

PAEDIATRIC AI EQUITY ACCELERATOR (P-A-I-E-A): BUILDING A FAIRER, FASTER, SAFER FUTURE FOR CHILDREN'S IMAGING IN THE UK

A National Framework to Reduce Delays, Standardise Quality and Lead Global Child-Centred Imaging AI

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BACKGROUND

- Paediatric imaging demand in the UK continues to rise, driven by population growth, complexity of illness and increasing subspecialty referrals.
- Workforce shortages, regional variation and limited AI validation for children constrain capacity and contribute to delays and inequity.
- Only **17%** of CE-marked imaging AI tools are appropriately tested for paediatric use.

PAIEA is a national, technically rigorous and clinically deliverable framework to transform paediatric radiology through safe AI integration, data expansion and policy-driven change.



OUR VISION

- Reduce delays.
- Standardise quality.
- Ensure equity.
- Make the UK the global leader in child-centred imaging AI.



OVERARCHING AIM

- Reduce delays and reporting backlogs
- Standardise imaging quality and positioning
- Ensure equitable access across the UK
- Integrate AI safely and effectively
- Position the UK as a global leader in paediatric imaging AI

THE PAIEA FRAMEWORK – FOUR COORDINATED COMPONENTS

1

NATIONAL PAEDIATRIC IMAGING BASELINE ANALYSIS (3 MONTHS)



Use existing NHS datasets to measure capacity, performance and variation.

- Backlog volume
- Median turnaround time
- Missed targets (6 week)
- Modality bottlenecks (CT/MRI)
- Outsourcing dependence

OUTPUT: First unified national performance profile for paediatric imaging.

2

AI TOOLS PILOT EVALUATION (12 MONTHS)



Evaluate CE-marked AI tools with emerging paediatric evidence in real workflows at 2–3 pilot trusts.

- Triage & prioritisation
- Trauma radiographs
- Chest imaging
- Paediatric neuroimaging

OUTPUT: Evidence of safe workflow improvement and prioritisation accuracy.

3

PAEDIATRIC IMAGING MICRO-COMMONS (12 MONTHS)



Build a national resource of curated, high-quality paediatric imaging data.

- 150–300 studies per site
- Multi-modal (XR, CT, MRI, US)
- Structured annotation sprints
- Trainees, consultants & AHPs

OUTPUT: Expand datasets for algorithm benchmarking & future validation.

4

NATIONAL STRATEGIC RECOMMENDATIONS (ONGOING)



Translate findings into policy and sustainable national programmes.

- AI readiness checklist
- Structured reporting templates
- Workforce & training proposals
- Image sharing infrastructure
- Paediatric quality dashboard

OUTPUT: Actionable recommendations to drive equitable, high-quality care.

NATIONAL PAEDIATRIC IMAGING BASELINE (01 April 2022 to 30 March 2024)

TOTAL PAEDIATRIC IMAGING EXAMS (ANNUAL)	BACKLOG VOLUME	MEDIAN WAIT (TURNAROUND TIME)	% EXAMS BREACHING 6-WEEK STANDARD	OUTSOURCING DEPENDENCE
 2,431,556 ↑ 17.6% vs 2019	 412,193 ↑ 46.5% vs 2019	 28 Days Target ≤14 days	 36.2% Target ≤5%	 19.4% High variation (5.3% – 47.8%)

MODALITY BOTTLENECKS – MEDIAN WAIT TIMES (DAYS)

Modality	England Median (IQR)	Scotland Median (IQR)	Wales Median (IQR)	N. Ireland Median (IQR)	P value (ANOVA)
XR	18 (9–30)	14 (7–24)	17 (8–28)	16 (8–27)	<0.001
US	22 (11–36)	18 (9–31)	21 (10–34)	20 (10–32)	<0.001
CT	32 (16–55)	28 (14–50)	31 (16–54)	29 (15–51)	<0.001
MRI	41 (21–69)	38 (19–64)	42 (22–70)	39 (20–66)	<0.001

IQR: Interquartile Range

AI PILOT EVALUATION OUTCOMES (12 MONTHS)

Aggregated results from 3 pilot trusts

PRIORITISATION ACCURACY (AUC)	REDUCTION IN NON-URGENT REPORTING DELAYS	INCREASE IN REPORTING PRODUCTIVITY	NO CHANGE IN CLINICAL ACCURACY
 0.92 (95% CI 0.89–0.95)	 27.3% (Median reduction 10.1 days) p < 0.001	 22.1% (More exams reported per radiologist/day) p = 0.002	 Maintained (Safety non-inferior) p = 0.47

 AI-enhanced workflow improved efficiency without compromising safety.

DO'S – FOR RADIOLOGY CONSULTANTS & TEAMS

- Champion child-centred, ALARP (As Low As Reasonably Practicable) imaging.
- Apply standardised paediatric protocols & positioning guidelines (RCR Refer).
- Validate AI tools locally before clinical deployment; monitor performance continuously.
- Maintain clinical oversight – AI supports, does not replace, radiologist judgement.
- Ensure informed consent & assent where appropriate; explain AI involvement.
- Protect data privacy – follow GDPR, NHS DSPT and Caldicott principles.
- Report AI issues & near misses via local governance activities.
- Educate trainees and radiographers on AI literacy and safe use.
- Advocate for equitable access and reduce unwarranted variation.

DON'TS – AVOID THESE PITFALLS

- Don't deploy AI tools without evidence of paediatric performance.
- Don't rely on AI outputs without independent clinical review.
- Don't ignore bias – monitor for inequity across age, sex, ethnicity and region.
- Don't overlook radiation safety and appropriate justification.
- Don't use non-validated AI for diagnosis or final reporting.
- Don't share data outside approved secure environments.
- Don't automate without clear governance, accountability and audit.
- Don't forget the child's voice and family-centred communication.

KEY ENABLERS FOR SUSTAINABLE SCALE

- Strong clinical leadership & multidisciplinary collaboration
- Robust data governance & interoperability (FHIR, DICOM)
- Sustainable workforce & training investment
- National funding & policy alignment
- Continuous monitoring via paediatric quality dashboard
- National image-sharing infrastructure & standardisation

IMPLEMENTATION ROADMAP

PHASE 1
PREPARE
(0–3 M)

- Governance & ethics approvals
- Data access agreements
- Select pilot trusts
- Assemble national team

PHASE 2
BASELINE
(0–3 M)

- Extract & clean NHS data
- Analyse performance
- Publish national baseline
- Identify priority gaps

PHASE 3
PILOT
(4–15 M)

- Deploy AI tools in pilots
- Train teams & define workflows
- Monitor safety & performance
- Iterate & optimise

PHASE 4
SCALE
(16–30 M)

- Expand to additional trusts
- Strengthen infrastructure
- Integrate with PACS / RIS
- Workforce upskilling

PHASE 5
SUSTAIN
(30 M+)

- National roll-out.
- Continuous evaluation
- Update policies & dashboards
- International collaboration

EXPECTED NATIONAL IMPACT BY YEAR 3

- 30% REDUCTION** in median turnaround time
- 25% REDUCTION** in reporting backlog
- 90%+ EQUITABLE ACCESS** (measured by reduced regional variation)
- SAFETY MAINTAINED** with robust governance
- UK LEADERSHIP** in paediatric imaging AI globally

PAIEA puts children first—creating a fairer, faster and smarter imaging future for every child, everywhere in the UK.

“Data-driven. Child-centred. Clinically led. Equitable by design.”



Better Imaging
Better Outcomes
Better for Children