QUEENSLAND COURTS

CORONERS COURT OF QUEENSLAND

FINDINGS OF INVESTIGATION

CITATION:	Non-inquest findings into the death of FD
TITLE OF COURT:	Coroners Court
JURISDICTION:	Cairns
DATE:	8 May 2020
FILE NO(s):	2018/1021
FINDINGS OF:	Ainslie Kirkegaard, Acting Coroner
CATCHWORDS:	Percutaneous Endoscopic Gastrostomy (PEG); post-PEG insertion care & complications; rural hospital presentation; delayed recognition & response to sepsis; Adult Sepsis Pathway; RESIST Sepsis Program; Queensland Sepsis Collaborative; delayed acceptance for interhospital transfer; management of urgent interhospital transfer from rural hospital to regional tertiary hospital.

Contents

1. FD was a 68 year old woman who died at a rural hospital in the early hours of 3 March 2018.

2. Mrs D had a ten-year history of oculopharyngeal muscular dystrophy (OPMD). This is a genetic condition characterised by slowly progressive muscle disease affecting the muscles of the upper eyelids and the throat. She had swallowing difficulties associated with this condition and required a percutaneous endoscopic gastroscopy tube which was inserted at a regional tertiary hospital on 27 February 2018. She presented to her local rural hospital the following evening, 28 February, some five hours after being discharged home from the regional tertiary hospital and was admitted for treatment of aspiration pneumonia. She became acutely unwell on the afternoon of 2 March with urgent clinical investigations revealing her PEG tube had become dislodged. She was escalated for urgent transfer to the regional tertiary hospital for surgical review. Her condition deteriorated rapidly during ambulance transfer requiring roadside emergency resuscitation efforts and diversion to another rural hospital where she died in the early hours of 3 March 2018.

3. Mrs D's death was reported to the coroner as she was thought to have died from a health care complication in circumstances where there was an apparent failure to consider abdominal sepsis during her admission at a rural hospital, failure to have escalated her for surgical review sooner and delays in her transfer to a regional tertiary hospital by road with only one paramedic, one nurse escort and her daughter in the ambulance when she was critically unwell.

Family concerns

4. Mrs D's daughter was understandably considerably distressed by having witnessed the events of the interhospital transfer and having to assist in the roadside emergency resuscitation efforts. The family expressed significant concerns about the management of the transfer.

Autopsy findings

5. An external examination and full autopsy were performed on 7 March 2018. Internal examination of the abdominal and pelvic cavity revealed purulent material particularly in the vicinity of the PEG tube which appeared to penetrate the gastric wall and be present within the gastric lumen. There was no evidence of additional gastric wall defect, mucosal ulceration or mucosal haemorrhage. The pathologist considered the intraperitoneal fluid to be consistent with leakage from the PEG site. There was also purulent exudate over the laryngeal and upper airway mucosal surfaces, pneumonic changes in the lungs, pleural effusions, valvular heart disease, coronary and general atherosclerosis, kidney scarring and muscle changes consistent with muscular dystrophy. No residual breast cancer was identified. Microbiological cultures from the abdominal and pelvic cavities grew Enterobacter cloacae. Having regard to these findings, the pathologist determined

the cause of death to be sepsis due to peritonitis as a consequence of leaking PEG tube in the context of oculopharyngeal muscular dystrophy.

Preliminary independent clinical review

6. An independent doctor from the Department of Health Clinical Forensic Medicine Unit reviewed the medical records and raised a number of concerns about Mrs D's clinical management at the local rural hospital and the management of the interhospital transfer, namely:

    - there should have been a higher clinical suspicion for abdominal sepsis – the reviewing doctor was uncomfortable with the diagnosis of aspiration pneumonia to explain Mrs D's presentation to the local rural hospital as it did not explain her abdominal symptoms and the chest x-ray had improved as compared with her previous imaging;

    - there was late recognition and inadequate treatment of a septic patient - when Mrs D became hypotensive on 1 March, it would have been prudent to explore other potential sources of sepsis, and abdominal causes should have been high of the list of differentials given her recent abdominal surgery. Fluid resuscitation was also indicated to manage her hypotension;

    - there was inadequate preparation of the patient for transfer (stabilisation, monitoring) – while the acute deterioration at around 4:30pm on 2 March was recognised quickly and prompted appropriate investigations, the reviewing doctor considered Mrs D was clearly septic but expressed concern that her sepsis was not adequately recognised or managed prior to transfer. With the benefit of hindsight Mrs D needed to be stabilised before transfer was even attempted;

    - there was possible obstruction from the surgical team to interhospital transfer resulting in delayed departure from the local rural hospital – the reviewing doctor was surprised that the surgical team insisted on waiting for a formal radiology report before accepting Mrs D given she was deteriorating so quickly. This delay reduced her changes of a safe interhospital transfer;

    - an inappropriate means of transportation was chosen with insufficient retrieval staff and lack of Queensland Ambulance Service back up – the reviewing doctor was uncomfortable that the ambulance transport proceeded with only one paramedic, one nurse escort and Mrs D's daughter when Mrs D was considered to be unstable;

    - apparent failure to recognise the critically unstable patient at the other rural hospital with an inappropriate decision to continue transfer without stabilisation of the patient – the reviewing doctor was concerned after an emergency stop at the other rural hospital, and some stop gap measures, they were sent on their way again. The reviewing doctor considered it should have been recognised that Mrs D was too unstable to make the hour long trip to the regional tertiary hospital, even with a bag of metaraminol running. She was peri-

arrest with severe hypoxia (60-80%), they were struggling to get an accurate blood pressure and her pulse was not palpable. If she was to have any chance of survival, she needed invasive monitoring, central access, inotrope support, intubation and ventilation. If aeromedical retrieval services were not available, a doctor escort could have been considered. However, given that there were signs that Mrs D was peri-arrest (unpalpable pulses with systolic blood pressure <57), aborting the transfer at the other rural hospital would not have been unreasonable; and

- potential lack of availability of aeromedical retrieval services.

7. These findings have been informed by review of Mrs D's medical records, preliminary independent clinical review, autopsy findings and clinical incident review outcomes and formal responses by the relevant Hospital & Health Service, Queensland Ambulance Service and Retrieval Services Queensland with reference to the family's specific concerns.

8. Following Mrs D's death, the relevant Hospital & Health Service (HHS) commissioned a root cause analysis (RCA) of the care provided to her by its health services over the period 18 February – 3 March 2018. This is a systemic analysis of what happened and why and is designed to make recommendations to prevent adverse health outcomes from happening again, rather than to apportion blame or determine liability or investigate an individual clinician's professional competence. It is conducted by a review team who had no involvement in the patient's care. I note that the RCA team included representatives from the Queensland Ambulance Service and Retrieval Services Queensland. The RCA report was received on 9 October 2018.

Events leading to Mrs D's PEG insertion on 27 February 2018

9. In addition to OPMD, Mrs D's medical history included breast cancer (grade 3) on surveillance, hypertension, dyslipidaemia, hypothyroidism, gastro-oesophageal reflux disease and diverticular disease.

10. Mrs D had presented to the local rural Hospital on 18 February 2018 with increasing dysphagia and suspected bilateral aspiration pneumonia. Chest x-ray confirmed aspiration pneumonia. She was admitted for further management and commenced on intravenous antibiotic therapy.

11. She had been seen by a speech pathologist in the community outpatient clinic two weeks earlier. The speech pathologist had sent a Videofluoroscopy (VFSS)/Barium Swallow request form to Mrs D's general practitioner for signature but the request had not been returned. Mrs D had also been seen by the community dietician on 15 February 2018 who recommended mildly thickened fluids and a pureed diet.

12. On 19 February, Mrs D regurgitated her oral intake. She was assessed by the speech pathologist and made nil by mouth and commenced on intravenous fluids.

She was referred to the regional tertiary hospital gastroenterology team and transferred to that hospital afternoon. A new referral for VFSS/Barium Swallow was made to the regional tertiary hospital for 20 February.

13. Mrs D was admitted directly to the Medical Assessment Unit at the regional tertiary hospital under a general medical consultant. She was assessed by a dietician and speech pathologist the following morning. A nasogastric tube was inserted and a gastroenterology referral was made in anticipation of Mrs D needing a percutaneous gastrostomy (PEG).

14. The VFSS/Barium swallow scheduled for 20 February was cancelled due to Mrs D's high risk of aspiration. She remained nil by mouth.

15. Following review by the gastroenterology team on 21 February, it was decided to postpone the barium swallow but proceed with the VFSS. Mrs D was allowed small oral intake only and her NGT feeds continued.

16. On 22 February, chest x-ray confirmed NGT placement and enteral feeding was recommenced. A referral for PEG tube insertion was made and the procedure was booked for 27 February. Mrs D underwent pre-anaesthetic assessment and was consented for the procedure.

17. She was then transferred to a rural hospital for management of her NGT enteral feeding pending the PEG tube insertion. The plan was for her to be discharged home after one day to await PEG insertion. She was commenced on a seven day course of antibiotic therapy (Augmentin Duo) via NGT because her sputum sample grew Klebsiella pneumoniae 3+.

18. However, after an episode of vomiting it was decided for Mrs D to remain as an inpatient there until the PEG insertion. She remained clinically stable and her antibiotic therapy continued. Blood results were noted to be normal on 23 February.

19. Mrs D was transferred back to the regional tertiary hospital on 26 February in preparation for the PEG insertion. She was admitted under the gastroenterology team. Pre-operative antibiotics were ordered for the following morning and intravenous access was obtained.

20. I note that while Mrs D was to be commenced on the PEG Carepath, there is no evidence it was used by those caring for Mrs D. The RCA report noted that while the PEG Carepath was available on the Queensland Health intranet, it was not used at the rural hospital or the regional tertiary hospital at that time. Further, the hyperlink to the Carepath within the PEG Management Procedure did not function. Although there was functionality within the integrated electronic medical record (iEMR), this was not used for PEG check post insertion; rather all post procedural documentation was entered into iEMR documentation at the regional tertiary hospital or hard copy progress notes at the local rural hospital.

21. Bloods taken on the morning of 27 February were within normal limits. Mrs D received preoperative intraveous antibiotics (Gentamycin and Ampicillin) before attending the Endoscopy Unit for the PEG insertion.

22. Mrs D had a 20Fr Medical Innovations Corporation (MIC) Pull gastrostomy (with Enfit connections) inserted with an upper endoscopy to confirm placement. The endoscopy report notes '..the entire examined stomach was normal. Placement of an externally removeable PEG with no T-Fasteners was successfully completed. The external bumper was at the 4.0cm marking on the tube.

23. The post procedural plan was for Mrs D to remain nil by mouth and nil by PEG for four hours after insertion and then for the PEG to be flushed with 50mls water to ensure Mrs D was pain free and tolerated the PEG. This is documented as being well tolerated and a feeding regime commenced. Mrs D received continuous PEG feeds overnight.

24. I note that post PEG insertion education at the regional tertiary hospital is provided by a *"PEG Credentialled Dietician".* This covers information about gastrostomy care and feeding and patients are given a 'Caring for your Gastrostomy tube' brochure to take home. I am advised that during the first few weeks post insertion, an immature gastrocutaneous track predisposes the patient to developing peritonitis if there is complete or partial dislodgement of the tube and feeding continues.

25. Mrs D and her daughter received education from a PEG credentialled dietician the following morning, 28 February. This education covered PEG hygiene, tube position check, hand hygiene, monitoring for infection and mouth care. The dietician demonstrated feeding and observed E's technique. Her daughter was deemed to be competent with PEG care and feeding. They were given two mesh bands and tape for securing the PEG.

26. The dietician documented the PEG bumper to be sitting at 4cm with 2-5mm between the bumper and skin and the tube was rotating and moving in and out of the stoma appropriately. Mrs D is noted to have indicated only mild pain when coughing and had a moist cough. She was noted to have tolerated 70ml/hr feeds overnight and tolerated a 200ml bolus feed via gravity syringe with 60ml flush before and after during the PEG education that morning. She was commenced on an intermittent feeding regime which involved intermittent gravity or slow/gentle push with 60ml water pre/post feed flushes plus additional 250ml flushes three times daily. Mrs D was given a supply of feeds and a Home Enteral Nutrition Services script for more. The dietician handed over to the nursing staff that Mrs D required education on medication administration before discharge home.

27. When reviewed on the gastroenterology ward round Mrs D was noted to be stable. She was discharged home with her daughter at 1:10pm with a plan for ongoing

dietician review with the local Community Health Service. She was given a prescription for topical Mupirocin cream 2% twice daily for two weeks.

Mrs D's readmission to the local rural hospital on 28 February 2018

28. Mrs D presented to the local rural hospital emergency department at 6:47pm that evening with nausea, vomiting, pain, weakness, rigors and fevers. This was only about five-and-a-half hours after being discharged home from the regional tertiary hospital. Mrs D followed the advice she had been given before leaving the regional tertiary hospital about monitoring for potential post-insertion complications and presented to her local emergency department in a timely way.

29. She was found to be febrile to 39.1 degrees, with an increased respiratory rate and low oxygen saturations. Venous blood gases showed a high lactate (2.98 mmol/L). She was examined by a Senior Medical Officer who noted she appeared deconditioned, had fevers and was shivery. Her chest was clear, her abdomen was soft and the PEG was described as clear but with epigastric tenderness. The initial clinical impression was documented as *"? recurrence of aspiration pneumonia ? postoperative complication*". There is no documentation relating to the PEG bumper position at this review. Bloods were taken but no blood cultures were ordered. A chest x-ray was ordered for the morning along with a mid-stream urine specimen. She was admitted to the ward for oximetry, PR medication and standard observations.

30. Mrs D was given PR paracetamol and PR indomethacin during the evening. As at 9:15pm she was still febrile at 38.8 and had an elevated respiratory rate. Bloods had been collected at 9:00pm but the afterhours pathology service was not called in to analyse the sample overnight.

31. Mrs D's intravenous access was difficult so it was decided to administer antibiotic (Augmentin) via the PEG rather than intravenously. Once her daughter provided the PEG equipment, she received the first dose of Augmentin 500/125mg via the PEG at around 1:00am on 1 March, nearly six hours after her presentation to hospital.

32. The patient record indicates Mrs D received further doses of paracetamol via PEG four-hourly from 6:00am on 1 March. Her morning medications were also administered via PEG at 8:00am. The dietician did not get to review Mrs D in person as she was attending a workshop. However a feeding regime based on the regional tertiary hospital dietician plan was documented at 9:10am.

33. Mrs D was reviewed by a speech pathologist who knew her well. Mrs D told her she been cleaning her bird cage after being discharged home from the regional tertiary hospital. In addition to the PEG feeds, the plan was to permit small amount of runny pureed diet and regular fluids for quality of life (with a maximum 4 x 5ml teaspoons specified). The Fluid Balance Chart notes that feeding via the PEG continued/recommenced at midday.

34. The pathology results from the previous evening were available for review from 9:30am that morning. However there is no evidence to indicate they were reviewed. These results revealed an elevated white cell count (18.6) and neutrophils (16.03) and raised inflammatory markers (CRP 36). There is no information available to me to clarify how and why these results were not accessed or acted upon. This was a significant missed opportunity by the treating team to have considered Mrs D's risk factors for and other potential sources of sepsis.

35. Chest x-ray performed at 10:30am showed areas of linear atelectatic change with improvement compared to the previous imaging.

36. A nursing entry made at 11:30am noted Mrs D reported pain on mobilising from the bed to the toilet. She was yet to be seen by the doctor at that time.

37. The local rural hospital utilised the Queensland Adult Deterioration Detection System (Q-ADDS) to record patient vital signs. Q-ADDS is a standardised vital signs or observation chart used in many Queensland public hospitals with the specific aim of detecting patient deterioration.

38. In essence, the Q-ADDS chart presents the most important vital signs for detecting patient deterioration - respiratory rate, oxygen saturation, oxygen flow rate, blood pressure, heart rate, temperature and level of consciousness. Each vital sign is presented as a separate graph. The chart incorporates a system for tracking changes in the patient's vital signs over time. It integrates both a single parameter system (in which an emergency response is required when any single observation is plotted outside the given range) and a multiparameter system (in which each vital sign is scored and then summed to produce a total score representing an indication of the patient's condition). The total score triggers a list of actions required when thresholds for abnormality are reached. Depending on the severity of the patient's score, the chart triggers actions ranging from notifying the nursing team leader, increasing the frequency of observations, escalating the patient for medical review within a certain timeframe to initiating an emergency call – a higher QADDS score requires higher levels of intervention. In this way, the Q-ADDS tool positions clinicians involved in a patient's care to track vital sign changes over time with a view to identifying clinical deterioration and appropriate interventions in a timely and consistent way.

39. Mrs D's Q-ADDS chart noted she remained stable throughout the morning. However, her blood pressure had dropped significantly to 80/51 when checked at 1:15pm, a level that would normally trigger an emergency response. The nurse rechecked the blood pressure twice with the second manual redo recording 92/54. The nurse's entry in the progress notes made at 1:50pm notes "*QADDS Score of 2 BP taken 3 times once manual. Spoke to Dr, Concerned as no mods in place Doctor had. No further orders*." Mrs D's other observations showed she was afebrile, heart rate (60-80s), respiratory rate (17-20) and oxygen saturations (98-100% on room air).

40. Mrs D was normally hypertensive so her new hypotension at this time was very low given her baseline systolic blood pressure. The Q-ADDS chart had been completed by documenting Mrs D's 'usual systolic BP' as 110, rather than the default of 120. There is no record of this change documented in the progress notes. The RCA report notes there was no documentation in the patient record that Mrs D's blood pressure had decreased from her recent previous admission or since her discharge from the regional tertiary hospital the previous day. The clinical handover was not documented so it is not known whether the nursing team leader was notified of the low blood pressure reading. There was no record of the telephone discussion with the doctor noted on intervention section on the Q-ADDS chart. The RCA team noted interviews with the staff caring for Mrs D at this time inferred that her low blood pressure may have been attributed to her deconditioned state.

41. As identified by the reviewing doctor, this was another missed opportunity for the treating team to have reassessed Mrs D's risk factors for and other possible sources of sepsis. It was also a missed opportunity to have commenced fluid resuscitation.

42. Mrs D was reviewed by a Senior Medical Officer at around 4:40pm who documented no new changes and a plan to continue current treatment, antibiotics via PEG as charted and to continue PEG and oral feeding as per the dietician and speech pathologist.

43. At 9:42pm, nursing staff documented a pain score of 5/10. Her blood pressure was noted as 99/53, asymptomatic and scoring Q-ADDS 1. Mrs D was receiving regular paracetamol via the PEG. The PEG site was described as clean and intact and she was gravity feeding well.

44. She was given 10mg Ordine via the PEG at 11:45pm and again at 2:05am for lower abdominal pain. Her regular paracetamol continued.

45. The Q-ADDS chart shows a decrease in her oxygen saturations from 2:00am (94% down from 98% on room air) which continued through the day. Her Q-ADDS score ranged between 0-1.

46. At 5:10am on 2 March, Mrs D was noted to have lower abdominal pain. She received analgesia via the PEG.

47. At 6:15am, Mrs D still had reduced oxygen saturations (94% on room air) and low systolic blood pressure.

48. Mrs D was reviewed by a Senior Medical Officer at 9:53am on 2 March who noted a recent upper respiratory tract infection based on the chest x-ray findings. She was noted to have an intermittent cough and no urinary symptoms. Her abdomen was soft and generally tender. The plan was to continue current management,

repeat blood tests and, if her inflammatory markers were elevated, discuss with the gastroenterology team.

49. There is an entry by a Medical Registrar at 1:30pm noting that Mrs D had not had any abdominal pain the day after the PEG insertion but the pain started to get worse on 1 March mainly around the PEG site which worsened with coughing. She did not have any nausea, vomiting or diarrhoea. She was noted to have been afebrile since admission. She had an ongoing productive cough that had not improved.

50. On examination, Mrs D's observations were pulse rate 65, blood pressure 120/20, oxygen saturations 94% on room air and she was afebrile with warm peripheries and a weak radial pulse. The PEG site was clean with no surrounding erythema or discharge from the wound. The doctor noted umbilical abdominal pain but not peritonitic and bowel sounds were present. There were scattered bilateral crepitations on chest auscultation.

51. The Medical Registrar noted the chest x-ray findings of resolving aspiration pneumonia and the blood results from 28 February with the elevated white cell count, neutrophils and raised inflammatory markers. Biochemistry was normal.

52. Noting the generalised abdominal pain post PEG insertion, the Medical Registrar documented "*?post op complication vs post op pain*". She noted Mrs D had been in Augmentin Due Forte for aspiration pneumonia which was radiologically improving. The plan was for repeat blood tests and discussion with the gastroenterology team if the tests showed worsening inflammatory markers. PEG feeds were to continue as per the dietician. Sputum cultures were ordered.

53. Bloods were collected at 1:59pm and the results registered in the pathology system at 2:17pm. These results showed a reduced white cell count (down to 3.5) and dramatically elevated inflammatory markers (CRP 346). A lactate level was not ordered.

54. Mrs D was noted to have been well at the start of the afternoon shift. The last recorded PEG feed on the fluid balance chart was at 4:00pm on 2 March. The feed was given with no concerns but approximately 30 minutes later Mrs D was found to be coughing and feeling unwell with the PEG feed *"leaking extensively".*

55. She was urgently reviewed by a Senior Medical Officer who noted she had ongoing abdominal pain and was vomiting, there was a leak around the PEG site and her abdomen was distended with generalised tenderness. Her vital signs were within normal limits. The repeat blood test results, in particular the markedly elevated CRP, were noted and the regional tertiary hospital gastroenterology team were contacted.

56. An urgent CT and PEGogram scan performed at 4:46pm was reported verbally as showing "*copious intraperitoneal fluid with gas. Contrast in gastric body. Contrast in bowel ?residual barium from fluoroscopy*". The clinical impression was of peritoneal leak from the PEG.

57. The ward nurse was reportedly very concerned about Mrs D's potential for deterioration during the CT scan but this was not documented in the patient record and there is no documented evidence that these concerns were escalated to a Medical Officer.

58. Mrs D was commenced on intravenous antibiotic therapy (Ceftriaxone 2mg) at 6:30pm. Her Q-ADDS score was 0 at this time.

59. The Senior Medical Officer contacted the on-call Surgical Registrar at the regional tertiary hospital at around 6:30pm. The surgical team reportedly refused to accept Mrs D for transfer without a formal CT report.

60. The CT findings were reported at 7:09pm. The findings were reported as *"A PEG tube is seen and it's identified to the right of midline. It appears to be outside the stomach. Contrast was administered and it does enter the stomach with no definite contrast into the abdomen. There is however a large amount of free fluid and free gas indicating a leak. Differential otherwise have included a perforated viscus. Surgical review however urgently recommended. Further bibasal atelectasis seen and some fluid distending the power oesophagus noted."*

61. The Senior Medical Officer reviewed the formal CT report at around 8:00pm noting "*Free fluid & air ++ PEG not in stomach".*

62. The Senior Medical Officer attempted to contact the surgical team again with the report findings but the surgeons were scrubbed in theatre and advised they would call back later. The oncoming Senior Medical Officer then called the regional tertiary hospital emergency department consultant who accepted Mrs D "*without question"* for urgent transfer.

63. By 8:30pm, Mrs D had developed an acute kidney injury, hepatic injury and raised lactate. She was given intravenous metronidazole 500mg at 8:40pm and in an indwelling catheter was inserted in preparation for interhospital transfer. Nursing notes described her as obviously deteriorating, becoming short of breath and coughing up stomach contents. Her Q-ADDS score was now 3 with an elevated respiratory rate (24), temperature 35.4C and oxygen saturations 94%.

Clinical guidance for identifying and responding to PEG complications in rural health facilities

64. Preliminary independent clinical review identified that there should have been a higher clinical suspicion for abdominal sepsis when Mrs D presented to the local rural hospital.

65. The RCA identified that PEGs are not commonly encountered within the HHS rural facilities and medical and nursing staff in these facilities in general are not familiar with PEG care requirements within the first few weeks post insertion.

66. The RCA team concluded that the local rural hospital medical officers did not consider Mrs D to be displaying overt peritoneal signs and given her recent pneumonia and aspiration risk, there was a bias towards a respiratory focus of infection.

67. The RCA team identified that the HHS PEG-related clinical resources did not provide clear instruction on initial patient management if suspected complications were encountered during the first few weeks post PEG insertion. In particular the resources did not provide information on clinical escalation or referral after hours; direct cessation of using the device until the PEG position had been confirmed; give clear guidance about how the PEG position should be confirmed or specify documentation requirements.

68. The RCA identified the absence of clinical guidance in identifying and responding to PEG complications to be a root cause as it was considered to have contributed to delay in recognition of PEG complications which led to a delayed referral to higher level care and delayed the recognition of sepsis.

69. To address this, the RCA team recommended that HHS update its Gastrostomy Tube Management Procedure and PEG Careplan to incorporate indications for discontinuing PEG feeds when suspected complicated are encountered; indications for contacting the on-call gastroenterologist after hours if complications are suspected; bumper position checking and position documentation/checking requirements; device securing and indications for considering entry into the Sepsis Pathway and incorporating a hyperlink to access that pathway.

Delayed recognition and response to sepsis

70. Preliminary independent clinical review identified there was late recognition and inadequate treatment of a septic patient at the local rural hospital.

71. At the time of Mrs D's death there was a clinical guideline and clinical pathway in place across the HHS for the recognition and management of adult sepsis.

72. The RCA team identified that Mrs D presented to the local rural hospital with a number of the risk factors identified on the HHS Adult Sepsis Pathway including:
    - indwelling medical device
    - recent invasive procedure/surgery
    - fevers or rigours
    - representation within 48 hours
    - abdominal pain
    - over 65 years of age.

73. The RCA revealed that the Adult Sepsis Pathway was not used when Mrs D presented to the local rural hospital emergency department, on admission or during inpatient shift to shift handover. This was considered to have led to the delayed recognition and response to sepsis.

74. Specifically, Mrs D's presenting signs and symptoms did not trigger completion of the 'Sepsis Six' treatment arm of the Adult Sepsis Pathway which involved oxygen, blood cultures, serum lactate, intravenous fluids, antibiotics, monitoring and reassessment. While the clinical procedure required all clinicians to recognise the risk factors, signs and symptoms of sepsis, it did not provide a compulsory screening tool to prompt entry onto the Sepsis pathway. Activation of the Sepsis Pathway was reliant on individual clinician awareness rather system triggers.

75. Mrs D presented to the local rural hospital with an elevated lactate of 2.98 mmol/L. I note that clinical studies have identified a strong association between an elevated serum lactate level and morbidity and mortality in critically ill patients. The RCA team noted that while the HHS Sepsis Pathway set out the management required where a lactate level is above 4.0 mmol/L, it did not provide guidance about the significance of an elevated lactate level between 2.5-4 mmol/L.

76. The RCA team also noted there was a delay of more than six hours between presentation to the emergency department and administration of the first antibiotic dose.

77. Further, Mrs D's septic risk factors were not reviewed during the inpatient shift to shift handovers. This led to the sepsis risk factors not being reassessed over the course of Mrs D's admission despite her new hypotension and developing abdominal pain over 1 March 2018. This was considered to have contributed to the delayed recognition of sepsis and may have increased the likelihood of death.

78. At the time of the RCA in 2018, the HHS was preparing to participate in a trial of changes to the sepsis pathway to incorporate a screening tool for patients who met certain clinical criteria; a clinical prompt to promote treatment for sepsis where a lactate level of 2 or higher; and intravenous antibiotic prescribing guidelines. The RCA team considered that these changes, had they been implemented at the time of Mrs D's death, would potentially have changed the course of her clinical management.

79. Significant changes to the management of sepsis have been rolled out statewide since Mrs D's death and are discussed in more detail below.

Recognition and response to clinical deterioration

80. Preliminary independent clinical review identified a missed opportunity escalate Mrs D's hypotension on 1 March 2018 for further clinical review and investigation.

81. The RCA identified underutilisation of the Q-AADS chart to trigger clinical escalation. Specifically, there was a missed emergency response on the afternoon of 1 March when an incorrect Q-ADDS score was documented. Further, nursing staff did not record pain scores on the Pain and Sedation section of the Q-ADDS chart.

82. There was no evidence to indicate that the casual Enrolled Nurse who was responsible for Mrs D's care on 1 March had yet attended nursing orientation which covers topics relating to recognition and management of the deteriorating patient, the Sepsis Pathway, clinical handover and clinical escalation and patient transfers. This formed part of the mandatory training nursing staff were required to complete within the first 4-8 weeks of their employment. I am advised that nurse subsequently attended the requisite mandatory training day.

83. The RCA team considered that the significant change in Mrs D's systolic blood pressure and developing pain throughout the afternoon on 1 March 2018 should have triggered escalation for medical review which may have led to a reassessment of her sepsis risk factors and triggered sepsis resuscitation measures and referral to a Consultant or Retrieval Services Queensland (RSQ) and escalation to higher level care.

84. The RCA also identified suboptimal medical and nursing utilisation of SBAR in clinical handover. This led to an uncertain level of communication during the medical, nursing and QAS handovers regarding Mrs D's Q-ADDS score, pathology and underlying risks for sepsis which in turn contributed to a lack of response to clinical deterioration and delayed recognition and response to sepsis. It was considered this may also have led to Mrs D's potential for deterioration during transfer not being recognised and the delayed escalation to RSQ.

85. To address these issues, the RCA team made recommendations aimed at improving compliance with QADDS documentation, clinical handover and clinical escalation requirements.

Delayed acceptance to higher level care

86. The RCA was informed by interviews with all staff involved in the interhospital transfer.

87. The surgical consultant advised that a verbal radiology report would have been a sufficient basis to accept Mrs D for transfer to the regional tertiary hospital. However, the Surgical Registrar who took the initial call from the local rural hospital had recently commenced the surgical rotation and did not recall a verbal report; rather, the Surgical Registrar recalled being asked to review a CT and at that time did not feel confident in CT interpretation. The Surgical Registrar intended to contact the surgical consultant to discuss the case. At the time of the phone call, the Surgical Registrar was in the emergency department overseeing three student doctors and was then called to theatre after the call. The theatre case was delayed meaning the Surgical Registrar's consultation with the surgical consultant about

Mrs D occurred later during that case. By this time the formal CT report had been completed.

88. The Surgical Registrar was not aware of any formal process for accepting referrals but did say the surgical Registrars would run all referrals via the surgical consultant who would make the decision about acceptance. In hindsight, the Surgical Registrar acknowledged the surgical consultant should have been contacted earlier. The Surgical Registrar subsequently completed training to improve their CT interpretation skills.

89. The RCA team concluded that absent use of the referral and acceptance procedure by junior surgical staff resulted in delayed acceptance by the surgical team which resulted in delayed transfer which in turn contributed to delayed escalation to higher level care.

90. Although the local rural hospital doctor's escalation to the regional tertiary hospital Emergency Consultant was seen as a last resort, other avenues for escalation were available as set out in existing guidelines within the HHS Hospital Transfer Procedure for escalating concerns when there is a delayed acceptance. These escalation pathways included contacting consultants directly, escalating to RSQ or escalation to the Executive Director Medical Services.

91. The RCA also observed that the clinical handover focussed on the surgical issue rather than sepsis.

The interhospital transfer

92. The online Interhospital Transfer Request Form was completed by the local Senior Medical Officer at 9:05pm. It requested transfer by ambulance and was categorised as semi-immediate. A 'nurse only' escort was requested. The reason for transfer was stated as *"needs urgent surgical review for dislodged PEG. Free air and fluid in abdo on CT"*.

93. Information provided by the Queensland Ambulance Service shows the QAS received a call for service at 9:13pm on 2 March to provide an interhospital transfer from the local rural hospital to the regional tertiary hospital with the local rural hospital providing a nurse escort who would undertake primary clinical care during the transfer. QAS was advised that Mrs D had peritonitis resulting from a dislodged PEG tube and a family member would accompany her on transfer to the regional tertiary hospital.

94. The QAS request form was faxed to the regional tertiary hospital at 9:21pm for an authorisation number. The QHAT code was Red 2B (urgent interfacility transfer requiring paramedical level care and response time 30 minutes). A referral letter to the regional tertiary hospital surgical team was also completed noting Mrs D had been treated for lower respiratory tract infection after presenting with fever, feeling generally unwell and with epigastric tenderness the day following PEG insertion.

PEG feeds were described as 'relatively uneventful'. The events of that afternoon were described as *"on examination today her abdomen felt moderately distended and was generally tender, though there were no overt Peritoneal signs. Repeat bloods today revealed a markedly elevated CRP in the 350's and a leucopenia. On advice from gastroenterology a CT abdomen and PEGogram was sought. There is a lot of intraperitoneal fluid with some gas. Contrast lies in the stomach, though there is some in the large bowel as well (?residual from previous imaging). A formal report is pending."* The reason for referral is documented *as "?Peritoneal leak following Peg insertion on 27.02.10*".

95. Retrieval Services Queensland were not contacted during the referral or transfer arrangements.

96. The QAS regional Operations Centre dispatched a paramedic at 9:33pm who arrived at the local rural hospital at 9:44pm. At this time there was a two-officer QAS crew in local Unit 7138. In order to ensure ambulance coverage in the area, the crew were returned to the station and split, with one paramedic dispatched to facilitate Mrs D's transfer as a single officer in another ambulance, and the other officer remaining in the local area. The drew returning to the station and preparing another vehicle resulted in a short delay in response to the service call for Mrs D. I am satisfied this delay had no bearing on the outcome for Mrs D.

97. A registered nurse who had completed her evening's work on another ward volunteered to escort Mrs D in the ambulance. She had recently started working at the local rural hospital and had attended the hospital's interhospital transfer and ambulance orientation two weeks previously. This was her first QAS escort. She had Basic Life Support Skills.

98. The escort nurse reported having received a limited handover because the evening shift ward nurse was having a busy shift. There is no documentation to indicate that the HHS InterHospital Transfer Patient Checklist was completed prior to transfer.

99. An Acute Resuscitation Plan was discussed and a 'life threatening condition' explained to the family whose documented wishes were for full resuscitation.

100. At this time Mrs D had an elevated respiratory rate (30 breaths per minute), elevated heart rate (112 beats per minute), normal level of consciousness (GCS 15/15) but low oxygen saturations (88%).

101. The paramedic received a brief handover from the escort nurse who told him Mrs D was being transported to the regional tertiary hospital emergency department for emergency surgery due to a dislodged PEG resulting in peritonitis/sepsis. The paramedic said the evening ward nurse called him aside to advise that Mrs D was quite ill and "*may deteriorate during transport..or during surgery."* This concern prompted the paramedic to generate a case note attached to the transfer but did not result in a review of the transfer requirements. Family was arriving and Mrs

D's daughter E asked if she could accompany her mother in the ambulance. Notwithstanding the evening ward nurse's express concerns, the paramedic agreed to the request.

102. Before leaving the local rural hospital, Mrs D received 2.5mg subcutaneous morphine for breakthrough pain/discomfort.

103. At 10:00pm Mrs D's Q-ADDS score was 3. She was alert and orientated. The escort nurse's retrospective note describes Mrs D as stable but unwell. Mrs D was loaded into the ambulance together with the escort nurse and E. The paramedic gave the escort nurse an introduction to the QAS equipment location and functionality. The ambulance departed the local rural hospital at 10:15pm.

104. The escort nurse's retrospective note indicates Mrs D's oxygen saturations were 85% with no improvement on 2-4L oxygen via nasal prongs so she was changed to 6L non-rebreather mask. Mrs D remained GCS 15.

105. At 10:34pm, the paramedic contacted the regional Operational Centre to advise that a Critical Care Paramedic (CCP) may be required in the event that Mrs D's condition deteriorated and it was agreed the paramedic would advise if that was needed. I note that the closest CCP was located in the regional city at this time.

106. Shortly after leaving the local rural hospital, the escort nurse reported a high blood pressure reading (220/120) but was unsure if the blood pressure machine was giving a reliable reading. They pulled over to the side of the road and a similar reading was obtained manually. Her oxygen saturations remained low (79-80%) on 15L non-rebreather mask and her carbon dioxide reading was 12. Reducing the oxygen made no difference. The paramedic continued on to the regional city. The escort nurse alerted him that Mrs D was deteriorating with dropping oxygen saturations, increased respiratory rate and effort, and decreasing blood pressure. A decision was made to divert to another nearby rural hospital for medical assistance.

107. At 10:46pm the paramedic advised the regional Operations Centre that Mrs D's condition had deteriorated. The ambulance arrived at the other rural hospital at 10:47pm.

108. Mrs D was assessed and treated by hospital staff including consultation with a Retrieval Services Queensland (RSQ) specialist medical officer. On initial assessment she was noted to have a reduced level of consciousness (GCS 14) and increased work of breathing. She was tachycardic, hypertensive and diaphoretic. Copious purulent discharge was oozing from the PEG site. The rural hospital doctor described this as "*feculent smelling discharge from around the PEG. She was soaked when they brought her in so it's still oozing from around that PEG site."*

109. RSQ was contacted via a Telehealth Emergency Management Support Unit call. A technical problem with the Telehealth equipment resulted in a delay between video and audio support meaning video linkage occurred but the audio was provided by telephone. Once the connections were established, the local Senior Medical Officer and the RSQ Clinical Coordinator worked through the presentation, starting with possible reversible causes for the reduced level of consciousness. I have had the benefit of listening to the communications between RSQ and the other rural hospital. Mrs D's daughter's significant distress can be heard in the background throughout.

110. Noting Mrs D's pupils were non-reactive and 3mm and she been given subcutaneous morphine prior to departing the local rural hospital, she was given 100mcg intravenous Naloxone at 11:35pm with an improvement in her GCS. She was maintaining her airway, her respiratory rate picked up and she was interacting and obeying commands.

111. There was also discussion about the possibly Mrs D may have aspirated during transfer. The RSQ Clinical Coordinator commented *"..but regardless I think she's been absorbing the subcut morphine and that's alerted her level of consciousness. In the background she does have septic shock that's going to keep evolving. I think they've just got to keep moving with this lady. So regardless her outcome is very very poor and they need to be ready for that. She could die but she's not going to do better by staying with you guys I don't think."* The local Senior Medical Officer agreed noting that from a time perspective and what they could offer there it was probably going to take longer for a retrieval helicopter to land than getting her back in the ambulance and on the road to the regional tertiary hospital. It was agreed that road transfer by ambulance as Code 1, lights and sirens, would be the fastest option, this being a one hour road trip.

112. The RCA team noted the other rural hospital could only provide Basic Life Support. There was no GP-anaesthetist available and the regional tertiary hospital was considered the closest facility. It was noted that an RSQ retrieval would take a minimum 1-1.5 hours.

113. The RSQ Clinical Coordinator initially recommended giving metaraminol but when the blood pressure was rechecked it was 138/112 and Mrs D was obeying commands so the metaraminol was not given.

114. An Acute Resuscitation Plan was discussed with her daughter who confirmed her wishes for full resuscitation.

115. The RSQ Clinical Coordinator explained the severity of the situation directly to Mrs D's daughter and told her "*the best thing we can do is to get your mum to […] Hospital…she is gravely ill and despite this she may still succumb..I'm just very scared that your mum might pass during this transfer..and I want you to be ready just in case."* The RSQ Clinical Coordinator agreed for her to travel with her mother in the ambulance on the condition that she be strapped in. She then conveyed this

to the paramedic stating *"..Mum could die but nothing we're doing here is going to change any of that, you just have to get to […]."*

116. The local Senior Medical Officer was unable to leave the hospital as there was no second on-call Medical officer rostered at the hospital and her departure would have left the hospital medically unattended. The escort nurse agreed to continue and the paramedic requested QAS back up. Reassessment of the appropriateness of a nurse escort was not reconsidered and there was no escalation to the on-call Director of Medical Services.

117. Due to the unreliable blood pressure machine during the initial transit, the RSQ Clinical Coordinator provided the escort nurse with education on administering metaraminol during transport with instruction for bolus doses if the radial pulse was weak or not able to be palpated. Mrs D received a single dose of metaraminol prior to transfer because she dropped her GCS a bit further; her GCS picked back up after this. The escort nurse's retrospective note indicates that just as the ambulance was leaving, the local doctor ran out to convey the RSQ Clinical Coordinator's advice to change the plan to one ampoule of metaraminol in 1L normal saline to be given throughout the transfer journey.

118. At 11:34pm the paramedic contacted the regional Operations Centre to request an additional paramedic given the likelihood of Mrs D's deterioration. However, due to a miscommunication issue within the Operations Centre, this request was not actioned, resulting in QAS backup not being dispatched at the time of his request. The paramedic was given to understand that a paramedic had been dispatched but did not receive a response from the regional Operations Centre acknowledging his request.

119. The paramedic recommenced the interhospital transfer at approximately 11:42pm. He was instructed to undertake the journey as a code one, lights and sirens response. The ambulance departed the other rural hospital at 11:44pm with the escort nurse and Mrs D's daughter in the back.

120. Minutes later, while the escort nurse was drawing up the metaraminol infusion, Mrs D went into cardiopulmonary arrest. The escort nurse immediately commenced CPR. At 11:47pm, the paramedic advised the regional Operations Centre that CPR was in progress. He pulled the ambulance to the side of the road to assist with the resuscitation. He assisted with the insertion of a guedels airway. Mrs D's daughter took over compressions as the escort nurse drew up more adrenaline. Mrs D remained in a non-shockable rhythm.

121. No paramedic back-up arrived at the roadside after 10 or so minutes, so the paramedic decided to return to the other rural hospital with the escort nurse and Mrs D's daughter continuing CPR. QAS records show the ambulance left the roadside at 12:01am, arriving back at the other rural hospital at 12:04pm.

122. Emergency resuscitation efforts were continued for a further 20 minutes at the hospital. Following discussion with Mrs D's daughter, resuscitation efforts were ceased and Mrs D was managed with comfort cares. She was declared deceased at 1:00am.

123. The escort nurse's retrospective note ended with the comment *"E did a fantastic job at assisting RN and Paramedic during this event. She was more than willing to do so and her assistance was greatly appreciated."*

124. QAS has since advised that the regional Operations Centre dispatched another paramedic at 11:56pm to assist with the roadside resuscitation. However, there was an internal miscommunication whereby it was thought a retrieval helicopter had been ordered and this is why no paramedic backup arrived at the roadside.

125. I have had the benefit of listening to a phone conversation between the RSQ Clinical Coordinator and the Queensland Ambulance Service after the ambulance left the other rural hospital seeking clarification as to why the transfer continued by road. The RSQ Clinical Coordinator explained that the case came through as a TEMSU call for advice *"..and the response time for a helicopter would not be in the same timeframe at all. I think this lady is highly likely to die anyway."* It was confirmed that the local doctor had not requested aeromedical retrieval. The RSQ Clinical Coordinator explained it was a 50 minute road trip and to get to the other rural hospital and back to the regional tertiary hospital by helicopter *"would take way longer than that."* The QAS representative suggested the crew thought the doctor had requested the retrieval helicopter *"..as in the doctor had said can you get the helicopter airborne?"*

126. The RSC Clinical Coordinator explained that Mrs D had responded *"quite nicely*" to what had been done; essentially she needed fluid and was getting some intermittent metaraminol and she had septic shock which was going to continue to evolve.

127. The QAS representative expressed a view that it would probably have been better for the ambulance not to have pulled in at the other rural hospital and *"keep moving*". The RSQ Clinical Coordinator explained *"I think there's a huge amount of distress in the ambulance anyway and I think that they're caught in a difficult situation when you have the daughter with the patient*." The QAS representative then recontacted the RSQ Clinical Coordinator to advise Mrs D had arrested three minutes out from the other rural hospital so there may be a further request for RSQ assistance. The RSQ Clinical Coordinator expressed the view that continued resuscitation efforts would likely be futile in the context of an arrest from septic shock.

Issues arising from management of the interhospital transfer

128. In February 2018 an educational 'roadshow' was rolled out across the HHS as part of a 'safe to send' campaign introducing a new HHS InterHospital Transfer Procedure. This procedure had recently been updated to incorporate time-critical

and non-time critical transfers, include a ‘Safe to Send/Safe to Receive’ checklist and revised Escort Selection Guide and associated nurse checklist and to incorporate information about the Interhospital Transfer Form which had been updated to incorporate an SBAR handover.

129. According to the Guidelines for Escort Selection and Nursing Escort Checklist:
    - one registered nurse with Basic Life Support Skills was a suitable escort for a ‘moderately dependent patient’ that requires monitoring, is agitated or confused and shows potential for deterioration;
    - one registered nurse with Advanced Life Supports Skills or a Medical Officer was a suitable escort for a ‘high dependency patient’ with significant potential for deterioration; and
    - one registered nurse with Advanced Life Support Skills plus one Medical Officer would be required for a critically ill patient transfer if RSQ was unavailable.

130. The criteria for assessing the reasonable prospect of deterioration included the patient’s monitoring and oxygen requirements, haemodynamic stability and intravenous infusions/additives.

131. After considering information about Mrs D’s clinical status when she was accepted for transfer to the regional tertiary hospital with reference the Interhospital Transfer Procedure and RSQ Activation flowchart, the RCA team agreed that RSQ should have been contacted at that time. That said, it did not come to a conclusion about whether RSQ input at that time would have changed the decision for road transfer by ambulance. This is because interviews with all staff involved in the transfer revealed that despite an awareness that Mrs D was unwell, her potential for deterioration to such an extent was not foreseen by any of the Medical Officers, the escort nurse or the paramedic prior to departure from the local rural hospital; none of those involved in the transfer from the local rural hospital considered her to be ‘critically ill’.

132. RSQ’s clinical review of the interhospital transfer identified that Mrs D appeared to be critically unwell prior to departure from the local rural hospital. As such, the clinical situation may well have justified having a medical escort during the road transfer.

133. The RCA team considered that the Interhospital Transfer Procedure guidelines did not provide sufficient objective criteria to assess reasonable prospect of deterioration and may have delayed referral and escalation to RSQ. To address this, the RCA team recommended review of the interhospital transfer procedure and associated flowcharts and checklist to incorporate consideration of Q-ADDS stability (or trending) in the hours prior to transfer, upgrading sepsis criteria from the ‘moderate’ to ‘high dependency’ risk score in the escort selection guide and, given the potential for rapid deterioration, to require consideration of consultation with RSQ for all sepsis cases prior to transfer.

134. I am satisfied that the paramedic recognised that Mrs D needed urgent medical assistance when he diverted the transfer to the other rural hospital. The decision that onwards transfer by road ambulance with a nurse escort was made by the RSC Clinical Coordinator and the local hospital doctor. While recognising the implications of this decision, the paramedic tried to comply with the instructions he was given by health service staff. He tried to get an additional paramedic but Mrs D arrested before this occurred. I accept the QAS advice that while an additional paramedic may have provided additional manual assistance it would not have increased the level of clinical care available to Mrs D during the onwards transfer.

135. The RCA team considered that the other rural hospital staff correctly followed procedure by contacting RSQ at the earliest opportunity. The RCA team noted the decision to continue the road transfer to the regional tertiary hospital was a time-critical decision where surgical intervention was perceived, by all involved, to be Mrs D's best chance of survival. However the other rural hospital, with Level One Emergency Clinical Service Capability, was unable to support a critically ill road transfer because it was not possible to provide the recommended Medical Escort without its Medical Officer 'leaving the post', an option that would only be considered as a last resort. The RCA identified there was no formal procedure for level 1 Clinical Service Capability Framework facilities like the other rural hospital to access medical back-up when road transfer of a critically ill patient is required. This contributed to a medical officer being unable to escort Mrs D from the other rural hospital leaving her in the care of escorts who were not optimally equipped to support a critically ill patient.

136. The RCA team concluded that the urgency of the situation and the other rural hospital's proximity to higher level care at the regional tertiary hospital contributed to the decision to continue the road transfer rather than activate an aeromedical retrieval and initiate further stabilisation measures at the other rural hospital. Further, it was considered that the urgency of the situation may also have contributed to lack of escalation to the Executive Director Medical Services and the selection of escorts (the registered nurse) and a single paramedic who were not optimally equipped to support a critically ill patient.

National and State initiatives to reduce sepsis-related deaths

137. Sepsis is a life-threatening illness.

138. The Australian Sepsis Network's report Stopping Sepsis: A National Action Plan (December 2017) cites over 18,000 Australians suffer from sepsis every year, 5000 of those affected will die, and of those who survive, half are left with a disability or impaired function.

139. In May 2017, the World Health Assembly at the World Health Organisation recognised sepsis as a global health priority by formally adopting a resolution to improve the prevention, diagnosis and management of sepsis around the world.

140. Early treatment is known and proven to save lives.

141. On 16 November 2017, The George Institute for Global Health and the Australian Sepsis Network convened a policy roundtable to address the pressing need to improve the awareness, prevention and treatment of sepsis in Australia. This process explored the challenges of early detection and best management of sepsis in pre-to-posthospital care. It culminated in the development of a co-ordinated national action plan including a recommendation to establish and develop a nationally recognised clinical standard for sepsis detection and treatment including clinical care pathways for rapid in-hospital detection, treatment and management.

142. In 2017, the Queensland Department of Health established a Statewide Sepsis Steering Committee to provide advice and guidance for a statewide sepsis program aimed at reducing mortality from sepsis. As part of this process, the Department of Health developed and piloted an emergency department adult sepsis screening tool and pathway at the Gold Coast University Hospital emergency department.

143. By July 2018, 16 public hospitals had joined the Adult and Paediatric Sepsis Breakthrough Collaborative. This initiative enabled teams from multiple hospitals to test and share ideas to achieve reliable recognition and treatment of sepsis patients presenting to Queensland's larger Emergency Departments.

144. In April 2019, a 12 month Rural and Remote Sepsis pathway trial commenced with seven Hospital and Health Services (Torres and Cape, North West, Central West, South West, Central Queensland, Townsville and Wide Bay) participating. In November 2019, all Rural and Remote Emergency Departments in Queensland were invited to use the sepsis pathways. As at February 2020, a total 100 sites had joined the trial project.

145. I am advised that on 17 Jan 2020 the relevant HHS nominated seven of its CSCF level 2-3 facilities (including the local rural hospital) to participate in the Rural and Remote ED Sepsis Pathway Trial and ordered Rural & Remote (R&R) ED Sepsis Pathways (both adult and paediatric). Since there are four versions of adult pathways to choose for each HHS, the pathway with prescribing antibiotic guidelines - High MRSA, Tropical (north of Mackay) – was chosen. As at 14 April 2020 it was confirmed the Rural & Remote ED sepsis pathways had been implemented in all the HHS participating sites.

146. The Rural & Remote ED Adult Sepsis Pathway directs clinicians to screen all adult emergency department patients who meet any of the following criteria:
    - looks sick
    - you suspect they have sepsis
    - has a suspected infection
    - fever symptoms (or recent fever symptoms)
    - hypothermia <35.5
    - signs of clinical deterioration (eg total Q-ADDS score of 4 or higher)

147. The Pathway directs clinicians to consider whether the patient has any of the following risk factors:
    - representation within 48 hours
    - malnourished or frail
    - immunocompromised/asplenia/neutropenia
    - indwelling medical advice
    - recent trauma or surgery/invasive procedure
    - postpartum/miscarriage
    - IV drug use or alcoholism
    - Aboriginal or Torres Strait Islander.

148. It then directs consideration towards whether there is any reason to suspect an infection.

149. If the answer to those considerations is yes, the Pathway directs the clinician to consider whether the patient has any high or moderate risk factors. In particular, the high risk factors include systolic BP <90 (or drop >40 from normal) and lactate 2mmol/L or higher (if known).

150. The Pathway then directs certain actions depending on the presence of any high or moderate risk factors. These include obtaining immediate senior medical officer review, ensuring lactate is taken and consideration of contacting RSQ.

151. If senior medical review assesses likely sepsis or septic shock, the Pathway then directs immediate commencement of resuscitation and treatment for sepsis, namely lactate measurement, taking blood cultures, commencing appropriate intravenous antibiotics and (if clinically indicated) intravenous or intraosseous fluids, consider vasopressor supports for hypotension during or after fluid resuscitation facilitating rapid source control (noting that if this requires operative intervention there is early notification to the appropriate surgical or interventional team), reassessing and monitoring the patient's response to resuscitation and early referral to the relevant team with clinical handover.

152. The Pathway also provides guidance about antibiotic selection.

153. I understand work is ongoing to incorporate a digital sepsis module to support early sepsis recognition in the iEMR system being rolled out across Queensland public hospitals.

154. Nationally, the Australian Sepsis Network is working with the Australian Commission on Safety and Quality in Healthcare to develop Sepsis Guidelines and a Clinical Care Standard by mid-2021.

Findings Pursuant to s45 of the *Coroners Act 2003*

Identity of the deceased: [de-identified for publication purposes]

How she died: FD died from complications following dislodgement of her recently inserted PEG tube.

There were multiple missed opportunities by the local rural hospital treating team to have assessed and reassessed possible causes for Mrs D's initial presenting signs and symptoms and the developing hypotension, reduced oxygen saturations and abdominal pain before she deteriorated acutely on the afternoon of 2 March 2018. These included a failure to review and act on an elevated lactate and blood tests results showing an elevated white cell count and raised inflammatory markers and failure to recognise indicators of clinical deterioration over the course of the afternoon and night of 1 March 2018. Earlier recognition and response to these aspects of the evolving clinical picture over the course of 1-2 March should have led to earlier active consideration and investigation of the possibility that Mrs D was experiencing a PEG-related complication rather than aspiration pneumonia. This in turn would have led to earlier engagement with the gastroenterology team and earlier transfer to higher level care for interventional management not available at the local rural hospital which could have significantly changed the outcome for Mrs D.

While there was an immediate and appropriate initial response to Mrs D's acute deterioration on the afternoon of 2 March 2018, the management of her referral and transfer to the regional tertiary before she left the local rural hospital was inadequate. Mrs D should have been accepted by the regional tertiary hospital surgical team following the initial phone contact at around 6:30pm. Consideration should have been given to contacting Retrieval Services Queensland to discuss the most appropriate transfer option before she left the local rural hospital. While consultation with RSQ at this time may not have changed the decision to transfer her by road, it was a missed opportunity to consider the appropriateness of transporting a critically unwell patient without a medical escort. That said, given just how unwell Mrs D became so soon after leaving the local rural hospital, the presence of the medical escort is unlikely to have changed the

outcome for her by that time. Further, it can not be said with any certainty that the outcome would have been any different for Mrs D had aeromedical retrieval been requested and actioned at that time. Rather, her chances for survival would have been maximised by earlier recognition and response to her clinical deterioration over the previous 24 hours.

I commend the attending paramedic, the escort nurse and Mrs D's daughter for their management of Mrs D's deterioration after the ambulance left the local rural hospital. They were faced with a very difficult and highly distressing situation that no one had anticipated prior to their departure from the local rural hospital. I am satisfied that Mrs D was managed promptly and appropriately at the other rural hospital with guidance from Retrieval Services Queensland. I accept that by that stage Mrs D was so unwell the decision to continue the road transfer to the regional tertiary hospital, knowing she could well die enroute, was the best and fastest option to give effect to the family's confirmed wishes for full resuscitation and active treatment. This was carefully explained to the paramedics, escort nurse and Mrs D's daughter, all of whom were aware of the chance Mrs D may not survive the transfer. The presence of a medical escort for the continued transfer would not have changed the outcome for Mrs D.

I am satisfied that implementation of the new sepsis pathways at the local rural hospital and other sites across Queensland will assist greatly in improving early recognition and response to sepsis. In particularly, the screening tool and treatment pathways will assist in addressing the opportunities missed by the local rural hospital treating team responsible for Mrs D's care over 28 February – 2 March 2018.

The current statewide focus on sepsis in children and adults and the initiatives flowing from the work of the Queensland Sepsis Collaborative are extremely encouraging.

Date of death: 3 March 2018

Place of death: [Rural Hospital]

Cause of death: 1(a) Sepsis (enterobacter cloacae)
1(b) Peritonitis
1(c) Leaking Percutaneous Feeding Tube
1(d) Oculo-Pharyngeal Muscular Dystrophy
2 Atherosclerotic Cardiovascular Disease, Valvular Heart Disease, Chronic Obstructive Airways Disease

I close the investigation.

Ainslie Kirkegaard
Acting Coroner
CORONERS COURT OF QUEENSLAND
8 May 2020