Regulation 28: REPORT TO PREVENT FUTURE DEATHS

	THIS REPORT IS BEING SENT TO: **1. North West Anglia NHS Foundation Trust (NWAFT)** **2. Cambridgeshire and Peterborough ICB (CPICB)** **3. Department of Health and Social Care** **4. Department for Digital, Culture, Media and Sport** **5. Northamptonshire Children Safeguarding Partnership** **6. Royal College of Emergency Medicine** **7. Faculty of Intensive Care Medicine** **8. Royal College of Radiology**
1	**CORONER** I am David Heming, Senior Coroner for the coroner area of Cambridgeshire and Peterborough.
2	**CORONER'S LEGAL POWERS** I make this report under paragraph 7, Schedule 5, of the Coroners and Justice Act 2009 and regulations 28 and 29 of the Coroners (Investigations) Regulations 2013.
3	**INVESTIGATION and INQUEST** On the 9th January 2018 an investigation was commenced into the death on the 26th December 2017 of **Christian James Gabriel Hobbs** (aged 17 years). The investigation concluded at the end of the inquest on the 14th October 2024 and some key determinations were :- **Medical Cause of Death :** 1a. Multi Organ Failure 1b. Cardiogenic Shock 1c. Arrhythmogenic cardiomyopathy **Conclusion:** Died from complications following an acute deterioration having decompensated

	over a short period of time on a background of a previously undiagnosed pre-existing arrhythmogenic cardiomyopathy.
4	**CIRCUMSTANCES OF THE DEATH** 1. Christian had no known relevant past medical history. He was at school and had a passion for and love of boxing from a young age. He was a member of a boxing club. His father, who had served for 10 years as an infantry officer in the Army said that he had seen fit men, but Christian was amongst the fittest he had seen. 2. The Christmas period in 2017 had led to a large gathering at the family home in Northamptonshire. On Christmas day, Christian seemed fine before lunch and a photograph had been taken. He was said to have been in good form over lunch but went inside as he was not feeling well. It was not considered that he had anything other than a suspicion of flu. 3. When checked the following day, he seemed much the same at circa 12 noon and he was adamant he still wanted to go on holiday. He had taken paracetamol and Ibuprofen. He was checked again in the late afternoon and his mother then asked his grandfather (a retired Consultant) to look at him because of some concerning features. His grandfather found his conscious level to be 'tenuous'. He considered him to be clammy and shut down. The radial pulse was not palpable and the carotid pulse was circa 240. He considered Christian was morbidly white and had no capillary return. 4. As a result, Christian's parents urgently transported him by car to the City Hospital, Peterborough. Christian told his mother on the journey that his heart had been going fast since after lunch the previous day and had a sound of rushing blood in his ears like he had been on a long run. 5. His grandfather telephoned the hospital and spoke to a receptionist and pre-warned about his arrival and relayed concerns about the heart rate, the poor perfusion and 'the prejudiced cardiac output'. **<u>ADMISSION TO PETERBOROUGH CITY HOSPITAL 26/12/2017</u>** 6. Christian was documented as having arrived in the Emergency Department (ED) at 17:42. 7. Christian was seen by the assessment nurse on recorded entries at circa 17:45 where the presenting complaint was documented as?AF/?SVT. It was also documented that Christian had complained of chest tightness and vomiting and that he had already taken paracetamol and ibuprofen. 8. Observations documented a heart rate of 159 (with a recorded entry of 240

		also), a blood pressure of 91/71 respiratory rate 17, SpO2 100% and Glasgow Coma Score 15. It was documented that Christian 'looks pale'. Christian was triaged using the Manchester Triage System as category 2.
	9.	A plan was made for ongoing observations, an ECG, bloods and IV fluids. Only the observations and ECG were ticked as having been done.
	10.	Christian was moved into the resuscitation area of the ED, together with his parents. He was in a wheelchair.
	11.	The first set of observations were documented at 18:00. These recorded a respiratory rate of 25, SpO2 97 on air, temperature 35.9C, blood pressure 79/46, Alert on the AVPU scale.
	12.	The NEWS score was 10.
	13.	It was documented that the observations should be continued at 30-minute intervals.
	14.	The first ECG was done at 18:07.
	15.	A nurse was involved in care in the resuscitation room together with an ST3 Doctor with the latter recording a number of entries in the notes from circa 18:10 onwards when the assessment was undertaken.
	16.	The presenting problem was documented as cough, raised temperature, palpitations.
	17.	The history included: • Unwell since yesterday morning • Felt palpitations while having lunch • In the night developed cough, productive of white phlegm • Had raised temperature and took paracetamol and ibuprofen • Body ache and three episodes of vomiting • Chest tightness but no pain • SOB at times
	18.	It was also documented that there was no nasal discharge or blockage, no sore throat, no rashes or neck pain, no abdominal pain, and no sudden change

in bowel habit.

19. Those observations were recorded as per the observations done at 18:00. In addition, Christian was documented as being dehydrated ++. The pulse was documented as regular with normal heart sounds and the chest was clear with no increase in respiratory effort. The abdomen was soft and non-tender. Christian was not delirious, the GCS was 15, and neurological examination was normal.

20. The working diagnosis was noted as ? sepsis ?chest infection ?viral.

21. The management plan was:

- ECG (this was done at 18:07 - described as sinus tachycardia).
- Bloods – VBG, cultures
- CXR
- Urinalysis (a dipstick of the urine to look for signs of infection etc).
- IV fluids
- Antibiotics
- TCI (meaning to come in) under medics if required.

22. The assessment was noted as completed at 18:35.

23. An x-ray was undertaken at circa 18:55

24. Normal saline 1L (an intravenous fluid) and co-amoxiclav 1.2g were prescribed at 18:30 and were documented as started/given at 19:00.

25. Further observations documented at 18:30 reported respiratory rate 23, SpO2 96% on air, temperature 35.6, BP 94/43, heart rate 143, alert. The NEWS score was 8. It was documented that 30-minute observations should continue.

26. At 19:00, cyclizine 50 mg (an anti-sickness drug) was prescribed and this was documented as being given at 19:20.

27. There was a change of shift at 19:00.

28. A nursing handover was recorded - 19:25.

29. Multidisciplinary documentation at 19:35 reported that .. 'pt looks pallor & presenting as acutely ill. BP↓ & tachycardic. Tx underway.'

30. At 19:50, it was documented 'Struggling to get venous bloods' and at 20:00 'Arterial bloods taken'.

31. An arterial blood gas result recorded at 19:44 showed a pH 7.409, PaCO2 3.1kPa , PaO2 9.88 , HCO3 14.3 mmol/L , BE -7.9 , K+ 5.72 , lactate 5.6 mmol/L.

32. Bloods were received at the haematology laboratory at 20:07 (taken at 19:50), and the clinical chemistry laboratory at 20:13.

33. Observations documented at 20:00 respiratory rate 30, SpO2 100% on air, temperature 36.2, BP 83/?56, heart rate 141, alert, blood sugar 5.6 and a NEWS of 9. Nursing documentation at 20:00 stated 'No change to pt [patient] condition'.

34. At around 20:15 it was documented that 'mother called for help – pt agitated -? Peri-arrest then started agonal breathing.'

35. Retrospective notes written at 20:30 by a medical registrar documented:

- Patient suddenly started gasping and not responding at around 20:00
- ED team attended – no pulse
- Pads attached; polymorphic VT noted.
- CPR started, 150J shock given, CPR continued
- ROSC , lasted for few ? min
- Again lost pulse, CPR started
- ROSC obtained
- Magnesium infusion + amiodarone infusion started [MgSO4 2g (8 mmol) is documented as given at 20:20, amiodarone 300 mg is documented as given at 21:07]
- Decision to intubate made by ED Consultant
- Intubated under sedation

36. Retrospective notes written at 20:30 by an ST6 EM documented that they attended a peri arrest buzzer and that the patient was in cardiac arrest and that CPR was in progress. The ED/ICU Consultant was leading. The ST6 EM managed the airway and intubated the trachea uneventfully.

37. Haematology results were reported at 20:22 – the only abnormality being a raised white cell count of 16.4 (monocytes 1.1, neutrophils 13.1).

38. A second ECG was done at 21:09. On it was documented 'SR (sinus rhythm)'.

39. Clinical Chemistry results were reported at 21:08 and were phoned through to ED. A call from the lab was documented at 21:20: sodium 13, potassium. 6.5, creatinine 115

40. Other abnormalities on the clinical chemistry were, a raised lactate (4.7 mmol/L), raised urea (10.5 mmol/L), raised CRP (44 mg/L) and a slightly raised ALT (64 U/L). Of note the troponin T was raised at 118 ng/L.

41. An ABG taken at 21:15 showed a severe mixed respiratory and metabolic acidosis (pH 6.97, PaCO2 8.52, BE -17.6, lactate 8.7) and a raised potassium (5.23). The PaO2 was 27 on 80% oxygen.

42. Christian had a urinary catheter inserted.

43. A second chest X-ray was done at ~ 20:48.

44. An ABG taken at 21:51 showed an ongoing severe lactic acidosis (pH 7.1, BE -4.2, lactate 10.3). The PaO2 was 14.56 on 21% oxygen.

45. A third ECG was done at 22:06

46. An ABG taken at 22:21 showed lactic acidosis (pH 7.05, - 16.3, lactate 11.2). The PaO2 was 12.43 on 21% oxygen.

47. Retrospective notes by the ED consultant at 23:35 documented:

- Responded to cry for help – parents in resus
- Patient had suddenly become unresponsive and started gasping
- Agonal respiratory effort
- HR 192 regular on monitor – palpable pulse
- Oxygen applied followed by resp arrest

- BVM and pads
- VF on monitor and no pulse
- Shock x 1 followed by CPR
- ROSC – tachy then VT with pulse followed by PEA arrest [pulseless electrical activity]
- CPR for less than one minute before signs of life. Patient moving arms
- HR 154 SVT SBP 111 GCS 4 (E1V1M2) . Minimal respiratory effort.
- I+V
- Hypotensive despite IV fluids (2L) and metaraminol boluses (a vasoconstrictor drug that is used to raise the blood pressure – a total of 9.5 mg was given between 20:25 and 21:05).
- Amiodarone and MgSO4 infusions (anti-arrhythmic drugs) (MgSO4 2g (8 mmol) is documented as given at 20:20, amiodarone 300 mg is documented as given at 21:07)
- Ceftriaxone given (? Meningoccal sepsis) 2g documented as given at 21:40]
- L femoral CVC placed.
- Noradrenaline infusion commenced. R femoral arterial line placed
- ICU consultant present.

48. Bedside echo by an ICU consultant and also another clinician showed septal wall akinesia. IVC filled.

49. BP remained 80 systolic despite increased noradrenaline (1 g/kg/min). Hydrocortisone 100 mg documented as given at 21:00. Dobutamine 30 mL/hr commenced as started at 21:45.

50. In addition, it was documented that terlipressin 0.5mg was given at 21:55 and that actrapid 10u/50 mL 50% glucose was given but no time was provided.

51. A further litre of normal saline was documented as being given at 21:10.

52. Worsening ABGs: 100 mL 8.4% $NaHCO_3$, 10 ml 10% calcium gluconate is

timed as given at 21:25.

53. ECG ? Brugada

54. A tertiary hospital Cardiology SpR was informed about possible salvage ECMO

55. The systolic BP dropped to 60 mmHg and boluses of adrenaline (total of 400g given between 22:09 and 22:18) were given without response. An adrenaline infusion was started at 22:18

56. A calcium chloride infusion was started at 22:35

57. Observations at 22:25 recorded BP 50/31 and HR 108

58. The blood pressure remained low (systolic blood pressure < 50 and the lactate continued to increase (11.2 on ABG done at 22:21).

59. Observations at 22:45 recorded BP 68/40 and HR 135.

60. Christian was increasingly mottled, worsening gas exchange – likely due to poor perfusion.

61. He was mainly unsedated throughout and no further muscle relaxants since RSI.

62. A call was made to a transplant fellow at a tertiary hospital – the response was, 'unsure if can help, will speak to consultant'

63. There was a discussion with the tertiary hospital ICU consultant who said, 'No one is entirely sure what the aetiology is. It is therefore very difficult to know what can be reversed by ECMO, and it is unlikely to be tolerated. Given the prolonged period of hypotension and lack of reversible cause which we can further improve, there is nothing more that can be done'.

64. This was discussed with the family, and it was agreed to stop active treatment and allow him to die which was documented at 23:45.

65. An independent expert report opined that when Christian was first assessed in ED, the symptoms were non-specific (palpitations, chest tightness, cough, aching, vomiting) but there were several concerning observations indicating severe illness. These included:

- Tachycardia (fast heart rate) with the lowest rate being 132 and rates of up to 240 documented (a rate that is non-physiological and

indicative of an arrhythmia – abnormal heart rhythm).

- Hypotension (low blood pressure)
- Tachypnoea (fast respiratory rate)
- Hypothermia (low temperature)
- High NEWS score (8-10)
- Looking pale [documented by triage nurse and resus practitioner]
- Dehydrated ++ was documented at the first medical review.

66. The expert felt that it was appropriate that Christian was moved into the resuscitation area of the ED where he could be continuously monitored and where there is a high staff/patient ratio.

67. The NEWS score of 10 required the triggering of a clinical response (as documented in the Emergency Department Majors proforma):

    - The medical review at 18:10 was reasonably comprehensive but missed several key points including:
    - There was no reference to the heart rate of 240 that was documented in the Doctors notes. It is likely that these arrhythmias were ventricular tachycardia.
    - It was not documented whether Christian had been passing urine normally.
    - The capillary refill time and the strength of the peripheral pulses were not documented, a short capillary refill time and bounding pulse may have more in keeping with sepsis, and a slow capillary refill time and weak pulse would have been more in keeping with a low cardiac output state from either hypovolaemia (reduced blood volume) or reduced cardiac contractility.
    - The jugular venous pressure (JVP) was not documented (a sign of central venous filling pressures and cardiac function).
    - The ECG was documented as sinus tachycardia. I accepted the evidence of a number of experts that this was not a normal ECG and that there were other non-specific abnormalities.

- It was considered that the non-specific abnormalities could be seen in conditions such as hyperkalaemia [high potassium levels] and cardiac dilatation.

- A chest X-ray was requested but the results of this were not documented.

- In the opinion of the expert ICU consultant, the CXR showed some soft ground glass opacification (GGO), mild upper lobe diversion (increased blood flow to the upper parts of the lung because of increased left sided heart pressures), and some fluid in the horizontal fissure (fluid outside of the lung sitting between the upper and middle lobes) – all these are consistent with heart failure, but they are not specific. In his opinion, these were quite subtle signs and could easily be missed. A retrospective review by a specialist forensic radiologist was clear on the presence of cardiomegaly on the imaging.

- Chest sepsis can cause GGO but in the opinion of the ICU expert there was no clear evidence of chest sepsis on the CXR.

- The ICU expert did see evidence of some mild pleural fluid in the horizontal fissure.

68. The medical diagnosis was of possible sepsis. I found that it was appropriate to have this high on the list of differential diagnoses as although the presentation was not classic, sepsis can present in many ways and a high index of suspicion is required.

69. However, I did find that it should have been immediately recognised that Christian was in a shocked state from his tachycardia, hypotension, and poor perfusion.

70. When a patient presents with undifferentiated shock (unclear cause), I concurred with the expert evidence, that it is important to immediately initiate therapy whilst rapidly trying to identify the aetiology so that definitive therapy can be administered.

71. I again agreed that it should be expected that any clinician would rapidly treat and investigate the cause of the shock and to regularly reassess to determine the response to treatment and to review the results of investigations. This would need discussion with Senior staff. There was a discussion between the ST3 and the ED consultant but the information exchange did not lead to a consultant face to face assessment of Christian prior to his arrest.

72. The differential diagnosis was not broadened prior to the cardiac arrest.

73. I agreed that it could be expected that a clinician should have recognised that Christian was acutely unwell.

74. As part of the rapid assessment of the aetiology of the shock I concurred with the view that a low cardiac output state ought to have been considered. Because of the probable tachyarrhythmias, the abnormal ECG, the tachycardia and the low blood pressure, cardiac pathology should have been considered. Several entries in the records pointed to Christian being in a 'shut down' state (poor peripheral perfusion) – this was documented by the triage nurse ('looks pale'), the ST3 ED doctor ('dehydrated ++) and the resuscitation room practitioner ('pallor', 'struggling to get venous bloods'). This should have further increased the suspicion of a low cardiac output state.

75. Focused echocardiography was not undertaken and would be a key diagnostic tool, when it is available. It could have answered several simple questions such as:

- Is the heart dilated?
- Is the heart contracting normally?
- Is the heart/circulation well filled?
- Is there a pericardial effusion (fluid in the sac around the heart) and if so, is this compromising the heart?

76. An ICU expert was of the opinion that focused echocardiogram should have been done and would likely have shown some abnormalities. An expert Cardiologist also emphasized the importance of this diagnostic tool.

77. It was stated that in sepsis, especially after appropriate fluid challenges, the heart is usually well filled and pumping vigorously on echocardiogram. In cardiogenic shock, the heart function is impaired on echocardiogram and depending on the cause, the chambers may be dilated.

78. The ICU expert indicated that a possible diagnosis of sepsis should have triggered a bundle of assessments/interventions such as the Sepsis 6 bundle. The Sepsis 6 Bundle/Pathway is a series of simple interventions that has been widely used in the NHS since 2007 – it aims to reduce the mortality from sepsis.

79. By the time Christian was in the resuscitation room, he had three 'Red Flag' triggers on the Sepsis Screening tool, any one of which should have triggered

the Sepsis 6 pathway. The Sepsis 6 pathway includes the following interventions, all of which should be completed within one hour:

- Administer oxygen
- Take blood cultures, think source control [where is the infection arising from and can the source be controlled]. Chest X-ray and urinalysis.
- Give IV antibiotics
- Give IV fluids – if hypotensive or lactate >2 then 500 mL stat, which may be repeated if clinically indicated
- Check serial lactates – if lactate > 4 mmol/L then call critical care and recheck after fluid challenges
- Measure urine output and commence fluid balance chart
- If the above interventions do not work or the patient is clearly critically ill, then immediate referral to critical care is indicated.

80. The chest X-ray showed some abnormalities consistent with heart failure; however, there was no handwritten documentation of the time that it was reviewed or what it showed.

81. Intravenous fluids were commenced but these were not given as rapid boluses and targeted against response - Christian remained hypotensive and tachycardic despite the fluid administration.

82. Apart from the blood cultures, bloods were not taken until 19:44.

83. I found that that the urgency of the situation was under-appreciated by the treating team. An expert indicated that it is very well recognised that unwell, and normally fit, children/young adults often look quite well until the point at which they rapidly decompensate. In the experts opinion, the fact that Christian was sitting up and talking resulted in a false sense of security and an under-appreciation of the physiological abnormalities on the part of some of those involved.

84. The expert also opined that there was a clear delay in getting the first blood gas. A cannula was in situ by circa 19:00, when intravenous fluids and antibiotics were given, and a venous blood gas should have been taken from this. This would likely have shown a raised lactate and potassium (as the

	ABG did at 19:44) – both of which would have impacted on management and should have further highlighted the severity of the situation. 85. I found that if there was difficulty in getting bloods, then this needed to be resolved by deployment of appropriate measures to expedite this. 86. Earlier correction of the high potassium, if it had been measured and recognised, may possibly have reduced the chance of further arrythmias. 87. Cyclizine was given as an antiemetic at circa 19:20. **SUBSEQUENT CARE DURING AND AFTER THE CARDIAC ARREST** 88. I share the views expressed in written reports and oral evidence that the care given during the resuscitation was generally of a high standard and everything possible was done to restore a spontaneous circulation and to protect organs from damage. 89. Once return of spontaneous circulation (ROSC) had been achieved then it was appropriate to intubate and commence mechanical ventilation. 90. The viewing and findings of the chest X-ray done at 20:48 were not documented. 91. I was of the view that the clinical situation after ROSC was extremely challenging with ongoing shock and hypotension despite multiple interventions. There was significant post cardiac arrest 'cardiac stunning' in the context of an already dilated and weak heart from the pre-existing cardiomyopathy. 92. The evidence of fluid management after arrest was hampered by a lack of clarity over timings and the nature of retrospective entries.
5	**CORONER'S CONCERNS** During the course of the inquest the evidence revealed matters giving rise to concern. In my opinion there is a risk that future deaths could occur unless action is taken. In the circumstances it is my statutory duty to report to you. **The MATTERS OF CONCERN ARE:** **POINT A - RE: CARDIOGENIC SHOCK CS)** **TO:** **i. Department of Health and Social Care**

ii. **Cambridgeshire and Peterborough ICB**
iii. **NWAFT**

I have a concern over funding availability and implementation of the key recommendations set out below.

The Intensive Care Society and British Cardiovascular Society issued a comprehensive report in October 2022 with the title - **Shock to Survival**: a framework to improve the care and outcomes of people with cardiogenic shock in the UK.

The Executive Summary reported that patients with cardiogenic shock need defined pathways of escalation and care to improve survival.

It was stated that CS is a commonly encountered but often under recognised clinical challenge with high mortality. This document outlined several recommendations as part of a systems approach to improving patient survival and experience. These included but were not limited to:

A. Increase awareness among healthcare staff that any deteriorating patient with an elevated National Early Warning Score (NEWS) 2 and evidence of hypoperfusion should prompt consideration of CS as a potential cause. Echocardiography or focused cardiac ultrasound FoCUS and electrocardiogram should follow urgently.

B. Improve access to echocardiography out of hours (including FoCUS with expert review) to support/exclude the diagnosis of CS or other cardiac pathologies

C. Adopt SCAI staging as the standardised descriptor of CS to facilitate triage, communication and expediency of discussion with a CS centre.

D. Establish CS centres as part of regional CS networks to bring together the most critically ill patients with the right clinical expertise

E. Ensure equity of access to CS expertise and care, including short-term MCS, through the design of CS networks and distribution of CS centres

F. Develop clear pathways of care and protocols for CSS care within networks to complement existing acute cardiac care pathways, including 24/7 access to CS MDT's and transfer to CS centres

G. Developed network protocols for patient selection for short- term MCS

H. Define a minimum CS data set and collect this data, including through existing national audits, encompassing the entire patient pathway

I. Prioritise high-quality research in CS to address important areas of uncertainty, including a patient selection for short-term MCS and cost-effectiveness of improved care pathways.

The report recognised that the National Cardiac Pathway Improvement Programme (CPIP) represented an opportunity to embed many of these recommendations, to potentially transform outcomes in CS patients, and CPIP leaders nationally and regionally should work with stakeholders and CS experts to implement them.

POINT B - RE: ECHOCARDIOGRAPHY

TO:

i. **Department of Health and Social Care**
ii. **Royal College of Emergency Medicine**
iii. **The Faculty of Intensive Care Medicine**
iv. **NWAFT**
v. **Cambridgeshire and Peterborough ICB**

Christian had not had an echocardiogram prior to his arrest. This was a concerning feature of his care in the ED given he was critically unwell and in a shocked state. Whilst the paper below focussed on critical care, there is a concern on the use of echocardiography in EDs and also within critical care departments given the findings that emerged from this research.

The paper by **Luke Flower (et al) : The use of echocardiography in the management of shock in critical care: a prospective, multi-centre**, **observational study (Intensive Care Medicine :2024)** emphasised that echocardiography was reported to either reduce diagnostic uncertainty or change management in 291 (54%) cases, with a change in management in 270 (50%) and a reduction in of diagnostic uncertainty in in 120 (20%) of patients.

The conclusion was that urgent echocardiography is not routinely used in the assessment of critically ill patients with shock in the UK and Crown Dependencies, despite international guidance. The study suggests that echocardiography may alter management and improve diagnostic certainty in patients with undifferentiated shock. Future work should explore barriers to the expansion of echocardiography provision within critical care to permit improved equity of care amongst patients presenting with shock.

The study was on behalf of NEAT ECHO collaborators and in association with the British Society of Echocardiography (BSE). The BSE highlighted an additional study finding that it was disappointing to read that only 25% of echocardiograms adhered to national storage guidance. This discrepancy was said in part to relate to poor underlying infrastructure for electronic image storage and transfer. The BSE commented that this was a reminder that delivering a high-quality echo service is not

only reliant on having an echo machine, but also a variety of additional background information technology components that the BSE would recommend as inconceivable to be absent from a modern CT or MRI imaging service.

POINT C - FLUID MANAGEMENT

To:

i. **NWAFT**
ii. **Cambridgeshire and Peterborough ICB (CPICB)**

Intravenous fluids were commenced but these were not targeted against response. Christian remained hypotensive and tachycardic despite the fluid administration. This is an area of concern also.

Another example of this is seen in a coronial investigation into the death of **LM** within the trust under reference 01976-2023. An independent expert flagged an issue on fluid management in that matter and the Trust SI report also found that the effects of Hartman's solution was not evaluated, and no further fluids were given.

Additionally, adherence to policy on completion of fluid balance charts and the understanding and need for acting on flags is a matter of concern.

It is not clear if the trust and CPICB has identified this as a recurring theme in audits/deep dive reviews.

POINT D -TEAM INTERACTIONS

To:

i. **NWAFT**

A concern arises over communications within a team itself and also interactions with other teams – e.g. when a referral is made to the medical team.

The under appreciation by some staff of how critically unwell Christian was raises an issue on exchanges of information and team culture. An example is the entry … 'TCI medics, if required' … and so there was no expression of the need for urgent review by the medical team by the key clinician involved in ED care.

The cases of **CR** under case ref :03638-2019 and **SO** under case ref: 00133-2023 are further examples on issues of team interactions.

A final example is seen again in the death of **LM** (see ref earlier). The SI of the trust found that case management and plans should be carried out in a timely manner, (particularly administration of antibiotics, blood test requests and specialty team assessment following referral from the ED). It was found that the deceased had not been seen by the medical team after referral to them and before a cardiac arrest.

POINT E – RADIOLOGY WITHIN NWAFT

TO:

i. **NWAFT**

Another recurring theme is radiology within the trust. In the case of Christian, nothing is recorded in the notes on assessment of the X-Rays undertaken.

There have also been a number of instances in our coroner investigations where there is an issue surrounding radiology.

POINT F -RADIOLOGY NATIONALLY

TO:

i. **The Royal College of Radiology**
ii. **Department of Health and Social Care**

I have a concern over whether there are sufficient numbers of radiologists to cover the ever-increasing expansion of imaging as a key diagnostic tool.

Further, there seems an almost two-tier system – that available in Tertiary hospitals and that available in district general hospitals.

POINT G – BLOOD GASES/ ELEVATED LACTATE

TO:

i. **NWAFT**

There was a delay in getting the first blood gas. A cannula was in situ by circa 19:00, when intravenous fluids and antibiotics were given. A venous blood gas should have been taken from this. This would likely have shown a raised lactate and potassium (as

the ABG did at 19:44) – both of which would have impacted on management and would have further highlighted the severity of the situation. The ABG at 19:44 was consistent with a compensated lactic acidosis and hyperkalaemia.

In the case of **CR** (see earlier ref). A blood gas requested by an anaesthetist was not done.

A further example is seen in the coronial investigation into the death of **SO** (see earlier ref) where an expert concluded that lactate was not measured until 02:30 on 30.12.2022 and it was 5.1. mmol/L – recognition of its elevation would likely have prompted earlier senior review, CT imaging and review by critical care.

Again, in the death of **LM** (see earlier ref). An independent expert report has raised a number of issues on clinical management in that matter. Specifically, the lactate was 9.18 from a VBG timed at 05:10 on 28/7/23 and the trust itself in an SI report concluded that there was no escalation.

The death of Christian and these further examples raise a concern.

POINT H - CRITICAL CARE

TO:

i. **NWAFT**
ii. **Cambridgeshire and Peterborough ICB (CPICB)**

The CQC reports in 2018 and 2019 highlighted issues surrounding critical care.

The coronial investigation into the death at Hinchingbrooke Hospital of **CR** (see earlier ref) led to an independent expert's report being commissioned that flagged suboptimal care. There was a finding of neglect (a gross failure of basic medical care) at the final inquest hearing. There would not appear to have been a Trust SI report in that matter.

There are concerns about resources and training within the trust for this specialty.

Furthermore, there is a concern as to whether the trust has had/acted upon any internal/ external review of the CCU at Hinchingbrooke Hospital.

POINT I - DIFFERENTIAL DIAGNOSIS

TO:

i. **NWAFT**

A recurring theme is lack of a differential diagnosis which raises concerns about

training.

POINT J - SEPSIS PATHWAY

TO:

i. **NWAFT**
ii. **Cambridgeshire and Peterborough ICB C&P ICB**

This is again another theme and accordingly raises a concern about training and auditing.

Within the context of the death of **LM** (see earlier case ref), there was inter alia, a delay in the administration of antibiotics and cultures were not taken.

Again, the case of **CR** (see earlier case ref) highlighted deficiencies on this topic.

POINT K- ANTIEMETIC MEDICATION

To:

i. **NWAFT**
ii. **Royal College of Emergency Medicine**
iii. **Department of Health and Social Care**

It will be seen from the circumstances set out earlier that cyclizine was administered at 19:20. Christian arrested at shortly after 20:00. This drug is known to cause adverse cardiovascular effects – tachycardia, arrythmias, hypertension and hypotension. Therefore, it is at least possible, given the subsequent physiological collapse of Christian that this medication possibly had some adverse effect on a background of an underlying arrhythmogenic cardiomyopathy.

I have a concern on clinical knowledge of such effects of this drug and pharmacologic consequences of other drugs also.

This was highlighted in the paper: **Ventricular Fibrillation Arrest Triggered by Antemetics Revealing an Underlying Long QT Syndrome in a Young Woman. Cureus 16(7). July 2024**.

It was emphasised that with antiemetic prescriptions being a common practice, it is vital to educate about their side effects, such as prolongation on QT. Exercising future caution before using these medications will help mitigate the risk of such adverse events. While emergency departments are already so busy, routine ECGs could help

prevent such disasters from happening.

It is also essential to ensure that doctors are equipped with the necessary skills and experience for early recognition of such a phenomenon. A multilayered approach focusing on clinical education from undergraduate to postgraduate levels alongside multidisciplinary collaboration can help ensure the delivery of high-quality care going forward.

POINT L – ECG ANALYSIS

TO:

i. **NWAFT**
ii. **Department of Health and Social Care**
iii. **Royal College of Emergency Medicine**

Some Issues emerged in evidence on the interpretation of the ECG at 18:10.

It has been pointed out in a study by Abdalla and Khanra: **Electrocardiography interpretation proficiency among medical doctors of different grades in the UK. Cureus 2022** that analysing the ECG interpretation proficiency among medical doctors showed low levels of clinician confidence in interpreting ECGs.

The paper in **point K** above also stated that this highlighted a deficiency that needs urgent attention due to the importance of the investigation, especially since an abnormal ECG can lead to potentially life-threatening consequences. Continued education was said to be paramount to ensure safe management of patients with LQTS.

This again raises concerns.

POINT M -RECORD KEEPING

TO:

i. **NWAFT**

There was a lack of recorded evidence on key aspects of Christians care.

This was flagged also in CQC inspections and within the context of this investigation there was no record of measurement of jugular venous pressure or capillary refill time and no record of reviews of X-Rays.

Again, in the case of **LM** (see case ref earlier), the trust SI report found nothing in the notes about staff action with the patient at a critical timepoint.

Reference to this also arose in the case of **CR** (see case ref earlier) where the expert flagged inadequate documentation.

POINT N - DATA FROM EMERGENCY DEPARTMENT ALARMS

TO:

i. **NWAFT**

Family evidence was heard that there appeared to be deactivation of the monitor alarm at a particular point in time and when Christian arrested, they had to call staff members for help.

The monitor evidence was not available for analysis of heart rhythms etc because there was no retention of the data at the time. This hampered consideration of data in the death that required detailed review and this is a concern. This was a case where a retention of the data, given the circumstances, would have greatly assisted understanding physiological changes at key points and would assist lessons to be learned to mitigate risk of other deaths.

POINT O – LEARNING FROM HSSIB REPORTS

TO:

i. **NWAFT**

I have a concern on whether the **HSSIB report – RECOGNISING AND RESPONDING TO CRITICALLY UNWELL PATIENTS** is firmly embedded in staff training.

POINT P - PATIENT SAFETY IN SOME TRUST AREAS

TO:

i. **NWAFT**
ii. **Cambridgeshire and Peterborough ICB**

The CQC reports in 2018 and 2019 indicated there was a requirement for improvement when inspecting whether services were safe.

There have now been a number of independent expert reviews in coronial investigations which have highlighted sub optimal clinical care in fact specific

scenarios. NWAFT cases and issues arising, seem to exceed the number of cases referred from tertiary hospitals in this coronial area.

This is a concern and it is unclear as to whether there has been a deep dive audit/review to look at patterns/trends rather than simply looking at raw overall mortality data

POINT Q – TESTING IN COMPETITIVE SPORTS FOR CARDIAC CONDITIONS

TO:

i. **Department of Digital, Culture, Media and Sport.**

The paper by **Teresina Vesella (et al) in Br J Sports Med 2019 :The Italian evaluation programme : diagnostic yield, rate of disqualification and cost analysis** pointed out that Italian Law mandated that every athlete must undergo annual preparticipation evaluation (PPE) to identify cardiovascular diseases that pose a risk of sudden death during sport and other conditions that may threaten the athlete's health. The conclusion was that PPE according to the Italian model identified a range of diseases in 2.0 % of apparently healthy athletes at an average cost of 79 euros per athlete.

The paper by **H.MacLachlan (et al)** in the **Journal of Science and Medicine in Sport in 2022** concluded that an electrocardiogram-based national screening programme identified a major cardiac condition in 0.3 % of the cohort (in elite cricketers).

I have a concern about funding mechanisms being available to say England Boxing that would enable appropriate screening for competitive boxers where there is already a mandatory need for a medical examination under the 'fit or not fit to box' protocol. This would aid further research on this important topic.

Additionally, there may be a lack of general awareness for parents of sports participants on the issue of sudden cardiac death and so there may be a gap in knowledge/understanding of possible emergence of red flag symptoms. This is despite the outstanding work of CRY.

POINT R – CHILD DEATH OVERVIEW PANEL REVIEW

TO:

i. **NORTHAMPTONSHIRE SAFEGUARDING CHILDREN PARTNERSHIP**

Whilst the death occurred in Cambridgeshire, it is understood that the Northamptonshire CDOP reviewed this matter. However, it appears that a copy of the Analysis Proforma is not available but taking information from a collation of reviews, there was no identification of any learning in terms of factors intrinsic to the social environment, physical environment or service provision. This is a concern given the

	scale of the coronial investigation that has revealed a number of significant issues on clinical management. **<u>POINT S – NWAFT PAEDIATRIC MORTALITY REVIEW</u>** **TO:** **i. NWAFT** It is unclear whether any NWAFT paediatric review (it is noted that Christian was treated as an adult patient and the paediatric team were not involved in his acute care) found any issues from a learning perspective given the matters analysed at length within the coronial investigation.
6	**ACTION SHOULD BE TAKEN** In my opinion action should be taken to prevent future deaths and I believe you (and/or your organisation) have the power to take such action.
7	**YOUR RESPONSE** You are under a duty to respond to this report within 56 days of the date of this report, namely by **02 June 2025**. I, the coroner, may extend the period. Your response must contain details of action taken or proposed to be taken, setting out the timetable for action. Otherwise you must explain why no action is proposed.
8	**COPIES and PUBLICATION** 1. [redacted] 2. [redacted] 3. Association for Cardiothoracic Anaesthesia and Critical care 4. British Association of Critical Care Nurses 5. British Cardiovascular Society 6. British Cardiovascular Intervention Society 7. British Society of Echocardiography 8. British Society for Heart Failure 9. Intensive Care Society

	10. Resuscitation Council (UK) 11. Royal College of Nursing 12. Society for Acute Medicine 13. Society for Cardiothoracic Surgery in Great Britain and Ireland 14. Scottish Intensive Care Society 15. The College of Paramedics 16. The Northern Ireland Intensive Care Society 17. Care Quality Commission 18. HSSIB 19. England Boxing 20. [redacted] 21. [redacted] 22. [redacted] I am also under a duty to send a copy of your response to the Chief Coroner and all Interested Persons who in my opinion should receive it. I may also send a copy of your response to any other person who I believe may find it useful or of interest. The Chief Coroner may publish either or both in a complete or redacted or summary form. He may send a copy of this report to any person who he believes may find it useful or of interest. You may make representations to me, the Coroner, at the time of your response, about the release or the publication of your response.
9	**Dated: 07/04/2025** David Heming **David HEMING**

	Senior Coroner for **Cambridgeshire and Peterborough**