Mafu again attempted to fax the ECG through to NRH for assistance, when EN Buegge called out the deceased was deteriorating. RN Mafu went to the telephone in the ED and attempted to call the on-call doctor in NRH ED for assistance. Before RN Mafu was able to connect to NRH she was informed the deceased appeared to be arresting. RN Mafu hung up the telephone to assist with resuscitation of the deceased.[17]

EN Buegge had commenced compressions and RN Mafu's priority was to call for help from nurses located close to the CH ED to come and assist. Both nurses stated the resuscitation of a patient in arrest required more than two nurses for competent active resuscitation. There needed to be the physical resuscitation as well as the ability to organise additional input and consultation.[18] Notes recorded after the event indicated the deceased arrested at 11.50 pm.[19]

The CH Health Service Manager/Director of Nursing (HSM) was Nicole Harwood and initially RN Mafu attempted to

[16] Ex 1, tab 18
[17] t 9.11.17, p27
[18] t 9.11.17, p28, 41
[19] Ex 1, tab 18

contact her, but there was no response to the telephone. RN Mafu then attempted other staff members she understood to live close by, unsuccessfully. RN Mafu swapped with EN Buegge for physical resuscitation of the deceased to allow EN Buegge to call for assistance from other nurses.

RN Mafu managed to insert a guedel airway and provided the deceased with a full oxygen mask. EN Buegge took Mrs Carter outside the ED so she was not exposed to the situation which was understandably distressing. She could also assist by letting attending nurses into the hospital.

The nurses' calls for assistance from other staff were not successful and RN Mafu asked EN Buegge to call RN Ralph Chimbaira. He was not on duty, but was located at the hostel.

RN Mafu had completed three further ECGs prior to the deceased arresting. An ECG was conducted immediately after the administration of the Mylanta, another two minutes later, with the third at 11.33 pm prior to his arrest. All four ECGs indicated an acute myocardial infarct and RN Mafu understood she needed medical advice, however, for that to occur she believed she needed to fax the ECGs to NRH for a doctor to review.[20] Once the deceased arrested there was no opportunity for the nurses to fax the ECGs to

[20] t 9.11.17, p23, 42

NRH for assistance until they obtained enough resources to enable ongoing competent resuscitation.

RN Chimbaira recorded on his telephone he received a call requesting assistance at 00.12 am on 13 October 2014. The only information he received was a request for help, before the telephone was disconnected. He knew RN Mafu was in ED on night shift and that she was new to the hospital. He had already advised her that if he could help her he would.[21]

RN Chimbaira arrived at CH at approximately 00.20 am and was let into the ED by Mrs Carter. She requested he go to the ED as quickly as possible. RN Chimbaira ran into the ED and discovered a male lying unresponsive in the resuscitation bay. He could see the deceased was not breathing, that his pupils were not reactive and dilated. RN Mafu was performing manual chest compressions while EN Buegge was assisting where she could.

RN Chimbaira took over management of the deceased's airway, while RN Mafu continued with the chest compressions and explained the deceased had attended at the ED with multiple complaints including chest pain, indigestion and a urinary tract infection. In RN Chimbaira's words *"it was a case of emergency and we needed to act promptly"*[22]. RN Chimbaira was advised RN Mafu had tried

[21] t 9.11.17, p48
[22] t 9.11.17, p49

to contact the NRH ED doctor for advice, but had not been successful in faxing the necessary ECGs through prior to the arrest. He was also advised they had tried to contact other staff without response.

RN Chimbaira advised RN Mafu that in the absence of assistance from the NRH they should seek assistance from the RFDS. EN Buegge again attempted to contact the HSM and on this occasion the telephone call was accepted. EN Buegge then assisted RN Chimbaira while RN Mafu telephoned RFDS.

There was no "hands-free telephone" in the ED and RN Mafu had to remain by the telephone to the RFDS doctor to relay information about the deceased's condition to RFDS. She did not have an opportunity to fax the ECGs to the RFDS.

HSM Harwood arrived at the ED sometime after 00.23 am. She had not heard the original telephone calls because her telephone was in a different room. When she arrived at the hospital Mrs Carter let her into the ED and it was clear Mrs Carter was very distressed and upset. Once HSM Harwood was in ED she could see CPR underway. Chest compressions were being performed by EN Buegge, RN Chimbaira was attending to the airway management and medications with RN Mafu on the telephone. HSM Harwood took over airway management while RN Chimbaira

gave her a hand over and advised he was in the process of administering adrenaline as per the RFDS doctor's instructions.[23]

ROYAL FLYING DOCTOR SERVICE

The RFDS on-call doctor overnight on the 12-13 October 2014 was Dr Solange Costermans. She was contacted by her operations centre (OC) at approximately 00.15 am on 13 October 2014 and was advised there was a telephone call from RN (Bea) in Cunderdin, "*Consultation/flight request*".[24]

Dr Costermans started taking a history and noted the deceased had presented to CH at approximately 11.00 pm complaining of left and right sided chest pain for two hours before presentation, with numbness to both left and right side for two hours with pain on his sternum. She recorded an ECG had been done, however, was not in receipt of any ECG information when consulted. She was advised the troponin levels were negative. IV access had been obtained and the deceased had been provided with nasal oxygen, but later complained of indigestion and was given Mylanta. The deceased's observations at that stage had been normal.

Dr Costermans did not understand from her initial information from the OC the deceased was already in cardiac arrest and she did not understand that to be the

[23] t 9.11.17, p42, 51, 60
[24] Ex 1, tab 10

situation until a few minutes into her taking of the history from RN Mafu.

I note Dr Costermans has recommended that where the OC has information provided at the time of the initial contact it should be passed through to the doctor providing advice. It would seem that having already given that information to the OC RN Mafu launched into the history immediately on contact with the doctor, not realising the doctor had not been informed by the OC of the current situation.

Dr Costermans then understood CPR was already in progress and there was a semi-automatic defibrillator in use and the patient was in the process of being shocked with on-going CPR. She was advised there was no spontaneous respiratory effort and the guedel airway was in situ with bag and mask ventilation. Dr Costermans advised adrenaline should be given and proceeded to make arrangements with RFDS OC, at 00.24 am, to mobilise resources towards a transfer pending the outcome of the resuscitation attempts.

Dr Costermans was unable to ascertain the rhythm from discussions with the RN, however, she could hear the defibrillator in the background indicating the chest compressions were ineffective The machine was indicating more pressure should be applied. Dr Costermans requested 1mg of adrenaline be provided IV, and adrenaline is

recorded in the CH notes as being administered at 00.30 am and again at 00.33 am.[25]

Dr Costermans could hear the response of "*no shock*" advised before the second shot of adrenaline was provided. Again no shock was advised and the instruction was to continue CPR. Dr Costermans started communicating with RN Chambaira instead of RN Mafu as RN Mafu wished to take over compressions and for RN Chambaira to go to the telephone for instructions.

HSM Harwood had arrived at the hospital and after the second dose of adrenaline she took over management of the deceased's airway, while RN Mafu assisted with compressions and RN Chambaira spoke with Dr Costermans.

Dr Costermans advised RN Chimbaira it was her opinion CPR had continued for a length of time, the deceased had arrested over 30 minutes earlier and the downtime was not indicative of a good outcome. The three nurses continued to perform CPR while HSM Harwood went to discuss the situation with the deceased's family, who now comprised of Mrs Carter, her son and his partner.

HSM Harwood preferred to involve the family in any discussions as to the cessation of resuscitation. All nurses

[25] Ex 1, tab 18

were content to have the family present in ED while they continued to attempt to resuscitate the deceased.[26]

Mrs Carter agreed further resuscitation was not in the family's best interest and staff were directed to desist resuscitation attempts in accordance with Dr Costermans instructions. The family was then left with the deceased for a short while. Dr Costermans recorded CPR as ceased at 00.40 am and that the HSM and family were present.

The police were then contacted for a hospital death as per the "death in hospital" protocols. The death in hospital form was completed by HSM Harwood at 1.35 am on 13 October 2014.[27]

Defibrillator Machine

After the death of the deceased it became obvious the defibrillator machine had been on an incorrect setting and shocks were being delivered to the deceased at 30 joules rather than the recommended level for cardiac arrest at 200 joules. RN Mafu advised she had turned on the machine at the beginning of the shift for a manual check to ensure it was operating correctly and that manual checks were done at 30 joules.[28] Following the manual check the machine had not defaulted back to the emergency rhythm of 200 joules.

[26] Ex 1, tab 2
[27] Ex 1, tab 18
[28] t 9.11.17, p32

The defibrillation was sent for detailed assessment, as part of the critical incident systems analysis, to a biomedical engineering testing agency and it was confirmed the machine was in manual mode during the deceased's resuscitation. Six shocks had been administered at 00.21, 00.23, 00.27, 00.29, 00.31 and 00.33 in accordance with the instructions, but each shock had been at 30 joules instead of 200 joules because the machine had not been reset. To be effective the defibrillator should have been used within 3 minutes of the deceased's arrest and those shocks should have been at the AED level (200 joules).[29]

The examination of the defibrillator machine made it clear there was not a problem with the equipment, but rather human error in leaving the machine in the manual check position at the beginning of the shift rather than ensuring it was put in a default position to deliver 200 joules necessary for an emergency response.

Due to the circumstances in the ED at the time the deceased arrested, with only two nurses attempting a full scale resuscitation before an additional nurse arrived, and then need for a nurse to speak with a doctor, the defibrillator had not been checked to ensure it was on the appropriate setting.

[29] Ex 1, tab 8

None of the nurses were aware of that at the time, nor obviously was the RFDS doctor, who had not viewed any of the ECGs and could only hear information over the telephone, including the defibrillator machine indicating the nurses should push harder. No one thought to check the strength of the delivered rhythm. This did not become apparent until the investigation into the deceased's death was completed.[30]

POST MORTEM EXAMINATION

The post mortem examination of the deceased was carried out by Dr Jodi White, forensic pathologist, PathWest Laboratory of Medicine, Forensic Pathology, with two registrars, Dr J Chau and Dr A Rijhumal, on 15 October 2014. At the end of that investigation the cause of death was given as undetermined pending further investigations.[31]

Those further investigations were completed on 26 May 2015 and the opinion was formed that the cause of death for the deceased was atherosclerotic heart disease.

The initial internal examination indicated there was a possible blood clot in a blood vessel over the heart (thrombosis) with mild hardening and narrowing of blood vessels over the heart (atherosclerosis). The deceased's lungs were heavy and congested and his kidneys showed mild scarring.

[30] Ex 1, tab 8
[31] Ex 1, tab 4

Histology confirmed those findings and showed the left anterior descending artery had a ruptured atheromatous plaque with adherent fresh thrombus. The myocardium had early margination of neutrophils with focal perivascular neutrophilic aggregates. Dr White advised that was consistent with myocardial infarction.

There was a benign vascular tumour on the liver and the kidneys showed non-focal changes consistent with a history of hypertension. The lungs showed abundant pigment laden macrophages consistent with the deceased's history of smoking.

Toxicology showed a small amount of alcohol with prescription medications.[32]

These findings confirmed the clinical view the deceased had suffered a myocardial infarction. This was due to the thrombus in the left anterior descending artery arising out of his atherosclerotic heart disease.

The appropriate treatment for the deceased, as indicated by interpretation of the ECGs would have been thrombolysis, followed by anticoagulation therapy. Thrombolysis needed to be directed by a medical practitioner able to interpret the

[32] Ex 1, tab 5

diagnostic information available (ECG) to ensure it was not contraindicated by other conditions.[33]

REVIEW BY WACHS OF THE EVENTS OVER THE NIGHT 12-13 OCTOBER 2014

It was the review by WACHS of the systems in place at CH which caused the Northam Coroner concern with respect to the death of the deceased. Reviews by WACHS of adverse events in its regional hospitals is done with a view to improving systems available to regional staff and their communities. It is not intended as criticism of regional nurses doing their best to provide relevant and appropriate care for their patients.

The aim is to ensure staff in regional areas have appropriate resources, including training, to carry out their duties in circumstances recognised as less supportive than those in big tertiary facilities. Doctors, as well as nurses and patients, have difficulty accessing the same resources as those available to the large metropolitan facilities.[34] In addition there is the difficulty of attracting families of senior medical officers to engage in long term periods of employment in remote areas away from resources available when attached to, or in proximity of large tertiary institutions.[35]

[33] Ex 1, tab 9, attach3 / Ex 1, tab12 /t 9.11.17, p7
[34] Inquest TAUAI 7/15
[35] t 9.11.17, p77

The clinical review of the incident conducted for WACHS was undertaken by Dr Tony Mylius, Cardiologist and Consultant Physician, Wheatbelt Medical Specialists. Dr Mylius is also a previous WACHS regional director and familiar with the difficulties facing regional staff.[36] Dr Mylius was provided with the clinical record of events without the narrative provided by staff for the purposes of the inquest.

The clinical record alone indicated documentation was not prepared in a timely manner with respect to the deceased's presentation, diagnosis, ECG investigations and reference to medical help.

Dr Mylius noted the deceased had an atypical presentation for myocardial infarction which may have obscured a clear diagnosis. RN Mafu was attempting to finalise documentation, while also attending to apparently changing signs and symptoms after presentation. Once the deceased arrested there was little opportunity for documentation to be completed and communication necessary for the provision of adequate medical intervention became disjointed.

The clinical record indicated the deceased's arrest occurred at 11.50 pm, sometime after the 4th ECG at 11.33 pm. All four ECGs indicated a myocardial infarction was in progress and the 4th one at 11.33 pm was a serious result. Initially

[36] Ex 1, tab 11

there were only two nurses present and the faxing of the relevant ECGs to NRH had been interrupted by what were perceived to be changing symptoms. RN Mafu stated in evidence she understood the ECGs, but also understood she needed to provide the ECGs to a doctor for review, assistance and direction for treatment.[37] If thrombolysis was the appropriate intervention she needed a doctor's direction as to its administration. RN Mafu had not provided thrombolysis before but would have been prepared to administer it if a doctor had confirmed it was necessary.

In addition to the difficulty with obtaining medical direction, the arrival of other nurses was delayed due to the difficulty in contacting them. The first additional nurse to arrive was RN Chambaira, who recorded receiving a call requesting assistance at 12.12 am on 13 October 2014. He was called because RN Mafu could think of no one else to call for assistance in dealing with the arrest which needed more than two people if medical input was to be achieved for active resuscitation. It was necessary for one nurse to be conducting compressions, another to be dealing with the airway and another to be on the telephone discussing the presentation with the reviewing doctor.

Dr Mylius was critical the RFDS doctor, when eventually called, had not been provided by CH with the four ECGs and did not understand the deceased had already arrested.

[37] t 9.11.17, p25

Dr Costermans made it clear in her report she believed RFDS OC understood an arrest was in progress but had not informed her of that fact before she spoke to RN Mafu, who presumably believed the doctor had been briefed.[38]

RN Mafu explained events happened very suddenly once the deceased arrested and RN Chimbaira confirmed the difficulty with responding adequately to the deceased was the number of things which needed to be done at the same time.[39]

The difficulties in obtaining medical review and additional assistance in the ED delayed the administration of appropriate therapy, thrombolysis, followed by specified blood thinners and transfer. It was necessary to stabilise the deceased prior to transfer. The deceased arrested before medical input had been obtained.

WACHS Chest Pain Pathway protocols guide nurses as to appropriate steps to follow in diagnosing chest pain, treatment and management, including the administration of thrombolysis therapy. However, thrombolysis required a doctor's order and required contact with a doctor before it could be considered. In this case the nurses felt events occurred before they were able to complete the steps in the pathway and the deceased arrested.

[38] Ex 1, tab 10
[39] t 9.11.17, p10, p53

Review by Dr Angus Thompson

Dr Thompson is a Consultant Cardiologist at Sir Charles Gairdner Hospital and also a Clinical Senior Lecturer at the University of Western Australia.

The Office of the State Coroner (OSC) requested Dr Thompson review the treatment and management of the deceased at CH. Dr Thompson was not in receipt of the statements of any of the staff dealing with the incident. He relied on the WACHS clinical incidents systems analysis and the deceased's clinical records. The main issue Dr Thompson was asked to consider was whether the deceased's death could have been prevented with appropriate and timely medical review and management.

In Dr Thompson's opinion, if the myocardial infarction had been identified at the time of presentation and medical assessment obtained immediately, it was possible the likelihood of death could have been reduced. In view of the post mortem results, which indicated a massive myocardial infarction with a thrombosis in the left anterior descending artery, Dr Thompson believed the deceased's survival, once he had arrested, was unlikely in any facility. He stated a large myocardial infarction has a high mortality rate, especially without medical support on site. He stated that even in a tertiary facility there could have been an arrest, following an infarction, which would lead to death.[40]

[40] Ex 1, tab 12

Dr Thompson pointed out all four ECGs showed acute myocardial infarction. The response of providing the deceased with aspirin and Nitroglycerin were appropriate and the only interventions available to the nurses which would have assisted. After that point, contact with an appropriate medical practitioner for the order of thrombolysis therapy was the only treatment which would have assisted.[41]

Dr Thompson said administration of thrombolysis would have reduced the likelihood of death if provided to the deceased within 30-60 minutes from presentation but would have been irrelevant once the deceased arrested. Once the deceased had arrested survival, even in a tertiary hospital setting, from cardiac arrest is poor. There are contra-indicators for administering thrombolysis which is why it needs to be done with medical practitioner input, and even then needs to be a practitioner experienced with myocardial infarction.

Dr Thompson also indicated the defibrillator setting was insufficient, at 30 joules, to cardiovert the deceased from ventricular fibrillation, but he believed that error was understandable in the circumstances which would have been confronting the nurses in the ED at CH once the deceased had arrested. He indicated the correct delivery of 200 joules may have helped, but in his opinion of the extent

[41] t 9.11.17, p7

of the thrombosis observed at post mortem, it was unlikely.[42]

In the circumstances of this presentation, which Dr Thompson agreed was an atypical presentation, the Chest Pain Pathway may have been confusing. The appropriate pathway would have seen medical advice within the first hour of presentation and certainly after the first abnormal ECG, despite the fact aspirin and spray were given which were useful. The situation should have seen a focus on achieving medical input without a concern about documentation before medical review. There would then have followed discussion as to the risk factors with respect to the administration of thrombolysis and possibly, as an alternative, dual antiplatelet therapy with IV herapin, but again Dr Thompson indicated that once in cardiac arrest those management therapies became less relevant. Once in arrest resuscitation was the only course of action.

In his view the primary focus should have been for advice from NRH if NRH had appropriate staff, otherwise RFDS or any tertiary hospital. Dr Thompson agreed the need for input from offsite medical practitioners would cause unavoidable delays. He stated it was not unreasonable for there to be a 30-60 minute delay before medical input could be achieved and that was at about the time the deceased arrested. Even in a tertiary institution setup to deal with

[42] Ex 1, tab 12 – t 9.11.17, p11

these situations on a regular basis Dr Thompson said the outcome was not always positive and there were often similar delays in arranging appropriate therapy.

The input from the RFDS doctor with respect to use of the defibrillator as soon as possible after arrest was appropriate, provided staff were trained and again those therapies took time, even in tertiary facilities. Dr Thompson was of the opinion that even if the deceased had been successfully resuscitated from his first arrest, it was highly likely he would have re-arrested and there would finally have been an unsuccessful outcome due to the extent of the thrombosis reported at post mortem. It would be unlikely thrombolysis would be successful in such a short time frame and the administration of other blood thinners would have needed the exclusion of other concerning conditions which were also possible on the initial presentation, although the progression in the ECGs made it clear an arrest was imminent.[43]

Dr Thompson agreed the ECG readings were comprehensive, however, he believed the staff at CH were attempting to achieve appropriate resuscitation and input, it was just unsuccessful.

Dr Thompson was of the opinion that while the delay in obtaining appropriate management for the deceased seemed

[43] t 9.11.17, p11

unreasonable, it was not excessive or inexcusable. As Dr Thompson said in evidence

> "*he (the deceased) basically went into cardiac arrest almost at that one hour mark. So there wasn't a lot of opportunity for alternative treatment to have actually been given at that point in time*".[44]

Dr Thompson reiterated he did not believe there needed to be emphasis on documentation over the contacting of an off-site medical practitioner to deal with the matter, although he could understand the atypical presentation of stomach discomfort and shivering tended to cloud the issue. He agreed the ECGs verified it was a heart attack and the first, taken at 11.04 pm, warranted the seeking of medical input rather than the completion of documentation.

THE SITUATION FOR CH IN 2017

The reality for small regional hospitals such as CH is that systems need to be in place which assist nurses in dealing with the time critical incidents without on site medical officer input. GPs need to be credentialed to work in WACHS to ensure they have required experience and it is entirely their decision as to whether they wish to contribute in that way.[45] Obviously in an emergency with a doctor present they can assist if they are in a position to do so,[46]

[44] t 9.11.17, p9
[45] t 9.11.17, p75
[46] t 9.11.17, p57

but that is a different circumstance. The introduction of technology into WACHS EDs and appropriate resourcing and training is beginning to make impressive contributions to the ability for WACHS to provide useful medical input from off-site centres.[47]

Evidence was heard from both Nicole Harwood as the HSM for CH since 2009 and Fiona Pender, Regional Clinical Nurse Educator for WACHS Wheatbelt region since February 2015. Ms Harwood was the HSM called into CH by the nurses when attempting to deal with the deceased's arrest. She arrived after RN Chimbaira and assisted with the deceased's airway. Ms Harwood stated that it was not necessary there be an on call nurse when the shift had an RN and an EN, although in a crisis other nurses would always be called back to duty.[48]

Ms Harwood stated there was difficulty with resourcing registered nurses in the Wheatbelt generally, and specifically a difficulty had arisen at the time of the deceased's death. CH was short of RNs and that was one of the reasons for RN Mafu being on site at short notice. Although RN Mafu was a qualified RN with advanced life support accreditation, she had not completed any reskilling recently, and had not been orientated to CH in 2014 due to the short notice for her roster.

[47] t 9.11.17, p59
[48] t 9.11.17, p55

The Chest Pain Pathway in 2014 did indicate an ATS 1 or 2 required medical review be sought immediately and it was not necessary to complete the usual documentation.[49] This was not as obvious in 2014 as it is in 2018, where the ETS has become available 24/7 since November 2017.[50] The ETS provides both a clinical service and a good education service, part of which is the provision of a hand book and useful posters. The new ETS poster clearly states that for an ATS of 1 or 2 medical input should be the first priority, rather than completion of documentation.[51]

The effect of that direction was that when RN Mafu correctly identified the deceased as being a priority ATS 1 or 2 and probably experiencing a myocardial infarction due to her provision of aspirin and Nitroglycerin spray, the priority was seeking medical input. RN Mafu's understanding she needed to complete documentation so she could send ECGs to the doctor for review was mistaken in that she should have telephoned for advice and then provided the ECGs as they became available at 11.04 pm and thereafter. This may have resulted in the provision of thrombolysis therapy which RN Mafu agreed she had never provided, but would have been prepared to provide under the direction of a doctor once alternate diagnoses had been excluded. Even then Dr Thompson was not certain the timeframe before arrest at 11.50 pm would have altered the outcome significantly.

[49] t 9.11.17, p61
[50] t 9.11.17, p59
[51] Ex 1, tab 19, attach 11

In addition to the ETS now available 24/7 as a high definition video facility, Ms Harwood pointed out recent education and standardisation of small hospital EDs across the regional Wheatbelt had assured there were now standard resuscitation boxes or trolleys across all sites. These provided immediate access to all the necessary therapies for specified emergencies.[52] The ETS also provided education to assist nurses with up skilling and being in a position to provide those therapies under direction at all sites across the Wheatbelt consistently.

The additional advantage of the 24 hour ETS was the fact it released the nurses on site from the need to be concerned with documentation. The ETS team coordinated any response and provided documentation, while directing the nurses as to the appropriate course of action.[53]

Ms Harwood stated there was now good education online for advanced life support to train nurses with interpreting ECGs, and in CH specifically the fax machine is now within hearing distance of the ED so as to not interrupt managing treatments.[54]

Clinical Nurse Educator, Ms Pender, also explained regional training is now provided to all sites and allowed for face to face interactions, for professional development offsite to

[52] t 9.11.17, p61
[53] t 9.11.17, p67
[54] t 9.11.17, p62-63

emphasis and train regional staff in the appropriate ways to respond to certain emergencies, for example an ATS of 1 and 2 did not need documentation, but contact with medical practitioners capable of dealing with that type of crisis.

The offsite regional development training also included videoconferencing and there was now better collegiate support between hospitals in a region which allowed for networking and consistency between sites. This meant staff could move from site to site and have the same equipment and fit for purpose kits. Overall there was far more support.[55] This served to attract more and better staff to the regions.

MANNER AND CAUSE OF DEATH

I am satisfied the deceased was a 63 year old male, well respected in the Cunderdin region and involved with his local community. During the evening of 12 October 2014 he started experiencing conflicting symptoms and presented at the CH ED shortly before 11.00 pm. By the time he had relayed a history and been triaged as an ATS 2, the ETS was no longer available for the assistance of the nurses on shift in the ED.

Once the deceased was assessed as an ATS 2 input from NRH should have been sought immediately. Pending a

[55] t 9.11.17, p70-72

response the appropriate course of action was to continue with the Chest Pain Pathway protocol until a doctor responded or advice was received from NRH that RFDS should be contacted instead. This was not as clearly outlined in 2014 as it is now the ETS operates 24/7. RN Mafu believed any reviewing doctor would require relevant documentation to provide instruction. This caused a delay in obtaining medical input.

Nevertheless, RN Mafu appropriately identified the possibility of a myocardial infarction and provided the deceased with aspirin and Nitroglycerin spray. In accordance with the Chest Pain Pathway protocol she performed an ECG, the first of which was at 11.04 pm, within the first 15 minutes of his presentation and that indicated a myocardial infarction. RN Mafu understood this but believed she needed to provide appropriate documentation to a medical practitioner in order to seek assistance. Her attempts to send the documentation were interrupted by apparently changing symptoms which delayed her, both with her documentation and faxing the materials to NRH, her first point of contact in the absence of the ETS.

At the time RN Mafu attempted to ring NRH there was a slight delay before the telephone was answered and in that time the deceased experienced additional difficulties which

caused her to hang up the telephone and provide the deceased with Mylanta.

Thereafter RN Mafu was attempting to complete the ECGs and referable documentation when the deceased arrested, at approximately 11.50 pm. Once the deceased had arrested it was necessary RN Mafu assist EN Buegge with resuscitating the deceased. Active resuscitation required the physical input of two people at least. There was no opportunity to either reach the fax machine or the telephone, other than to seek on hand assistance to enable the nurses to appropriately resuscitate the deceased and then obtain medical review.

The reviewing cardiologists all agreed that once the deceased had arrested the administration of preventative therapies were irrelevant. Also, in view of the final mechanism of death, it was unlikely to have been successful. The thrombosis seen at post mortem was large and unlikely to have been successfully dissolved in the time frame available. The thrombosis was as a result of the deceased's atherosclerotic heart disease and could have resulted in death even in a tertiary facility with all the appropriate resources.

I find death occurred by way of Natural Causes.

CONCLUSION

It is clear the deceased was a well-respected member, both of the Cunderdin Community and the hospital community. He was also a well-loved family member and, with his wife, had contributed to attempts to improve regional medical care. It is sad his death came at a time before WACHS had the opportunity for the deceased to have benefited from improvements to the provision of rapid medical review to Wheatbelt region small hospitals. It is not clear that would have improved the outcome in this case, but would have ensured all involved felt less confronted by the realities of remote medicine in 2014.

E F Vicker
Deputy State Coroner
15 March 2018