

ENABLE-AI: Enhancing diagnostic precision and prognostication of mature B-lymphoid neoplasms using Artificial Intelligence

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INTRODUCTION

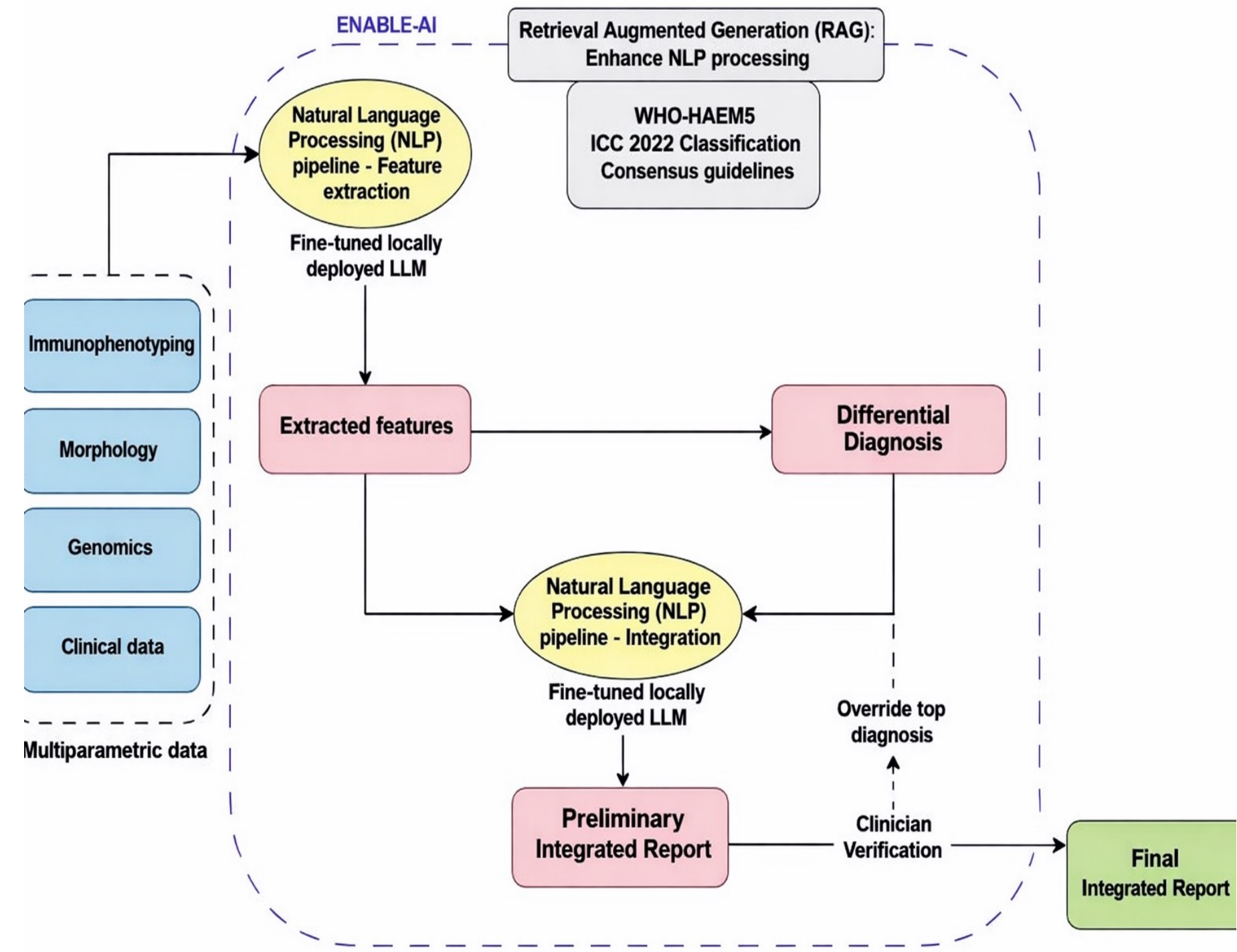
Blood cancers span 100+ subtypes, classified against complex, ever-expanding WHO-HAEM5 criteria — all of which must be evidenced in an integrated diagnostic report for every patient. Even at high-volume centres like the Royal Marsden, this process is time-consuming. ENABLE-AI streamlines it by generating an evidence based preliminary integrated report for the haematologist to review and sign off.

AIM

- To assess patient attitudes towards AI in diagnostics
- Evaluate its performance on synthetic data and fine tune as needed
- Assess the performance of ENABLE-AI to perform integrated reporting on real patient data

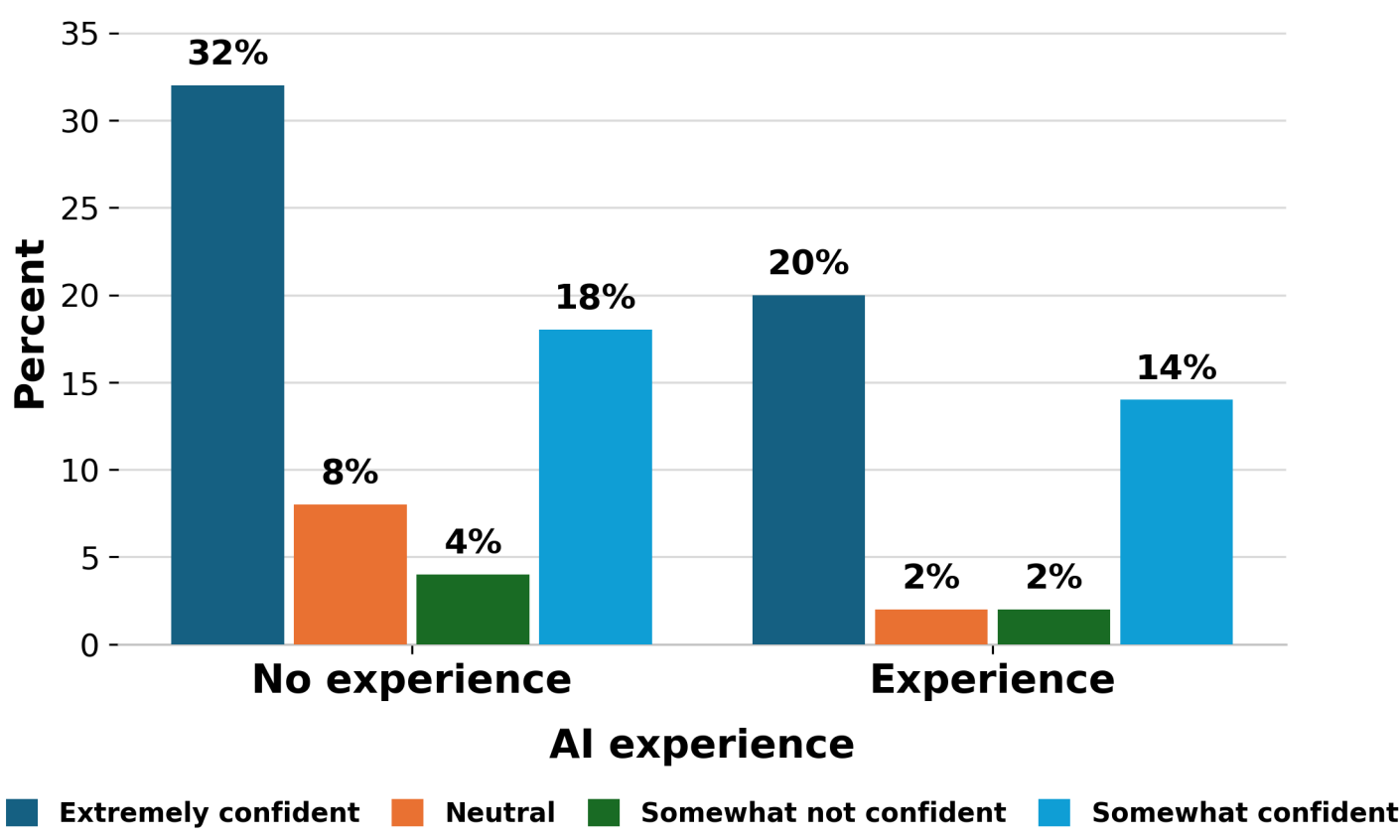
METHOD

A mixed-methods patient survey captured views on diagnostic AI, directly informing ENABLE-AI's design. The platform performs sequential feature extraction — using Lang Extract and Docling with clinician-defined schemas across four diagnostic modalities — followed by report integration, where a locally hosted LLM (gpt-oss:120b) generates a report via retrieval-augmented generation against WHO-HAEM5 criteria. Performance was improved through iterative prompt engineering rather than model fine-tuning. The clinician-facing GUI displays this alongside source reports, with every extracted feature traceable to highlighted. s WHO-HAEM5 excerpts. Clinicians retain full oversight: diagnoses can be edited or overridden, with all changes logged for audit. The pipeline was validated on 1000 synthetic cases spanning 8 leukemic B-cell malignancies



Patient Survey N=50

Diagnostic Confidence

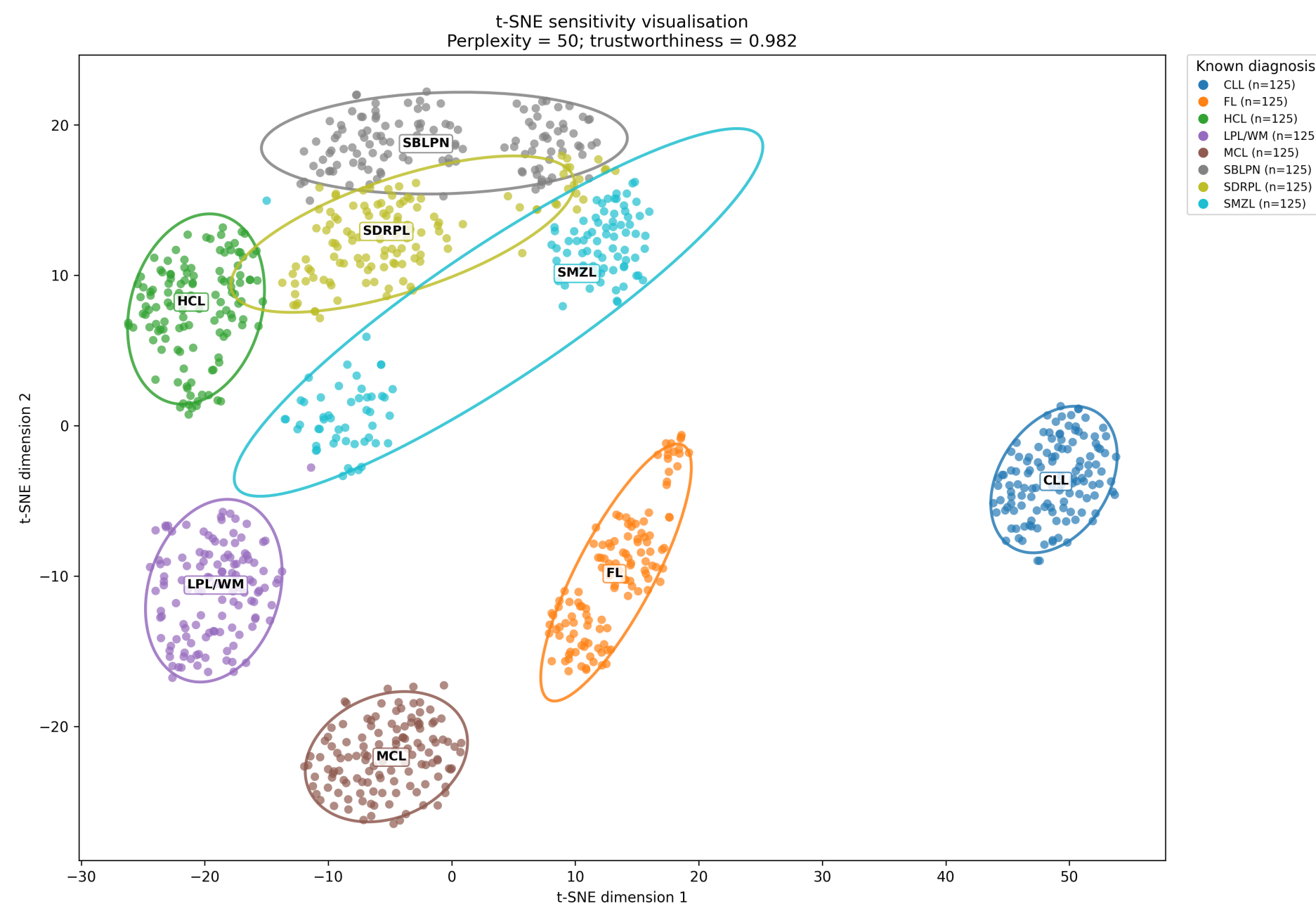


Key Findings:

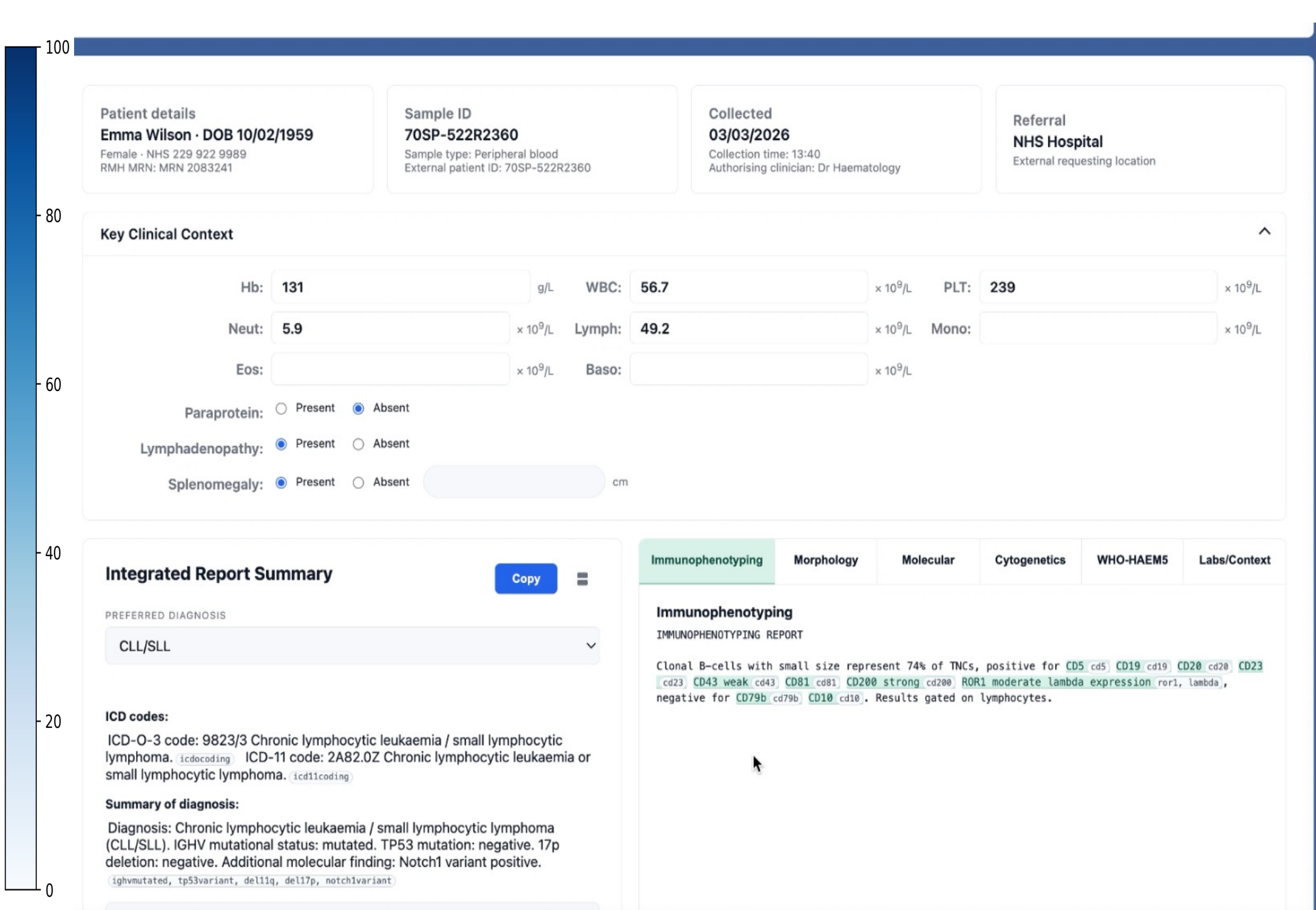
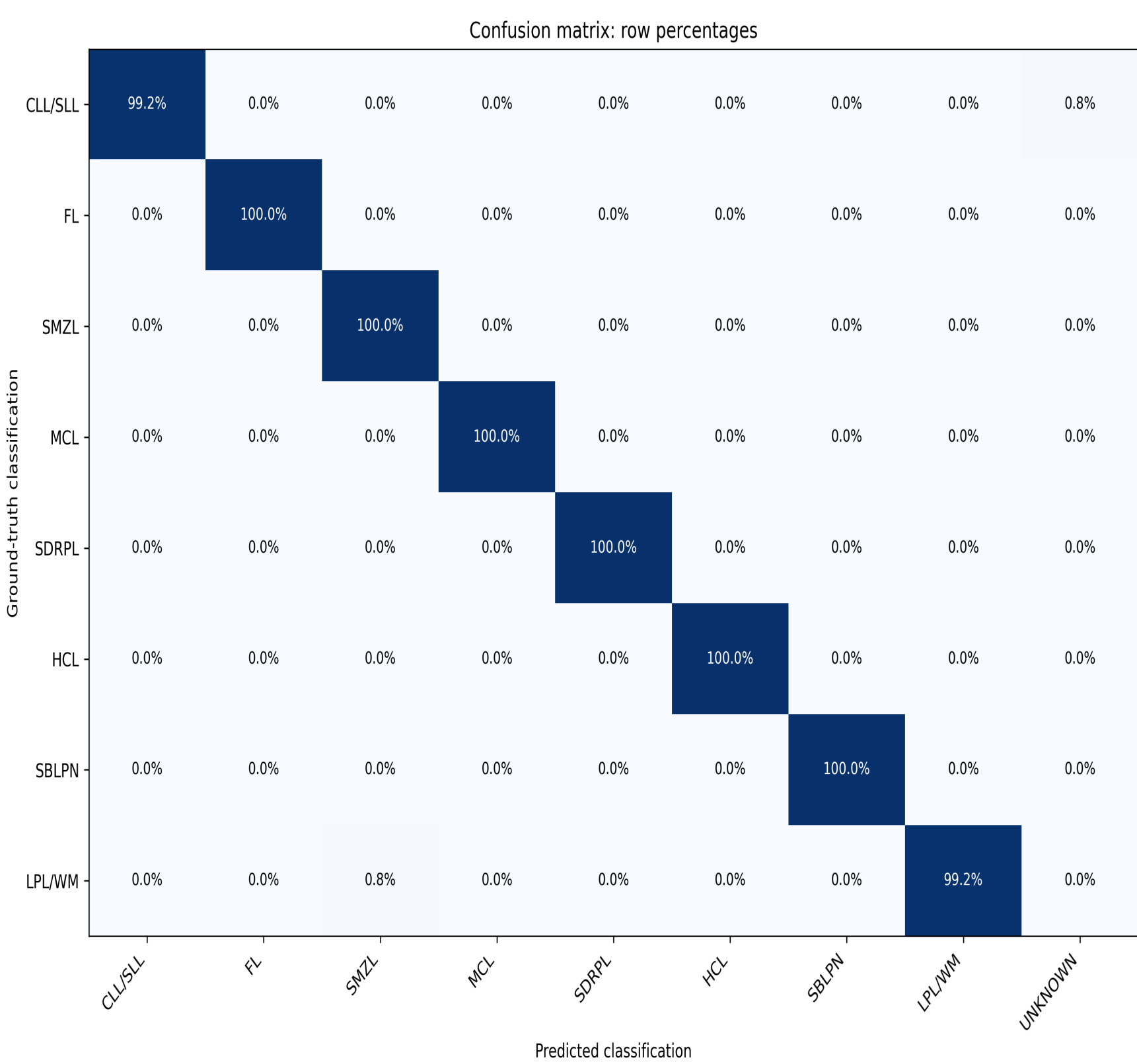
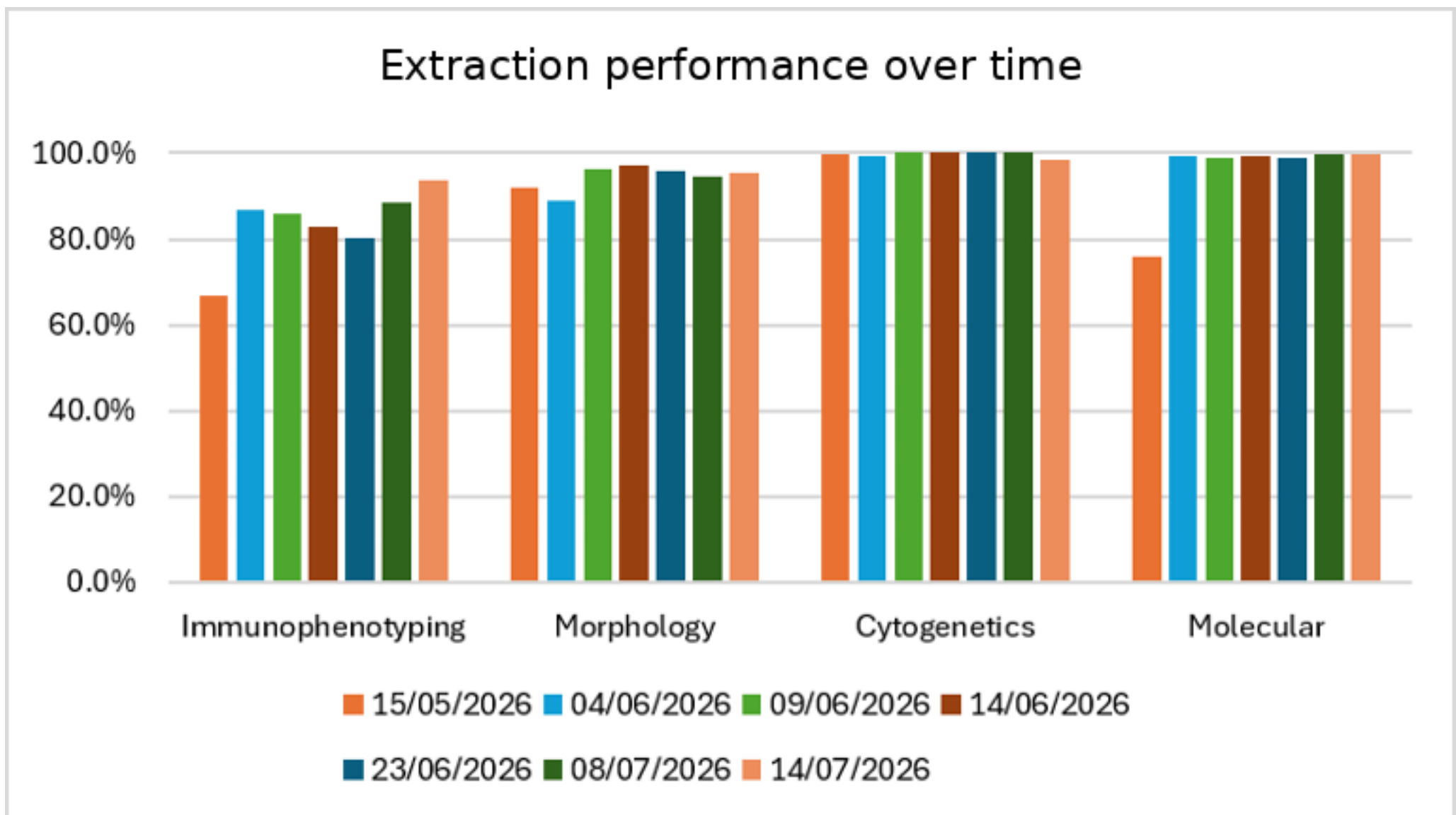
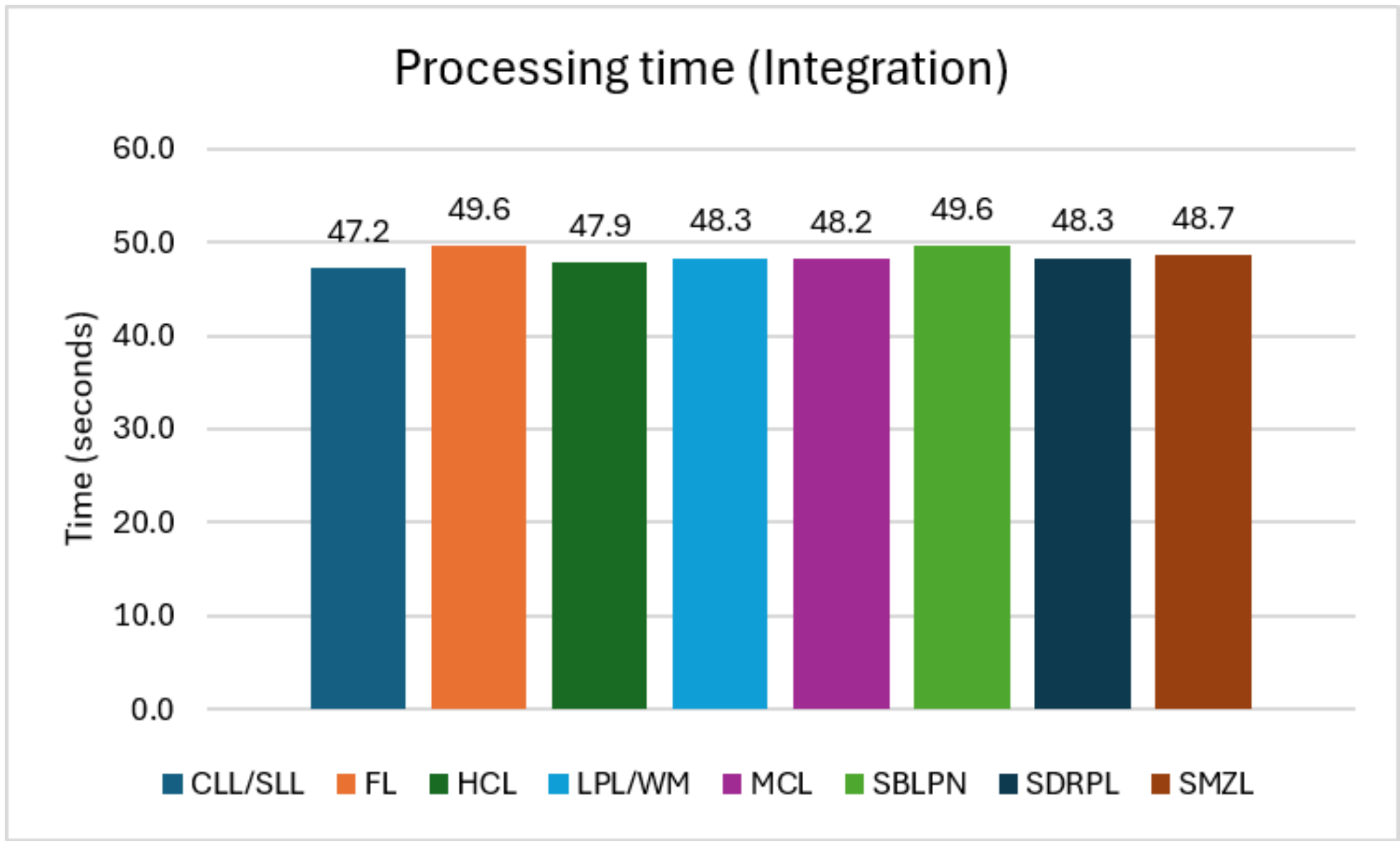
- 60.8% had no prior AI experience
- 80.3% comfortable with AI-assisted diagnosis
- 82.35% support AI + clinician oversight
- Concerns similar across groups (20% vs 18%, NS)
- Benefits: speed, efficiency, accuracy
- Concerns: transparency, governance
- 74.51% want disclosure of AI use
- 84.3% willing to share data for AI training

No Clinical significance between those with experience and without

SYNTHETIC CASES N=1000



MODEL PERFORMANCE



The model highlights the extracted evidence within each source report that informs the final integrated report.

Accuracy
99.8%

Macro F1
99.85%

MCC
0.998

Coverage
99.9%

Selective accuracy
99.9%

DISCUSSION

Patients support AI- assisted diagnostic integration as far as clinician oversight is maintained. Extraction was weakest for immunophenotyping reports, whose atypical language diverges from standard medical text — though prompt engineering improved this. The explainability feature is designed to give clinicians confidence in the model's outputs by surfacing traceable evidence.

FUTURE PLANS

- To assess the platforms performance on Real patient data
- Evaluate tool performance against expert SIHMDS consultants

REFERENCES

Alaggio R, Amador C, Anagnostopoulos I, et al. The 5th edition of the World Health Organization Classification of Haematolymphoid Tumours: Lymphoid Neoplasms. Leukemia. 2022;36(7):1720-1748. doi:10.1038/s41375-022-01620-2

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