Universität Zürich[UZH] | USZ Universitäts Spital Zürich | UZH .ai | ETH AI CENTER

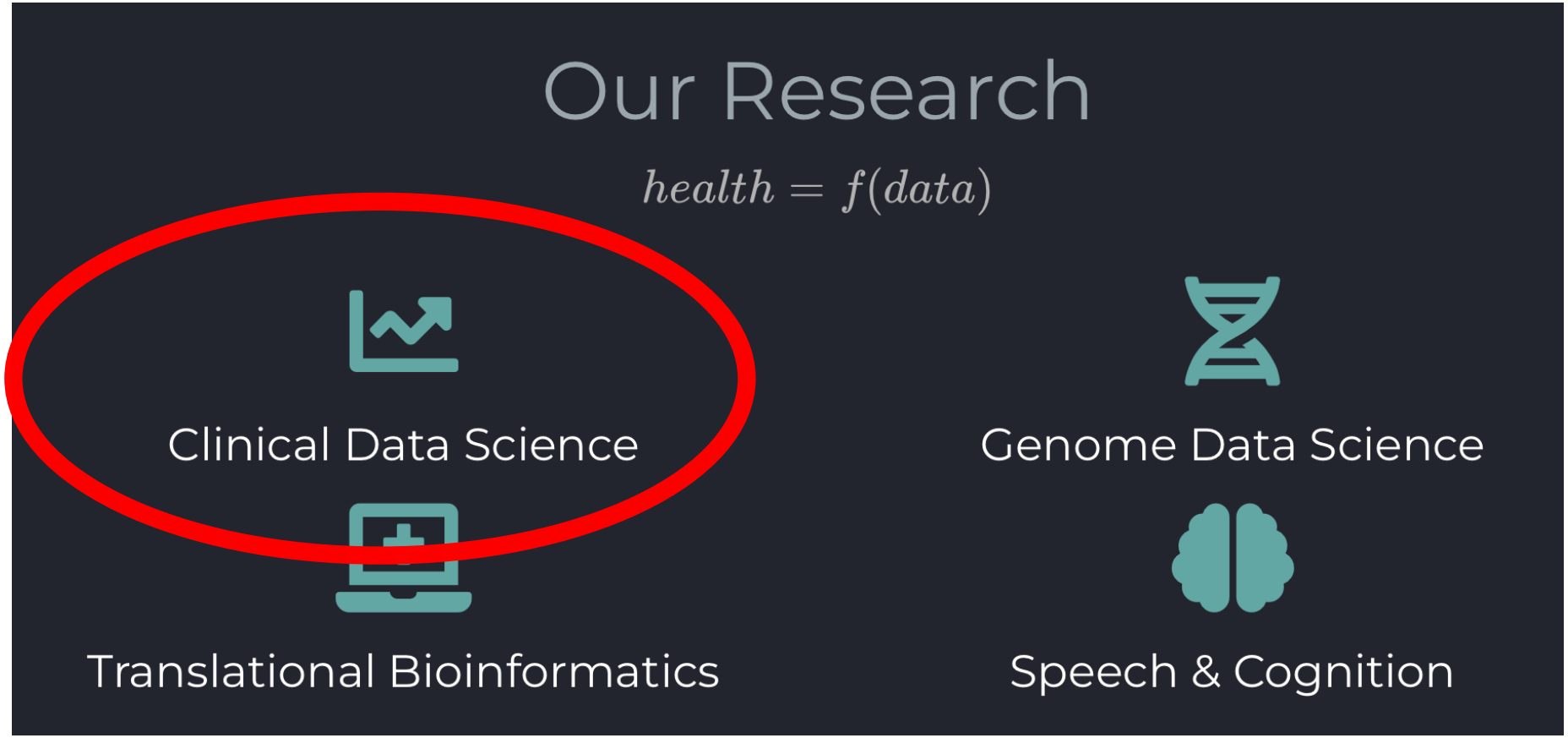


Development of Clinical AI at the University Hospital Zurich

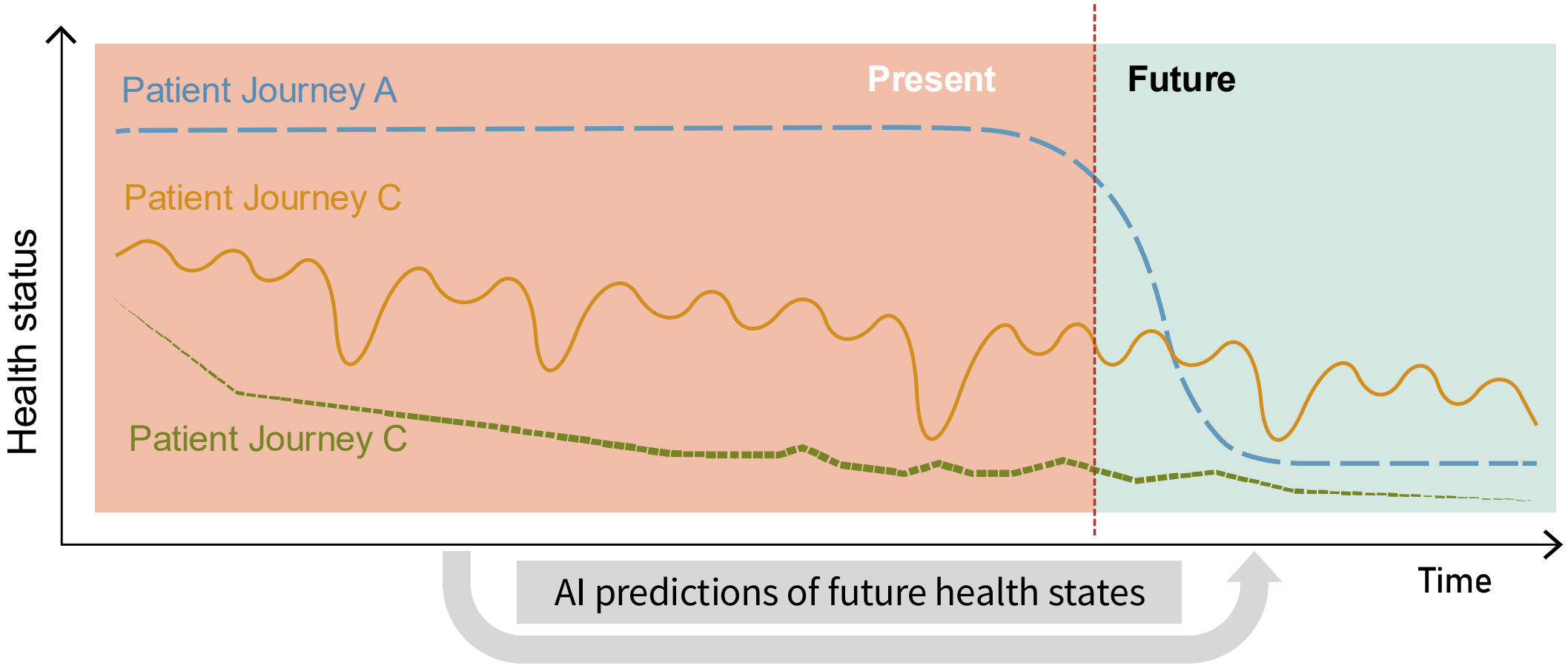
Michael Krauthammer, MD PhD

Sep 30, 2026

KrauthammerLab @ University of Zurich / University Hospital of Zurich



Research Focus I: Patient Journey Analysis



Patient Journey Analysis


Ahmed Allam


Cécille Trottet


Britta Maurer


Oliver Distler


Reto Schüpbach

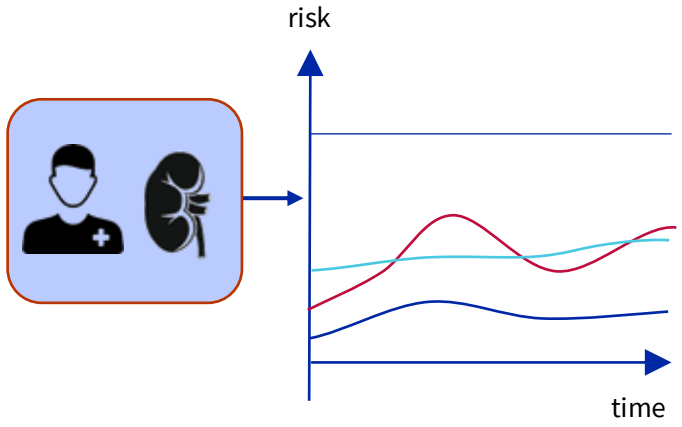

Emanuela Keller

Prediction of **delirium** in the ICU



https://www.masimo.de/care-areas/acute-care/icu/

Prediction of **transplant rejection** after kidney tr.



https://www.morethanscleroderma.com

Disease activity prediction in rheumatic diseases



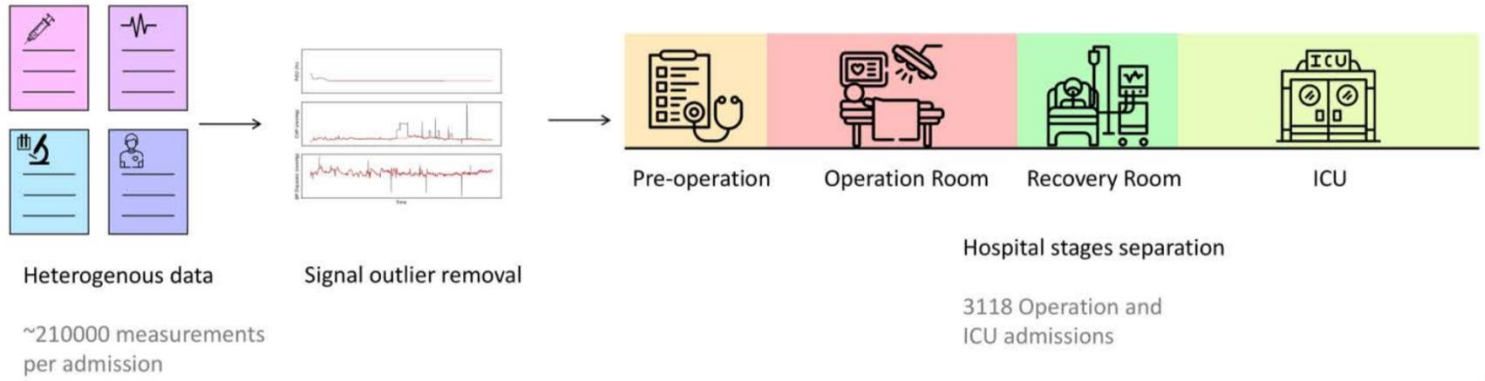
Patient Journey Analysis: Postoperative Delirium

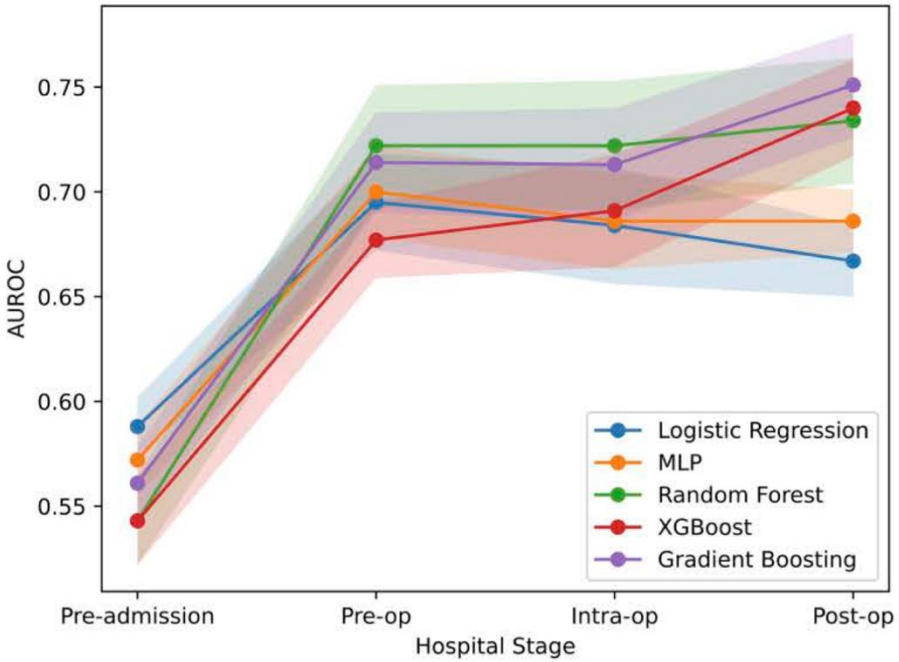
PLOS Digital Health 2026

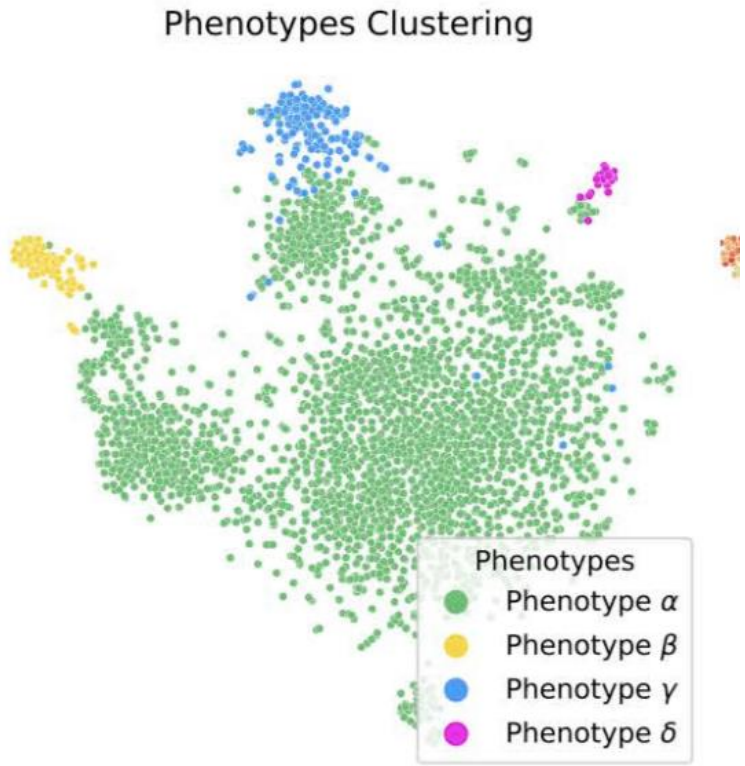
RESEARCH ARTICLE

Clustering of disease trajectories with explainable machine learning: A case study on postoperative delirium phenotypes

Xiaochen Zheng[1*], Ahmed Allam[1‡], Manuel Schürch[1‡], Xingyu Chen[2], Maria Angeliki Komninou[3], Reto Schüpbach[1,3], Jan Bartussek[1,3‡], Michael Krauthammer[1,3‡]







Patient Journey Analysis: Transplantation Outcome Prediction

npj | digital medicine

Article

Published in partnership with Seoul National University Bundang Hospital

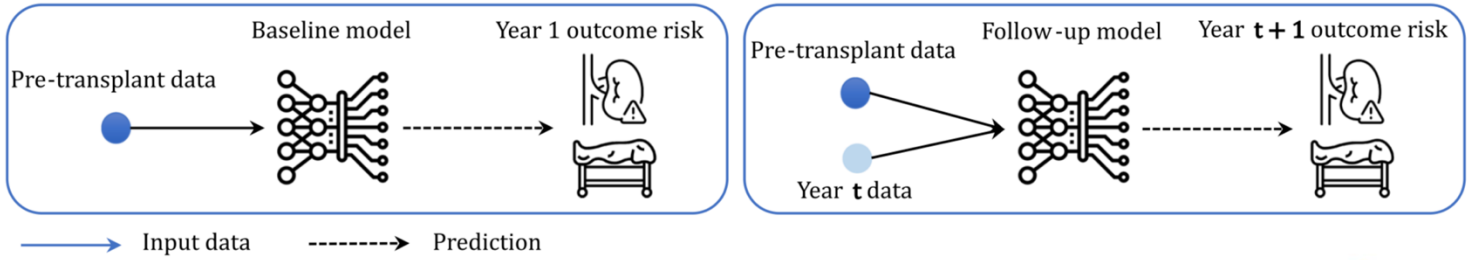
2025

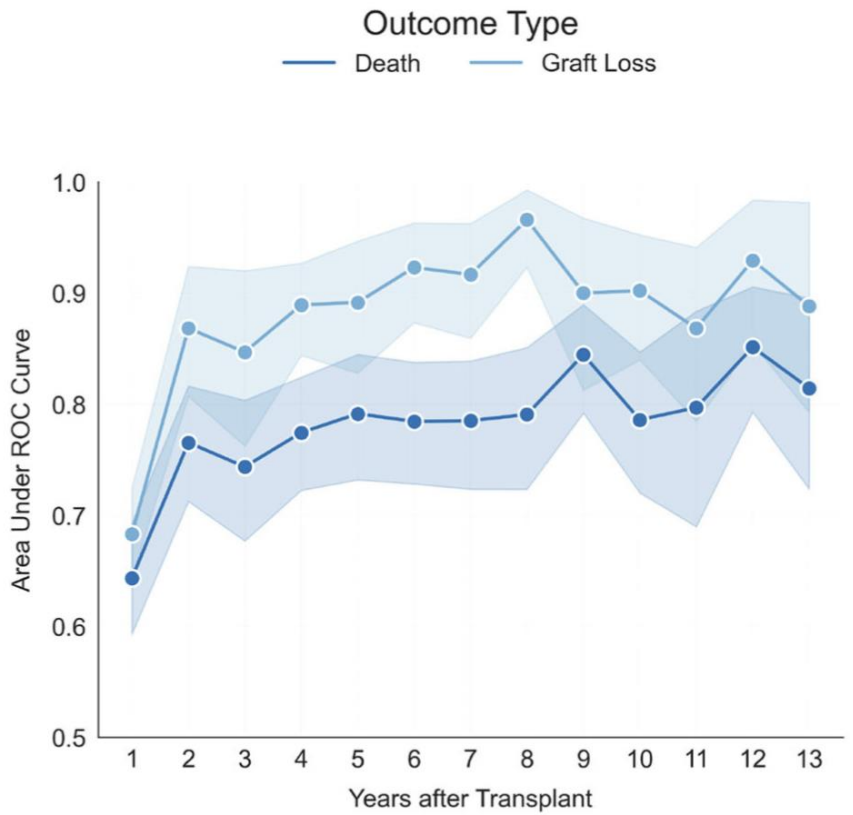
https://doi.org/10.1038/s41746-025-02049-4

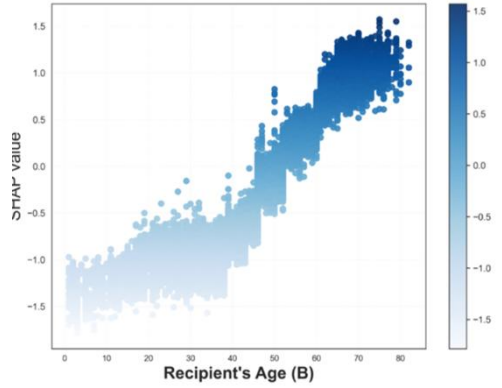
Enhancing post-kidney transplant prognostication: an interpretable machine learning approach for longitudinal outcome prediction

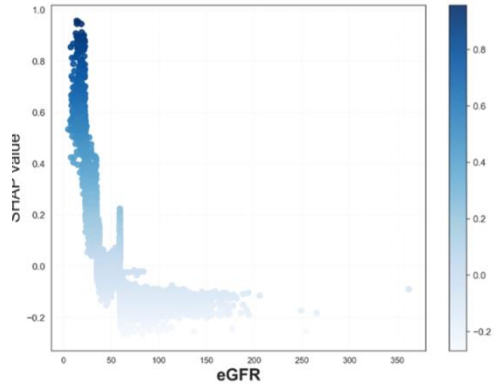
Check for updates

Bowen Fan[1] ✉, Manuel Schürch[2], Yuan Tian[3], Anna Mallone[3], Lukas Frischknecht[3], Michael Koller[4], Christian Van Delden[5], Alexander Leichtle[6,7], Dela Golshayan[8], Jean Villard[8], Thomas Schachtner[3], Daniel Sidler[9], Stefan Schaub[4], Jakob Nilsson[3,13], Michael Krauthammer[1,13] & Swiss Transplant Cohort Study[*]









Patient Journey Analysis: Systemic Sclerosis

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Article

Published in partnership with Seoul National University Bundang Hospital

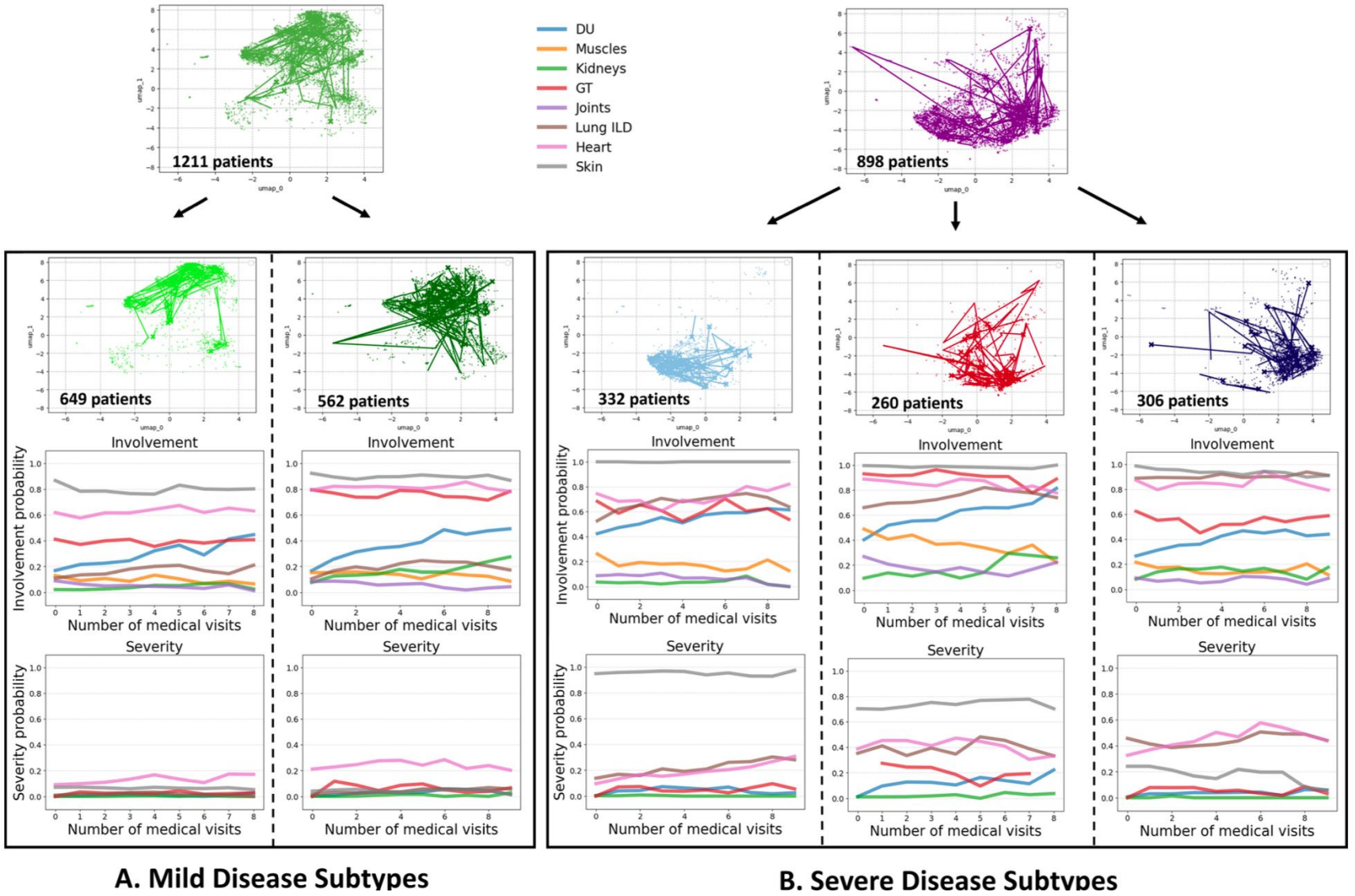
2025

https://doi.org/10.1038/s41746-025-01962-y

Deep hierarchical subtyping of multi-organ systemic sclerosis trajectories - a EUSTAR study

Check for updates

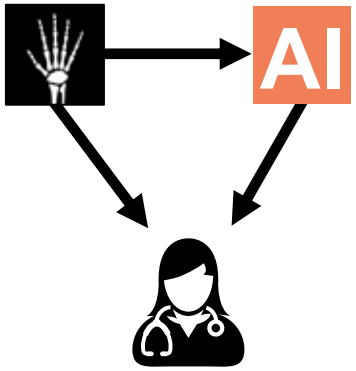
Cécile Trottet[1,2], Manuel Schürch[3,4], Ahmed Allam[1], Liubov Petelytska[5,6], Ivan Castellví[7], Radim Bečvář[8], Jeska de Vries-Bouwstra[9], Florenzo Iannone[10], Patricia Carreira[11], Marie-Elise Truchetet[12], Giovanna Cuomo[13], Elena Rezus[14], Francesco Paolo Cantatore[15], Carmen Pilar Simeón-Aznar[16], Magda Parvu[17], Marta Dzhus[18], Oliver Distler[5], Anna-Maria Hoffmann-Vold[5,19], Michael Krauthammer[1,2] ✉ & EUSTAR Collaborators*



Research Focus II: Medical Decision-Making

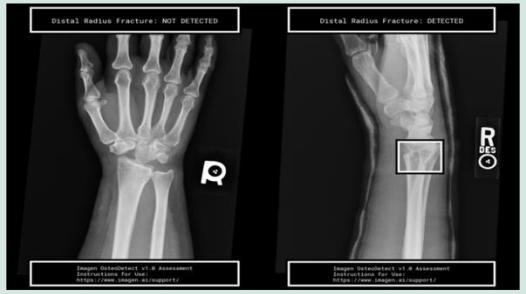
2026 Over 1000 FDA-approved AI systems available

AI Assistant



AI-supported diagnosis

OsteoDetect



Detect Fractures in radiology images

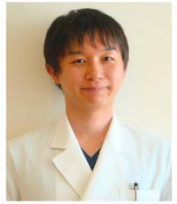
Physician performance **increased 4-5%** with AI

https://www.accessdata.fda.gov/cdrh_docs/reviews/DEN180005.pdf

RadVLM: Multitask Radiology Assistant

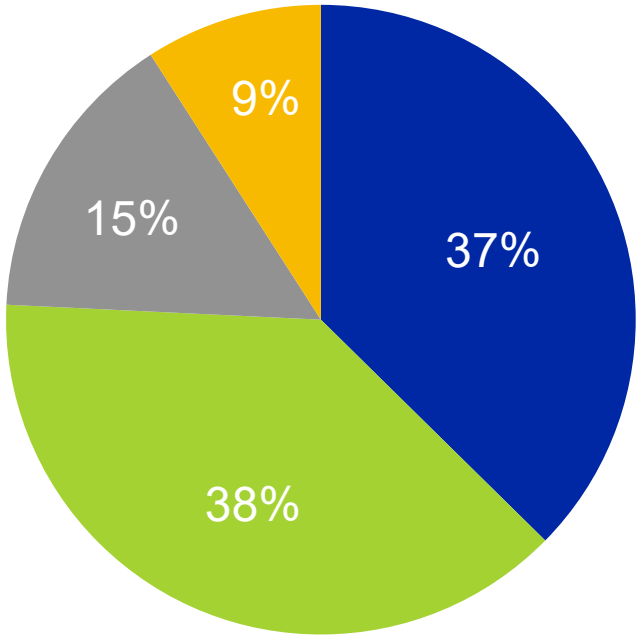
RadVLM: A Multitask Conversational Vision-Language Model for Radiology 2026

Nicolas Deperrois[1*], Hidetoshi Matsuo[2], Samuel Ruipérez-Campillo[3], Moritz Vandenhirtz[3], Sonia Laguna[3], Alain Ryser[3], Koji Fujimoto[4], Mizuho Nishio[2], Thomas M. Sutter[3], Julia E. Vogt[3], Jonas Kluckert[1,5], Thomas Frauenfelder[5], Christian Blüthgen[5], Farhad Nooralahzadeh[1†], and Michael Krauthammer[1†]



Instruction dataset with >1 Million instructions



- Report Generation
- Abnormality classification
- Visual Grounding
- Multi-turn Conversations

RadVLM: Multitask Radiology Assistant

a. Report generation

What can you say about this Chest X-Ray?



Lungs are well-expanded, but there is a new left lower lobe opacity seen best on the PA film, concerning for pneumonia. No pneumothorax. The cardiomediastinal silhouette is stable.

b. Abnormality classification

Are there identifiable abnormalities on this Chest X-ray?



I can find the following abnormalities: mass and nodule.

c. Abnormality grounding

Point out the location of the lung opacity.



The cardiomegaly is positioned at [0.69, 0.45, 0.82, 0.63] on the image.



d. Anatomy grounding

Can you locate the left lung on the image?

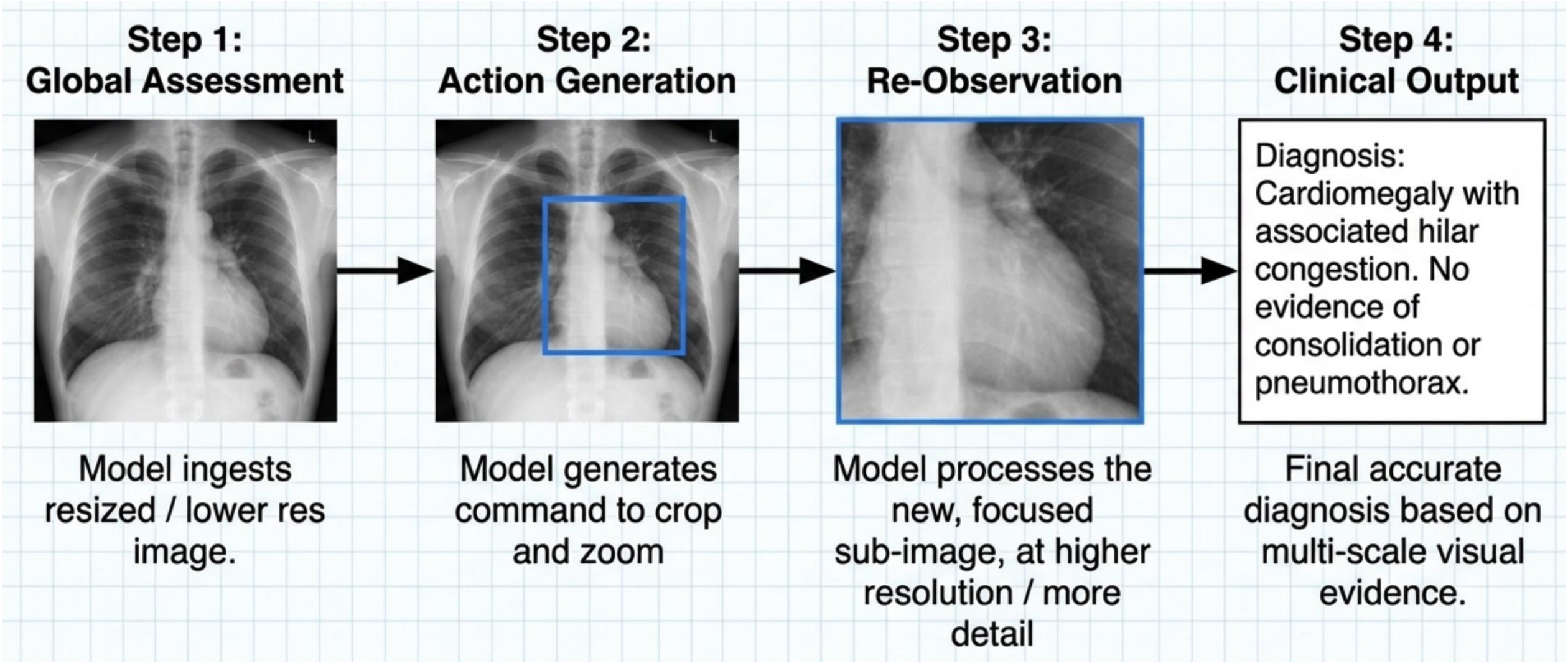


The left cardiophrenic angle is located at [0.22, 0.37, 0.48, 0.54] on X-ray.



Deperrois, N., Matsuo, H., Ruipérez-Campillo, S., Vandenhirtz, M., Laguna, S., Ryser, A., ... & Krauthammer, M. (2025). RadVLM: A multitask conversational vision-language model for radiology. *arXiv preprint arXiv:2502.03333*.

RadVLM: Next Steps - Visual Thinking via Zoom-in Tool Use



RadVLM – Summary

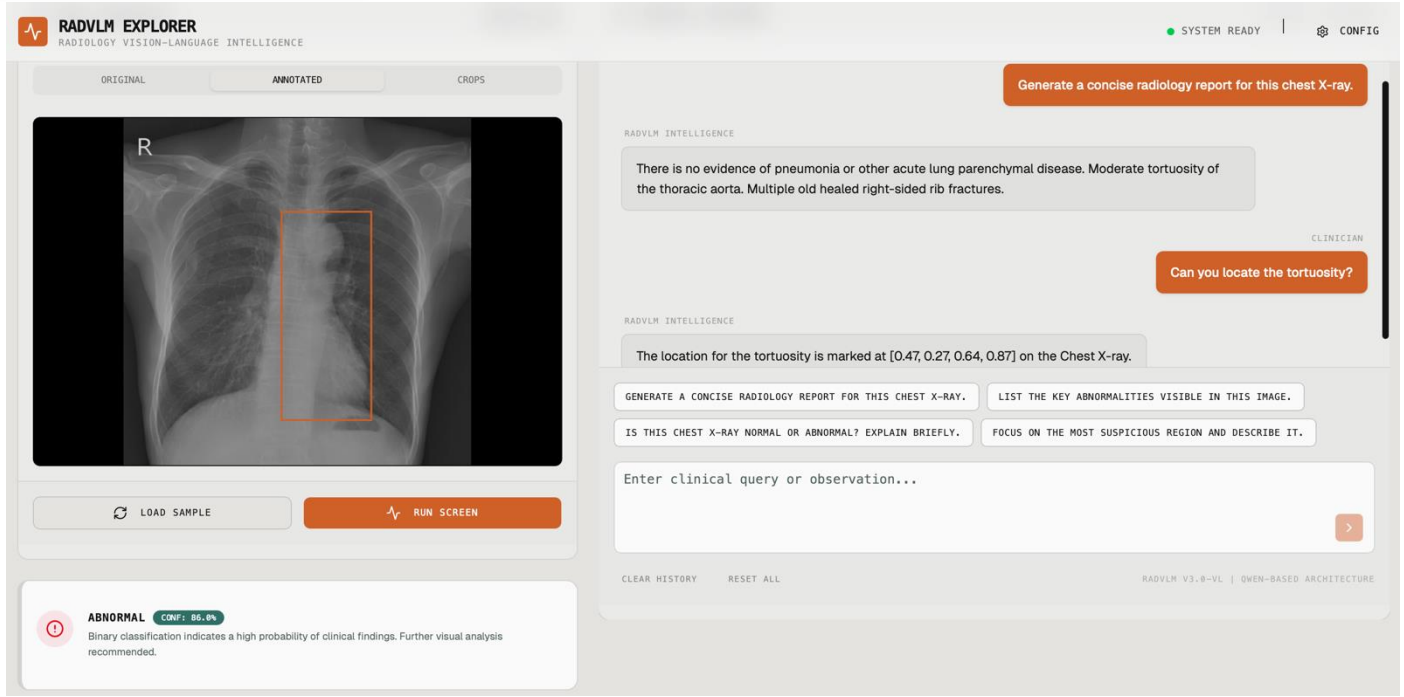
PhysioNet

Database | Credentialed Access

RadVLM Instruction Dataset

Nicolas Deperrois, Hidetoshi Matsuo, Samuel Ruiperez-Campillo, Moritz Vandenhirtz, Sonia Laguna, Alain Ryser, Koji Fujimoto, Mizuho Nishio, Thomas Sutter, Julia Vogt, Jonas Kluckert, Thomas Frauenfelder, Christian Bluethgen, Farhad Nooralahzadeh, Michael Krauthammer

Published: Sept. 25, 2025. Version: 1.0.0



Voice-Based Diagnostics: Psychiatry

npj | digital medicine

Article

Published in partnership with Seoul National University Bundang Hospital

2026

https://doi.org/10.1038/s41746-025-02309-3

Uncertainty modeling in multimodal speech analysis across the psychosis spectrum

Check for updates

Morteza Rohanian[1,2] ✉, Roya Hüppi[3], Farhad Nooralahzadeh[1], Noemi Dannecker[3], Yves Pauli[3], Werner Surbeck[3], Iris Sommer[4], Wolfram Hinzen[5,6], Nicolas Langer[7], Michael Krauthammer[1,2] & Philipp Homan[3,8]

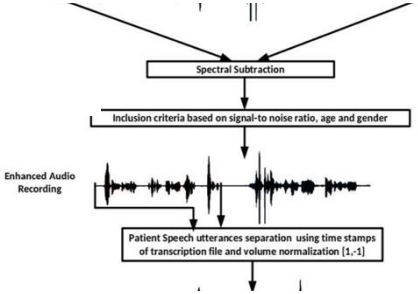




Morteza Rohanian



Philipp Hohman



Cognitive State (Dementia, Schizophrenia…)

Rohanian, Morteza. "Multimodal Assessment of Cognitive Decline", 2021
Rohanian, Morteza et al. "Uncertainty Modeling in Multimodal Speech Analysis Across the Psychosis Spectrum", 2026

Research Focus 3: Hospital Process Optimization



Process Optimization: Nursing Ressource Allocation

JOURNAL OF MEDICAL INTERNET RESEARCH 2025 McMahon et al

Original Paper

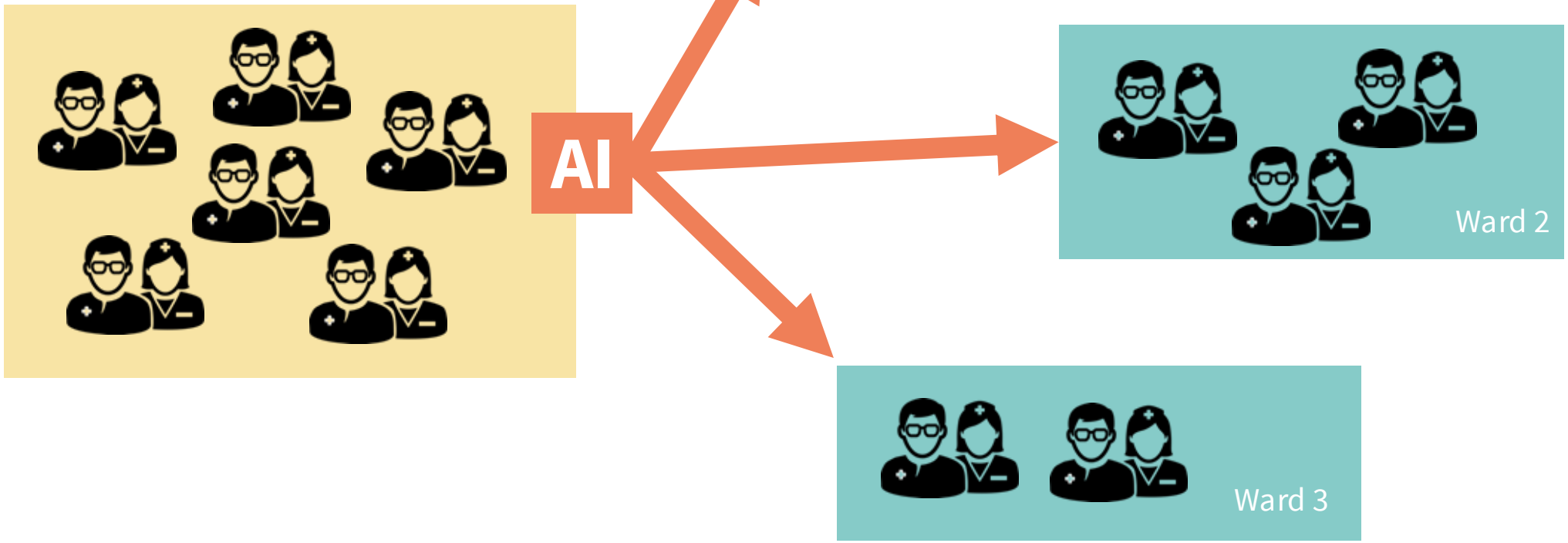
Development of a Data-Based Method for Predicting Nursing Workload in an Acute Care Hospital: Methodological Study

Mark McMahon[1,2], MSc; Sylvie Plate[3], RN, MScN; Tobias Herz[3], RN, BA; Gabi Brenner[3], RN, MScOD; Michael Kleinknecht-Dolf[3], RN, PhD; Michael Krauthammer[1,2], MD, PhD



Gabi Brenner

Fixed number of nurses



Process Optimization: AI for Patient Scheduling

JAMIA Open, 2026;9(4), ooag151
https://doi.org/10.1093/jamiaopen/ooag151
Research and Applications

2026 AMIA OXFORD

From prediction to practice: machine learning models and real-world interventions for magnetic resonance imaging appointment no-shows in a hospital setting

Mark McMahon, MSc[1,2], Jonas Kluckert, MD[1,2,3], Olivio F. Donati, MD[3], Nicolas Andres Perez Gonzalez, PhD[1,2], Laura Kinkead, MSc[1,2], Christian Blüthgen, MD, MSc[3], Andreas Hötker, MD[3], Thomas Frauenfelder, MD[3], Michael Krauthammer, MD, PhD[1,2,*]


Mark McMahon


Jonas Kluckert


Olivio Donati

Improved MRI Usage

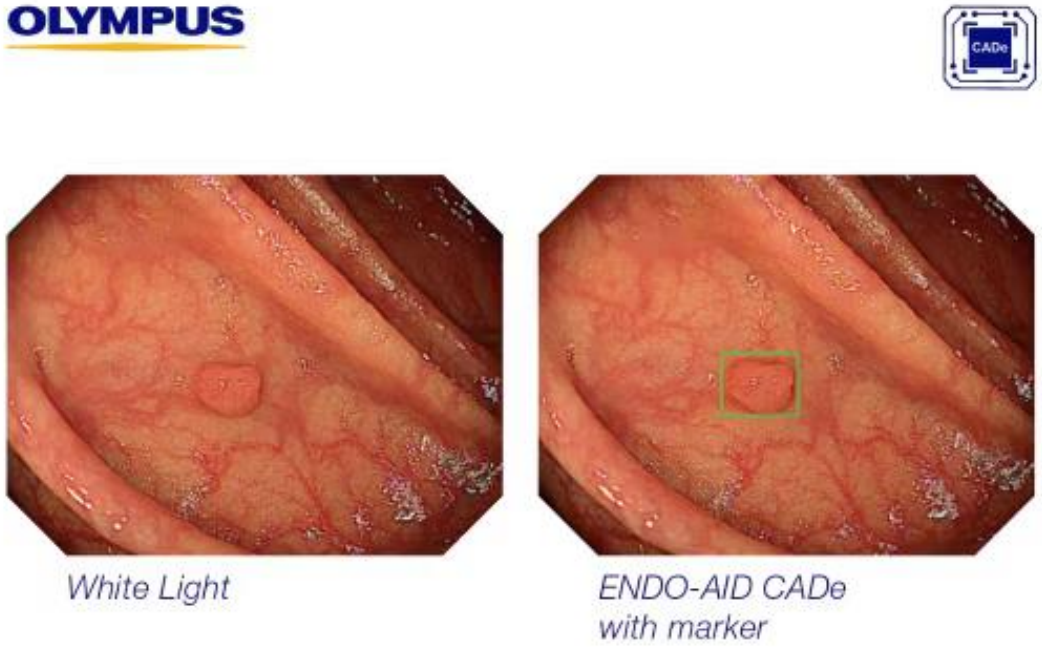


- MRI machines are 17% idle (not booked) during day
- Substantial costs / missed income

- We are building an AI application that identifies patients that will likely miss their appointment
- These patients receive targeted appointment reminders

McMahon, in review, JAMIA Open

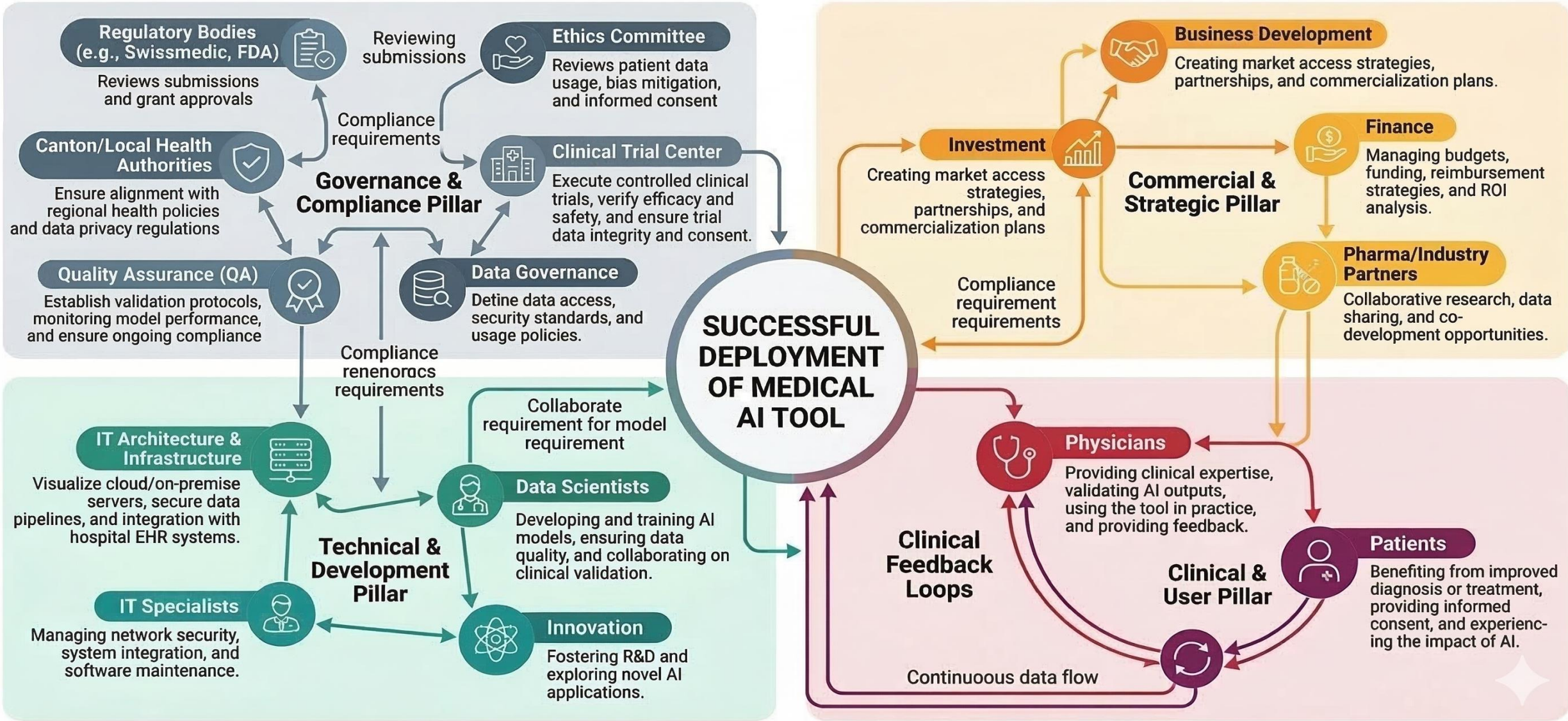
Success Stories: Control...





Kamitani Y, Nonaka K, Isomoto H. Current Status and Future Perspectives of Artificial Intelligence in Colonoscopy. J Clin Med. 2022 May 22;11(10):2923.

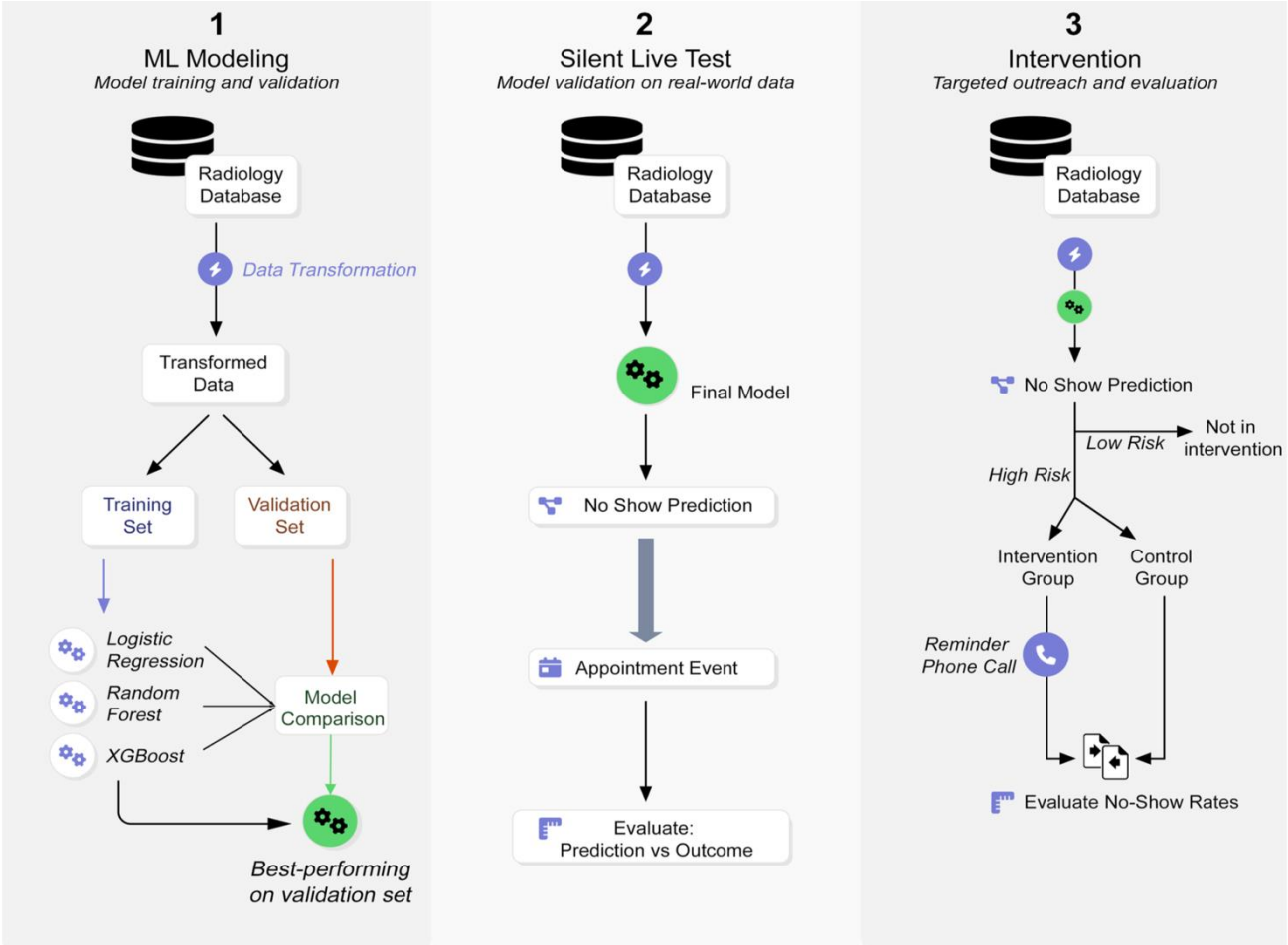
But the Journey is Hard ...



But the Journey is Hard …

AI for identifying Patients that do not show up for MRI exam → extra phone call





AI worked very well, but patients still did not show up for exam

McMahon et. al, in submission

Healthcare Systems and AI



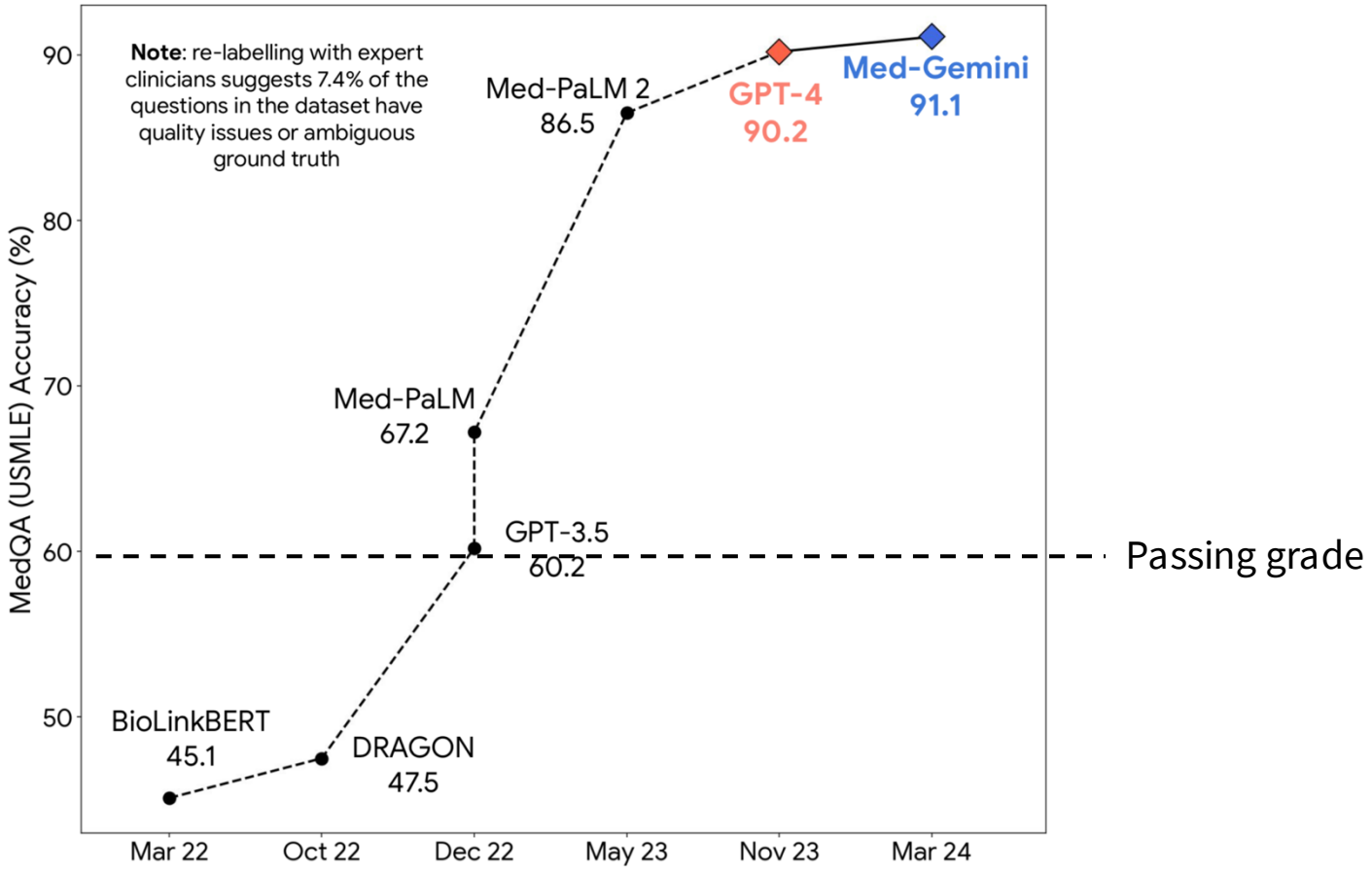
AI, Societal Changes and the Future of Medicine





DALL-E “AI will improve medicine” 28.1.2023

Large Language Models (LLMs): Solving Medical Cases



https://research.google/blog/advancing-medical-ai-with-med-gemini/

LLMs vs Physicians: Empathic Respones

npj | digital medicine

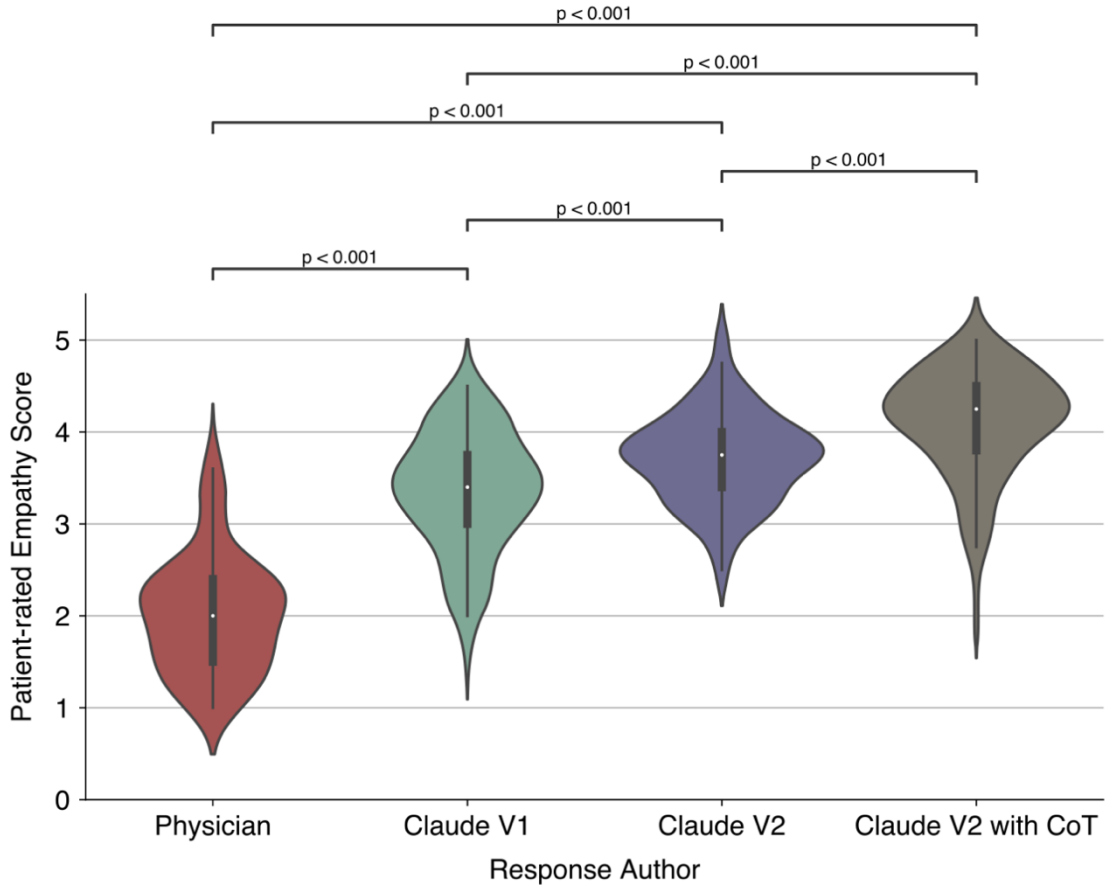
Brief communication

Published in partnership with Seoul National University Bundang Hospital

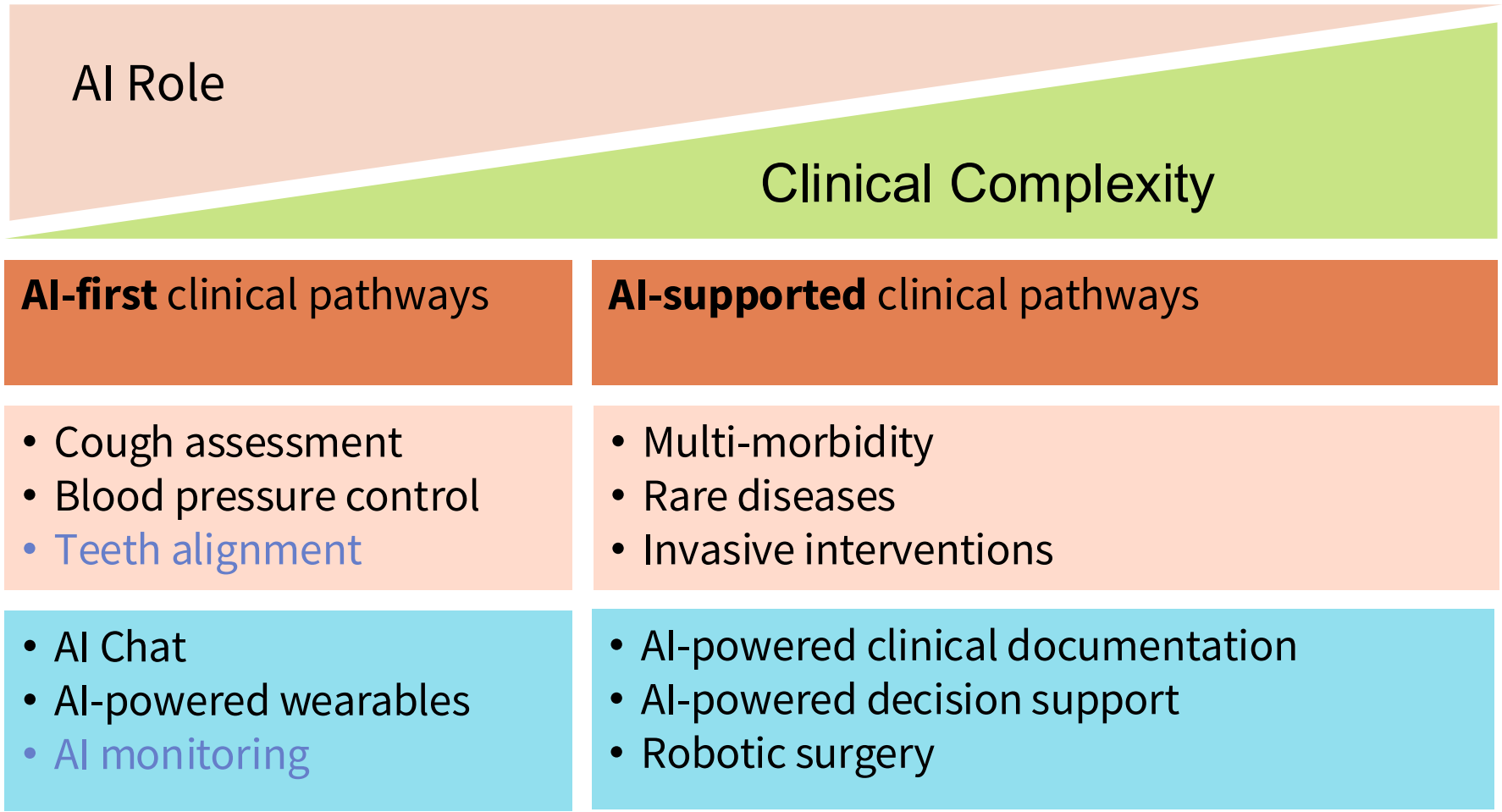
2025

https://doi.org/10.1038/s41746-025-01671-6

Patient perceptions of empathy in physician and artificial intelligence chatbot responses to patient questions about cancer



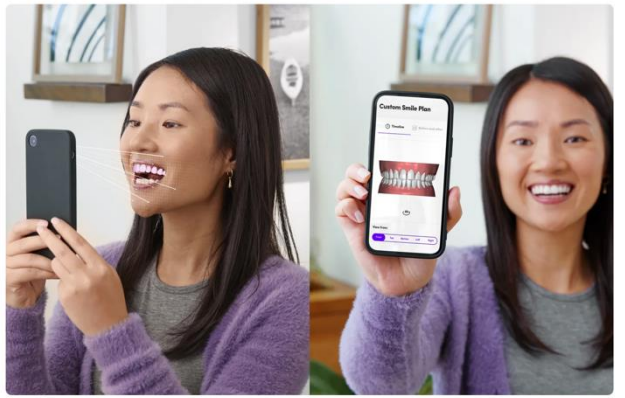
AI and the Complexity of Medical Care



AI-First Teeth Alignment

Teeth alignment *and AI-first clinical pathway:* Direct-to-consumer (DTC) AI companies like SmileDirectClub (USA)

- **Little involvement** of traditional dentists
- **AI integration**: “We were able to bring our treatment planning process down from 45 minutes to under 10 minutes, because we automated that whole process”
- **Regulatory challenges and legal battles**: The company faced relentless opposition from the dental community, including complaints from the American Association of Orthodontists. SmileDirectClub was **shutdown** in **2023**.

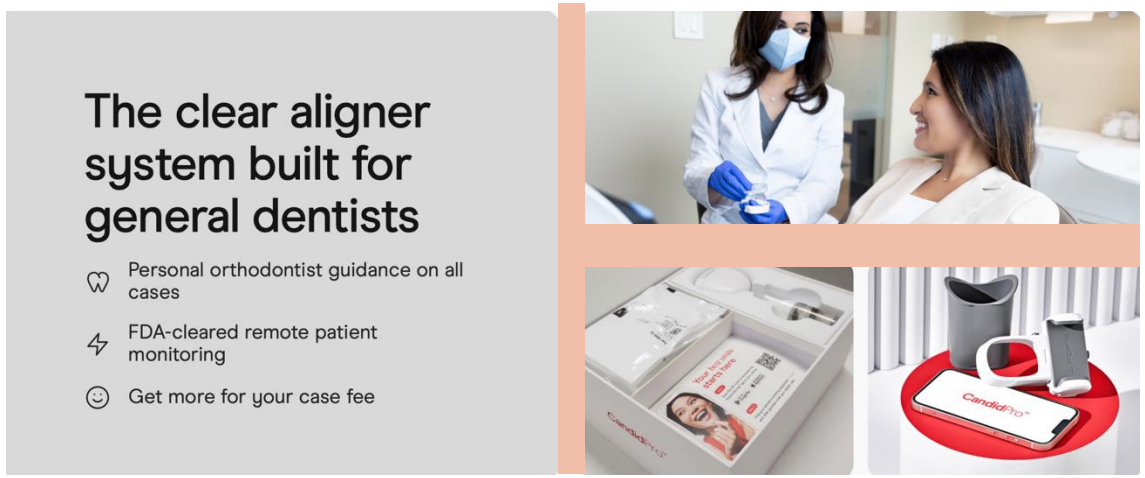


The technology enables SmileDirectClub to get an accurate model of a customer’s teeth in their current state to inform treatment plans.
Permission granted by SmileDirectClub

https://www.ciodive.com/news/SmileDirectClub-CIO-AI-strategy-Justin-Skinner/648216/

AI-Supported Teeth Alignment

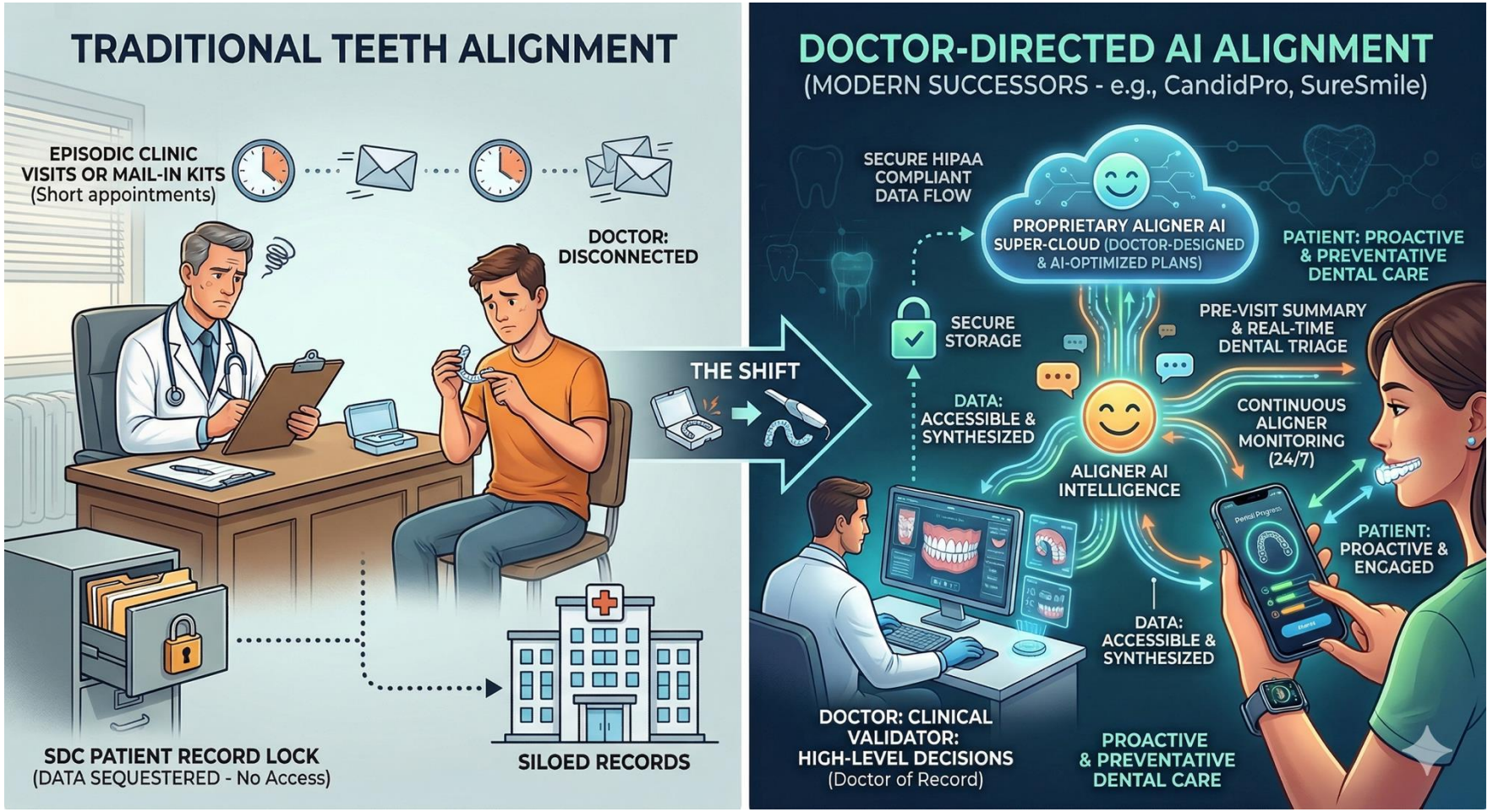
- **DTC-model not successful**.
  New business *model includes independent dentists*
  (Example: CandidPro)
- **AI-based remote monitoring**
- **Company-provided specialists**
- **Data ownership** questions**,**
  lock-in issues



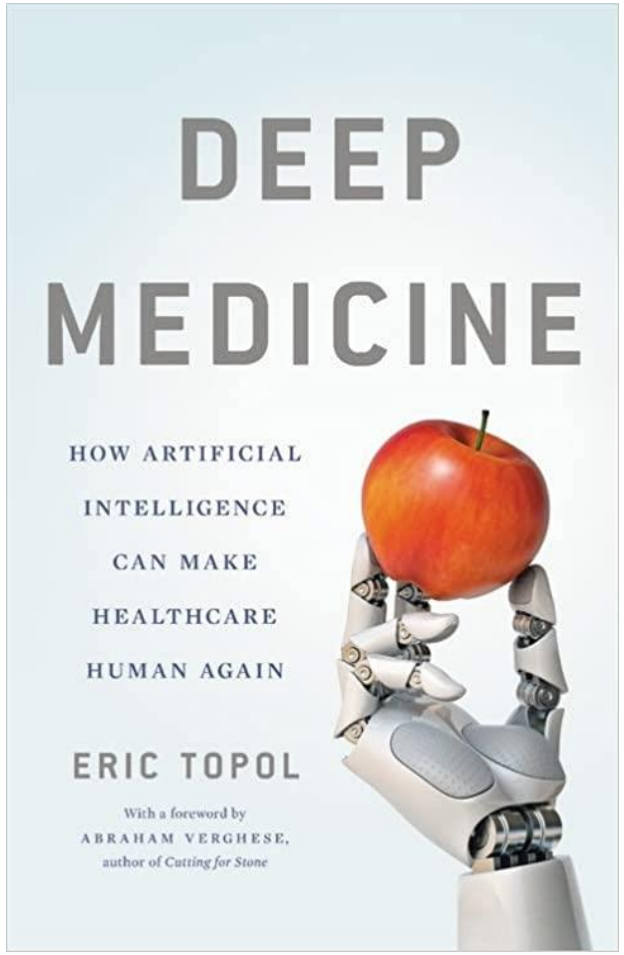
Role of independent dentists changing; i.e. first point of contact and subsequent AI-support; not “sole” authority

https://www.candidpro.com/providers/homepage

Patient-centric & Tech-dominated Healthcare System



Reimagining Care with AI



AI takes on routine task

Physicians have more time for patients

AI aids in diagnosis, therapy decisions

Higher quality care for patients

AI-first business models

Patient-centric & tech-dominated health

I am looking forward to the discussion…





krauthammerlab.ch