Derek Winter DL
Senior Coroner for the City of Sunderland

	REGULATION 28 REPORT TO PREVENT FUTURE DEATHS **THIS REPORT IS BEING SENT TO:** **GE Healthcare and their Solicitors and Counsel**
1	**CORONER** I am Derek Winter DL, Senior Coroner for the City of Sunderland
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. http://www.legislation.gov.uk/ukpga/2009/25/schedule/5/paragraph/7 http://www.legislation.gov.uk/uksi/2013/1629/part/7/made
3	**INVESTIGATION and INQUEST** Mr Thomas Smith Collings, aged 64 years, died at Sunderland Royal Hospital on 2nd August 2018 at 2am from a naturally occurring illness contributed to by a combination of unexpected factors with regard to his life support. The Inquest, as part of my Investigation, concluded on 4th April 2019, when I recorded a conclusion 'Natural Causes'. The Cause of Death was: - Ia Acute Myocardial Infarction Ib Coronary Artery Disease II Type 2 Diabetes, High Blood Pressure
4	**CIRCUMSTANCES OF THE DEATH** Mr Collings suffered unheralded ventricular fibrillation (a lethal heart rhythm) at 01.20:41 on 2 August 2018, for which there was no warning – he was stable, symptom-free and all his observations had been good in the time leading up to the collapse. The ventricular fibrillation (VF) rhythm was very clear from the ECG traces and will have resulted in the cessation of effective cardiac output. The ECG monitor showed a clear artefact after 01.21:00, which hid the true underlying rhythm, and after this time, it would have been impossible to determine that Mr Collings was in VF by looking at the monitor. He was undoubtedly in VF throughout this time however, until he was discovered 6-7 minutes later at around 1.27. VF does not terminate itself, and it was present when the crash team attached the monitor after commencement of resuscitation, so it was present throughout this time, and he would have remained without any cardiac output.

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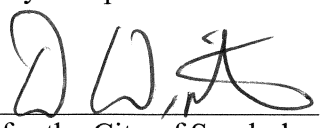
	Lead disconnection is relatively common in sleeping patients (as well as those who are awake), for example when they roll over in their sleep, and so this pattern of artefact due to lead connection does not normally lead to urgent concern among nursing staff. This explained the pausing of the alarm before attending to Mr Collings. Normally, abnormal rhythms such as VF are spotted quickly on a cardiac care unit when a nurse notices a patient collapse and checks their heart rhythm, or a nurse notices the abnormal rhythm on the ECG monitor, or the ECG monitor detects the VF rhythm automatically (the systems have algorithms to do this) and an urgent alarm is sounded. In Mr Collings' case, these usual processes did not occur. There was an unfortunate combination of factors in Mr Collings' case that led to his death. It is likely that, if any one of these had not occurred, his death would have been averted on the balance of probabilities: - • The occurrence of VF while the nurses were attending to other duties and not close to the central monitoring console. • The ECG monitoring system did not detect the VF, and the red crisis alarm did not sound. • Genuine artefact occurring 18 seconds later (likely as Mr Collings collapsed and detached an electrode), resulting in artefact on the ECG trace, when the nurses viewed the monitor. • A confused patient being present on the unit at the same time, which diverted a nurse from attending to Mr Collings more quickly.
5	**CORONER'S CONCERNS** I should be glad to be told about any additional learning arising from the evidence heard at the Inquest especially with regard to the evidence of your engineer [redacted] and [redacted] In particular, are there any improvements to the algorithm for earlier alerts, especially those that may differentiate sooner between any artefact, such as a detached lead, and a life-threatening event, such as a ventricular defibrillation, recognisable by the human eye?
6	**ACTION SHOULD BE TAKEN** In my opinion action should be taken to prevent future deaths and I believe you 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 11th May 2019. 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** I have sent a copy of my report to the Chief Coroner and to the following Interested Persons: - • Family • CQC • South Tyneside and Sunderland NHS Foundation Trust and their Solicitors

	I am also under a duty to send the Chief Coroner a copy of your response. 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 by the Chief Coroner.
9	Dated this 15th day of April 2019 Signature  Senior Coroner for the City of Sunderland