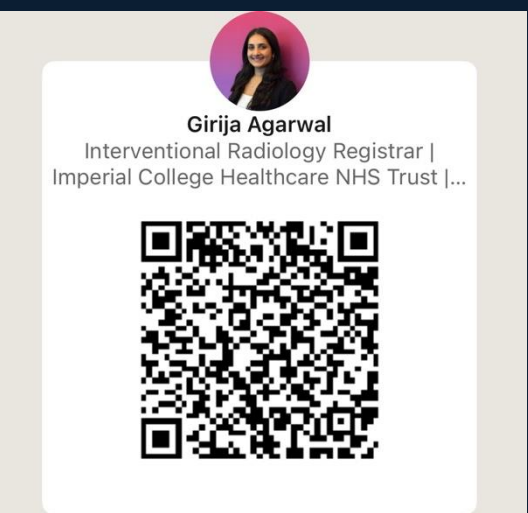




LinkedIn QR

Real-world clinical impact of AI-assisted fracture detection for musculoskeletal radiographs

G Agarwal, K Punjabi, G Lee, R Raghavendran, D O'Regan, A Rockall, R Bhattacharya, E Dick

Imperial College Healthcare NHS Trust, Imperial College London

LIVE CLINICAL DEPLOYMENT

ADULT APPENDICULAR MSK X-RAYS

Key message

Fracture AI was valued by UCC and ED clinicians, especially out-of-hours, and did not increase VFC referrals or on-call interruptions. Imaging staff feedback was more mixed, highlighting the need for training and ongoing post-deployment surveillance.

Purpose & methods

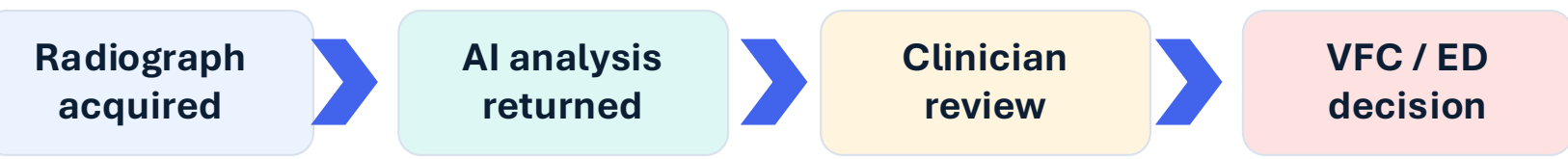
Purpose

To evaluate the real-world clinical impact of an AI fracture detection tool after deployment across emergency and radiology services (3 month pilot)

Mixed-methods evaluation

- Retrospective diagnostic audit of adult appendicular MSK radiographs.
- Virtual Fracture Clinic referral outcomes compared before and after live deployment.
- Short surveys of ED clinicians, imaging staff and radiology registrars on utility, training and on-call interruptions.

Live deployment pathway



AI output used as decision support; original images reviewed before final diagnosis.

Retrospective diagnostic audit



Discrepancy breakdown



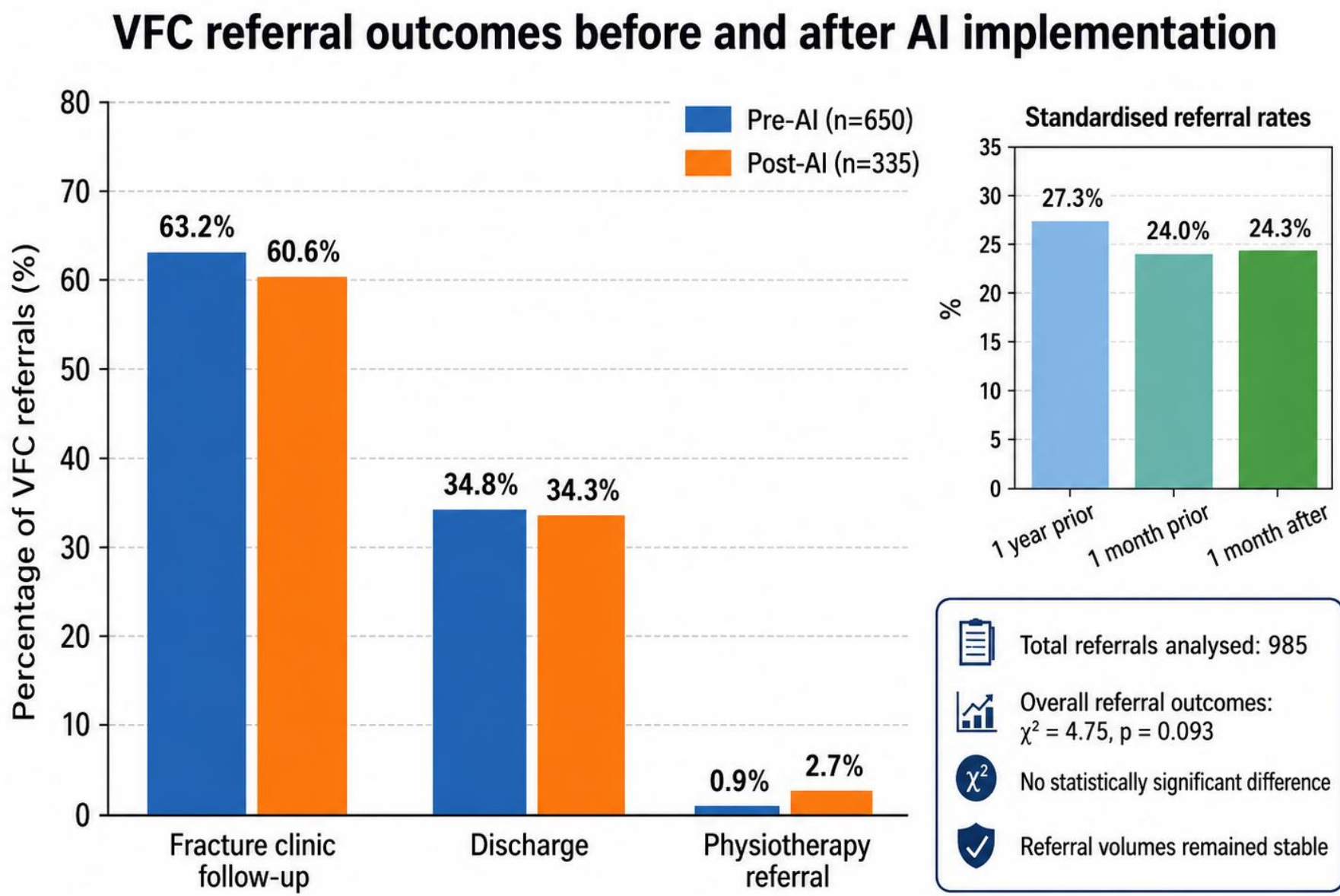
All false negatives were minor or equivocal fractures: four ankles and one wrist.

The audit excluded paediatric radiographs and cases with metalwork

The tool was noted to have false positives in the presence of metalwork and these were excluded from the analysis as this wasn't the intended use case for the tool

Service impact: VFC referrals

- 985 Virtual Fracture Clinic referrals reviewed across pre- and post-AI deployment periods (one year prior, 1 month prior and 1 month post)
- Data included referral numbers and outcomes (fracture clinic follow-up, discharge, physiotherapy referral).
- Pre-AI periods were combined and compared to the post-AI cohort using chi-square analysis.
- Referral rates were standardised against MSK radiograph volumes from corresponding two-week intervals.



VFC referrals were reviewed across three one-month periods: one year prior to AI introduction, one month prior, and one month after introduction of AI fracture identification tools.

Results:

- A total of 985 referrals were analysed (Pre-AI: 650; Post-AI: 335). Referral volumes remained stable.
- Fracture clinic follow-up decreased slightly post-AI (63.2% vs 60.6%), with similar discharge rates (34.8% vs 34.3%). Physiotherapy referrals increased modestly (0.9% vs 2.7%).
- There was no statistically significant difference in overall referral outcomes ($\chi^2 = 4.75$, $p = 0.093$).
- MSK radiograph volumes were comparable. Standardised referral rates were similar pre- and post-AI (27.3% and 24.0% vs 24.3%).

Example AI output



AI report examples demonstrate fracture detection overlays and summary outputs returned to clinicians as decision support

We did not use the AI for worklist prioritisation during this pilot

Conclusions

- Urgent care clinicians found the tool very useful, particularly out of hours
- Imaging staff feedback was more mixed

- VFC outcomes remained stable, suggesting AI did not drive inappropriate increases in fracture clinic follow-up.
- On-call radiology interruptions were not increased

- Post-deployment surveillance remains important for false positives, minor/equivocal false negatives

Limitations & next steps

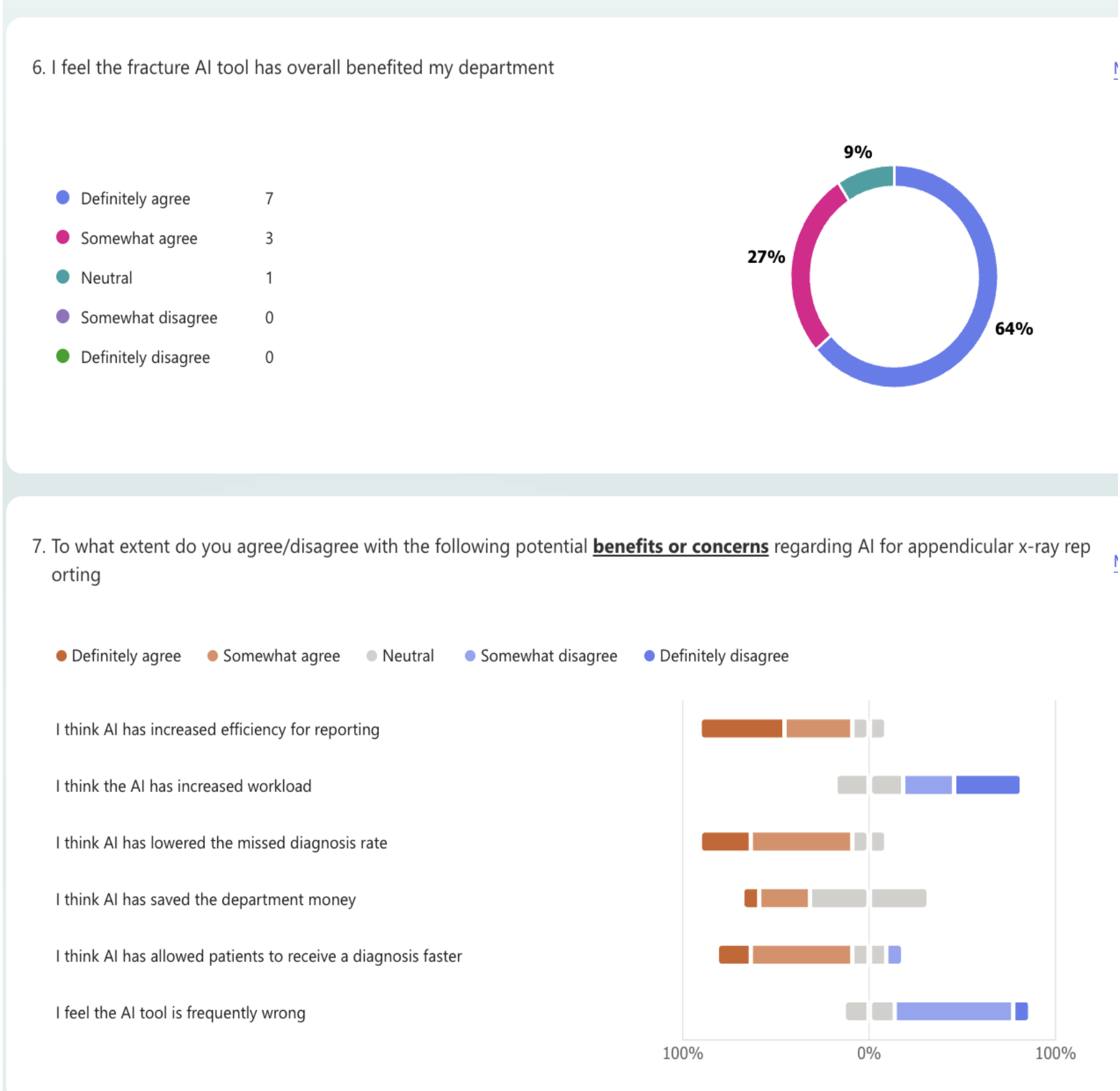
- Single-centre experience with small sample size
- Low survey response rates from ED and imaging department

Future work :

- Automated post deployment surveillance
- Business case development and cost-benefit analyses
- Larger prospective evaluation

ED Clinician Survey

N=11 Respondents (consultant, trainees, ACPs)



Imaging Department Survey

N=10 Respondents (consultant, SpR, Reporting and non-reporting radiographers)



Urgent Care Survey

N=15 UCC emergency practitioner respondents

How useful is the tool in hours and out of hours?



Comments:

- EPs found it very useful and supportive of their practice
- Speed of AI interpretation out of hours was useful

Radiology Registrar Survey

N=7 Radiology SpR respondents

5. Overall, how has the fracture AI tool affected interruptions during on-call shifts?

