CORONERS COURT OF QUEENSLAND

FINDINGS OF INVESTIGATION

CITATION:	Non-inquest findings into the death of C
TITLE OF COURT:	Coroners Court
JURISDICTION:	Cairns
DATE:	7 September 2020
FILE NO(s):	2018/2167
FINDINGS OF:	
CATCHWORDS:	Melioidosis, remote hospital, repeat emergency department presentations, increasing parental concern, paediatric sepsis, interhospital transfers, Rural & Remote Emergency Department Paediatric Sepsis Pathway, RESIST Sepsis Program, Queensland Sepsis Collaborative.

Contents

C was a six year old boy who passed away at the Lady Cilento Children's Hospital on 14 January 2017. He was a generally healthy and happy child.

C's treating team at the Lady Cilento Children's Hospital attributed his death to overwhelming sepsis due to melioidosis. His death was not discussed with the coroner at that time. No autopsy was performed.

C's death was first reported to the State Coroner on 3 May 2018 due to the family's concerns about the care C received from a remote hospital over several days leading up to his admission on 10 January 2017 and subsequent transfer to a regional hospital by which time he was seriously ill. The family also lodged a complaint with the Office of the Health Ombudsman. The Health Ombudsman considered the family's complaint potentially identified broader systemic issues and undertook a systemic investigation.

The family's concerns related to failure by remote hospital staff to correctly diagnose and investigate the cause of C's worsening symptoms having attributed them to gastroenteritis for several days.

These findings have been informed by review of C's medical records with reference to the family's specific concerns, statements provided by his parents, preliminary independent clinical review provided by the Department of Health Clinical Forensic Medicine Unit and the outcomes of the Health Ombudsman's systemic investigation (which was informed by specialist paediatric infectious diseases opinion).

Melioidosis

Melioidosis is a complex bacterial infection caused by an organism found mostly in the soil of tropical areas like South East Asia and tropical Australia. Most cases occur during the wet season following heavy rains and flooding. The majority of infections occur when skin abrasions or wounds come into contact with wet soil or water contaminated with the bacterium. People with underlying diseases and conditions which lower immunity are at a greatly increased risk of infection; it is very uncommon in healthy adults and rarely seen in children. Most cases notified in Queensland are in the northwest Gulf country, the Torres Strait Islands and the Townsville region. Aboriginal and Torres Strait Islander peoples are disproportionately affected by this condition. I note a 2017 clinical study identified that children in Far North Queensland who contract melioidosis have a higher mortality rate even when they receive optimal care. It can be difficult to diagnose in children as they often do not show symptoms.

The process for diagnosing melioidosis can take three days or more due to the time it takes to culture the organism in samples taken from the patient.

It is a serious infection which without prompt and appropriate treatment can lead to significant clinical deterioration with sepsis and death.

On 16 January 2017, following C's passing, the Director of Tropical Public Health Services issued a media statement to relevant Hospital and Health Services, local schools, councils and non-government organisations alerting the community to an

increase in melioidosis cases that year. This was followed by the circulation of a Melioidosis Fact Sheet by the Department of Health.

C's multiple presentations to the remote hospital

Review of C's medical records shows his parents were vigilant and proactive in bringing him in to the local Health Care Centre or to the remote hospital when they were concerned about him.

At the time of C's death, the remote hospital was serviced by Locum Medical Officers. There was a changeover of locum doctors during the period over which C was presenting to hospital.

According to C's parents, he woke up visibly unwell on Thursday 5 January 2017. He was reluctant to eat, had a high fever, projectile vomiting and green-black diarrhoea. He complained of headache and was crying with pain. He needed assistance to go to the toilet. His mother says when she took C to the remote hospital around 10:00am that morning with this history he was examined by a doctor who told her there was a gastro bug going around the community. C was given Panadol and an ice block to stop the diarrhoea and sent home with advice to return if he became worse. There is no record of this presentation in remote hospital records.

C's condition worsened overnight with ongoing vomiting and diarrhoea and laboured breathing. He was irritable and complained that his skin burned. His mother says she took him back to the remote hospital around midday the following day, Friday 6 January. He was seen by the same doctor after a two hour wait and again given Panadol and sent home with advice to return if he became worse. There is no record of this presentation in the remote hospital records.

C's condition continued to deteriorate overnight with vomiting and diarrhoea and distress. His mother says she took him back to the remote hospital early the next day, Saturday 7 January, but was told to return on Monday when a doctor was available because there were no doctors working over the weekend but one would be called in if C became worse. She carried C back to hospital the next day but was again told there was no doctor on over the weekend. C was very lethargic, irritable and complaining of bad headache. There is no record of these presentations in the remote hospital records.

New locum doctors started working at the remote hospital on Monday 9 January, replacing the locum doctors who had been rostered on the previous week.

When C's mother took him back to the remote hospital on Monday 9 January, he was seen by a new locum doctor after a long wait. This is the first documented presentation in the remote hospital records. The emergency department clinical record documents his mother's advice that C had been unwell with vomiting on 5 & 6 January followed by diarrhoea since twice daily and had mostly been sleeping. He was febrile (38.9) and had an elevated heart rate. The doctor documented C's presenting history as him having been unwell since the previous Thursday with vomiting, fevers and diarrhoea, the vomiting settled on Saturday but he had ongoing fever and diarrhoea, he was eating and drinking "ok", was weak and fatigued, had no rashes but had a runny nose,

sore throat and a mild cough. On examination his chest and abdomen were clear. His tongue was dry but he had normal skin turgor and brisk capillary refill. There was no rash or neck stiffness. Noting there had been gastroenteritis in the community, the doctor's working diagnosis was viral gastroenteritis. The management plan was to give C paracetamol and fluids, check his urine analysis and blood pressure and reassess his condition in an hour. There is no further documentation in the hospital record regarding his further management or advice given to his mother before he was sent home again that day.

C's admission to the remote hospital on 10 January 2017

By Tuesday 10 January, C could barely walk and one side of his face was very swollen. He had a fever. His parents took him back to the remote hospital at around 2:00pm and on this occasion he was admitted for treatment and further investigation. His presenting history was documented as pain – representation 1/7 with increasing pain in head, febrile and lethargic. He was febrile (40.1) and had an elevated heart rate. He was given an anti-emetic, Panadol and a urine sample was taken pending medical review.

C was seen by a different doctor who documented that he had been unwell since Sunday PM with fever, headache, vomiting & diarrhoea but had been eating and drinking and his urine output was normal. He had been lethargic but had no rash or skin infection and no pain apart from headache and his younger siblings were both well. On examination C was noted to be drowsy and lethargic but cooperative. He had dry mucous membranes. There was no pallor, work of breathing or jaundice and he was not in distress. He was not sensitive to light and had no neck stiffness, lymphadenopathy or rash. His chest and abdomen were both clear. Examination of his skin and joints revealed nothing abnormal. The doctor's clinical impression was viral gastroenteritis/viral illness. The doctor also documented a soft heart murmur noting C had been referred for specialist review in June 2016 with a heart murmur. C's medical records show that following paediatric specialist review and echocardiogram in November 2016 excluded rheumatic heart disease and he was considered to have an "innocent murmur".

C was commenced on intravenous fluids and blood and urine samples and a tonsillar swab were taken for testing and cultures. He was admitted to the high dependency unit on two-hourly observations. An early warning and response observation chart (known as the Children's Early Warning Tool, CWET) was commenced. C was given an anti-emetic, paracetamol, ibuprofen and hydralyse. He remained febrile (over 39 degrees) and was actively cooled with wet cloths. His temperature eventually settled to 37.2 degrees at around 5:30pm.

After discussion with the on-call paediatric Registrar at Retrieval Services Queensland, C was commenced on intravenous antibiotic (ceftriaxone) and it was decided he needed to be transferred to the regional hospital by the Royal Flying Doctor Service for further management. Unfortunately the transfer was delayed until the following day because another patient needed to be transferred from another remote location.

C was stable until he spiked another fever (39.5) and developed an elevated heart rate (142) and respiratory rate (34) at around 12:30am. He is documented as being "in severe pain in bilateral knees, head and abdo pain." He was given paracetamol and ibuprofen. Medical review at 12:50am noted C was thirsty and complaining of abdominal and knee pain and headache. His skin was warm over the left knee but there was no joint effusion or swelling and he had full range of movement. He was distressed but cooperative. He was noted to be guzzling water. There was no neck stiffness. His abdomen was soft and non-tender. An ultrasound scan showed a prominent bladder and he passed 250mls of urine. Urine analysis showed moderate blood in the urine. The doctor's working diagnosis was still viral illness. The doctor consulted the on-call paediatric Registrar who advised to continue current management with intravenous fluids and antibiotic and that no further investigation or treatment was indicated at that stage. Afterwards he was tolerating good amounts of oral fluids. He settled again at around 2:00am but slept intermittently. C's condition settled and his temperature returned to normal by morning.

At 6:05am C's blood pressure was low (76/50). Nursing staff contacted the locum medical officer by phone who advised a bolus dose of normal saline solution and to increase the infusion rate from 20ml/hr to 60ml/hr. Approximately two hours later Ch's observations were within normal range.

When seen by a different doctor the next morning, Wednesday 11 January, C was grizzly and wanting to sleep. His observations were stable. He was continued on intravenous fluids and antibiotic. The Royal Flying Doctor Service was thought to be arriving at 10:30am. The doctor who had reviewed C overnight spoke with the on-call paediatric Registrar about whether C needed further antibiotic or antiviral treatment. She was advised to continue with intravenous fluids pending the chest x-ray.

A chest x-ray performed that morning showed some consolidation in the right lower lobe suggestive of pneumonia. The paediatric Registrar was consulted about the chest x-ray findings and advised commencing an additional intravenous antibiotic (Azithromycin).

C's observations were stable through the morning and he was mobilising with assistance. He was sipping oral fluids. He was noted to be sensitive to touch during nursing cares. He was prepared for transfer to the regional hospital, accompanied by his father.

I note the locum medical officer's referral letter to the regional hospital referred to C having presented to the remote hospital "last Saturday with 2 days V&D (no blood; non offensive diarrhoea). Since last Sunday p (2 days) he had been ill with fever headache lethargy." This is the first documented reference to C having been brought to hospital before Monday 9 January.

The referral letter also flags that at that stage the doctor had not requested Arbovirus/Leptospirosis serology or taken a nasopharyngeal swab.

C's transfer to the regional hospital on 11 January 2017

C was flown out from the remote hospital at around midday. On arrival at the regional hospital he was admitted to the paediatric ward. Blood cultures were reported as growing gram negative bacilli so his antibiotic therapy was adjusted to include meropenem, vancomycin, lincomycin and erythromycin. His condition deteriorated rapidly with signs of septic shock, respiratory failure and anuria. He was extremely unwell and transferred to the intensive care unit where he was intubated and ventilated. Further bloods were taken to test for leptospirosis, arbovirus and for mycoplasma serology. By this time he was seriously ill with bilateral pneumonia, acute respiratory distress syndrome and had developed multiorgan failure. The working diagnosis was septic shock due to pneumonia.

The paediatric team were in regular consultation with Retrieval Services Queensland from early in the morning of 12 January regarding retrieval options for C. Initially he was to be transferred to a regional tertiary hospital paediatric intensive care unit but he was too unwell to fly without medical officer support. His condition was so serious arrangements were made to transfer him to the Lady Cilento Children's Hospital in Brisbane for advanced intensive care management with ECMO (extracorporeal membrane oxygenation). A specialist retrieval team was dispatched to the regional hospital from the Lady Cilento Children's Hospital and he was transferred to the Lady Cilento Children's Hospital paediatric intensive care unit overnight arriving in Brisbane in the early hours of 13 January.

I note that Blood cultures up until the time C was transferred to the regional hospital on 11 January were negative and remained so during his admission at that hospital. Enquiries with the local pathology laboratory indicate that the definitive result identifying the bacterial organism that causes melioidosis was not available until after midnight on 13 January when the pathology report was validated. However, C had been commenced on the appropriate antibiotic for this organism (meropenem) shortly after his arrival at the regional hospital on 11 January. The paediatric intensive care team were consulting the paediatric infectious diseases team about the possibility of melidosis infection during the evening on 13 January. C was continued on the meropenem.

Unfortunately despite maximal intensive care therapy including EMCO, C's condition worsened and he developed a fixed and dilated pupil. Urgent CT imaging of his brain showed he had suffered a stroke but was too unwell for neurosurgical intervention. Repeat CT scan of the brain performed on 14 January showed that C had progressed to brain death. Arrangements were made for his extended family to be on the phone and say a prayer for him as he passed away. C died peacefully in the paediatric intensive care unit with his family present at 6:48pm on Saturday 14 January 2017.

Should C have been admitted to the remote hospital sooner?

Both the coronial investigation and the Health Ombudsman's systemic investigation identified that the remote hospital records did not match the information provided by C's parents regarding the timing and frequency of his presentations to hospital. Whereas the family reported having taken C to the remote hospital once a day, every

day from Thursday 5 January until he was admitted on Tuesday 10 January, the hospital records do not document presentations earlier than Monday 9 January.

This issue was not addressed by two internal clinical review processes undertaken by the relevant Hospital & Health Service following C's death.

While the Health Ombudsman's investigation was unable to conclusively reconcile C's parents' account with the clinical records, it relied on reference in the interhospital referral letter written by one of the locum doctors on Tuesday 10 January stating "presented to [hospital] last Saturday with 2 days V&D". The doctor later recalled C's mother was unhappy that C had previously been seen but was still unwell and the doctor was confused and frustrated at the time by the absence of any corresponding clinical record. This information, in the context of broader systemic findings of significant record keeping deficiencies (described as "an overall laxity towards record keeping by clinical staff") and the disorganised and at times chaotic management of remote hospital emergency department, was significant in the Health Ombudsman's finding it is more probable than not that C did present to the remote hospital prior to what is documented in his patient records. I accept this finding noting the multiple presentations due to concern about C's condition is in keeping with his parents' previously documented vigilance in bringing him in for medical review when concerned about his health.

The absence of clinical documentation for C's presentations prior to Monday 9 January 2017 makes it difficult to properly assess his clinical condition and how it should have been managed over that period. At the very least it was enough to cause his family concern and repeatedly seek help from the remote hospital.

Preliminary independent clinical review was not overly critical of the initial medical management at the remote hospital suggesting the working diagnosis of viral gastroenteritis was not unreasonable in the context of a six year old child presenting with a fever and reporting persistent vomiting and diarrhoea at a time when local knowledge indicated there had been cases of this in the community. Having regard to the clinical documentation of C's condition and treatment over 9-10 January 2017, the reviewing doctor was reassured by the fact C was tolerating oral fluids when he presented on both those days, had an adequate urine output and was assessed as only mildly dehydrated. There was no rash and although Ch complained of knee pain, a definite arthralgia (joint pain) could not be identified. Given the rarity of melioidosis in children, even in endemic areas of Northern Australia and the Cape region, the reviewing doctor did not consider a diagnosis of melioidosis in a child with symptoms suggestive of gastroenteritis would be high on the list of differential diagnoses at that time. This opinion was shared by the paediatric infectious disease specialist assisting the Health Ombudsman's investigation.

The reviewing doctor considered that C's initial management with paracetamol and oral fluids was reasonable in a child who was tolerating oral fluids and had a satisfactory urine output; admission for intravenous fluids may not be indicated. However, while this was the documented management plan when C presented on Monday 9 January, the absence of documentation indicating that the fluid challenge was in fact done or the findings of reassessment of C's condition an hour later make it difficult to properly assess whether he did in fact respond well to the documented

management plan and was sufficiently hydrated to not require admission for intravenous fluids at that time.

The paediatric infectious diseases specialist engaged by the Health Ombudsman held a different view suggesting that treatment with a rehydration ice block and paracetamol on 5 & 6 January was likely inadequate and the apparent failure to perform an assessment on a febrile child brought in by a concerned parent over the weekend of 7-8 December was not appropriate.

While I am not critical of the initial clinical management of C's presenting symptoms (albeit not documented) on 5 & 6 January 2017, I consider the apparent failure by nursing staff at the remote hospital to reassess and document C's condition and his mother's continued concerns about him over the ensuing weekend was clinically inappropriate. While there were no doctors working in the hospital over the weekend, it appears one could be contacted to at least discuss patients by phone and if necessary be called in to review them over that period. However, even had this occurred, given C's documented presenting clinical signs and symptoms on Monday 9 January, on the information available to me I can not be satisfied that admission for further investigations over the weekend was clinically indicated.

The paediatric infectious diseases specialist assisting the Health Ombudsman's investigation suggested that the 'big picture' of C's repeat presentations, ongoing parental concern and the collection of symptoms warranted further investigations and may have led to earlier administration of appropriate antibiotics and an earlier referral for admission to a specialist paediatric unit. This opinion had regard to the submission by the doctor who reviewed C on Monday 9 January 2017 that had she known about any of C's earlier presentations, she would certainly have considered it relevant information.

While I accept that when considered in isolation C's presenting clinical signs and symptoms on Monday 9 January may not have warranted admission, the doctor who reviewed him that day did not have the benefit of documented clinical assessments of the condition in which he had presented over the preceding days. The absence of clinical documentation hampered the doctor's ability to objectively assess the significance of the family's level of concern about C. It is reasonable to suggest this information may well have influenced the doctor's consideration of whether consultation with the regional hospital on-call paediatrician was indicated at that time. That said, whether in absence of clear signs of sepsis taking this step would have resulted in C being admitted to the remote hospital that day to commence further investigations can only speculated upon. At best, it was a missed opportunity to actively consider the possibility of sepsis, commence further investigations including blood cultures, chest x-ray and treatment with antibiotic therapy with specialist paediatric input a day earlier than occurred. However, noting the paediatric specialist advice given the following day did not include commencing C on the particular antibiotic to treat melioidosis (meroprenem), it can not be said with certainty that earlier escalation for specialist input would have changed the outcome for C.

Was there a missed opportunity to have diagnosed and treated the melioidosis sooner?

As noted above, independent clinical review recognised that viral gastroenteritis is the most common cause of presentation of fever and diarrhoea in children, whereas melioidosis as a cause of sepsis in children is very rare and would not be considered by most clinicians as the likely cause of C's presentations to hospital. Having regard to this specialist medical opinion, I am satisfied it was reasonable for the clinicians involved in C's care not to have identified melioidosis as their working diagnosis.

However, I do consider more could have been done sooner for C on 10 January to actively consider and manage his risk of developing severe sepsis. In bacterial sepsis, the first dose of antibiotics should be given within the first hour. As identified by the paediatric infectious diseases specialist assisting the Health Ombudsman's investigation there was a nearly 5-hour delay in commencing C on intravenous antibiotics after he represented to the remote hospital on 10 January. The decision to commence intravenous Ceftriaxone was made in consultation with the regional hospital paediatric registrar, which discussion did not take place until 2 hours 20 minutes after C presented to hospital. It seems that the doctor who reviewed C that day had not been alerted to the fact of C's presentation and was not prioritised for medical review even though he had presented the previous day. While this was not optimal and he should perhaps have been commenced on intravenous vancomycin for a possible disseminated Staphylococcus aureus infection sooner (the most likely pathogen based on local epidemiology), it did not change the outcome for C because he was not being treated with the particular antibiotic for melioidosis and nor should there have been a high index of clinical suspicion for this rare condition given C's clinical signs and symptoms.

Systemic issues identified by Health Ombudsman's investigation

I have had the opportunity to consider the outcomes of the Health Ombudsman's systemic investigation. It identified a range of systemic issues at the remote hospital some of which impacted on the quality of care C received before being transferred to the regional hospital mon 11 January 2017.

Those systemic issues included poor clinical record keeping (absent and incomplete clinical records); failure by hospital staff to properly use early warning & response observation tools to help them recognise and respond to clinical deterioration; the absence of a specific sepsis clinical pathway to recognise clinical deterioration and actively consider a diagnosis of sepsis; lack of use of Ryan's Rule; the local model of care (routinely managed patients other than those requiring emergency care through the hospital's emergency department); and the use of short term locum doctors. The report makes 20 recommendations aimed at addressing these and other systemic issues relating to clinical governance matters.

As the Health Ombudsman has published his report, I do not propose to repeat the discussion of those issues and recommendations in my findings other than to recognise that the relevant Hospital and Health Service has accepted the

recommendations. Its implementation of them will be monitored by the Office of the Health Ombudsman.

In particular I note that following service improvements at the remote hospital since C's death:

- the appointment of four permanent medical officers offering seven days per week services (previously two locum medical officers);
- regular programmed visits by a Consumer Liaison Officer; and
- more functional clinical medical record system in place across the region.

National and State initiatives to reduce sepsis-related deaths

Sepsis is a life-threatening illness.

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. The life-time risk of suffering from sepsis is highest during early childhood, resulting in a disproportionate impact of sepsis on children and infants. The report notes that half of all recorded paediatric sepsis cases in Australia, and one-third of paediatric sepsis deaths, occur in previously healthy children.

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.

Early treatment is known and proven to save lives.

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.

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.

The paediatric phase of the sepsis program was launched at a Statewide Paediatric Sepsis forum in August 2017. A working group was established to develop a statewide paediatric pathway to support early recognition and management of children in emergency departments.

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. Rural and remote clinicians were consulted in the development and trial of adult and paediatric sepsis clinical pathways at rural and remote emergency departments across the State.

The remote hospital and nine other facilities within the relevant Hospital and Health Service participated in a 12 month Rural and Remote Sepsis pathway trial commencing in April 2019. The trial concluded on 31 July 2020 and is currently being evaluated.

I am advised that the remote hospital is using the new Rural & Remote Emergency Department Adult and Paediatric Sepsis pathways.

The Rural & Remote ED Paediatric Sepsis Pathway directs clinicians to screen all child emergency department patients who meet any of the following criteria:

- parental and/or health care worker concern
- history of fever or hypothermia
- looks sick
- altered behaviour or reduced level of consciousness
- signs of clinical deterioration (eg total CEWT score of 4 or higher)
- unexplained pain or restlessness
- deterioration during current illness
- representation within 48 hours.

The Pathway also flags patient factors which increase the sepsis of sepsis including whether the child Aboriginal & Torres Strait Islander, Pacific Islander or Maori.

If any of these criteria are met, the treating team is to document a full set of observations in the Children's Early Warning Tool including blood pressure and AVPU and record the child's weight.

It then directs consideration towards whether the child has any features of severe illness such as a significant oxygen requirement, severe respiratory distress, tachypnoea, apnoea, severely abnormal heart rate, hypotension, lactate 2mmol/L or greater, altered AVPU, non-blanching rash and/or hypothermia.

If the answer to <u>any</u> of those considerations is yes, the Pathway directs the clinician to treat the child as having sepsis or septic shock until proven otherwise and to obtain immediately senior medical review and contact Retrieval Services Queensland.

If there are no indicators of severe illness, the Pathway then directs consideration towards whether the child had any features of moderate illness such as moderate

respiratory distress, tachypnoea, moderate tachycardia, delayed capillary refill, unexplained pain or restlessness, low blood glucose level, appearing pale, flushed or mottled, cold extremities, reduced urine output and/or parental or health care worker concern.

If the answer to any of these considerations is yes, the Pathways directs the clinician to treat the child as potentially having sepsis and to obtain early senior medical review and/or consider calling Retrieval Services Queensland and consider ordering blood pathology including lactate.

If senior medical review considers sepsis is likely then the treating team is directed to immediately commence resuscitation and treatment for sepsis within one hour, namely maintaining oxygen saturations 94% or higher, obtaining intravenous or intraosseous access, taking blood cultures and full blood count, measuring lactate, venous blood gases and blood glucose level and commencing appropriate intravenous antibiotics within one hour and intravenous or intraosseous fluids and prepare inotropic support for hypotension, preparing the child for retrieval as advised and then reassessing and monitoring the child's response to resuscitation. The Pathway flags indicators of clinical deterioration for escalation to a senior medical officer and Retrieval Services Queensland, namely persistent tachypnoea, persistent tachycardia, hypotension, reduced level of consciousness despite resuscitation, lactate 4mmol/L or higher or not reducing or if the child is clearly critically ill at any time.

The Pathway also provides guidance about antibiotic selection including antibiotic pathways where treatment of melioidosis is indicated.

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.

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 he died: C died from complications of melioidosis, a very rare bacterial infection in children. While aspects of the care he received during multiple presentations to the remote hospital prior to being admitted for treatment and further investigation on 10 January 2017 were not optimal, I am satisfied it was reasonable for the medical officers involved in his care not to have actively considered a working diagnosis of melioidosis while he was at the remote hospital. This is because his clinical presentation was initially consistent with viral gastroenteritis and subsequently pneumonia for which he was

commenced on intravenous antibiotics and transferred to the regional hospital for specialist paediatric management. Unfortunately C rapidly developed overwhelming sepsis from which he was unable to recover despite maximal intensive care therapies. I am satisfied that the Health Ombudsman's systemic investigation has identified the range of systemic issues at the remote hospital that impacted on the care C received and the relevant Hospital and Health Service is working to implement the Health Ombudsman's recommendations. 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. 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: 14 January 2017

Place of death: Lady Cilento Children's Hospital

Cause of death: 1(a) Sepsis
1(b) Melioidosis

I close the investigation.

Ainslie Kirkegaard
Acting Coroner
CORONERS COURT OF QUEENSLAND
7 September 2020