West Midlands Ambulance Service
University NHS Foundation Trust

Ambulance Service Headquarters
Waterfront Business Park
Brierley Hill
West Midlands
DY5 1LX
Tel: 01384 215555
website: www.wmas.nhs.uk

Mrs J Lees
Area Coroner for Black Country
Jack Judge House
Halesowen Street
Oldbury
B69 2AJ

23 November 2023

Dear Mrs Lees

Re: Regulation 28 Report to Prevent Future Deaths – Lauren Page Smith (Deceased)

Thank you for your email dated 15 November 2023 attaching your Regulation 28 Report.

On behalf of West Midlands Ambulance Service (WMAS), I am sorry that you have had to raise concerns following the inquest of Ms Smith. May I please take this opportunity to pass on my sincere condolences to the family of Ms Smith. I am deeply saddened by this case.

Our Trust prides itself on the training and education provided to our staff and overall patient safety, therefore it is disappointing that our Serious Incident investigation did not reflect this. I hope that our responses to your concerns below together with the evidence you heard in court from [redacted] will provide you with assurance in our training and education and patient safety.

Concern 1
An ecg reading was taken at 08:56 am when both the paramedic and technician were in attendance on Miss Smith. That ecg was abnormal. The ecg identified pathological Q waves in V1, V2 and V3, an isolated ST elevation in V2 and a positive AVR deflection. Although the rhythm was sinus rhythm, 3 abnormal indicators were clearly present on the ecg. In addition, the auto diagnostic monitor clearly recorded the ecg as abnormal and reported an anterior infarct which was available for attending paramedics.

Response
It is accepted by the Trust that the ECG taken at 08:56am was abnormal. The Zoll monitor clearly reported this as anterior infarct and the patient should have been transferred to hospital in accordance with existing established policy.

Concern 2
Interpretation of a 12 lead ecg is fundamental part of the job of a paramedic and the ecg was not interpreted correctly by either the paramedic technician or the attending paramedic with over 8 years' experience.

Response
It is accepted by the Trust the interpretation of a 12 lead ECG including the auto diagnostic system employed by the Zoll is a fundamental part of the job of a paramedic, which is why we provide comprehensive education, training and regular refresher training and provide the very best diagnostic equipment such as the Zoll ECG monitor.

Concern 3
[redacted] gave evidence at inquest that she'd never heard of Q waves before and didn't see the ST elevation on the ecg. She'd never heard of the term pathological Q waves nor an AVR positive deflection.

Response
[redacted] attended paramedic training from 23 February 2015 at Staffordshire University, and the relevant sections from the programme are detailed below.

Institute for Health Care Development and Paramedic Science Diploma with Staffordshire University (IHCD Student Paramedic Training Programme)

		Appendices attached for IHCD and Diploma
		Cardiac monitoring – Appendix 1 Clinical Skills module – Appendix 2
WMAS Clinical Progress and Practical Record Module D4.3 page 36 D5.1 Pages 40 & 88 WMAS Clinical Progress and Practical Record Student Paramedic Course	Cardiac Monitoring	D4:3 CARDIAC MONITORING • Assist in positioning the patient on a firm surface ready for cardiac monitoring/defibrillation. • Correctly position the electrodes and leads as directed and an interpretable ECG is obtained. • Avoid inflicting any unnecessary injury/discomfort to the patient. • Maintain the dignity and wishes of the patient at all times. • Seek any clarification of instructions and pass on any wishes of the patient to the practitioner/rescuer immediately. Key learning points; The importance of following directions and notifying the practitioner / rescuer of any changes in the patient's condition. Principles of patient sensitivity. Equipment types, use and application. The importance of patient consent. W.M.A.S. Additional Requirements. Review of electrical conduction system of the heart. Interpretation of a Normal Sinus Rhythm E.C.G. Introduction of E.C.G. analysis plan. Recognition and interpretation of: • N.S.R. • V.F. • V.T pulse / pulseless. • Asystole. • Sinus Tachycardia / Bradycardia. • PVC'S • P.E.A. D5:1 CARDIAC MONITORING / DEFIBRILLATION

		Correctly position the electrodes and leads and ensure an interpretable ECG is obtained. Patient Assessment Scenario • Breathing – Rate / Rhythm / Volume • SP02 • Peak Flow • Pulse - Rate / Rhythm / Volume • Colour / Temperature / Texture of skin • Capillary refill • Blood pressure • ECG 6 or 12 lead • Temperature • Blood sugar reading • GCS • FAST

The Trust can confirm that it provides a full day of clinical updates annually in addition to other statutory and mandatory training. The dates that [redacted] undertook these clinical updates, which covered Q waves and ST elevation, are included below. Only the sections relevant to ACS (acute coronary syndrome) care and ECGs are included in this table.

Relevant mandatory refresher clinical training for the last four years

Training Year	**Date complete**	**Course Type**	**Summary of training**	**Timetable or guide learning Total (mins)**
2020-21	19.11.20	Clinical Update	Hyperventilation vs Pulmonary Embolism (Appendix 3)	90
2021-22	20.01.22	Clinical Update	ACS, 12 lead ECGs, Zoll Analysis (Appendix 4)	60
2022-23	01.09.22	Clinical Update	Patient Safety - ACS case study, 12 Lead ECG, Zoll analysis (Appendix 5)	60
2023-24	07.11.23	Clinical Update	ACS, STEMI inc progression of a STEMI and pathological Q waves (Appendix 6)	60
	Total			**270**

[redacted] was a clinical team mentor (CTM) for the Trust at the time of this incident, this role requires her to train other paramedics in specific clinical areas. As part of her role as a CTM she received the following CTM training.

CTM Mandatory Training

Training Year	Date complete	Course Type	Summary of training	Timetable or guide learning Total (mins)
2020-21	01.03.21	Clinical Update	Clinical Decision Making - ECGs (Appendix 7)	90
2021-22	30.03.22	Clinical Update	Bias, ACS case reviews (Appendix 8a and 8b)	60
2022-23	17.03.23	Clinical Update	Learning from adverse incidents - Zoll data in investigations (Appendix 9)	60
	Total			**210**

Furthermore, the JRCALC (Joint Royal Colleges Ambulance Liaison Committee) guidelines for Non - Traumatic Chest Pain/Discomfort (Appendix 10) provides guidance on ECG's and accompanying features. These can be accessed via a mobile phone, an individual Trust issued ipad or an Electronic Patient Record (EPR) device, all of which are provided by the Trust.

Concern 4

Technician [redacted] told me she had never heard of pathological Q waves and that she wouldn't know what they were. She told me she didn't recognise the ST elevation on the ecg.

Response

[redacted] undertook an ECG assessment on 4 August 2020 as part of her Technician training (Appendix 11) which tested her knowledge on ECG interpretation, she passed this assessment with a score of 92.5%. This assessment covered Q waves and ST elevation.

[redacted] has also undertaken the following ECG training on her technician training course;

Level 4 Associate Ambulance Practitioner Course from May to August 2020

Component No	Session Title	Summary of training (Appendix 12a – 12f)	Timetabled Time (mins)
15	Cardiovascular Examination	Principles of pain assessment, physiological measurements and common deviations.	240

	ECGs	ECG Fundamentals, electrical conduction system of the heart, PQRST waveform, ECG monitoring preparation, 4 Lead ECG, Paper and timings and 11 point guide. Sinus Rhythms, ACS, STEMI, NSTEMI & Supraventricular rhythms, conduction abnormalities, ventricular rhythms and non-shockable rhythms of cardiac arrest. 12 lead ECG Placement, 12 lead ECG - views of the heart, 10 rules of the ECG, Stable Angina, ST segment abnormalities, ST segment recognition, posterior MO, ST Depression, ST Elevation, ECG Interpretation, Primzmetal Angina and Ventricular Paced Rhythms.	240
19	Cardiovascular Conditions	Understand the pathophysiology and management of cardiovascular system disorders. Be able to assess and manage medical conditions, in accordance with agreed ways of working.	240
Total			**720**

The Trust can confirm that it provides a full day of clinical updates annually in addition to other statutory and mandatory training. The dates that [redacted] undertook these clinical updates, which covered Q waves and ST elevation, are included below. Only the sections relevant to ACS (acute coronary syndrome) care and ECGs are included in this table.

Relevant mandatory refresher clinical training

Training year	Date completed	Course Type	Summary of training	Timetable or guide learning Total (mins)
2021-22	28.09.21	Clinical Update	ACS, 12 lead ECGs, Zoll Analysis (Appendix 2)	60
2022-23	01.06.22	Clinical Update	Patient Safety - ACS case study, 12 Lead ECG, Zoll analysis (Appendix 3)	60
2023-24	09.09.23	Clinical Update	ACS, STEMI inc progression of a STEMI and pathological Q waves (Appendix 4)	60
	Total			**180**

JRCALC (Appendix 10) guidelines for Non- Traumatic Chest Pain/Discomfort would also be available to [redacted] via the EPR device, etc, all of which are provided by the Trust.

Concern 5
The ecg print out clearly indicated a cardiac event in progress at the time the ecg was taken. [redacted] died from an acute MI.

Response
The Trust accepts that a cardiac event was in progress.

Concern 6
I am concerned that neither the paramedic nor the technician was able to interpret the ecg correctly and that neither paramedic appears to have noted or acted upon the auto diagnostic monitor report.

Response
All our clinicians have received education and training on ECG intrerpretation some of which is as evidenced within concern 3 and concern 4.

As part of the Trusts ongoing education and training for staff we have undertaken a range of initiatives to improve the understanding of ECGs and the auto diagnostic function of ECGs.

The Trust have issued a number of articles to educate staff on the use of the auto diagnostic monitor.

Appendix 13 - Clinical Times issue 39 – issued on 10 April 2019
Appendix 14 - Clinical Times issue 45 – issued on 30 November 2022
Appendix 15 - Clinical Times issue 49 – issued on 11 September 2023

Prior to the inquest there were a number of clinical improvements undertaken in relation to cardiac arrest cases, these were;

January 2023

- The Trust delivered a session to CTM staff at Lichfield Hub on STEMI Care/Safety themes regarding the discharge on scene of ACS (Acute coronary syndrome)
- There was a CPD day at Erdington hub alongside the Research team to provide presentation on STEMI clinical times article on ACS and the new JRCALC update, including the ambulance quality indicators and time from 999 call to inflation of a balloon in a specialist coronary catheter

February 2023

- Engagement with Zoll medical to provide ECG recognition and ALS (Advanced Life Support) sessions to staff – 2 free sessions delivered
- Review of cases of all non-traumatic chest pain discharged at scene vs the clinical risk assessment tool

March 2023

- Development of monitoring of on scene time for crews at cases of STEMI as defined by the national ambulance quality indicators taken to the national audit group
- Article in Weekly Brief on gender disparity in cardiac care

April 2023

- Evening training session on ECGs and Resus skills delivered

May 2023

- Further sessions of education delivered in evening on ECG and resus skills alongside Zoll

June 2023

- Delivered in person CPD (Continuing professional development) event, which included ECG skills and recognition
- The Trust began contacting crew in cases of STEMI where AQI (Ambulance Quality Indicators) was not met to explore reasoning

August 2023

- ACS discharge on scene case study published in clinical times, including information on Zoll automatic interpretation data
- Article published in weekly brief linking to ACS educational Resources learning

September 2023

- 52 ECG cases reviewed by WMAS senior clinical leads group, publishing in our weekly briefings & clinical times began on these cases to share learning with clinical staff
- Microsoft teams channel set up for regular publication of ECG case studies and to allow for discussion

Concern 7
[REDACTED] was informed that her observations and ecg were normal. This information was not correct, and it is likely that [REDACTED] based her decision not to attend hospital on this incorrect information.

Response
It is accepted by the Trust that the information provided to [REDACTED] by the clinician in relation to the ECG was incorrect.

Concern 8
I was told in evidence that paramedic training includes identifying Q waves and ST elevations and any abnormal rhythms. I was told that a positive AVR deflection (which was a view) was not 'normal' and should have been identified as abnormal. I was told that the diagnostic monitor display reported what was seen on the ecg.

Response
Q wave changes and AVR deflection does feature in our training but is not a significant feature, as this is high level ECG competency. The ECG auto diagnostic did identify an abnormal ECG and this should have been acted upon.

Concern 9
I heard in evidence that ecg interpretation forms part of a paramedics initial training and mandatory annual training, but I am concerned that there was no evidence at inquest of any qualitative assessment of the ecg aspect of their training. I was informed that

Technician was undertaking a Paramedic BSc at Wolverhampton University. The training provider and/or regulator must ensure that training is effective. I am concerned the absence of such assessment presents a risk to patient safety at this time.

Response
In addition to the training evidenced in response to concern 3 & 4, the Trust can confirm that all internally delivered initial paramedic training includes qualitative ECG assessments. undertook an ECG assessment on 4 August 2020 as part of her Technician training (Appendix 11) which tested her knowledge on ECG interpretation, she passed this assessment with a score of 92.5%. This test covered Q waves and ST elevation.

The Trust regularly meets with each of its partner universities at its contract meetings. The course provision is reviewed regularly to ensure it meets the requirements for both WMAS and the HCPC. has not yet completed the full University BSc training at the University of Wolverhampton.

Concern 10
I heard in evidence that neither paramedic nor technician had received any further training from WMAS following the death of and the internal SI investigation which specifically identified the incorrect interpretation of the ecg. I am concerned this presents a risk to patient safety at this time

Response
The Trust accepts that this should have been rectified following the Serious Incident investigation. The Trust can provide assurances that although there was no further specific formal training documented as part of the Serious Incident investigation both clinicians attended a root cause analysis meeting on the 7 March 2023 which forms part of the Serious Incident and learning process.

The clinicians also completed clinical supervision shifts. completed this shift on 26 July 2023 (Appendix 16) and completed her shift on 11 July 2023 (Appendix 17). also completed a CTM update day on 17 March 2023 due to her role as a CTM.

Both the clinicians are booked to attend training school for remedial training on the 1 December 2023. In addition to this will be meeting with the Trust's Consultant Paramedic who is the Head of Clinical Care, to review and reflect on the ECG abnormalities as part of an additional self reflection request.

Since the incident has also requested to attend a level 6 university course to further her knowledge on ECG's. has been approved and supported by WMAS to attend a level 6 ECG in practice course, commencing in January 2024.

Concern 11
I am concerned that whilst may've undertaken their own additional learning/self-reflection NO qualitative assessment of this learning has been undertaken and no action has been taken by their employer WMAS and no restrictions or sanctions placed on their practice nor further individual training provided by WMAS and they continue in their respective roles. I am concerned this presents a clear existing risk to patients which remained unaddressed at the time of inquest.

Response
Following the clinicians attending to , they were both asked to provide documented reflective practice. The Trust can confirm these have been completed by both clinicians.

Technicians and student paramedics always work with a fully qualified registered paramedic.

Both clinicians will be attending training school on 1 December 2023 for remedial training.

Concern 12
I was told in evidence that neither paramedic nor technician had been referred to the HCPC. I have reported my concern about the fitness to practice of both [redacted] [redacted] to the HCPC however there appears to be a lacuna in respect of [redacted]. [redacted] is a technician and not a fully qualified paramedic and as such is not yet registered with the HCPC. Therefore, the HCPC can take no action at the present time. I am informed the report I have made will be considered at such time as [redacted] applies for full registration. I am concerned this presents a risk to patient safety at this time.

Response
The Trust follows the guidance provided by the HCPC in relation to circumstances in which a referral by an employer should be made. This guidance can be found on the HCPC website (https://www.hcpc-uk.org/employers/managing-concerns/refer-an-employee-to-us/). Reference the section 'When to refer', the Trust did not believe that a referral was required following the serious incident investigation. Accepting that a referral has now been made, the Trust will review its practices to ensure appropriate referrals are made.

Concern 13
I am informed that as [redacted] is a Student Paramedic (qualified/trained to technician level), WMAS as her employer are responsible for her professional competency. I am concerned that the lacuna I have identified in relation to her technician status has not been addressed and that despite WMAS applying the same HCPC standards to trainees as fully qualified paramedics, that WMAS have taken no action in relation to [redacted] fitness to practice and provided no further training. I am concerned this presents a risk to patient safety at this time.

Response
WMAS are responsible for the professional competency of our Student Paramedics. All technicians and student paramedics always work with a fully qualified registered paramedic. WMAS is the only ambulance service in the country to have a fully qualified registered paramedic on every emergency ambulance. A paramedic working with a student paramedic is responsible for scene management and clinical decision making. [redacted] will be attending training school on the 1 December 2023. [redacted] will also be attending training school on the same date.

Concern 14
I am concerned that there has been no collective learning by West Midlands Ambulance Service following the death of Lauren Smith. There has been no action to address the learning gaps identified by WMAS own internal investigation report in respect of both the paramedic and technician. Therefore, I have addressed this aspect of my PFD to the CQC/Chief Inspector of Hospitals/HSIB as part of their regulation as to the safety of the West Midlands Ambulance Service considering the risk I have identified in relation to patient safety due to inaction by WMAS.

Response
The Trust takes patient safety and the education and training of our staff very seriously.

The Trust has undertaken a significant programme of work, which is ongoing, in relation to clinical improvement in the management of chest pain, ECG recognition and cardiac arrest management, evidence of can be found within concern 6.

Once the Trust became aware of this incident, the clinicians involved received a case review with a CTM on 3 February 2023 to discuss learning points and reflect on the incident. The clinicians were also part of the Serious incident process and attended a root cause analysis meeting on 7 March 2023 where the case was discussed in detail. Following the Serious Incident investigation both staff members were also asked to undertake reflective practice, which has been completed. Additional training specific to ECGs and ACS is scheduled to be completed on 1 December 2023. Both clinicians also received a clinical supervision shift. [redacted] completed this shift on 26 July 2023 (Appendix 16) and [redacted] completed her shift on 11 July 2023 (Appendix 17). [redacted] also completed a CTM update day on 17 March 2023 due to her mentor role.

I hope this response provides you with the appropriate level of assurance that as a Trust we have dealt with the concerns highlighted within your report and the extent to which we take patient safety very seriously.

May I once again please pass on my sincere condolences to the family of Ms Smith. I am sorry we let Lauren down, and we let her family down.

If you require any further assistance, please do not hesitate contact me.

Yours sincerely,

Chief Executive Officer