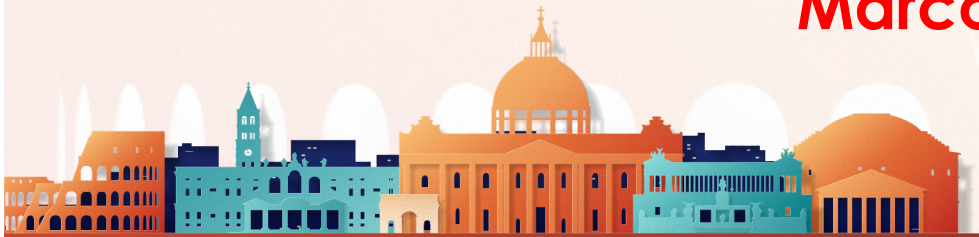
PLACE 2026
PLATFORM OF LABORATORIES FOR ADVANCES IN CARDIAC EXPERIENCE

CONGRESSO
ROMA, 25 - 27 Giugno 2026

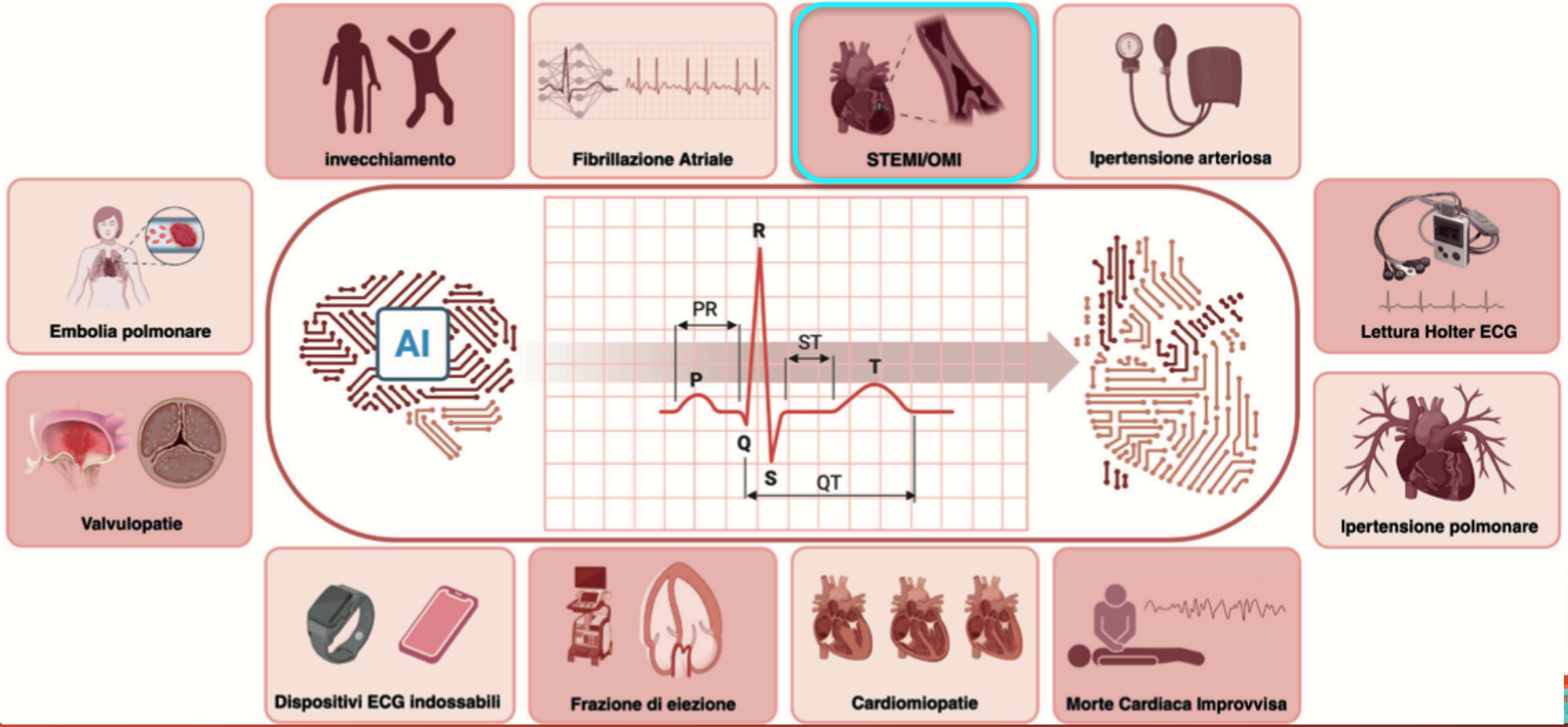
Digital place – intelligenza artificiale: quali scenari nel 2026?

Applicazioni dell'intelligenza artificiale nella terapia intensiva cardiologica

Marco Tubaro



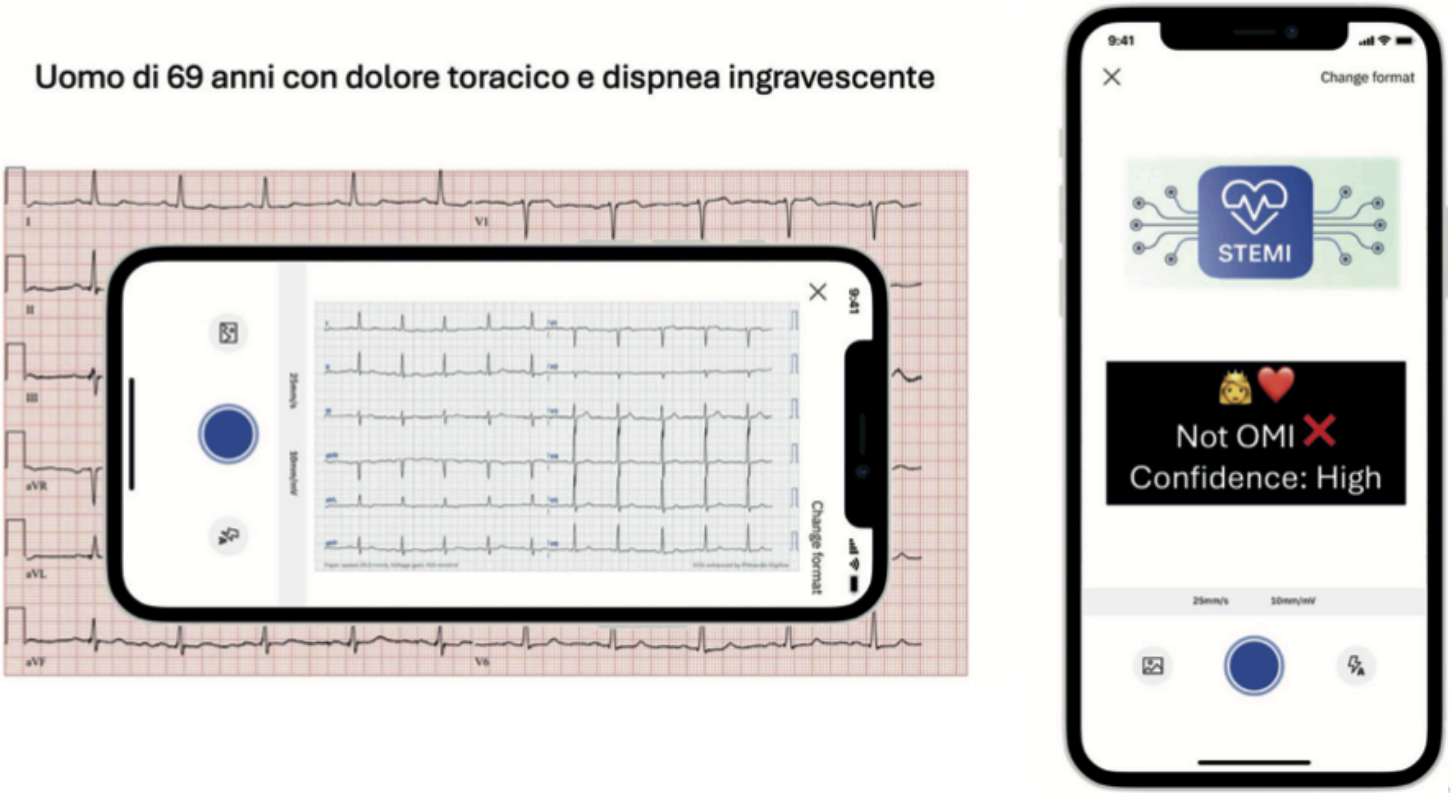
AI-ECG



Ricci F. G Ital Cardiol 2025;26(9):635-646

PMcardio: LVEF & OMI

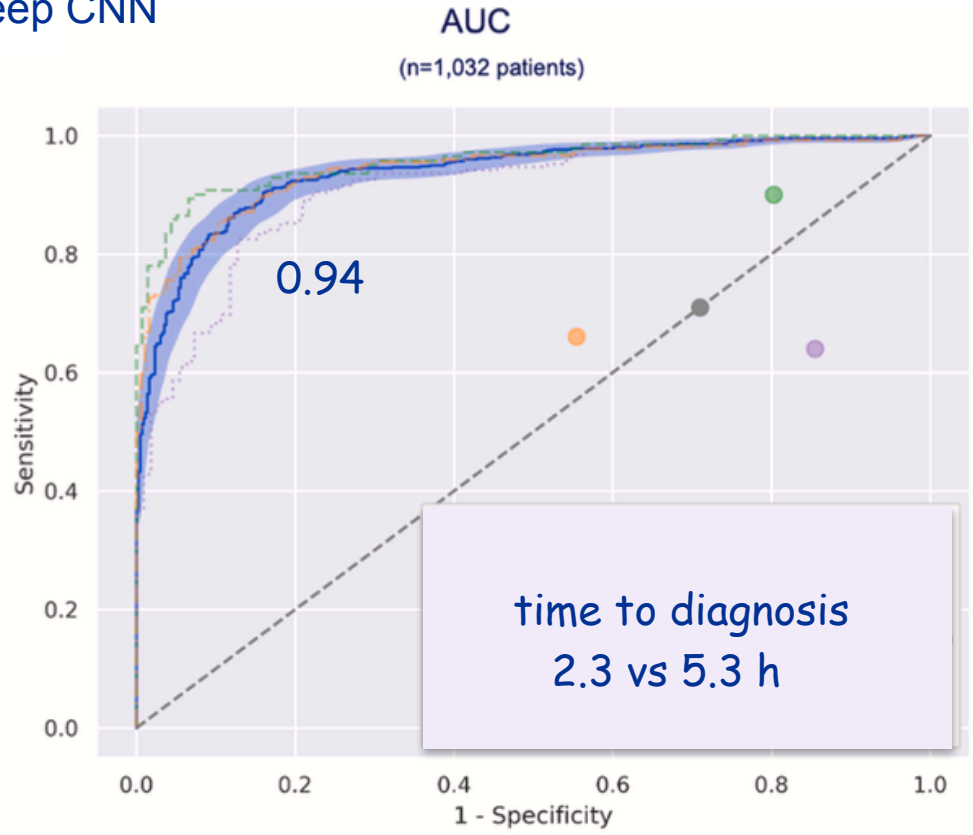
deep CNN

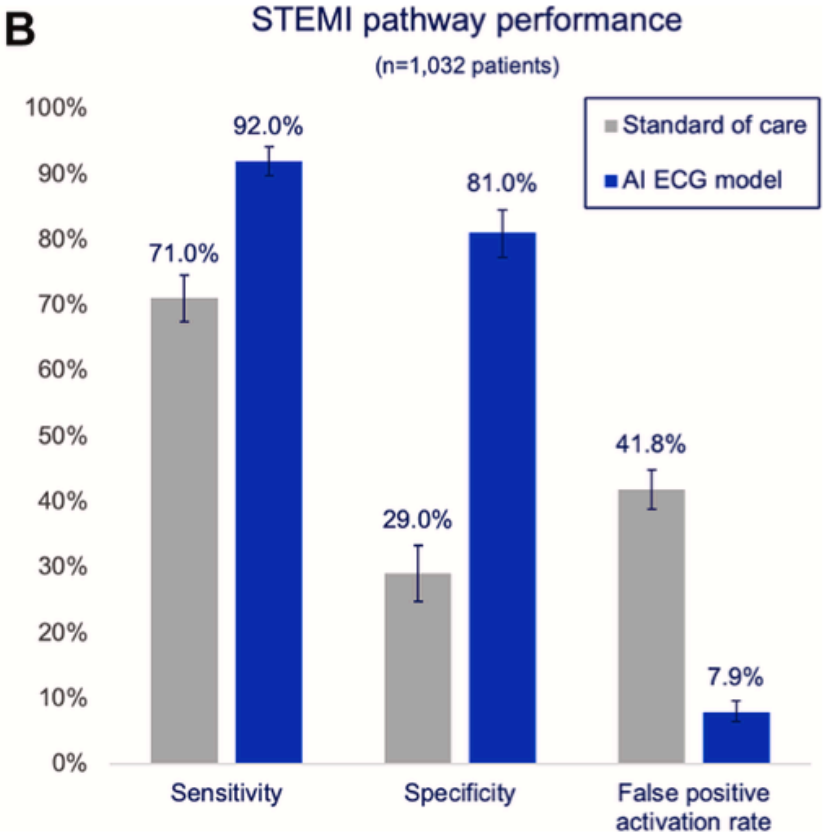


Ricci F. G Ital Cardiol 2025;26(9):635-646

PMcardio: AI-ECG & STEMI triage in a multicenter U.S. registry

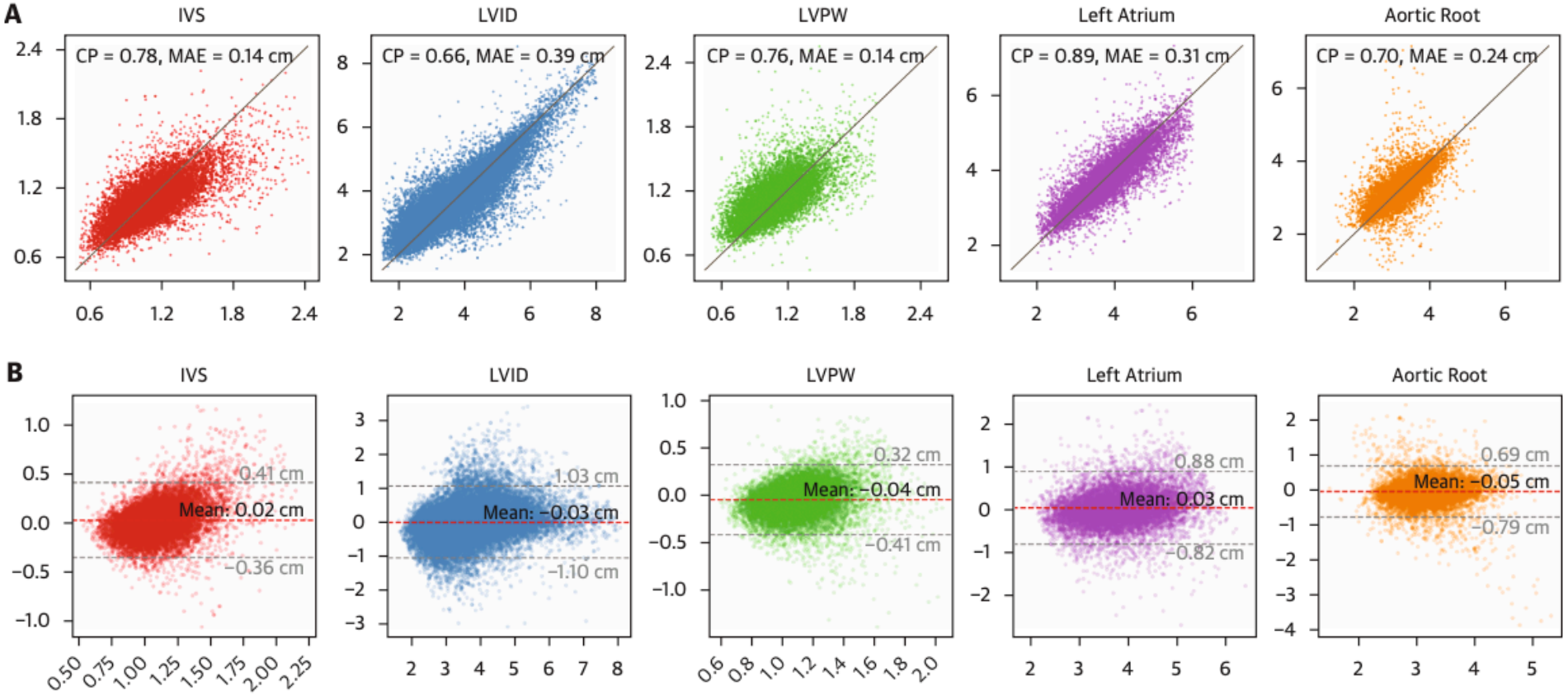
deep CNN





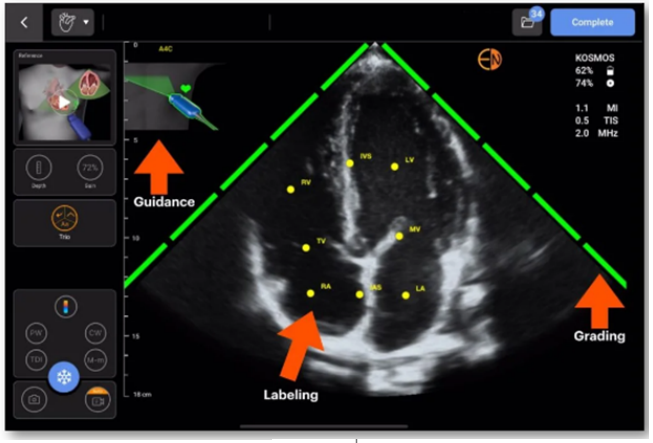
Herman R. JACC Cardiovasc Interv 2026;19:145-156.

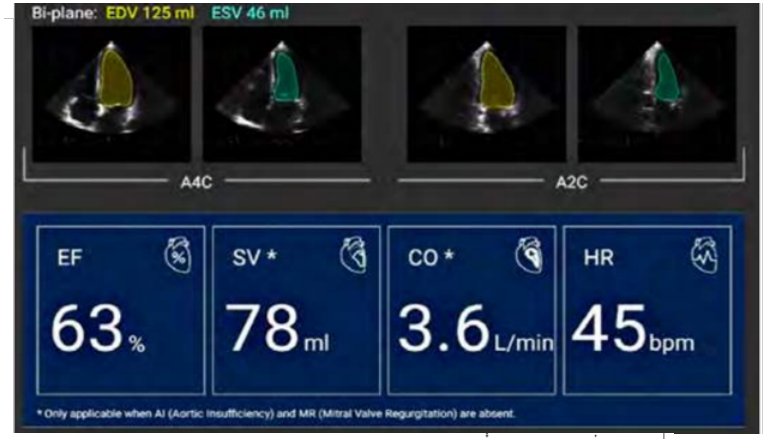
Echo Net: AI automation of echo measurements



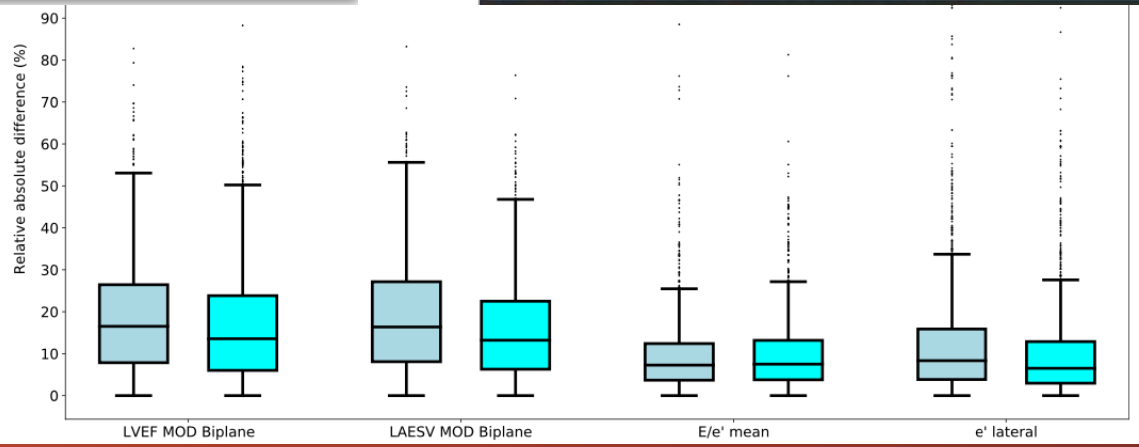
Sahashi Y. JACC 2025;86(13):964-978.

DL-automated workflow for echo interpretation





23 parameters

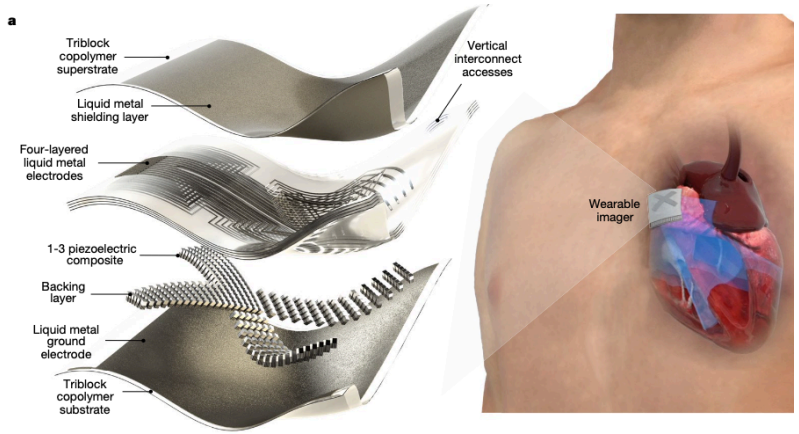


among experts

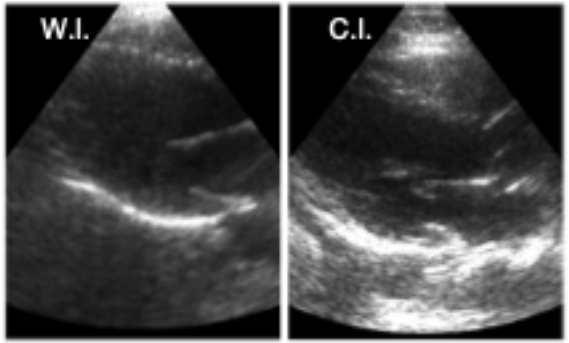
DL vs experts

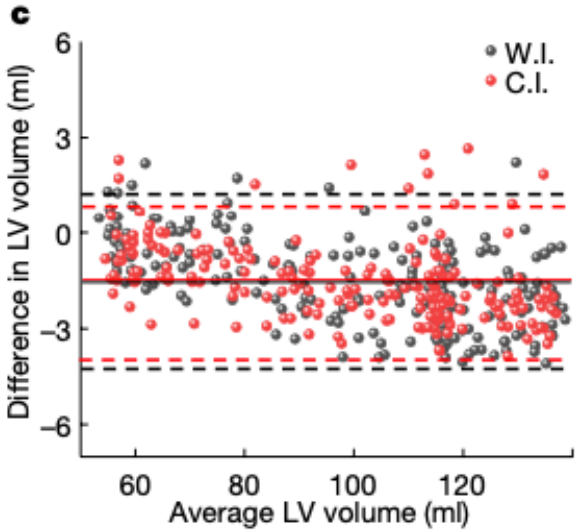
Tromp J. Nature Communications 2022;13:6776.

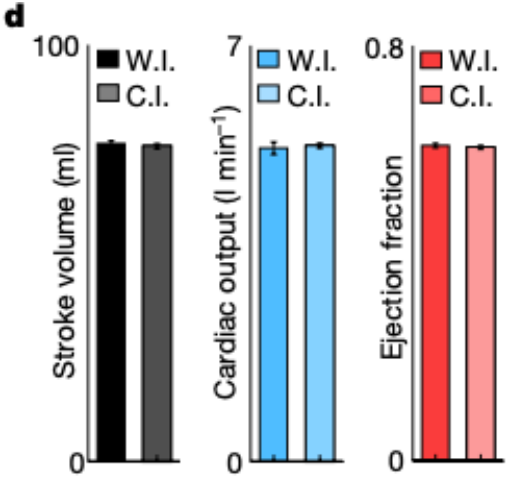
wearable cardiac ultrasound imager



Parasternal long-axis view



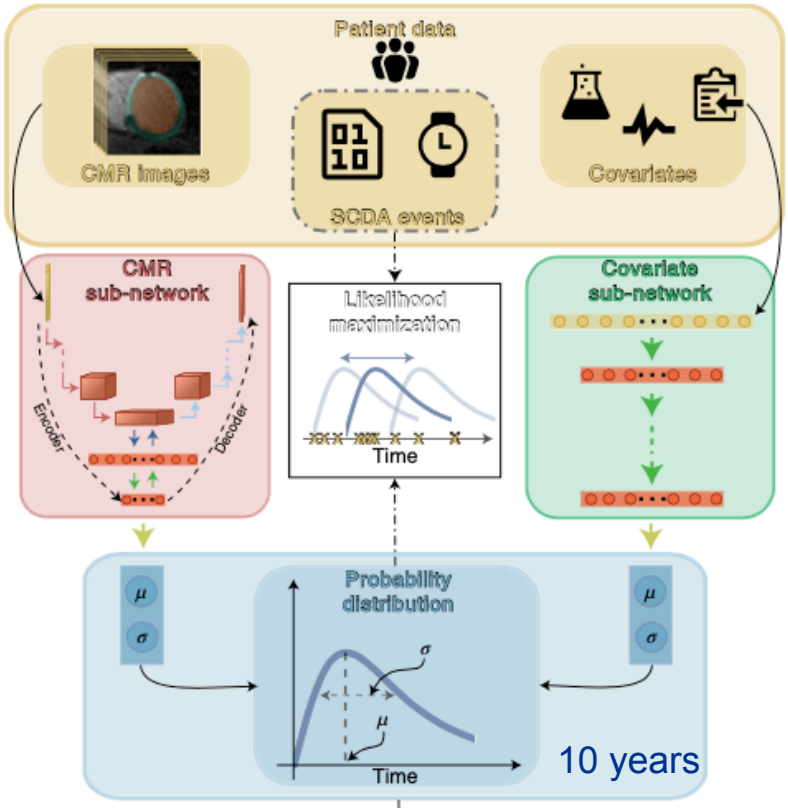


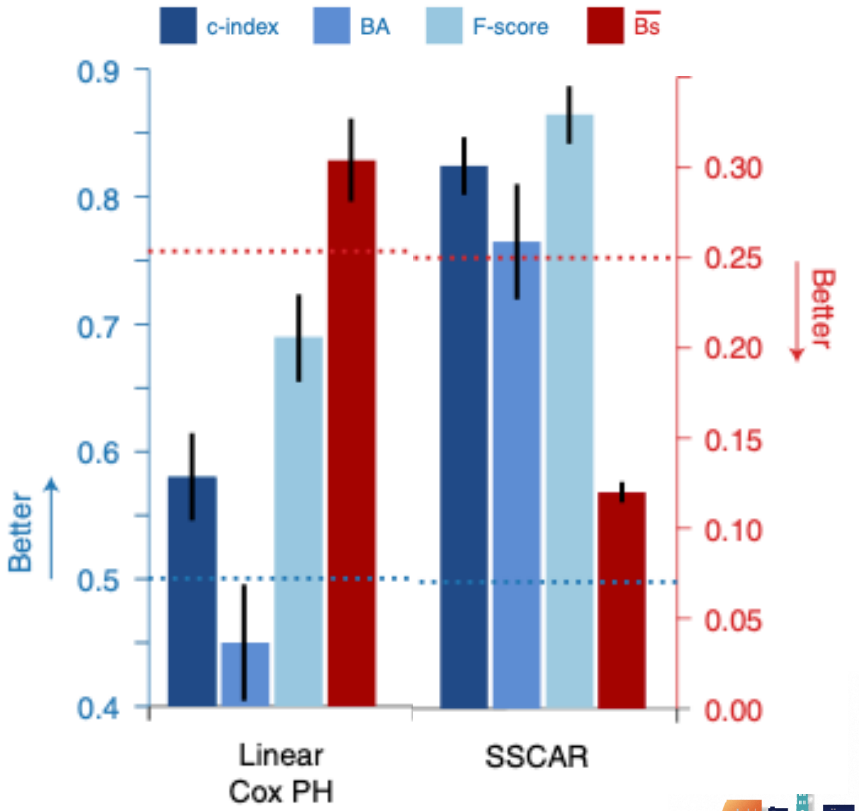


W.I. wearable imager
C.I. commercial imager

Hu H. Nature. 2023;613(7945):667-675.

SSCAR: DL-CMR to predict survival free of arrhythmic SCD





BA =balanced accuracy, Bs = Brier score

Popescu DM. Nature CV Res 2022;1:334-343.

CathAI: fully automated coronary angiography analysis

UCSF cohort

10,797

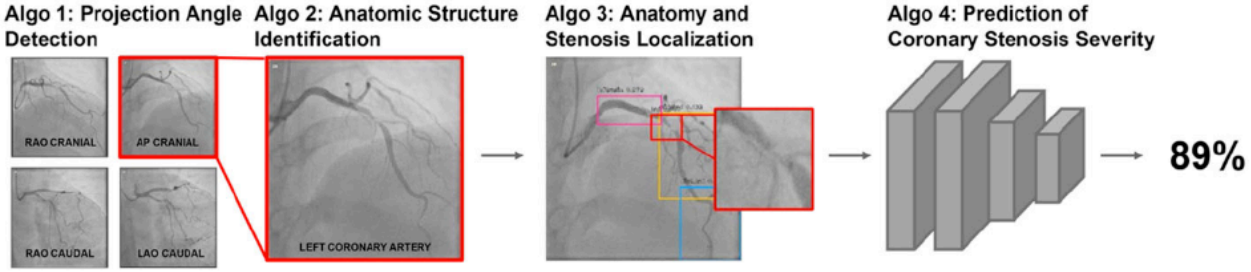
Adults with coronary angiograms matched to the angiogram report

UOHI cohort

464

Adults where coronary angiograms were adjudicated by two interventional cardiologists

Goals of the algorithms



Predictive ability of the CathAI deep learning pipeline

Cohort	Projection Detection	Anatomic Structure Identification	Stenosis Localization	Stenosis Severity
				Discriminating between severe (≥70%) and non-severe stenosis
UCSF	F1 Score: 0.90	PPV* : 97% & 93%	PPV: 93.3%	AUC: 0.862
UOHI	F1 Score: 0.81	PPV* : 100% & 100%	PPV: 84.5%	AUC: 0.869

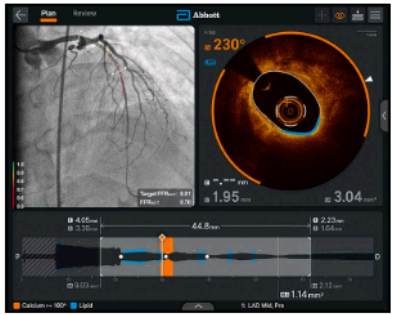
** left & right coronary artery*

Avram R. NPJ Digit Med 2023;4:142.

high resolution OCT with physiology and AI-automated insights

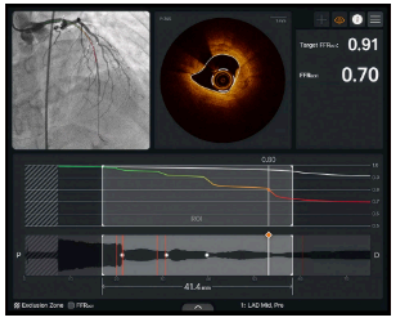
FFR_{OCT} to optimize PCI

Evaluate the degree of ischemia for each lesion



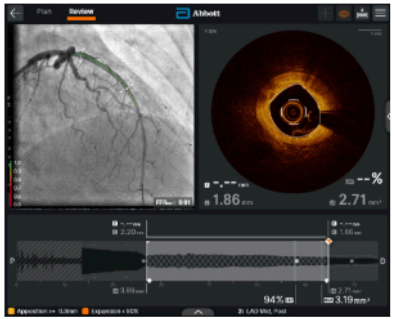
Target FFR_{OCT}

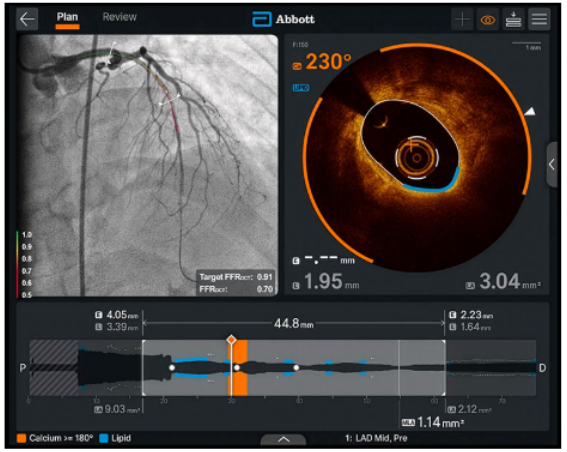
Compare the physiologic impact of different treatment plans in real time



Post-PCI FFR_{OCT}

Predict patient outcomes, independent of MSA

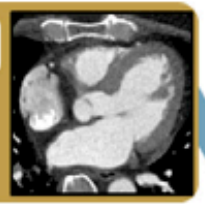




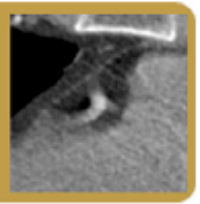
calcium (orange) and lipid (blue) detection

AI applications in CCTA

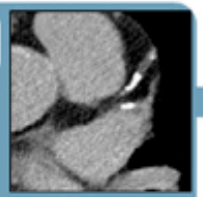
Reconstruction
- Improves image quality
- Dose reduction

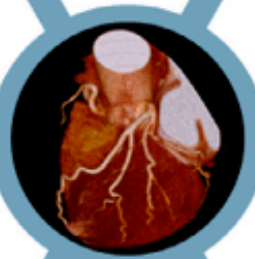


Motion correction
- Improves image quality

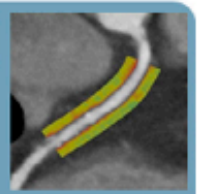


Calcium scoring
- High reproducibility
- Improves outcome prediction

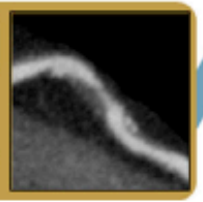




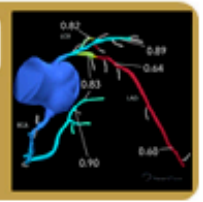
Epicardial fat
- Time saving
- Improves outcome prediction



Coronary plaque
- Improves detection
- Facilitates characterization



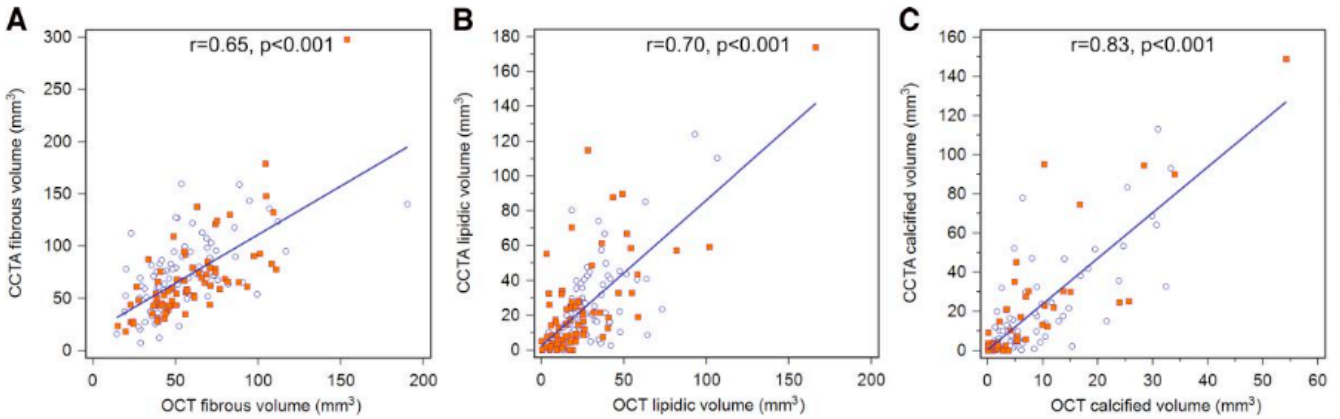
CT-FFR
- Low computational burden

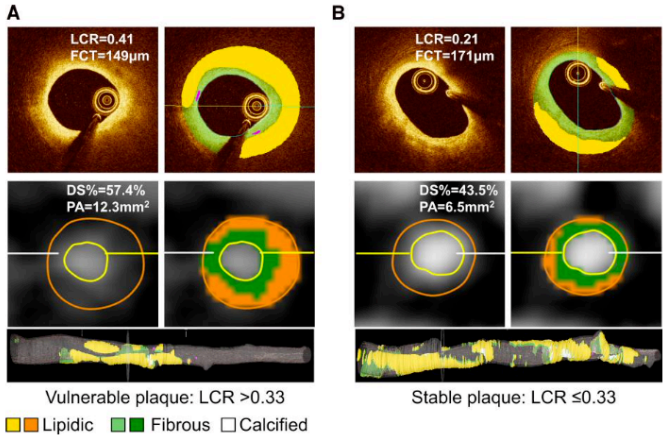


Tatsugami F. Diagn Interv Imaging 2023;104:521-528.

AI-CCTA vs. OCT for automatic plaque quantification

INVESSEL



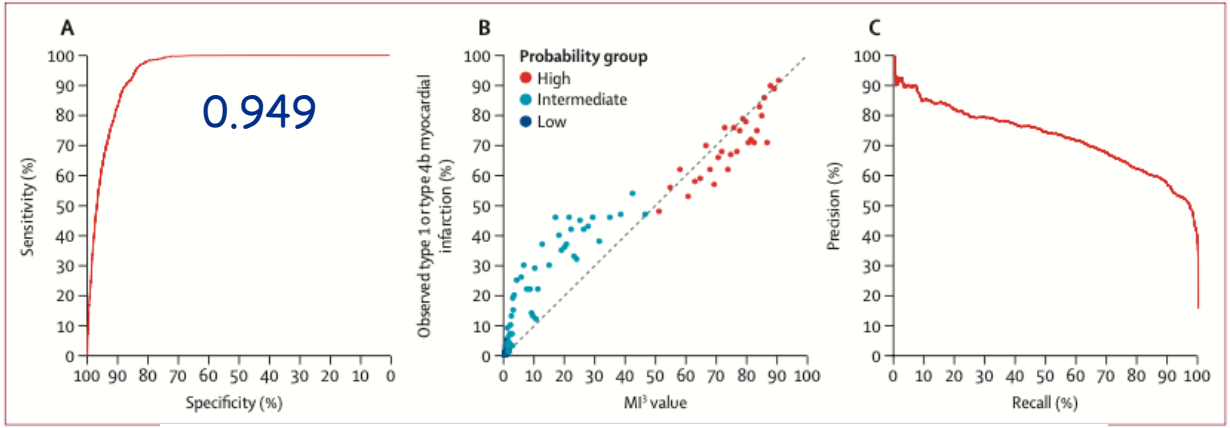


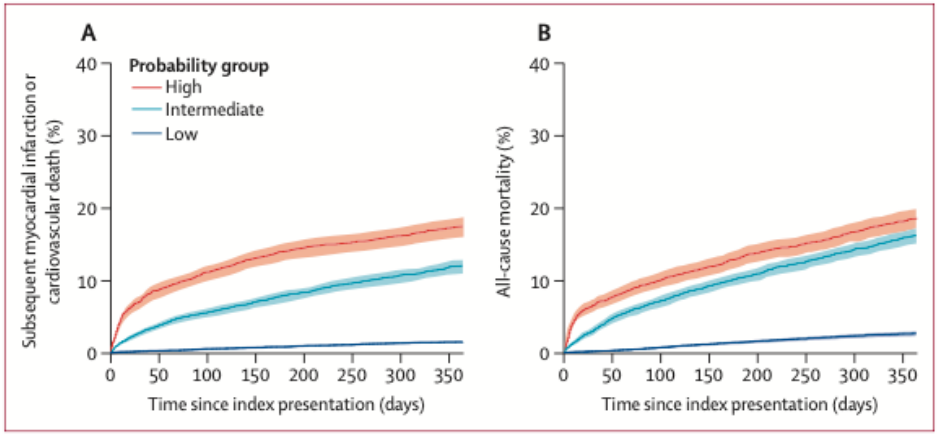
LCR = lipid-to-cap ratio

Li G. Eur Heart J DH 2026;7:ztag024

ML - MI³ algorithm (myocardial-ischaemic-injury-index)

gradient boosting

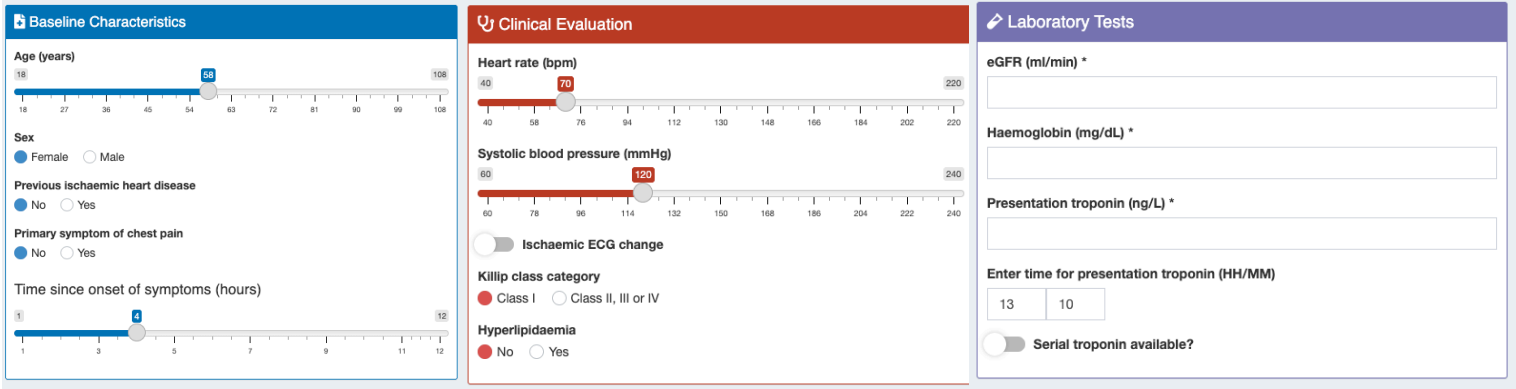


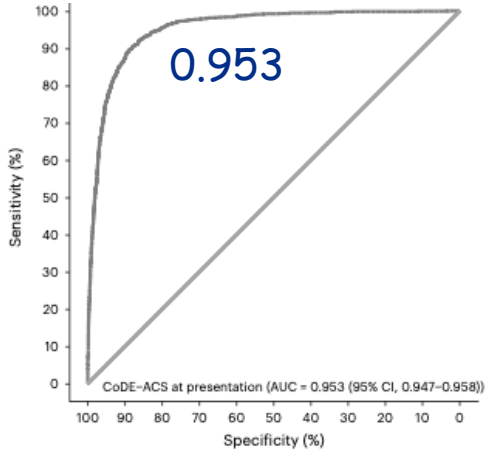


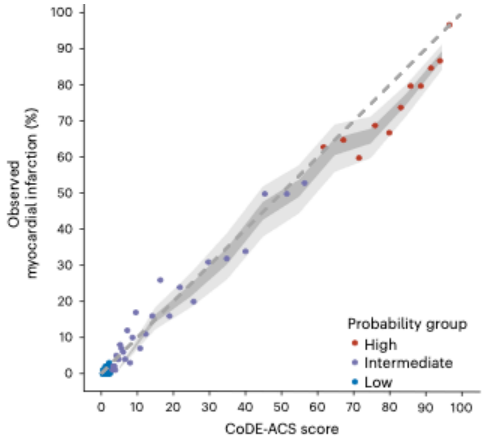
Doudesis D. Lancet Digit Health 2022; 4: e300–08.

CODE-ACS score: machine learning for AMI diagnosis

XGBoost





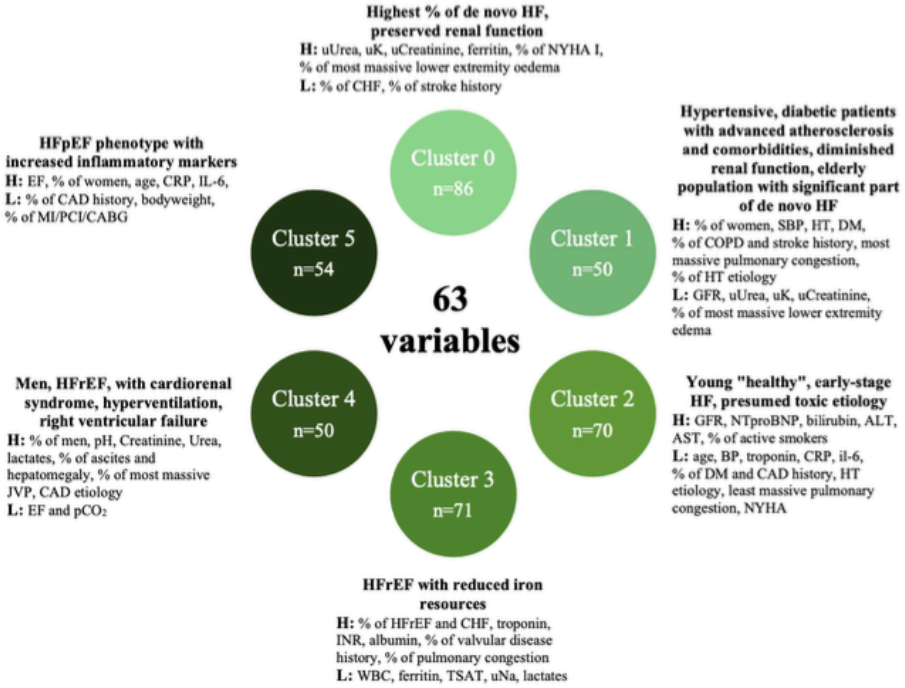


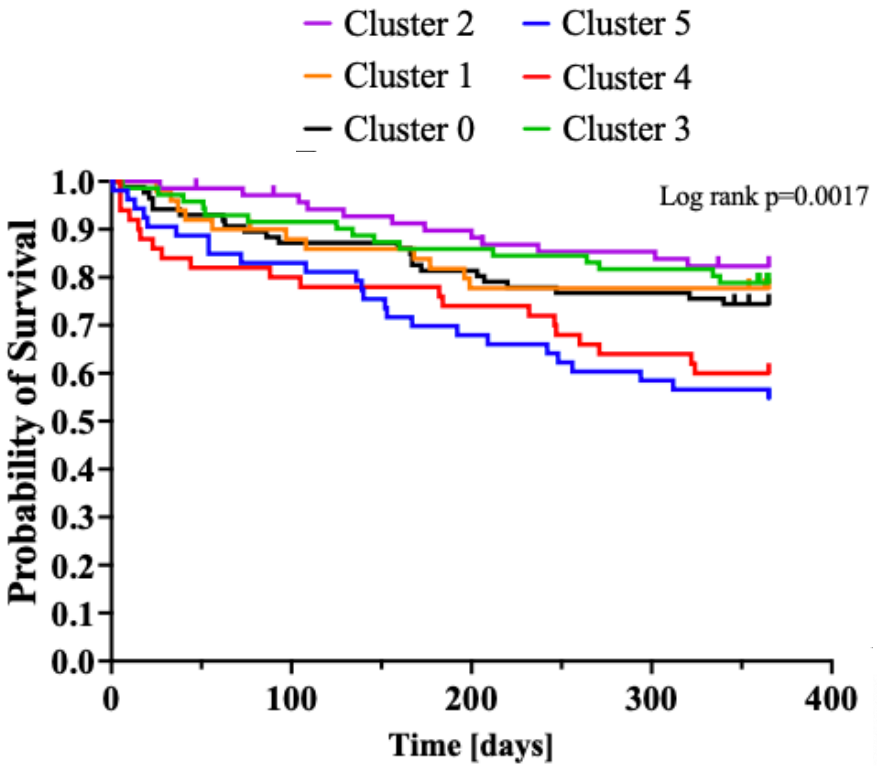
4x low risk patients

Doudesis D. Nature Med 2023;29:1201-1210

unsupervised ML for novel phenotyping in AHF

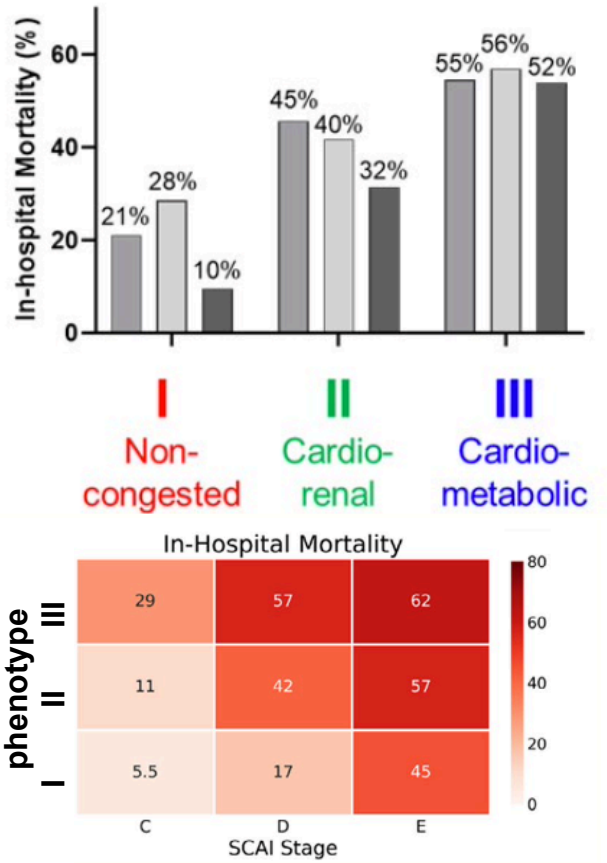
381 AHF pts, K-medoids algorithm

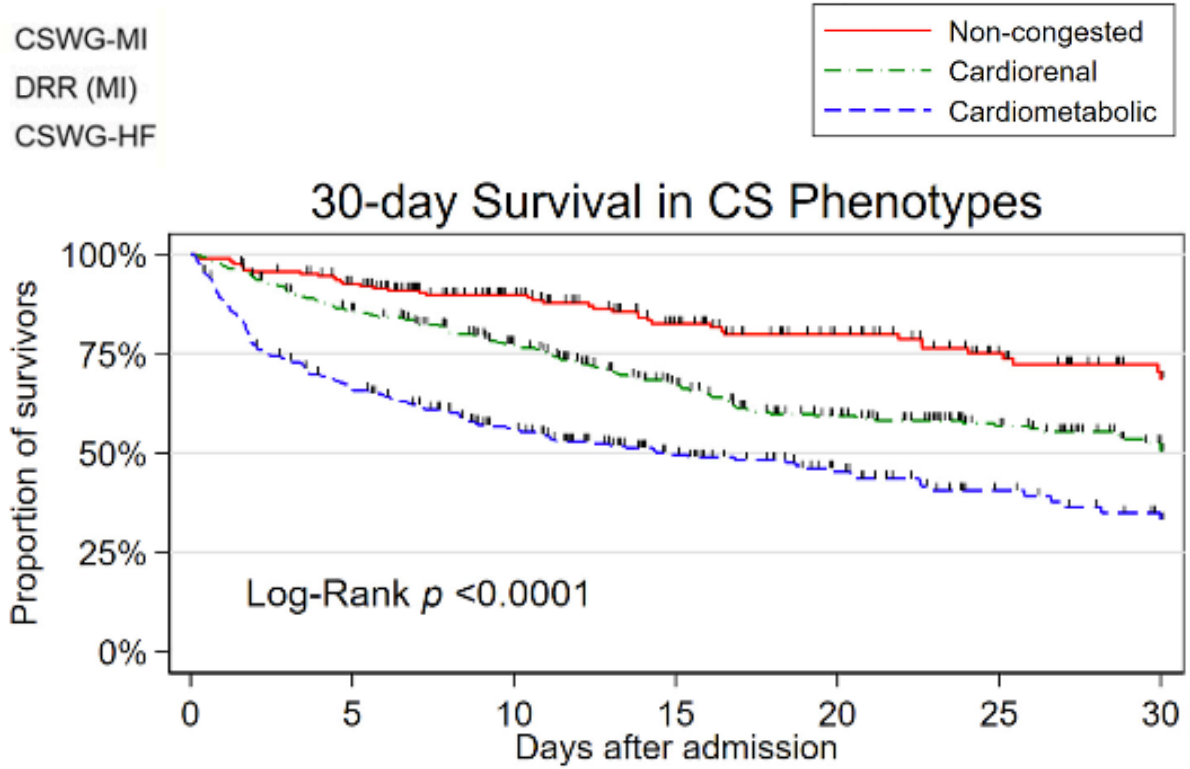




Urban S. Biomed 2022;10:1514.

unsupervised ML for phenotyping of cardiogenic shock

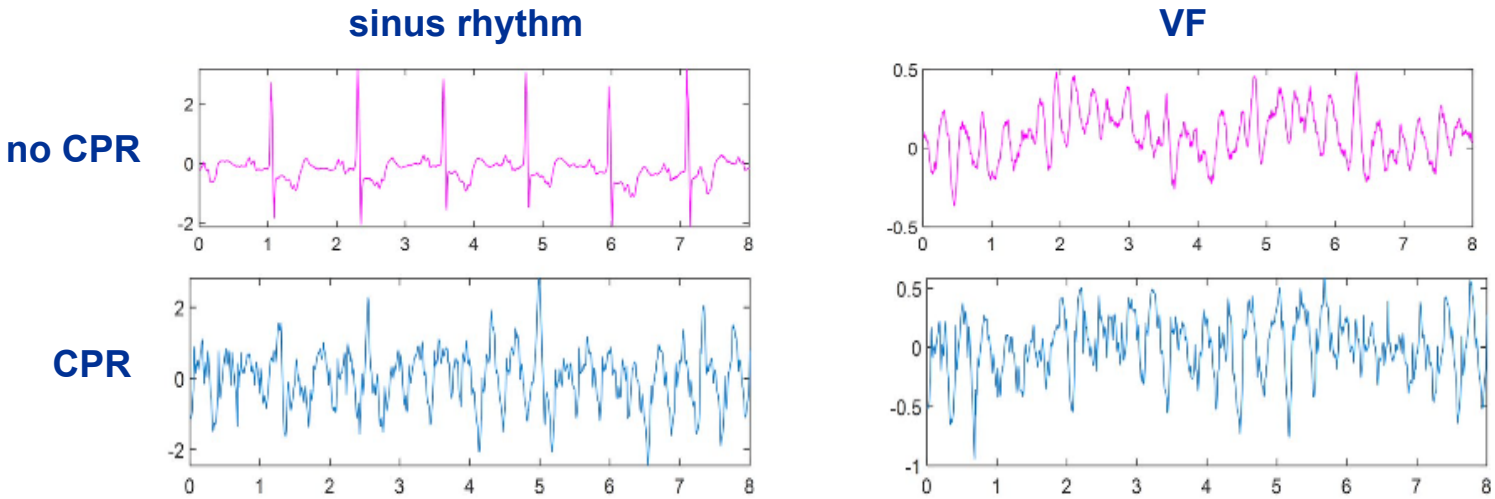




Zweck E. J Am Heart Assoc 2021;10:e020085
Zweck E. JACC HF 2023;11:1304-1315.

DL- automated defibrillator shock advisory system during CPR

CNN + bidirectional LSTM



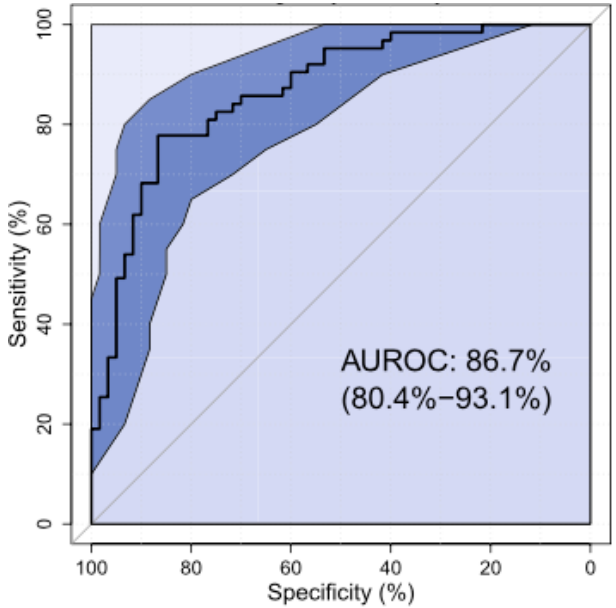
	sensitivity (%)	specificity (%)
CPR	99.04	95.2
no CPR	94.21	84.14

Hajeb-M S. J Am Heart Assoc 2021;10:e019065

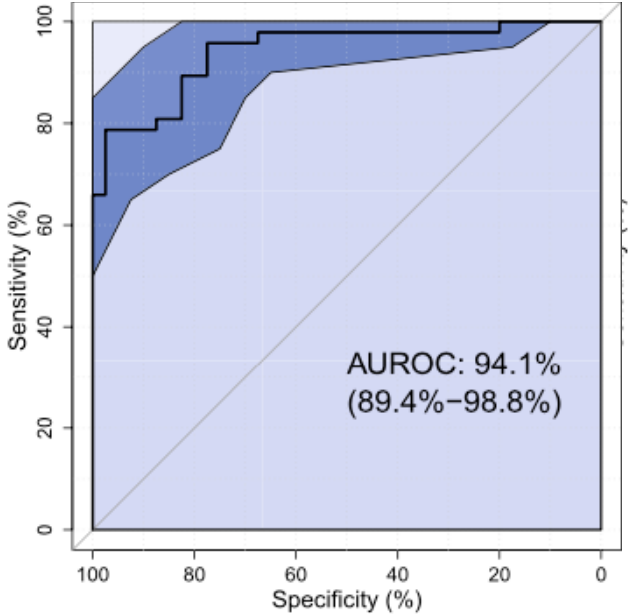
ANN algorithm to predict neurological outcome after OHCA

comatose patients after ROSC – CPC 1-2 vs. CPC 3-5 after 6 months

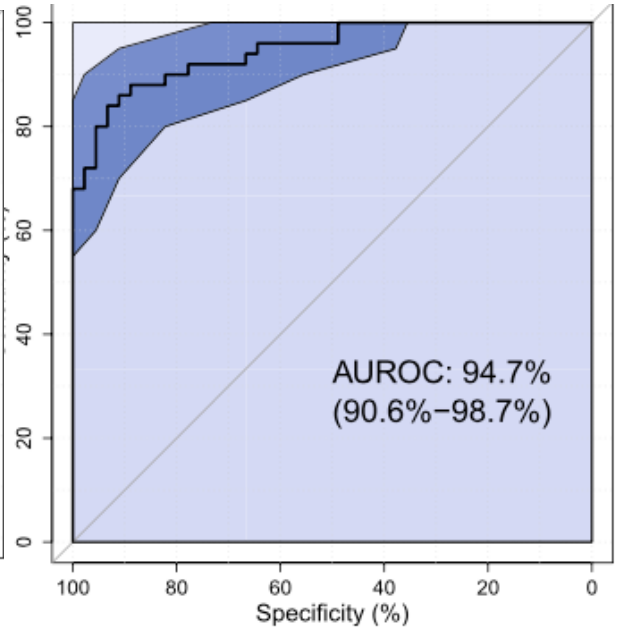
72 h - no biomarkers



72 h - clinical biomarkers



72 h - research biomarkers



CPC = cerebral performance category

Andersson P. Crit Care 2021;25:83.

transformers

Attention Is All You Need

Ashish Vaswani* Google Brain avaswani@google.com
Noam Shazeer* Google Brain noam@google.com
Niki Parmar* Google Research nikip@google.com
Jakob Uszkoreit* Google Research usz@google.com
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Aidan N. Gomez* † University of Toronto aidan@cs.toronto.edu
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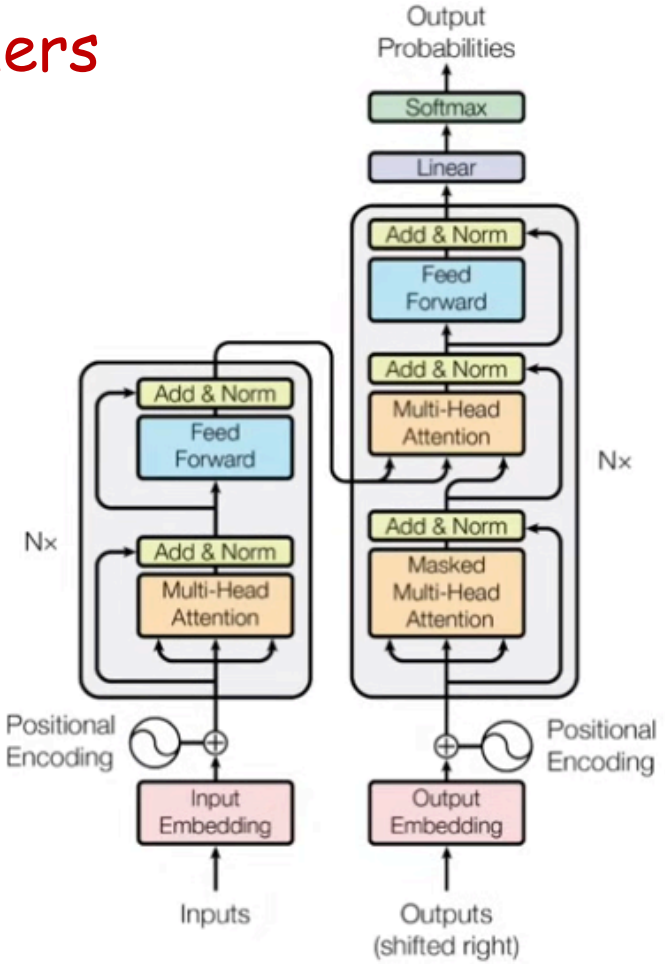
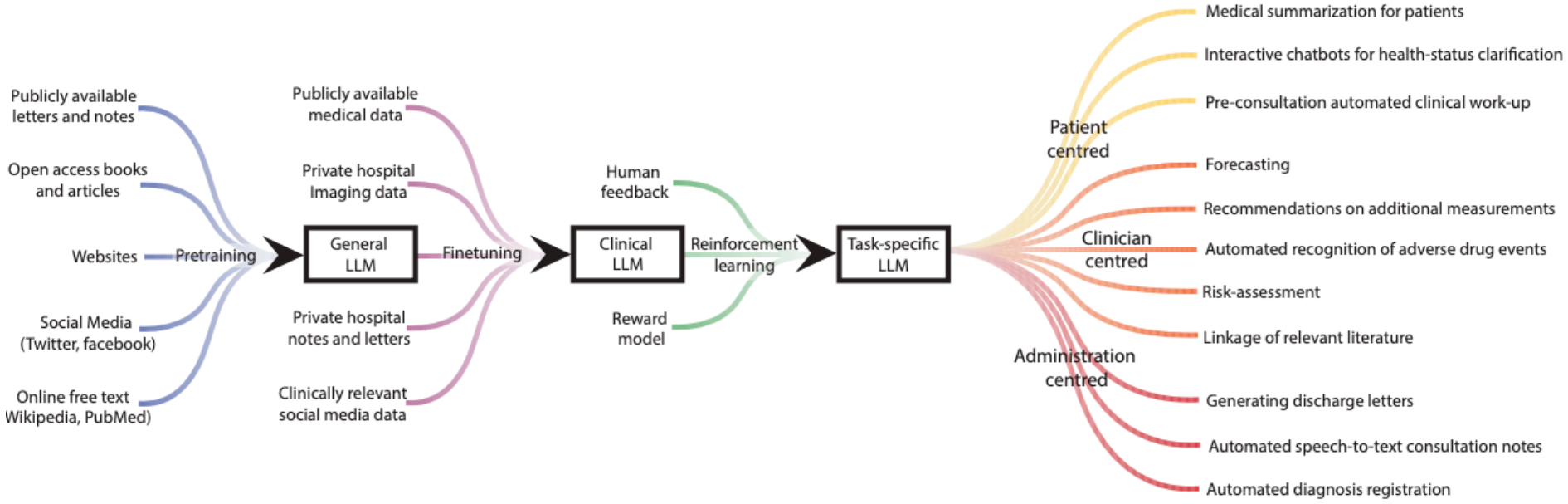
Illia Polosukhin* ‡ illia.polosukhin@gmail.com

31st Conference on Neural Information Processing Systems (NIPS 2017), Long Beach, CA, USA.

$$\text{Attention}(Q, K, V) = \text{softmax}(\frac{QK^T}{\sqrt{d_k}})V$$

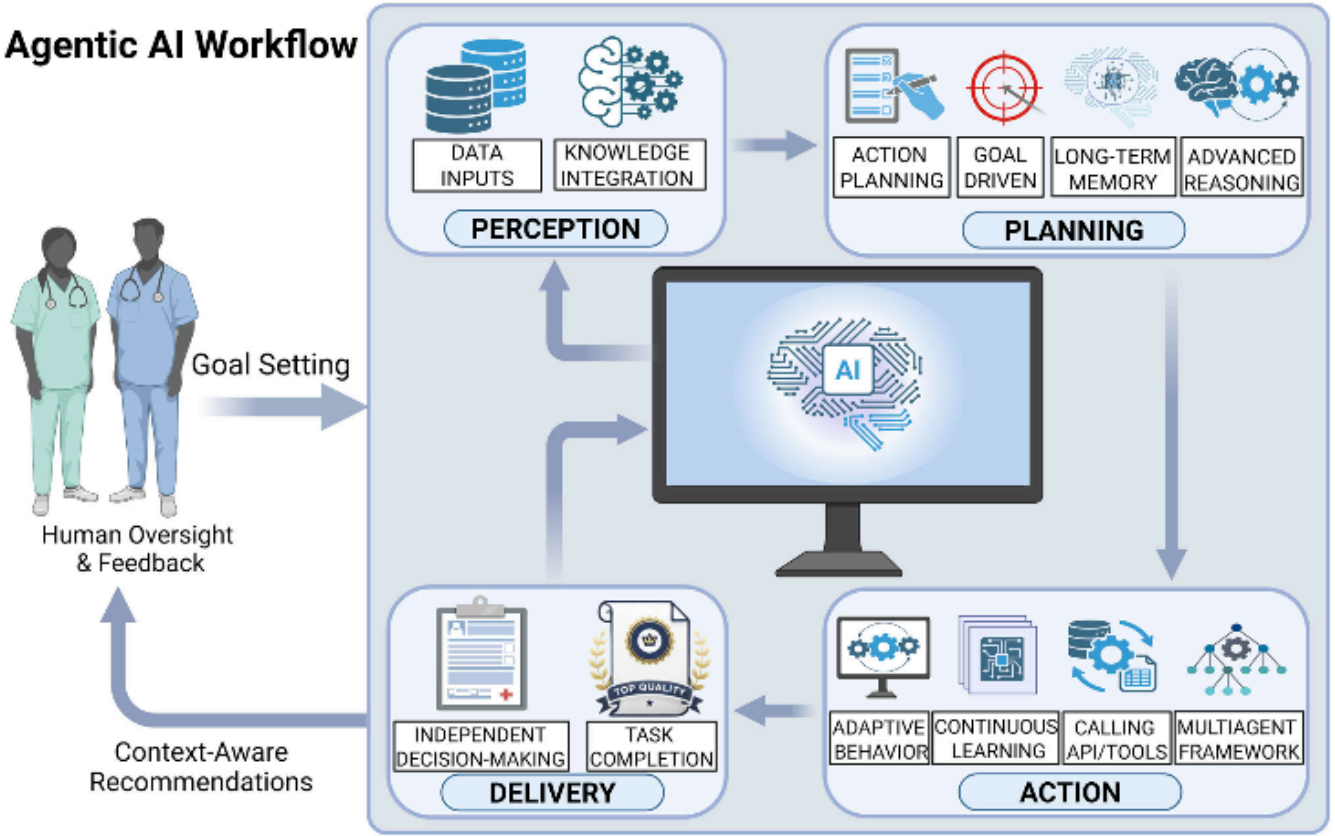


training task-specific LLM in cardiology



Boonstra MJ. Eur Heart J 2023

agentic AI



Collaco BG.NPJ Digit Med 2026;9:345.