

BACKGROUND AND OBJECTIVE

Chest radiography (CXR) is the most frequently performed imaging examination, yet it remains one of the most challenging to interpret. Radiology trainees must develop proficiency in interpreting CXRs, and validated assessment tools are essential for measuring performance-based learning outcomes.

At the National Imaging Academy Wales (NIAW), a web-based CXR reporting testing system was integrated into the training program (Figure 1). This system features a selection of the most difficult cases, primarily focused on review areas and complex or ambiguous imaging patterns (Figure 2).

To determine the effectiveness of this system, trainee performance was evaluated using the outcomes of a CXR examination administered at the conclusion of a 13-week cardiothoracic imaging rotation.

Figure 1: Timeline of CXR reporting and training across core and subspecialty stages in the South Wales Radiology Training Scheme



SUMMARY OF WORK

48 ST2 radiology trainees participated in a 13-week cardiothoracic imaging training program at the National Imaging Academy Wales (NIAW) between 2022 and 2025. All trainees completed a final competency test consisting of 30 CXR cases at the end of the program.

Trainees were divided into two groups:

- Control Group (n = 16): Completed the final CXR test without additional intervention.
- Intervention Group (n = 32): Completed an additional mock web-based CXR test during the 13-week training program (using www.cmrad.com and Google Forms platform). This test included 89 CXR cases (18 normal and 71 abnormal). All reports were analysed, with detailed feedback provided by a consultant cardiothoracic radiologist (16 years of experience). Trainees received individualised feedback and were encouraged to review and reflect on errors, particularly false positives/negatives and misinterpreted or incomplete true positives.

Performance on the final CXR test was compared between the control and intervention groups to evaluate the impact of the web-based mock test and feedback process on diagnostic accuracy.

RESULTS

The average score on the final CXR test was:

- Control group (n = 16): 73.8%
 - Intervention group (n = 32): 77.4%
- Trainees exposed to the web-based CXR reporting system demonstrated improved performance (Figure 3). The average initial score on the web-based mock test was 63.7%, indicating a measurable learning curve over the course of the training program.

DISCUSSION AND CONCLUSION

CXR while the most frequently performed imaging examination, remains prone to interpretation errors—often due to subtle or commonly missed findings.

Incorporating a range of formative assessments within radiology training programs provides valuable insight into trainee progression and diagnostic practice.

The implementation of a web-based library of challenging CXR cases offers a targeted educational tool for radiology registrars. This approach not only enhances diagnostic accuracy but also encourages the development of systematic strategies to reduce interpretive errors and improve clinical confidence.

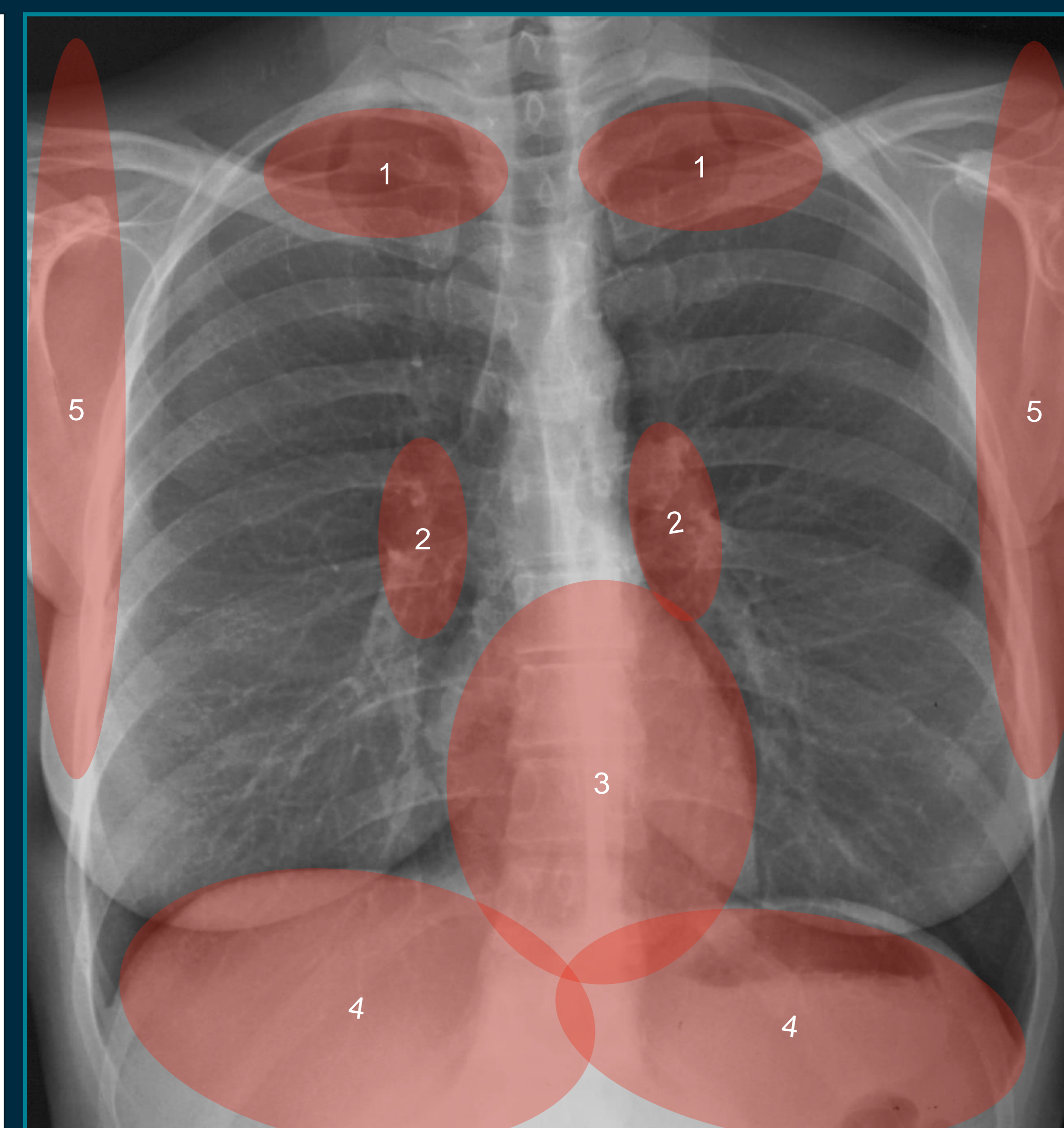


Figure 2: Review areas on a chest radiograph are common areas for missed findings

- 1 - lung apices:
Pancoast tumour, pneumothorax
- 2 - hilar shadows:
lymphadenopathy or lung lesion
- 3 - heart shadow:
consolidation, collapse, lung or mediastinal masses
- 4 - diaphragms:
lung base lesion, free gas, lines and tubes (e.g. nasogastric tube), gastric distension, bowel obstruction
- 5 - bones and soft tissues:
fractures, masses, mastectomy, subcutaneous emphysema, evidence of previous surgery

TAKE HOME MESSAGE

Web-based CXR testing combined with individualised feedback enhances diagnostic accuracy and supports meaningful learning progression in radiology trainees.

Figure 3: CXR test results

