

CITATION: *Inquest into the death of Joanne Craig*
[2019] NTLC 026

TITLE OF COURT: Coroners Court

JURISDICTION: Darwin

FILE NO: D0013/2018

DELIVERED ON: 20 September 2019

DELIVERED AT: Darwin

HEARING DATE(s): 27, 28 August 2019

FINDING OF: Judge Greg Cavanagh

CATCHWORDS: **Failure of primary care providers to offer vaccination (Pneumovax23), Failure by hospital to identify sepsis, Failure to identify septic shock, antibiotics commenced too late**

REPRESENTATION:

Counsel Assisting: Kelvin Currie

Counsel for Top End Health Service Stephanie Williams

Counsel for Dr Brummit Marie Savvas

Judgment category classification: B
Judgement ID number: [2019] NTLC 026

Number of paragraphs: 70

Number of pages: 26

IN THE CORONERS COURT
AT DARWIN IN THE NORTHERN
TERRITORY OF AUSTRALIA

No. D0013/2018

In the matter of an Inquest into the death of
JOANNE CRAIG
ON 24 JANUARY 2018
AT KATHERINE DISTRICT HOSPITAL

FINDINGS

Judge Greg Cavanagh

Introduction

1. The Deceased, Joanne Craig, was a 57 year old woman of Aboriginal descent from the Wurrumunga clan group. She was born 5 October 1960 in Tennant Creek to Peggy Corp and Noel Corp. She had five brothers and sisters. On 20 October 1984, at the age of 24 years, she married Steven Craig. They had four children: Daniel, Michael, Steven Jr and Lindsie. They had 11 grand-children. They took on many other children also after the deaths of two family members and two friends.
2. In 1994 Joanne and Steven took over management of Mistake Creek Station, a 4000km² cattle station located about 630km southwest of Katherine. Joanne was an equal partner in the innovations and the running of the station.
3. Through their hard work they transformed the station into a modern, innovative and successful station. They quadrupled the cattle numbers. They

developed the infrastructure and the business management. They developed the capacity of their staff and managers. They modernised the processes and procedures. They ran low-stress stock handling and horsemanship skills courses and became an accredited training facility. They conducted Rural Operations courses for the Education Department.

4. Students from schools as far afield as Centralian Senior College in Alice Springs, Tennant Creek High School and Taminmin College in Humpty Doo have participated in 10-day courses at the Station. Joanne and Steven became involved in the Australian Rural Leadership Program. Employees involved can complete certificates II, III and IV in Beef Management.
5. Joanne was tireless. Apart from the station business she was passionate about her family. She was the family organiser and connector. She loved her dogs and horses, she was a photographer and an avid sports person.
6. Joanne looked after her health. She didn't smoke and didn't drink and saw the health professionals on a regular basis. Records indicate that she attended the doctors at Wurli-Wurlinjang Health Service in Katherine between 2009 and November 2017. She also attended on Kintore Clinic in Katherine (later taken over by Gorge Health Services) between at least 2010 and September 2016. There are also records from the Central Clinic Alice Springs that show four attendances on doctors from 2004 to 11 January 2018.
7. On Tuesday 5 December 2017 Joanne went to the Central Clinic Alice Springs for a check-up prior to flying to the United States of America for two weeks with her daughter. She left for the USA two days later on 7 December 2017. She returned on 23 December 2017.
8. On 23 January 2018 Joanne and Steven were in Katherine. While having dinner at the Katherine Golf Club, Joanne complained of feeling cold and

feverish. They returned home at about 9.00pm. She took Panadol and went to bed.

9. The following morning she was still unwell and Steven drove her to the Emergency Department of the Katherine District Hospital. She was triaged at 9.12am. Her presenting symptoms were recorded by the triage nurse as:

“Vomiting/nausea. One day (1/7) fevers, vomiting x 4 this morning, global aching. Tolerating fluid intake, ongoing productive cough since late December”.

10. Her vital signs were recorded as:

“Temp 39.9; pulse 126/min; respiratory rate 18/min; BP 116/73 mmHg; oxygen saturation 98%.”

11. Venous blood gas (VBG) results showed mildly reduced potassium (3.0 mmol/L) and elevated lactate (2.3 mmol/L). The working diagnosis was a likely viral illness with no clear source of infection. The plan was for further observations and investigations.
12. Her condition deteriorated throughout the day. She went into cardiac arrest at 8.42pm. She was declared life extinct at 9.25pm.
13. Her blood cultures grew streptococcus pneumoniae. In the opinion of the Forensic Pathologist, Dr Marianne Tiemensma, she died due to multiple organ failure caused by sepsis that was due to streptococcus pneumoniae infection.
14. It was apparent that when she arrived at Katherine Hospital and was triaged at 9.12am she was suffering from sepsis. The only way to treat sepsis is the administration of broad spectrum intravenous antibiotics at an early stage.
15. According to one expert she should have been provided broad spectrum antibiotics by midday at the latest. If that had happened she is likely to have survived. According to another expert she should have had antibiotics

shortly after 3.30pm. If that had happened she may well have survived. However withholding antibiotics until 7.40pm gave her no chance for survival.

The bacteria

16. Streptococcus pneumoniae is a gram positive bacteria. It is an encapsulated bacteria that (in simple terms) makes it more difficult for the immune system to combat. It is present as part of the normal bacterial flora in the nose and throat of up to 10% of adults and up to 40% of children.¹

The danger

17. The bacteria can cause septicaemia, an infection of the blood stream. An initial source of infection is present in less than 50% of cases.² As indicated by Dr Raftos:

“The natural course of bacterial septicaemia includes a prodrome with symptoms of fever, chills, and muscle and joint aches lasting for hours to days, followed by a precipitous decline to septic shock, multiple organ failure and death.

Appropriate treatment of bacterial septicaemia includes generic intravenous antibiotics along with intravenous fluid resuscitation. Any delay in initiating intravenous antibiotic treatment significantly increases the likelihood of both death and permanent disability.”

The vulnerability

18. The very young or elderly are more vulnerable. Aboriginal and Torres Strait Islander people lack immunity to encapsulated bacteria.³ Streptococcus pneumoniae is a vaccine preventable disease.

¹ Report of Dr Raftos p10

² Ibid p 11

³ Ibid p11

The vaccine

19. The Australian Immunisation Handbook⁴ recommends that all Aboriginal and Torres Strait Islander adults receive the Pneumovax23 (23vPPV) vaccination when 50 years of age with a further dose five years later. The Handbook recommends that the rest of the population receive the vaccination at 65 years of age.

The statistics

20. The Centre for Disease Control at the Department of Health (Northern Territory) provided statistics of the extent of coverage of the vaccination for Aboriginal and Torres Strait Islanders between the ages of 50 and 60 throughout the Northern Territory. The average coverage across all regions was 50%.
21. The Katherine region was the lowest with a coverage of only 38%. Alice Springs Urban area was highest with a coverage of 72%.

The General Practitioners

22. After the age of 50, Mrs Craig utilised three General Practices in the Northern Territory: the Central Clinic in Alice Springs, Kintore Clinic/Gorge Health Services in Katherine and Wurli-Wurlinjang Health Service in Katherine.

Central Clinic Alice Springs

23. Mrs Craig attended the clinic on two occasions. Once on 5 December 2017, before she went on her trip to the USA and on 11 January 2018 on her return. On both occasions the consultation was primarily around her blood pressure. On the first visit it was 180/100 on the right arm and 190/85 on the left arm. She was prescribed Perindopril Arginine (5mg each morning). On her return her blood pressure had reduced to 145/84.

⁴ Published by the Australian Government Department of Health

Wurli-Wurlinjang Health Service

24. Mrs Craig attended the Service on a number of occasions in 2009 and 2010 just prior to turning 50. She then attended in 2014 in relation to a cough and shortness of breath and then in November 2016 primarily in relation to grieving after the death of her father, skin lesions, cutaneous lupus erythematosus and blood pressure. She was referred to the Katherine Hospital to be linked to specialist care and information was released to Gorge Health to assist with rheumatologist referral. The plan included returning in the new year for a full skin check.
25. Mrs Craig had attended on Wurli-Wurlinjang on 6 February 2017 and 6 March 2017. On that last occasion her blood pressure was taken (145/80) and her cardiac risk assessed (CVS screen - low 9%). Blood was taken for a full blood test.
26. On 13 March 2017 she returned to discuss the blood test results. They were normal. On that occasion she complained of a sore toe. It was thought likely to be arthritis.
27. On 24 April 2017 she attended in relation to joint swelling and pain in a finger and a right eye pterygium that was becoming an issue. She was referred to an ophthalmologist. That was the last consultation.
28. My office asked Wurli-Wurlinjang whether it used vaccination schedules and why it was that Mrs Craig had not received the pneumovax23 vaccination. In a letter dated 23 May 2019 the Health Service stated, in effect, that there was no vaccination schedule for pneumovax23, that the eligibility for the vaccination was prompted during an Aboriginal Health Assessment and that Health Assessments were offered annually to patients who identified the Service as their primary health clinic. They stated:

“As Mrs Craig did not identify the Service as her primary health clinic she may not have been offered an Aboriginal Health Assessment”.

29. During the course of the inquest the Senior Medical Officer stated:

“It was probably an ... oversight that she was not offered an Aboriginal and Torres Strait Islander health check at that time.”⁵

Kintore Clinic/Gorge Health Services

30. There were no medical notes available from Kintore Clinic. The Clinic was closed on 30 November 2015 and from that date the General Practice operating from the Clinic site was Gorge Health Services. Dr David Brummitt operated Kintore Clinic and works for Gorge Health Services. He said he could not find Mrs Craig’s medical notes from her consultations with Kintore Clinic.

31. The medical notes from Gorge Health indicated that in 2016 Mrs Craig saw the doctors at Gorge Health on four occasions. Twice in May, once in June and the fourth time in September. The consultations were primarily in relation to ongoing tests for lupus but also included other medical issues and support during the final weeks of her father’s illness.

32. My Office requested similar information from Gorge Health Service to that requested from Wurli-Wurlinjang. The practice manager responded:

“I would like to inform you that on the 28 November 2016 we received a fax from Wurli-Wurlinjang asking us for a health summary for Ms Craig, as she was now attending their clinic. As she never attended Gorge Health after that date, it would seem that actually Wurli-Wurlinjang was her primary health clinic for at least a year before her death. This is longer than she was a patient at Gorge Health.

⁵ Transcript p42

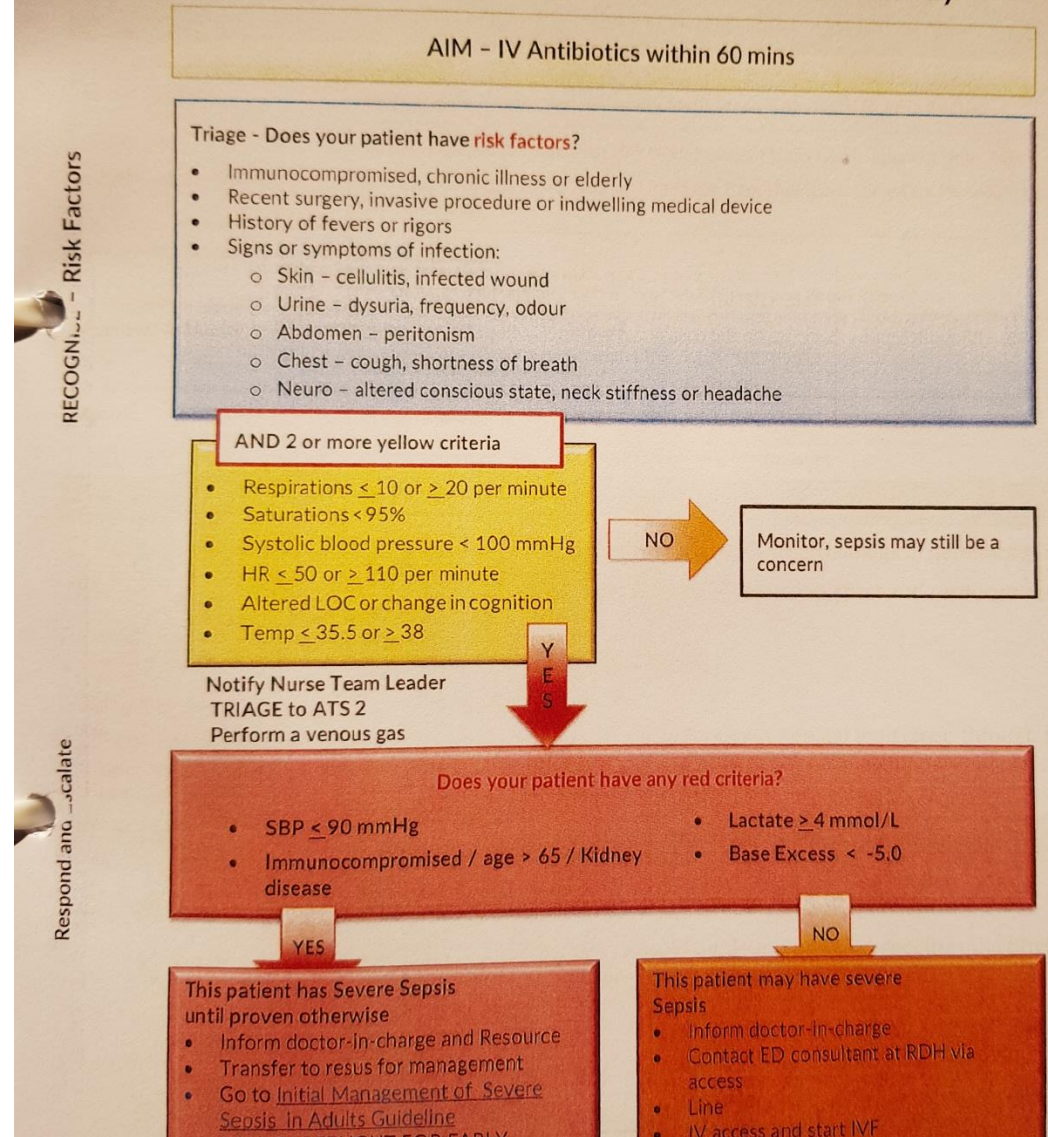
As Wurli is funded to provide health care to Indigenous clients, I would have expected them to have conducted an Indigenous health check and immunised as appropriate. They were Ms Craig's primary health clinic."

33. Mrs Craig was not provided the pneumovax23 vaccination or any information in relation to it by any of the General Practices she attended.

The Hospital Treatment

34. There were a number of chronologies of the observations and treatment received by Mrs Craig while in the Katherine Hospital from her arrival on the morning of 24 January 2018 until her death that same day. For those who have a keen interest a copy of the timeline in treatment, as provided by Associate Professor Dr Didier Palmer (with a few alterations), is appended to these findings.
35. Mrs Craig was triaged at 9.12am. It was noted that she had vomiting/nausea, fever for one day, had vomited four times that morning, had global aching, was tolerating fluid intake and had a cough since the previous month.
36. Her vital signs included a temperature of 39.9°C, a heartrate of 126 beats per minute, a respiratory rate 18 breaths per minute, blood pressure of 116/73 mmHg, and oxygen saturation at 98%. The impression of the doctors was that she was suffering a likely viral illness with no source of infection. They believed a differential diagnosis to be a bacterial infection (sepsis). It is said that she was entered on the sepsis recognition pathway. The pathway at that time was in the following form:

Early Recognition Sepsis in Adults KH ED Pathway



37. The risk factor of a history of fevers along with her heartrate (126) and temperature (39.9) fulfilled the blue and yellow zones. The doctor ordered a venous blood gas (returned a lactate of 2.3 mmol/L), started her on intravenous fluids and ordered blood tests. The blood test results were returned at 11.41am. They indicated a raised white blood cell count of 18.7 (normal 4.0 – 11.0) and raised neutrophil count of 14.2 (normal 2.0 – 8.0). CRP was 26 mg/L (normal less than 5.0).
38. The interpretation of those results was a point of contention during the inquest. The expert witness Associate Professor Dr John Raftos considered

that the blood test results were much more indicative of a bacterial infection (sepsis) than a viral infection. He said if it was a virus those markers would be unlikely to be raised and more likely suppressed. In his opinion at that point at the latest antibiotics should have been commenced.

39. He stated in his report:

“The clinical features of Ms Craig’s presentation to the Emergency Department at Katherine Hospital on 24 January 2018 included:

- Australian Aboriginal heritage,
- fever: temperature 39.9°C,
- tachycardia: heartrate 126 beats per minute,
- aches and pains:

“GLOBAL ACHING,” - triage nurse,
“myalgia” - medical student,

- elevated lactate: 2.3 mmol/L (normal 0.5 - 2.0),
- markedly elevated inflammatory markers, indicating serious bacterial infection:

White Cell Count $18.7 \times 10^9/L$ (normal 4.0 - 11.0),
Neutrophil Count $14.2 \times 10^9/L$ (normal 2.0 - 8.0),
Band Forms $3.1 \times 10^9/L$ (normal 0.0 - 0.5).

The only safe and reasonable medical synthesis of this presentation, regardless of any clinical guideline, would be that Ms Craig had a serious bacterial infection, requiring immediate empirical intravenous antibiotic therapy and management in a closely monitored clinical environment, either the Emergency Department or an Intensive Care Unit.”⁶

40. He gave the following response when challenged:

⁶ Report dated 24 December 2018, p 12

Q. But do you accept, doctor that those markers could also at the time that Mrs Craig is in the emergency department, equally represent a viral infection?

A. Well when you're taking a bet, when you're taking a bet on a patient's life ... I would much rather and I think that the aim for treatment of sepsis is you give antibiotics and if it turns out to be a viral infection, nothing was lost ... but if you don't give the antibiotics, you can't go back and give them at the appropriate time.

Q. Well can I suggest that the time at which she should have definitely been given antibiotics was when it was obvious she was in shock at 3:30 pm?

A. No you don't wait until someone's dying before you treat them.

41. In contrast, Associate Professor Dr Didier Palmer was of the opinion that the picture was more complex and that raised inflammatory markers are just as often associated with persons suffering viruses. In his opinion the indication for antibiotics did not come until 3.30pm.
42. Mrs Craig remained in the Emergency Department. Her observations remained relatively stable. Some appeared to improve a little. Her temperature fell until at 3.20pm when it was 37.8. Her heartrate was at 90 beats a minute. Her blood pressure was fluctuating a little, albeit always above a systolic pressure of 103. By 3.20pm she had received 2 litres of normal saline. She still appeared to be dry. Her blood pressure was 110/50.
43. Her doctor was finishing his shift at 3.30pm. He transferred her to the ward after the observations taken at 3.20pm. At the time of her transfer she was receiving fluid at the rate of 125 milligrams an hour (8 hour bag).
44. There was no specific handover of the care of Mrs Craig at 3.30pm. At that point there appeared to be no specific concerns. On arrival on the ward further observations were undertaken. Her blood pressure had dropped

dramatically to 86/54 mmHg. Her heartrate was 102 beats a min, and her oxygen saturations were 95% on room air.

45. Mrs Craig was at that point in septic shock. So far as the information on the sepsis pathway was concerned she fulfilled the criteria in the red section as her systolic blood pressure had dropped below 90 mmHg. Her heartrate was 102 beats a minute. The pathway stated in the red section “this patient has severe sepsis until proven otherwise”.
46. So far as the Adult Observation Chart used on the ward (between the flags) was concerned, the drop in her blood pressure put her in the pink area. The action required according to the Chart was that the RMO review the patient within 30 minutes.
47. In the opinion of Dr Didier Palmer antibiotics should have been commenced. He stated:

“The observations on the ward at 1530 should have resulted in escalation and timely medical review and the commencement of broad spectrum IV antibiotics (regardless of the lactate level – septic shock can occur with a normal lactate) shortly after 1530 (within an hour).”
48. A doctor was not however called at that time. Thirty minutes later the nurse undertook another set of observations. Mrs Craig’s condition was worsening. Her blood pressure had dropped further to 81/47 and her oxygen saturations to 93%. The doctor was asked to attend. He ordered an intravenous fluid bolus but did not attend. The fluid was given at 4.25pm.
49. At 5.00pm Mrs Craig had red and stinging hands. The nurse ceased the intravenous fluids. An Emergency Department registrar (different to the doctor who ordered the bolus of fluid) was seeing a patient nearby and was asked to check on Mrs Craig by the nurse. The doctor re-sited the cannula and obtained another Venous Blood Gas analysis. It showed that Mrs Craig

had a reducing pH (7.26) and rising lactate (4.2). According to the sepsis pathway a lactate equal to or over 4.0 is one of the items in the red zone.

50. Repeat observations were conducted at 5.30pm. They showed a slightly improved picture. Blood pressure was 93/62, heartrate was 90, temperature was 37.0, respiratory rate was 22, and oxygen saturations 97%. Mrs Craig said she was feeling better. The doctor spoke to the on-call doctor and the commencement of antibiotics was considered. However it is clear that neither doctor understood the full history of Mrs Craig while at Katherine Hospital. It was decided to continue observations and repeat the lactate analysis at 7.00pm.
51. At 6.30pm the observations showed a significant deterioration. Blood pressure was 75/48, heartrate was 75, temperature was 36.6, respiratory rate was up to 24 and oxygen saturations were down to 81%. There was a thought that the low oxygen saturations might have been due to a bad trace and they did not result in an emergency call.
52. Ten minutes later Mrs Craig was suffering diarrhoea and vomiting. She went to the toilet and had dizziness. It was noticed that her lips were blue. The medical emergency team was called. She was put on oxygen and given fluids. At 6.48pm a Venous Blood Gas analysis showed her lactate to be 7.4. She was returned to the Emergency Department (which for Katherine Hospital is the most intensive care environment).
53. At 6.50pm Mrs Craig had another two bouts of diarrhoea. By 7.10pm it was noted that Mrs Craig was clammy and peripherally shut down. At 7.20pm antibiotics were finally commenced. From 7.40pm there was intensive resuscitative efforts, but Mrs Craig went into cardiac arrest at 8.42pm and was declared deceased at 9.25pm.

Reviews and Response

54. The failure to identify the deterioration was the subject of reviews by Katherine Hospital, Top End Health Service and the Department of Health. At Katherine Hospital improvements were sought to be made regarding transfer and clinical handover of patients between the emergency department and the ward, and upskilling in the identification of deteriorating patients and the appropriate escalation of care.
55. Staff at the Katherine Hospital have made a video for continuing education on the dangers of sepsis along with its identification and treatment. There has also been personal learning from the doctors involved in Mrs Craig's care.
56. The doctor who first saw and admitted Mrs Craig said during evidence:

“I've thought about this case a lot over the last couple of years, and I feel like in any physician's career you're going to have cases that do affect your practice into the future, and feel that a case like this - and having spoken to different intensivists and different specialists in different areas, infectious diseases and intensivists, I feel like I would have a lower threshold in a situation like this to be giving antibiotics earlier. Obviously that's with the benefit of hindsight. And I guess the reasons why [we] are trying to avoid giving antibiotics are things like increased, resistance to broad-spectrum antibiotics; not knowing what you're treating; there's risk of giving any medication, such as anaphylaxis ... So those are all competing factors. However, having spoken to different intensivists and different infectious diseases specialists, I feel like the risk of developing antibiotic resistance if giving a few doses of broad-spectrum antibiotic early on in the patient's course until you know which direction they're going in is less of an issue than I think the medical profession thinks, and certainly that I thought at the time.”

57. The doctor who ordered the bolus of fluids after 4.00pm stated:

“We are genuinely affected when these things happen ... my practise has changed. It always will change. We will always continue to upskill and hopefully minimise any repetitions of any of these sorts of things ever happening again.”

58. The sepsis recognition pathway is being upgraded by the Top End Health Service. Aboriginality has been included as a risk factor and there is an indication that a lactate over 2.0 is significant after adequate fluid resuscitation.
59. In May 2019 the Department of Health sought from the NSW Clinical Excellence Commission (CEC) an assessment of the current systems for “diagnosis and treatment of patients with sepsis in the NT”. That assessment was completed in July 2019. The CEC made 23 recommendations relating to governance, training, standardisation, system change and continual improvement.
60. The Department of Health has developed a management plan for implementation of the recommendations. Two of the milestones are said to be the development of an NT Health Sepsis Management Pathway and an NT Health Education Plan that includes a detailed strategy for Aboriginal Health.
61. I commend Katherine District Hospital, the Top End Health Service and the Department of Health on their efforts to ensure continual improvement in combatting the challenges sepsis recognition and treatment poses since the death of Mrs Craig.

Comment

62. Despite two inquests into the failure to identify sepsis at a Northern Territory Hospital, the need for early intervention seemed not to have been appropriately understood. Sepsis kills and it kills often. It is a very common cause of death in hospitals. It is therefore incumbent on management to ensure that the recognition of sepsis and its early treatment is appropriately and continually reinforced and the understanding of its staff is audited.
63. For a patient who from the outset was recognised to be in potential danger the documentation is very poor. There was for instance no fluid balance chart utilised at any time. Given that urine output is a significant parameter when identifying sepsis that seems less than adequate. Such a chart may also have assisted the doctors to understand that they were unlikely to be dealing with hypovolemic shock after 3.30pm.
64. The death of Mrs Craig was likely to have been preventable.
65. One of the significant concerns of the family was that very early on in the care of Mrs Craig the doctors understood that the infection was either viral or bacterial. If viral, there was likely no real danger. If bacterial, there was real danger. However, the consequences of withholding antibiotics was not discussed with Mrs Craig or her family. The family are confident that if that discussion were had she would have sought antibiotic treatment. In circumstances where withholding treatment may well have had and did have fatal consequences, that failure to discuss the options for treatment was significant.
66. Pursuant to section 34 of the *Coroner's Act*, I find as follows:
 - (i) The identity of the deceased was Joanne Craig born on 5 October 1960, Tennant Creek Hospital, Northern Territory.

- (ii) The time of death was 9.25pm on 24 January 2018. The place of death was Katherine District Hospital, Katherine in the Northern Territory.
- (iii) The cause of death was multi-organ failure due to sepsis that was due to *Streptococcus pneumoniae* infection.
- (iv) The particulars required to register the death:
 - 1. The deceased was Joanne Craig.
 - 2. The deceased was of Aboriginal descent.
 - 3. The deceased was a manager of a cattle station.
 - 4. The death was reported to the Coroner by a doctor at Katherine Hospital.
 - 5. The cause of death was confirmed by Forensic Pathologist, Marianne Tiemensma.
 - 6. The deceased's mother was Peggy Foster and her father was Noel George Corp.

Recommendations

- 67. I **recommend** that General Practitioners have a schedule for and make every effort to provide to Aboriginal and Torres Strait Islander people the Pneumovax23 (23vPPV) vaccination in accordance with the Australian Immunisation Handbook.
- 68. I **recommend** that the Top End Health Service do all things necessary to ensure its staff are competent in the recognition of sepsis and escalation of treatment and that such efforts are ongoing.

69. I **recommend** that the Top End Health Service do all things necessary to ensure that the documentation utilised when treating patients is appropriate and appropriately utilised.
70. I **recommend** that documentation utilised be audited on a regular basis.

Dated this 20 day of September 2019.

GREG CAVANAGH
TERRITORY CORONER

ANNEXURE

Timeline of Events (from ED attendance 24-01-2018) from Dr Didier Palmer (with my modifications)

Key

Nursing or medical assessment or actions

Observations

Investigations

Treatment

Wednesday 24th January

Mrs Craig attends Katherine Hospital Emergency Department

0912hrs

Triaged: One day of fevers, vomited 4 times on the morning of presentation, global aching, cough for a month

Given an Australian Triage Scale (ATS) of 4 (to be ideally seen within an hour by a doctor)

0912hrs

Observations:

Temperature

39.9C Pulse

126

Respiratory rate 18

Blood Pressure 116/73

Oxygen saturations 98% in air

0955hrs

Medical student (6th year) takes a comprehensive history for Dr Wyllie: Ms Craig had been unwell from the previous evening when out to dinner with fever and had vomited 4 times on the morning of attendance, she had reduced oral intake. She also had a headache but no red flags for meningitis (neck stiffness / photophobia / purpuric rash / contact history). She was noted to work on a cattle station and had had a cough for a few weeks. She had a diagnosis of hypertension and was on perindopril and supraventricular tachycardia and was on metoprolol when this occurred. She had been investigated inconclusively by a rheumatologist the previous

year for cutaneous systemic erythematosis and was an ex- smoker and non-drinker. Systems review revealed no obvious infective source.

On examination she looked unwell and lethargic and systems exam revealed her to be dry but otherwise no abnormality was found except a soft ejection murmur which had been noted from childhood.

CXR was normal (as reported in the notes I have not reviewed it myself)

Venous blood gas: pH 7.35; Co2 48 Na 141 K 3 Lac 2.3 HCO3 26.5
(performed 1035)

Blood tests requested (arrived in lab and registered at 1043): FBC / EUC / LFT / CRP / Blood cultures / melioid serology

The clinical impression was of a viral illness with no other clear infective source.

Initial management: ondansetron (anti- emetic) (prescribed 0915);
Ibuprofen (anti pyrexial) (prescribed 1100); IV access and IV fluids (1L normal saline prescribed 1050)

The above plan and investigation would have been discussed with Dr Wyllie and would have required his authorisation for investigations and administration of drugs and fluids.

1100hrs

Nursing note: vomiting settled with ondansetron, vitally stable, plan: IV fluids, bloods, paracetamol

1100hrs

Treatment to this time: Antiemetic

Observations:

Temperature

39.7C Pulse 95

Respiratory rate 18

Blood Pressure 140/50

Oxygen saturations 98% in air

1141hrs

Full Blood Count results available, results included:

White Cell Count	18.7 x 10 ⁹ /L	(Normal 4.0 - 11.0)
Neutrophil Count	14.2 x 10 ⁹ /L	(Normal 2.0 - 8.0)

Metamyelocytes	0.4 x 10 ⁹ /L	(Normal 0.0)
CRP	26 mg/L	(Normal < 5.0)

1200hrs

Treatment to this time: antiemetic, up to 1L normal saline, ibuprofen

Observations:

Temperature

39C Pulse 103

Respiratory rate 20

Blood Pressure 120/50

Oxygen saturations 93% in air

1220hrs

Second L of normal saline charted (commenced 1235)

1230hrs

1g of paracetamol given (charted at 1220)

1251hrs

Ward test urine: negative

1300hrs

Treatment to this time: antiemetic, 1- 1.5L normal saline, ibuprofen, paracetamol

Observations:

Temperature 38.7C

Pulse 90

Respiratory rate 22

Blood Pressure 103/50

Oxygen saturations 94% in air

1330hrs

Treatment to this time: antiemetic, up to 1.5- 2L normal saline, ibuprofen, paracetamol

Observations:

Temperature 38.4C

Pulse 92

Respiratory rate 20

Blood Pressure 107/50

Oxygen saturations 96% in air

1425hrs

Treatment to this time: antiemetic, 2L normal saline, ibuprofen and paracetamol

Observations:

Temperature

38.4C Pulse 89

Respiratory rate 20

Blood Pressure 105/50

Oxygen saturations 94% in air

1425hrs

Dr Wyllie documents:

Treatment thus far: 2L IV fluids and 2 anti-pyretics (paracetamol and ibuprofen):

Investigations: CRP 26; EUC 141/3.2/6.2/71; LFT alt 91 ggt 81; FBC 134/.4/18.7 (n 18, lymph 0.6); U/A Protein + otherwise NAD

Plan:

- a. Admit to inpatient ward for fluids/ antipyretics/ observation
- b. 2nd set of blood cultures; full melioid screen
- c. Not for antibiotics as does not fit severe sepsis criteria yet – improving but needs observation.
- d. This plan was made in discussion with Dr O’Hern (the medical registrar on duty for inpatients and on call from home after 1630 for the medical inpatients)

1430hrs

Dr Wyllie charted IVT N/Saline with 20 mmol KCl to continue @ 125 mls/hr

1520hrs

Observations (pre-departure from the ED):

Temperature

37.9C Pulse 92

Respiratory rate 24

Blood Pressure 110/50

Oxygen saturations 96% in air

1530hrs

Arrives on the inpatient ward transported on a wheelchair, noted to be alert and orientated. The nurse notes the patient to be hypotensive on arrival observations at 1530 and s/he repeats the observations at 1600hrs and they show the patient is still hypotensive. At that point s/he escalates to the (ED) doctor by phone.

1530hrs

Observations (post arrival on inpatient ward):

Temperature

37.4C Pulse

102

Respiratory rate 24

Blood Pressure 86/54

Oxygen saturations 95% in air

1600hrs

Observations:

Temperature 37.2C

Pulse 90

Respiratory rate 20

Blood Pressure 81/47

Oxygen saturations 93% in air

1625hrs

The contacted ED doctor gives a telephone order for **1L of Hartmanns solution to be given as a bolus**. The nurse noted the patient to be comfortable.

1710hrs

The patient buzzed due to pain in both hands, Hartmanns solution was ceased

Observations:

Temperature

37.2C Pulse 90

Respiratory rate 20

Blood Pressure 89/46

Oxygen saturations 93% in air

The medical officer was called again

1730hrs

Observations:

Temperature

37C Pulse 90

Respiratory rate 22

Blood Pressure 93/62

Oxygen saturations 95% in air

1730hrs

Up to this point the patient had had 2- 3L crystalloid

The ED registrar left the ED and attended the patient on the ward. He noted no source of infection but she felt cool peripherally, felt subjectively better, was afebrile, was making urine and was not confused and had a rise in lactate to 4.5

The registrar discussed the case with Dr O'Hern who elected to observe and repeat the lactate at 1900hrs and not give antibiotics

1830hrs

Observations:

Temperature

36.5C Pulse 75

Respiratory rate 22

Blood Pressure 75/48

Oxygen saturations 81 % in air with poor trace

The nurse documents that the patient was slightly short of breath and also had diarrhoea and was assisted to the toilet. A medical officer was on the ward reviewing another patient and the nurse was advised to repeat the observations on the patient's return from the toilet. When in the toilet the patient had an episode of vomiting post toileting and her lips went blue (cyanosis). She was brought back to her bed, commenced on oxygen and the foot of the bed raised and a rapid response was called.

1910hrs

MET Call (emergency response medical call)

Medical officer notes **pre- syncope, low blood pressure, peripherally shut down, delayed capillary refill; all signs of cardiovascular collapse (shock) despite the patient still mentating normally.**

500ml bolus Hartmann's and transfer back to ED (with a delay documented as the patient was using the pan).

1930hrs

The patient was transferred back to the ED and the notes document her arrival in the ED at 1930

At that point the diagnosis was of decompensated septic shock and there was a very experienced medical team comprising a consultant emergency

physician, an accredited emergency medicine advanced trainee, a GP anaesthetist and a junior medical officer.

The patient was initially mentating normally with a blood pressure of over 100 systolic and a heartrate of about 100. Central venous access was attempted but proved not possible. Wet season severe sepsis antibiotics were given (meropenem and vancomycin) and peripheral inotropes commenced.

Ms Craig continued to deteriorate rapidly and lost output (went into cardiac arrest). Standard Advanced Life Support protocols were followed and she was intubated and ventilated. There was a brief return of circulation but there followed diminishing response to inotropes and further cardiac arrest.

Stephen (Ms Craig's partner) was brought into the resuscitation and there was discussion with him regarding the futility of further resuscitative effort.

2125hrs

Resuscitation was ceased at 2125hrs with Stephen in the room.

Family members arrived to support Stephen at 2143.