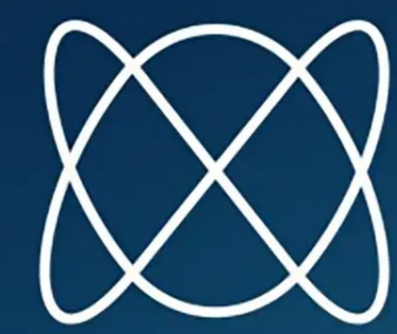


FOUNDATION MODELS - NHS ADO(A)PTION

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OxCAIR-ICU: Dr David Clarke



Introduction

OxCAIR projects: initially extending their work with Foundation Models (Open source and Commercial) in order to better evaluate the effectiveness of AI solutions within the NHS. Fine-tuning then with LoRA comparing to H2H open source baseline. Using this knowledge to develop AutoMM for ICU



NICE
National Institute
for Health and
Care Excellence

NHS
England

Four workstreams, one trajectory

1 Comparison study

Submitted

Can open Foundation Models Read X-rays?

- Real NHS dataset used to evaluate 8 Open source Foundation models
- Real NHS Data: Pneumothorax + Fractures
- Exposed data-leakage in previous studies
- Corresponding author

2 LoRA adaption

In progress

Foundation Model Fine tuning

- More accuracy, tiny compute



3 AutoMM: M&M data engine

DPIA authored, in review

AutoMM: build + DPIA

- an automated pipeline that queries CIS database
- patient trajectories across resp, cvs, labs and medication domains.
- applies LLM reasoning to synthesise case narratives.
- generates structured M&M data-driven discussion prompts.

4 Pre-doctoral

NIHR National Institute for Health and Care Research

NIHR AWARD

Research question:

Can an LLM/FM trained on continuous ICU clinical data identify early warning signals of antibiotic escalation, de-escalation, and infection trends — and can genomic data improve prediction accuracy?

NIHR funded pre-doctoral
Starting September 2026

Fine-tuning approach

1 Freeze pre-trained weights

All original model parameters locked. No gradient updates to W.

2 Inject trainable A and B matrices

Added in parallel to attention/MLP layers. B initialised to zero - no disruption at training start

3 Train on NHS CXR data

Only B and A receive gradients. Task-specific loss on NHS pathology labels

4 Merge and evaluate vs H2H baseline

$W' = W + BA$ merged at inference. Compare delta-AUC, sensitivity, specificity.

Python codebase written: class LoRALayer
github repo: <https://github.com/snowgecko/LoRA>

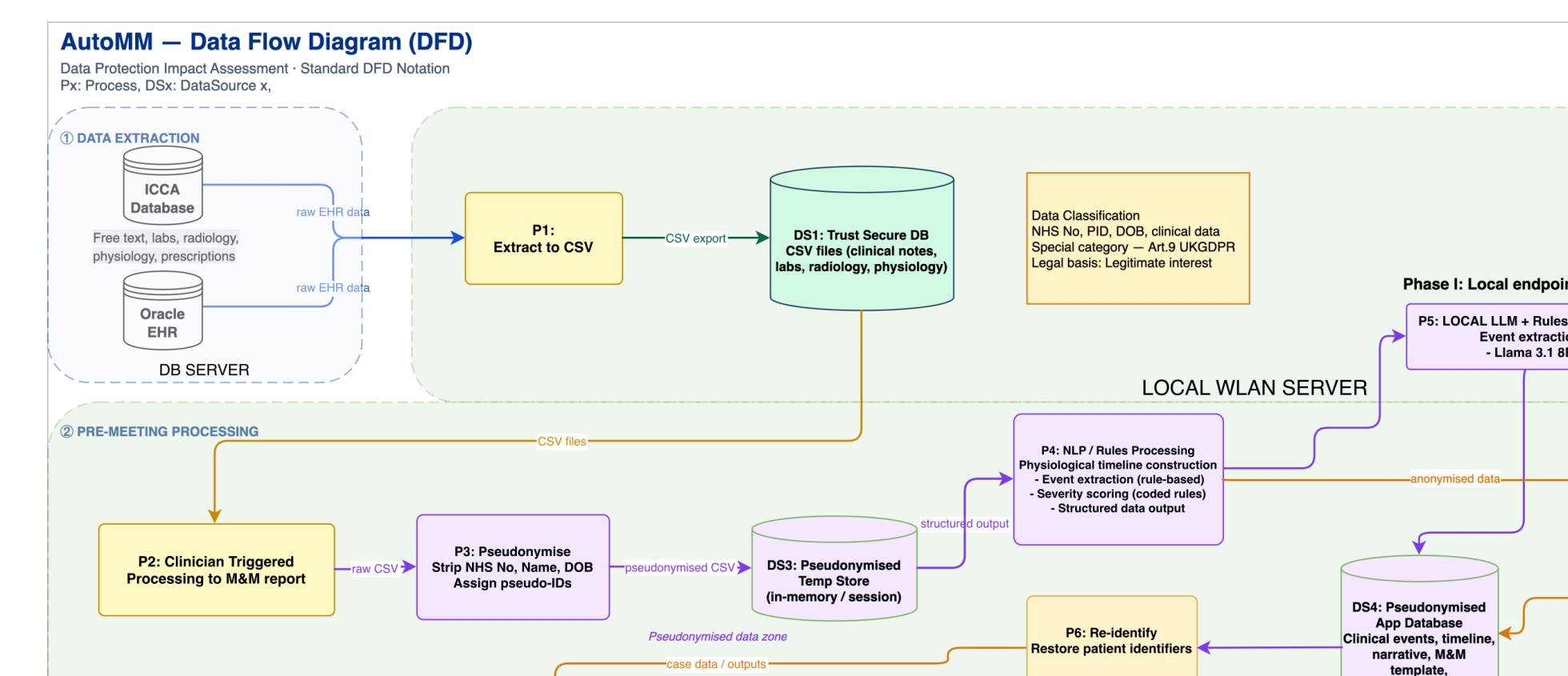
Regulation, Standards & Data Governance

SCHEMA Full schema developed

CIS [ICCA/Carevue] database. . built CISReportingDB python class for data extraction. ~130 clinically curated attributes.

DPIA

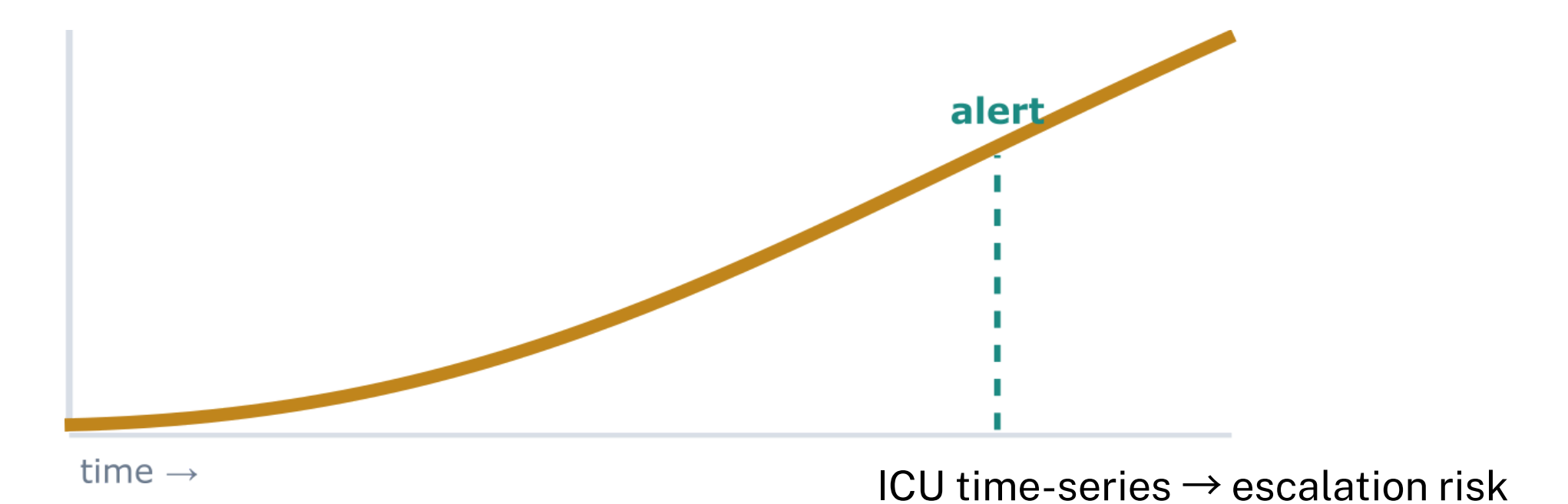
Full DPIA completed for NHS patient data usage. Local/SHA-256 pseudonymisation.



Information Governance - TVS SDE team. - abridged DPIA - close to approval [documentation provided on request]

Aligned with NHS AMR National Action Plan

The M&M schema is the direct data foundation for the Predoc ICU Antimicrobial AI research — same data source, de-risked data access



The overarching aim is to identify predictors of antibiotic escalation, examine patterns of antimicrobial prescribing (relevant to stewardship), to detect early warning indicators of emerging resistance or changing infection patterns, and to help identify biologically meaningful pathways that influence treatment trajectories in the ICU.

ICU antimicrobial AI represents one of the highest-impact integration patterns in critical care.

Finish LoRA runs · approve DPIA · submit LoRA + M&M papers
Pre-doc September 2026

Key Sources & Acknowledgements

OxCAIR-ICU · NIHR Pre-doctoral Award · Big Data Institute · NHS DSP Toolkit & UK GDPR governance

Acknowledgements: OxCAIR (Dr Ather, Dr Novak), OxCAIR-ICU: Dr Clarke, BDI (Prof Bartek),