# REAL-WORLD PERFORMANCE OF AI ENABLED VERTEBRAL FRACTURE (VF) ALGORITHM FOR FRACTURE LIAISON STUDIES: THE ADOPT STUDY

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## Background

- Fewer than 30% of vertebral fragility fractures (VFs) are reported on routine clinical CT scans by radiologists.
- As VF patients are often at very high risk of future fractures, an automatic VF identification tool would lead to a major improvement in FLS performance and clinical impact.
- HealthVCF is an automated VF detection tool that highlights fractures from CT with the aim of aiding radiologists to report fractures.

## Objective

- To validate Nanox-AI HealthVCF's ability to detect vertebral fractures from routine CT scans.

## Methods

- 500 consecutive CT scans were retrieved by 4 sites from 2017 that included imaging of the spine.
- All patients were assessed for VFs from sagittal imaging by a clinician with local radiologist adjudication.
- For each scan, the clinician recorded if a VF was present, were VF(s) mentioned in the clinical report, and did the clinical report use the term 'vertebral fracture'.
- These findings were compared with the outputs from the Nanox-AI model at the 'high specificity' (1 site) and 'balanced' (3 sites) settings.

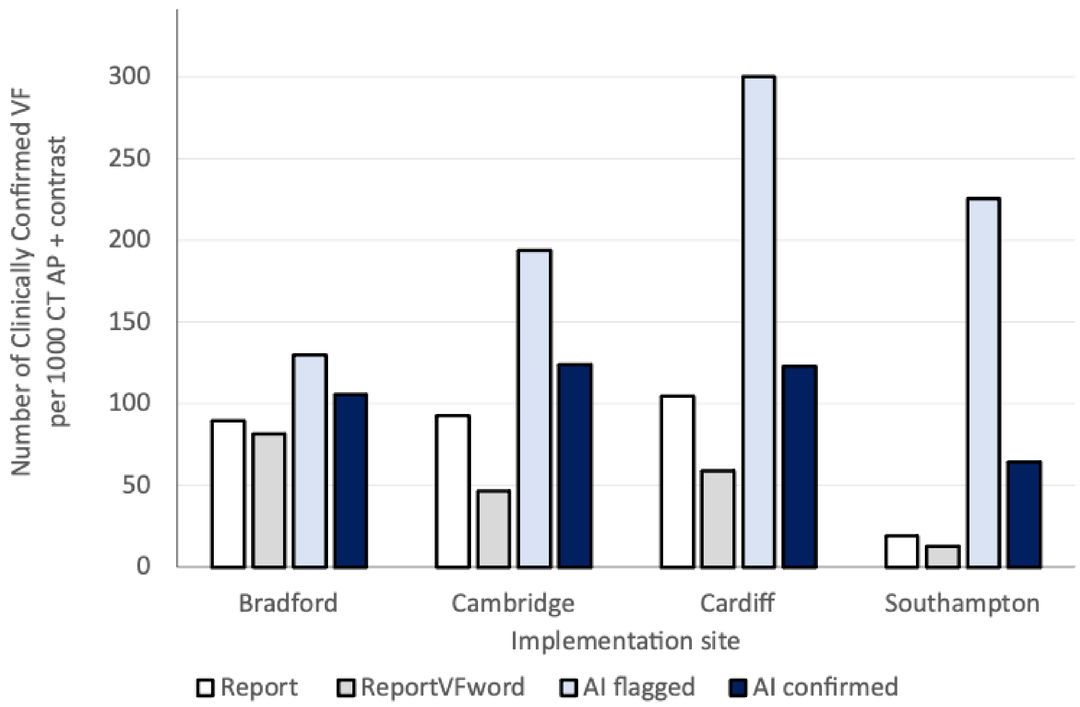
## Results

- CT scans from 2000 patients (49.7% women) were audited from 4 sites. A total of 255 (12.8%) VF patients were identified by the local clinical reader.
- Radiology reports had a sensitivity of 51% and specificity of 100% compared with sensitivity of 79% and specificity of 81.2% in 'balanced' sites and sensitivity of 48.3% and specificity of 98.5% in the 'high specificity' site (see figure 1).
- When comparing scan types, the prevalence of VFs varied from 9.7% for CT Pulmonary Angiogram to 42.7% for CT Abdomen and Pelvis.
- The sensitivity of radiology reports and the Nanox-AI model did not vary significantly between scan types. Between hospitals, the prevalence of vertebral fractures varied from 5% to 17%.

Figure 1: Results from 'balanced' setting sites.

| Disease | Test | | Sensitivity: 79.0% |
|---|---|---|---|
| | Y | N | Specificity: 81.2% |
| Y | 132 | 35 | PPV: 34.6% |
| N | 249 | 1076 | NPV: 96.8 % |

Figure 2: HealthVCF reporting of VFs from CT Abdomen and Pelvis scans.




## Discussion/Conclusion

- In the real-world setting, opportunistic VF reporting in CT using the Nanox-AI model identified an additional 22.5 patients per 1000 patient scans analysed with important differences by AI setting, scan type and hospital.
- However, radiologist reporting of vertebral fractures remains the gold standard of care due the high false-positive reporting by HealthVCF.
- A combined HealthVCF with Radiologist over-read to FLS could improve patient care, although further research is required.