Research Frontiers & Open Challenges

Interpretability

- Black-box models in critical care
- Explainable AI methods needed
- Clinical trust and adoption

Data Efficiency

- Limited labeled medical data
- Few-shot learning
- Self-supervised pretraining

Robustness

- Distribution shift in healthcare
- Adversarial attacks
- Safety guarantees

Integration

- EHR system compatibility
- Clinical workflow integration
- Regulatory approval pathways

🎯 Critical Research Needs

Despite architectural advances, practical medical AI deployment requires solving interpretability, data efficiency, robustness, and integration challenges.