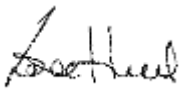
	REGULATION 28 REPORT TO PREVENT FUTURE DEATHS **THIS REPORT IS BEING SENT TO:** • **Sandwell and West Birmingham Hospitals NHS Trust** • **Birmingham Medical School** • **Aston Medical School** • **Secretary of state for Health** • **General Medical Council** • **UK Foundation programme**
1	**CORONER** I am Louise Hunt Senior Coroner for Birmingham and Solihull
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 8 December 2020 I commenced an investigation into the death of Joan Mavis COLEY. The investigation concluded at the end of the inquest on 29/03/21. The conclusion of the inquest was; The deceased died from sepsis contributed to by an air embolus caused by inadvertently leaving her central line unclamped and uncapped. Her death was contributed to by neglect.
4	**CIRCUMSTANCES OF THE DEATH** The deceased suffered from end stage renal failure requiring dialysis, diabetes mellitus and had recently had her right 4th toe amputated in 2019 following an infection. She was admitted to the emergency department on 21/11/20 feeling unwell after her dialysis with hypotension. She was noted to have an infected right foot which was treated with a dressing and antibiotics. A blood culture taken during recent dialysis had shown signs of a blood infection (staph Hominis) and a decision was made to undertake a further blood test to understand the significance of the previous result. The blood sample was to be taken from an existing central line used for dialysis. On 25/11/20 a junior doctor shadowing the ward offered to take the sample and was accompanied by a 3rd year medical student who asked to take the sample of blood. In the process of taking the blood the dialysis line cap was removed to clean the line and at the same time the line was left unclamped which allowed air to enter the deceased's line and she suffered a cardiac arrest. She was resuscitated and admitted to ITU where they noted evolving sepsis the following day. Despite treatment she passed away on 27/11/20. The likely cause of her cardiac arrest was air getting into the central venous blood system through the unclamped, uncapped central line. The reason the line was left unclamped and uncapped was due to a combination of factors including lack of understanding, lack of training and supervision of junior Doctors and no clear process to assess and monitor competency. The cardiac arrest due to air embolus contributed to her death Based on information from the Deceased's treating clinicians the medical cause of death was determined to be: 1a Multiorgan failure 1b Sepsis

	1c Line infection and infected foot ulcer II Diabetes mellitus (poorly controlled), End stage renal disease on Dialysis, Ischaemic heart disease, diabetic retinopathy, Toe amputation to treat diabetic toe gangrene. PEA Cardiac arrest - probably secondary to air embolus
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. **Medical school training**: The inquest heard evidence that there is very limited training on how to take bloods from a central line, the physiology involved and potential risks. The junior doctor in question did not feel she had adequate knowledge of the potential risk associated with the task she was undertaking. Urgent action is required to review what training is provided to medical students regarding taking bloods from central lines. 2. **Induction programme for FY1 Doctors and assessment of base line competencies**: The inquest heard how taking bloods from a central line is not part of the "check list" of tasks that junior doctors have to undertake. As a result there was no process in place to check whether an individual doctor was competent take take bloods from a central line. This is inherently unsafe. Consideration should be given to adding "taking bloods from a central line" to the checklist of tasks. 3. **How to effectively assess and monitor competencies to undertake procedures**: The inquest heard how there was no formal system for assessing a doctor's competence to undertake a particular task for example, taking bloods from a central line The doctor would learn on the job with no formal training or assessment. When moving wards if a doctor agreed to undertake a procedure it was assumed they were capable and competent. This is inherently unsafe. The inquest heard how nurses have stringent criteria and training before they can handle any procedures. Consideration should be given to a similar process for junior doctors. 4. **Handover of competencies from ward to ward**: The inquest heard how there was no system of hand over when junior doctors change from ward to ward. The junior doctor in this case was shadowing on a new ward and the Consultant in change had no understanding of the doctors level of ability or competency. Consideration should be given to having a system to hand over ability and competencies. 5. **General understanding of the process to follow when taking blood from a central line and the associated risks:** The inquest heard how there was a general lack of understanding of how to take bloods from a central line and the associated risks. The basic physiology was not understood and the consultant also did not know how to take blood from this central line. Consideration should be given to ensuring all doctors are fully aware of the basic principles when taking bloods from a central line and the associated risks. 6. **Standard operating procedures for taking bloods from central lines**: The inquest heard how there was no standard written procedure for taking bloods from a central line. Consideration should be given to having a national standard procedure, which should be linked with training and assessment of competency for doctors to take bloods from a central line.
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

	26 May 2021. 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: • The Family • Sandwell and West Birmingham Hospitals NHS Trust I have also sent it to the regional Medical Examiner, Birmingham and Solihull CCG, NHS England and the CQC. 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	**31 March 2021**  **Louise Hunt** **Senior Coroner for Birmingham and Solihull**