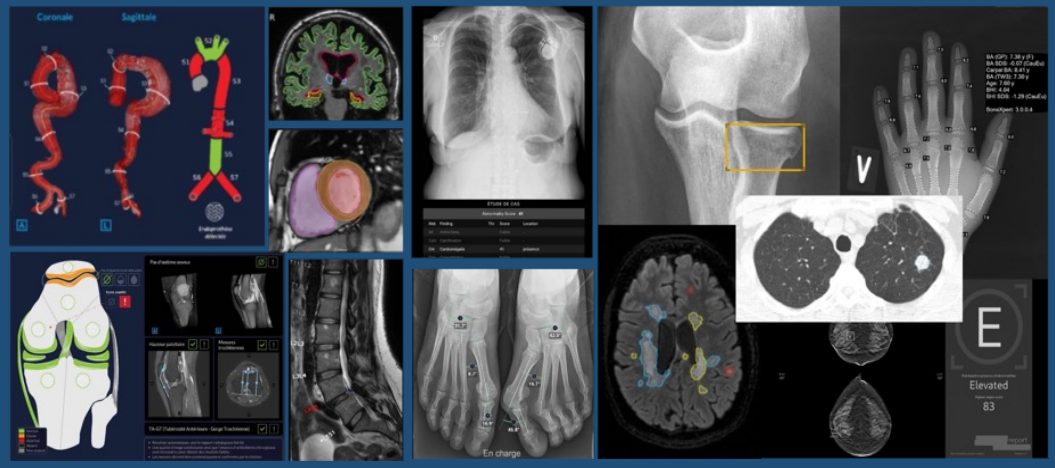
3R GROUP SWITZERLAND

EHR Interoperability in Practice:

Lessons from Radiology

Panel Session 1 · Achievements · Challenges · Perspectives



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01 ACHIEVEMENTS

The Technical Scaffolding Exists – and the Ecosystem Is Maturing

Clinical exchange standards

FHIR R4 · HL7 v2/v3 · SNOMED CT · LOINC
FHIR ServiceRequest as the referral carrier
EHDS · MDR 2017/745 · EU AI Act 2024

IHE imaging AI profiles

AIW-I Workflow orchestration
AIR Result encoding
AIRAI Post-market assessment
DICOM SR TID 1500 · IHE SWF.b / IRA / IMR

Ecosystem – a new level of open/readiness

SNOMED on FHIR + Claude/GPT connectors
AWS HealthScribe · GCP Healthcare FHIR API
Orthanc → PACS-independent DICOM server
Mistral → on-premise clinical LLM

European Society of Medical Imaging Informatics

Full IHE member
Shapes imaging AI profiles at EU level
Direct input into EHDS implementation guidance

The gap is not missing standards – it is missing enforcement and absent requirement for adoption

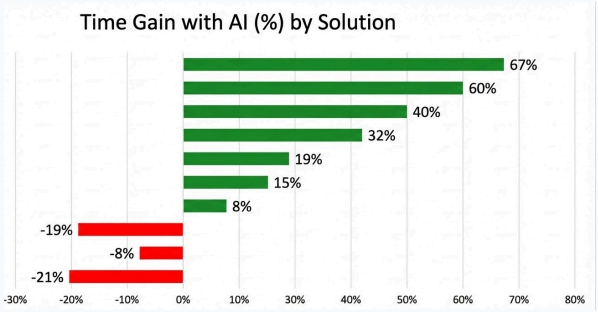
01 ACHIEVEMENTS

3R Network – 5 Years of Real Production Data

22	>10	~100k	5 yrs
Imaging centres (CH)	AI algorithms in production	AI-analysed exams / year	AI programme in production

+2.5% radiology capacity = +1 radiologist FTE / year
| measured from 1 routine AI-workflow across 20 centres

Largest outpatient radiology network in Switzerland ·
Not a pilot – continuous longitudinal production



2.5% of total FTE gain with existing algorithms – the bottleneck is not algorithm quality, it is infrastructure

02 CHALLENGES

Integration Failures – Measured Across 96,874 Rad Exams

Protocol naming

Hundreds of free-text DICOM variants per vendor.
Manual remapping required at every new site, every scanner update.
No European vocabulary – 3R built its own.

Timing: AI results arrive too late

7.2% results post sign-off overall

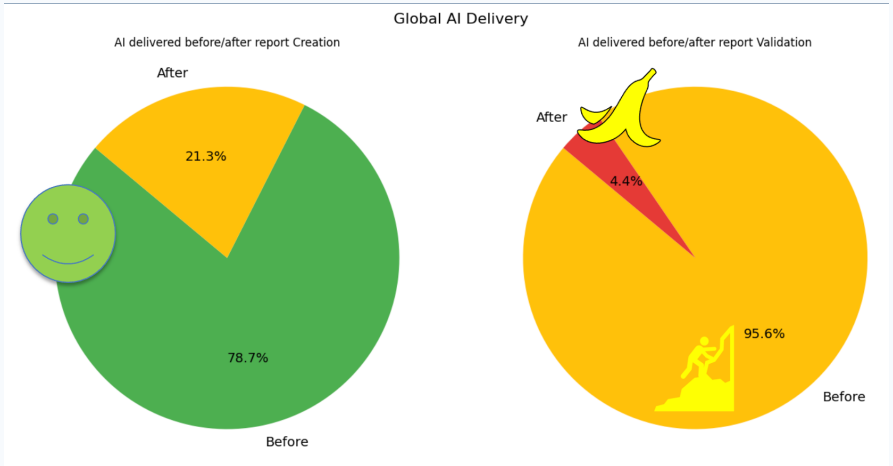
69% of latency = routing, not the algorithm

No standard for context-aware delivery (urgent vs. routine)

Output format fragmentation

No common schema for AI results:
– HL7 v2 ORU
– FHIR DiagnosticReport
– DICOM SR TID 1500
– Proprietary JSON

Each new vendor = bespoke RIS/PACS integration at HC provider's cost.



Integration costs fall entirely on hospitals – vendors have no incentive to standardise unless required by regulation

02 CHALLENGES

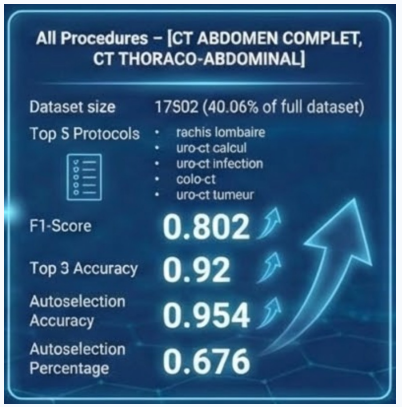
3R R&D: CT Protocol Harmonisation at Scale

Problem: Each CT vendor (eg, GE, Siemens, Philips, Canon, UI) encodes protocol names as free-text DICOM strings – hundreds of variants for the same clinical procedure.

80% micro-F1
ML protocol classifier

R&D IP Project with GE HealthCare

Systematic catalogue of all French-language CT protocol name variations across all major vendors – several hundred distinct DICOM strings mapped to clinical equivalents. This harmonisation vocabulary now powers AI routing at 3R.



Without such a taxonomy, multi-site AI routing requires manual reconfiguration at every new site, scanner replacement, and software update.

Protocol naming chaos is a Europe-wide problem – no DICOM controlled vocabulary exists. This must be fixed at standards level.

02 CHALLENGES

The Largest Unaddressed Gap: AI Ignores Clinical Context

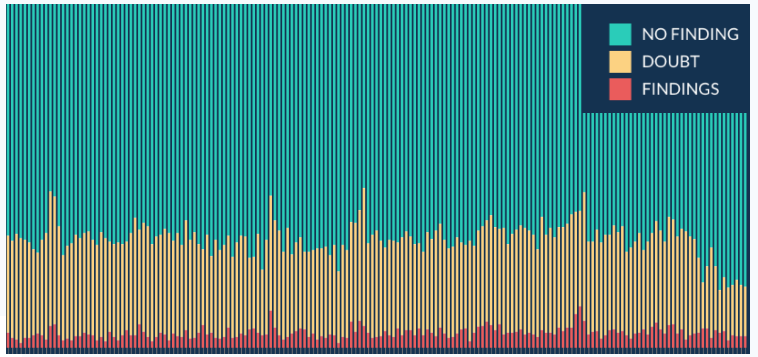
26.7%

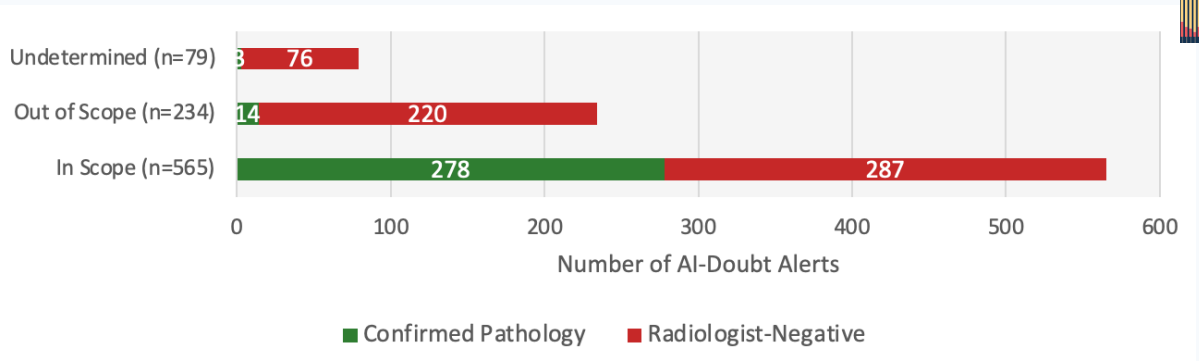
of fracture AI alerts at 3R are out-of-scope (non-trauma referrals)

How current AI works:

Reads the image → emits result → clinical context not queried.

This is a design choice, not a data problem. Indication data exists in the RIS – often in handwritten format, and vendors don't use it.





EU could require AI vendors to demonstrate indication-aware performance – not just image-level metrics – in MDR post-market surveillance

02 CHALLENGES

EU AI Act & Regulatory Gaps – Compliance Is Currently Impossible

EU AI Act (2024) – what high-risk AI requires

Art. 9 – Risk management system
Art. 13 – Transparency + logging
Art. 15 – Post-market monitoring
Art. 17 – Quality management

All require data lineage, model cards, audit trail.

What we actually need

– Standardised performance monitoring API
– LLM audit trail
– DICOM model provenance metadata
– Calibration drift alerts

Compliance gap is in the surrounding system, not in the algorithm itself.

MDR 2017/745 – current gap

CE marking certifies algorithm performance.
Does NOT validate IHE profile conformance.
Does NOT validate FHIR API availability at deployment.
No AI quality metrics, so fees are for AI volumes only!

LLM safety: unresolved

Hallucination risk without DICOM SR grounding.
Prompt injection via external data (e-referrals).
No PACS audit trail for LLM-generated report text.
→ Art. 13 requirements unmet by any current PACS/RIS.

The compliance gap is not in the AI algorithm – it is in the hospital IT infrastructure around it

03 PERSPECTIVES

Europe Has Algorithms. The Bottleneck Is Infrastructure.

Current EU grant programmes fund algorithms. The integration layer that connects them to care is unfunded.

Data normalisation

Protocol mapping · **terminology harmonisation** · **DICOM tag standardisation**

Pseudonymisation

GDPR-compliant token management across **sites and vendors**

Orchestration

Multi-vendor AI routing · **Dashboards** & **AI Audit Logging** (EU AI Act Art. 12)

Context-aware delivery

Urgency-based AI result routing – **urgent** / pre-dictation / async

*Open stack: Orthanc · FHIR APIs · Mistral · SNOMED on FHIR – **EU AI Act Art. 9 & 12** mandates orchestration, dashboards & audit logs for high-risk AI deployment.*

Fund the glue – not only the models

As a Swiss train AI should be safe, on time, precise, and convenient

03 PERSPECTIVES

5 Policy Actions

1 **IHE profiles adherence for ALL diagnostic specialties**

AIW-I / AIR / AIRAI in CE marking · pathology, cardiology, nuclear medicine · eliminates **PACS lock-in**

2 **Clinical context as MDR performance criterion**

Indication-aware metrics in post-market surveillance (**Art. 84 MDR**) · AI that reads the referral + **case urgency**

3 **Minimum AI Result API – required**

DICOM SR TID 1500 or **FHIR DiagnosticReport** + confidence scores + model version + performance data

4 **EU Connectathons → EUDAMED + EHDS AI provenance**

IHE Europe AIGI annual testing → results in **EUDAMED** · EHDS: AI provenance as **first-class data object**

Image courtesy of Dr Amine Korchi, 3R

5 **EU AI Act–aligned grants for AI-ready hospital IT infrastructure**

Horizon Europe & EU4Health: orchestrators, dashboards, **AI audit logging** (EU AI Act Art. 9 & 12) · EHDS + MDR compliance as grant condition

Standards exist.
Implementation lags.

IHE profiles adherence · Clinical context in MDR · AI Result API · EU Connectathons

3R Swiss Imaging Network · 5 years · 22 centres · ~100k AI exams/year · 2.5% capacity gain

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