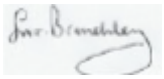
	REGULATION 28 REPORT TO PREVENT FUTURE DEATHS **THIS REPORT IS BEING SENT TO: Secretary of State for Health and Social Care**
1	**CORONER** I am Simon Brenchley, Assistant Coroner for Birmingham and Solihull Districts
2	**CORONER'S LEGAL POWERS** I make this report under paragraph 7, Schedule 5, of the Coroners and Justice Act 2009 and regulations 28 and 29 of the Coroners (Investigations) Regulations 2013.
3	**INVESTIGATION and INQUEST** On 23 September 2024 I commenced an investigation into the death of Colin Charles BROOKS. The investigation concluded at the end of the inquest on 29th May 2025. The conclusion of the inquest was that; The deceased died as a result of a hypoxic ischaemic brain injury after blood flow to his brain was compromised during emergency cardiac surgery when there was a delay in the reapplication of a bridge clamp to the circuit of a cardiopulmonary bypass machine.
4	**CIRCUMSTANCES OF THE DEATH** On 7th May 2024 at the Queen Elizabeth Hospital in Birmingham, Mr Brooks underwent complex cardiac surgery involving the replacement of his aortic valve, aortic root and ascending aorta as well as coronary artery bypass grafts. After the initial surgery was completed, whilst he was still being monitored in theatre, it was noted that he was losing blood so it became necessary for surgeons to re-open his chest to investigate and deal with the source of the bleeding. During the efforts to deal with the bleeding, the left coronary button was injured necessitating the emergency reinstitution of cardiopulmonary bypass at 2137 in order to repair this. A clamp on the bridge between the arterial and venous lines of the cardiopulmonary bypass machine, which had been removed prior to commencement of bypass in order to add and circulate heparin in the machine, was not reapplied prior to bypass commencing as it should have been. This led to a significant shunt being present within the bypass circuit meaning that Mr Brooks became profoundly hypotensive with low blood supply to his brain. After a number of measures were taken to try to identify the cause of the low pressure, the absence of the clamp was identified at about 2200 hrs at which point the clamp was reapplied with full blood flow and pressure achieved again, allowing the emergency surgery to proceed and the bleeding resolved. After the surgery, Mr Brooks was transferred to the Cardiac ICU but he failed to regain consciousness. It was established that he had sustained a significant hypoxic ischaemic acquired brain injury due primarily to the loss of the blood supply/flow to his brain during the surgery. He remained in a state of unresponsive wakefulness and was subsequently moved to a neurology ward, with plans put in place to transfer him to a specialist neurology rehabilitation unit. However, during August 2024 his medical condition deteriorated due to a number of complications including the development of irreversible renal failure and he subsequently passed away in the neurology ward on 11th September 2024. Based on information from Mr Brooks' treating clinicians the medical cause of death was determined to be: **1a Hypoxic brain injury** **1b Cardiac Surgery - Coronary Artery Bypass Surgery and Aortic Root Replacement 7th May 2024**

	1c **1d** **II Ischaemic Heart Disease, Aortic Stenosis, Aortic Aneurysm, Diabetes, Hypertension, Hypercholesterolaemia**
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 will occur unless action is taken. In the circumstances it is my statutory duty to report to you. The **MATTERS OF CONCERN** are as follows. – 1. During the inquest I heard that the emergency surgery on Mr Brooks was taking place out of hours at the same time as another emergency procedure, a lung transplant operation, was taking place in another theatre. The only two on call perfusionists on site were the perfusionist operating the cardiopulmonary bypass machine ("CPB") in Mr Brooks's surgery (Perfusionist 2) and the perfusionist involved in the lung transplant operation (Perfusionist 3). 2. The Safety Requirements published by the Society of Clinical Perfusion Scientists in 2023 advises that : *"The minimum safe number of accredited clinical perfusion scientists to cover operating theatres for any CPB procedure is deemed as N+1, where N equals the number of operating theatres in use at any given time on a single site. The plus one shall be available onsite"* 3. One of the factors that was, in my view, likely to have contributed to the delay in Perfusionist 2, who was relatively junior in terms of experience, being able to identify the absence of the bridge clamp as the cause Mr Brook's hypotension, was that Perfusionist 2 was limited in being able to obtain advice from another perfusionist. 4. Contrary to the "N+1" advice, there was no other available perfusionist on site, (apart from Perfusionist 3), whom Perfusionist 2 could call in to theatre quickly to help with troubleshooting. Perfusionist 3 was unable to leave the theatre next door and so messages had to be exchanged between the two perfusionists which led to the issue being identified. 5. I heard that whilst the "N+1" advice is followed by the UHB Trust during normal working hours, it is not possible for this to be followed out of hours in circumstances where two operating theatres are in operation at the same time owing to resourcing/funding issues and problems with the availability of perfusionists generally, one of the factors being the significant effect staffing this requirement out of hours would have on reducing the waiting lists for surgery during working hours. 6. Although it was a rare event that two emergency procedures requiring a bypass machine were taking place at the same time out of hours, nonetheless there is a risk that future deaths could occur in similar circumstances if action is not taken to address resourcing and the availability of perfusionists.
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 31 July 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** I have sent a copy of my report to the Chief Coroner and to the following Interested Persons: Mr Brooks's family UHB I have also sent it to the Medical Examiner, ICB, and the Society of Clinical Perfusion Scientists who may find it useful or of interest. 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. She may send a copy of this report to any person who she 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	Signature:  **Simon Brenchley** **HM Assistant Coroner for Birmingham and Solihull** **5 June 2025**