Mr Tom Osborne
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15 August 2025

Dear Mr Osborne

Regulation 28 Report following an Inquest into the death of Mr Karl Dunstan

I am writing following receipt of a regulation 28 report dated 25 June, following on from the Inquest concluded on 24 June 2025. Mr Dunstan died from a pulmonary embolus secondary to a deep venous thrombosis the day after his admission to hospital.

I was sorry to learn of Mr Dunstan's death, and it is very evident from the inquest pack that its nature and timing has had a profound impact upon a close and loving family. My thoughts are with them.

I shall come on to address the substantive content of the regulation 28 report, but I do find it necessary to comment on the text of your narrative conclusion before doing so. Specifically, you assert that a failure to undertake a D-dimer test and therefore to obtain an urgent CT pulmonary angiogram (to make a definitive diagnosis of a pulmonary embolus) meant that thrombolysis was not started when he later collapsed (in cardiorespiratory arrest). You imply that thrombolysis would perhaps have altered the sad outcome in describing 'missed opportunities [which] more than minimally contributed to his death'. **For avoidance of doubt, we consider that whilst a different course of events and actions might potentially have influenced the ultimate outcome, it would not – on the balance of probabilities – have done so.** Mr Dunstan's management – although we naturally wish it had been different given what subsequently transpired – was reasonable at each decision point. The Trust does not make any admission of breach of duty. When asked, the clinicians attending the inquest as witnesses expressed some disappointment that they had clearly not been able to communicate some key points to you.

In terms of the substantive content of your regulation 28 report, you assert that Mr Dunstan should have had both a D-dimer and a CT pulmonary angiogram (CTPA).

I would make the following points:

- Confirmed pulmonary embolus is not a rare diagnosis in hospital practice but nor is it common.

- Pulmonary embolism is a notoriously difficult clinical area: in order to pursue investigations towards a diagnosis, the clinician needs to be sufficiently concerned about the likelihood of a positive diagnosis (as ionising radiation to the chest carries real risk), and the diagnostic approach adopted changes according to the clinical context and the level of suspicion. Risk stratification scores (such as the Wells score) should only be applied when the diagnosis in question is felt to be a real possibility. Likewise, ubiquitous use of D-dimer in any patient presenting to the Emergency Department with symptoms or signs which could be consistent with (but were not particularly suggestive of) pulmonary embolus would not be appropriate. [redacted] (the Canadian professor who designed and validated the scoring system bearing his name) highlights these challenges:

  The model should be applied only after a history and physical [examination] suggests that venous thromboembolism is a diagnostic possibility. It should not be applied to all patients with chest pain or dyspnea or to all patients with leg pain or swelling. This is the most common mistake made. Also, never… do the D-dimer first [before history and physical exam]. The monster in the box is that the D-dimer is done first and is positive (as it is for many patients with non-VTE conditions).

- Departments across the NHS (and indeed globally) use validated screening scores to determine the pre-test probability of a pulmonary embolus. Where the pre-test probability is low, a negative D-dimer test can be helpful in providing further assurance that significant pulmonary embolus is unlikely. A positive D-dimer is non-specific (see below).
- Clinicians will often establish longs lists of 'differential diagnoses' with some being more likely than others in a specific patient presentation. A combination of the natural history of the presentation (how the signs and symptoms evolve), response to initial treatment and investigative tests are used during the course of the admission to firm up on the diagnosis / diagnoses. Some conditions on the list of differential diagnoses may be considered possible but very unlikely – to be reconsidered later if one of the more likely diagnoses is not confirmed.
- Not every patient in whom a pulmonary embolus may feature as part of the differential diagnosis needs or should have a CTPA. This is for a number of reasons including resource availability and the risks of the test (significant ionising radiation and the potential for contrast reaction). Pulmonary embolus ought to be near the top of the list of differential diagnoses, rather than at the bottom of that list, for a CTPA to be pursued. For clarity, it is my understanding that the treating consultant did not at any point during her involvement consider that pulmonary embolus was the most likely diagnosis. Her view was that ongoing infection (or an infective complication such as lung abscess or empyema) was much more likely. This view was reinforced further after a positive response to initial treatment when reviewed (once aware that the CTPA had not been authorised).

- The circumstances in which to use scoring systems +/- D-dimer are somewhat nuanced. D-dimer only really has a role when the clinician considers that the diagnosis of pulmonary embolism is a significant possibility – somewhere between possible and probable.
- The Wells Score is primarily designed for patients presenting acutely to an Emergency Department with *de novo* symptoms. It is not particularly useful in hospitalised patients. Given the chronicity of Mr Dunstan's presentation (with two previous courses of antibiotics in the community), it could be argued that he had more in common with a hospitalised cohort (rather than patients presenting with *de novo* symptoms).
- D-dimer is considered to be an 'acute phase reactant'. That is to say that levels will often be elevated in association with infection or inflammation and D-dimer is not specific for venous thrombosis. The consultant was also aware of a raised ferritin (another acute phase reactant) which was being looked into by Mr Dunstan's GP.
- When a CTPA is requested at MKUH, decision support software (iRefer) is used to ensure that the clinician is not requesting an inappropriate or unnecessary test.
- When a CTPA is requested at MKUH, the pre-test probability (Wells Score) is considered and, where the probability is low, a D-dimer is sought. A low probability request accompanied by an elevated D-dimer allows the radiographer to authorise the investigation.
- In the absence of a positive D-dimer, the clinicians looking after the patient are at liberty to speak to the duty radiologist and the investigation may then proceed without the need for a positive D-dimer (or indeed with a known negative D-dimer).
- In this case, the actual Wells Score (as evident in statements provided to the inquest) was low at 1. This equates to a 1.3% chance of patient in the Emergency Department population subsequently being confirmed to have a PE. The request card stated a Wells score of 4 as the requesting resident doctor stated that PE was felt to be the most likely / equally likely diagnosis – it is likely that the granularity and nuance of the consultant's thought processes would not have been communicated in detail (and a Wells score of 1 versus 4 did not impact on how the request was managed in radiology).
- The consultant did not consider that there was clinical urgency for the requested CTPA to be carried out. Indeed, the scan was not solely or indeed primarily being requested to evaluate the vasculature. Other reasons for the request were to evaluate the lung fields themselves, on account of the long course of Mr Dunstan's symptoms (to rule out malignancy or another underlying condition, or to demonstrate a septic collection – abscess or empyema – in the context of the clinical picture of 'slow to resolve' infection) and the relatively poor quality of the plain chest X-ray (in part on account of body habitus). The possibility of an abscess or empyema was higher in the differential diagnosis that a pulmonary embolus: the pulmonary angiogram element (the times intravenous contrast) was essentially an add-on as a CT was being requested.

Evidently, the nuanced rationale around the imaging request is not fully apparent from the request form and its focus on Wells Scores and D-dimers.

- Importantly, the medical team (including the consultant) was aware that the radiographer had not been able to authorise the scan (due to a low Wells score and absence of a D-dimer) and knew that they could seek authorisation by discussing with the duty radiologist. The consultant did not do that as Mr Dunstan had objectively improved over the course of the day in response to initial treatment adding weight to the primary diagnosis of infection / dehydration being the cause of Mr Dunstan's presentation and symptoms. The chance of pulmonary embolus being the driving diagnosis was, at this point, felt to be even lower than at presentation. The rationale for the CT chest (including the angiographic component) was now even weaker – and the CT chest could potentially have been cancelled or deferred to the six-week point. At this time (in the afternoon), PE was not really a diagnosis which the team was actively wanting / needing to exclude. Furthermore, and in pragmatic terms, Mr Dunstan was being given prophylactic doses of low molecular weight heparin which were relatively high (on account of body weight) and close to treatment doses.

In light of this case, we have:

- Discussed the case at the Trust's Grand Round (29 January 2025) to gain alternative views and perspectives.
- Held discussions between departments at the hospital (medicine and radiology) to review and optimise the screening and triage systems for various groups of patients (outpatient, acute presentations, inpatients).
- Liaised with neighbouring Trusts to understand the approaches which they currently use in this scenario.

We consider that our current approach is consistent with other NHS organisations and broadly strikes the right balance between the advantage and risks of CT pulmonary angiography.

We do plan to undertake an audit to look at pick up rates (of pulmonary embolus) versus the Wells score and D-dimer. Clearly it is important to understand whether the request and scoring systems are being used appropriately. Specifically:

- Are the rates of positive PE diagnosis for patients undergoing CTPA at MKUH broadly in line with that which would be predicted by the recorded Wells scores?
- Is the patient group in whom the Wells score is being utilised appropriate (outpatients and *de novo* ED attendances)?
- Are requestors placing undue emphasis on aspects of the history, or being tempted to exaggerate, in the knowledge that the scoring system is in use.

We plan to trial a system for six months (and evaluate) whereby if a CTPA cannot be approved by the radiographer, it will be brought to the attention of the duty radiologist. If the radiologist is satisfied (from the request narrative) that a D-dimer is not required, he/she may authorise the study. If the radiologist is not satisfied, efforts will be made by the radiographer to contact the requester by bleep / telephone to inform them of this and to invite them to undertake a D-dimer or to discuss further investigation with the duty radiologist as appropriate (in addition to the current system of the primary communication being electronic).

I trust that this response is helpful.

Yours sincerely,

[redacted]

[redacted]

Chief Executive