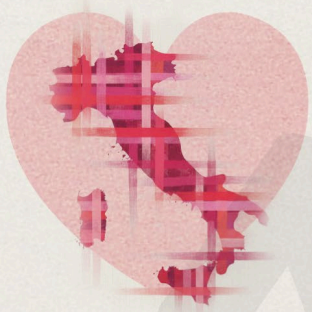

L'ITALIA che SI PRENDE CURA

27-28 FEBBRAIO

CONFERENZA REGIONALE

La SALUTE è un DIRITTO

Arsela Prelaj, MD, PhD,
Medico Oncologo &
Head of AI-ON-Lab
Fondazione IRCCS Istituto
Nazionale Tumori di Milano, Italy
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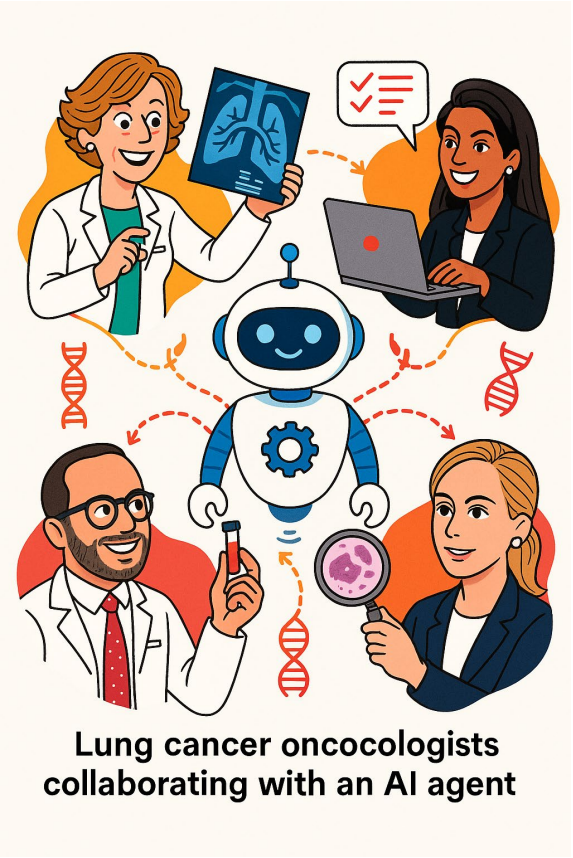
AI evolution in Healthcare



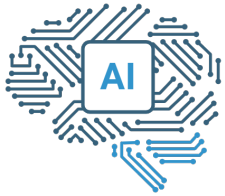
Lung cancer oncocologists collaborating with an AI agent

Data overload

Time pressure

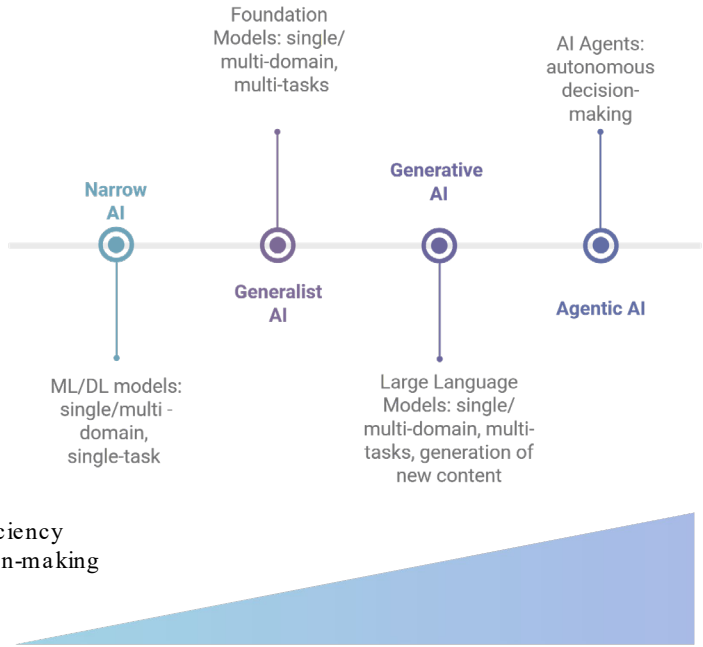
Variability in data interpretation

Fragmented data systems



AI solutions

- Data integration
- Time saving
- Task-solving efficiency
- Improved decision-making



Clinical Usability: I3LUNG

Under Revision in Nature Medicine

PATIENTS COHORT

100 NSCLC pts treated with ICI, 6 I3LUNG centers

PHYSICIANS

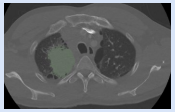
10 experts in lung cancer

10 non-experts in lung cancer

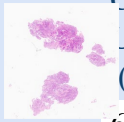
PHASE 1 - NO XAI support

Patients' data

Clinical
demographic
lab
Genomics
molecular



CT scan



H&E slide

Clinical Usability (n=100)

Age, median (range) 67 (30–87)

Male, % 64.0

ECOG PS 0, % 32.4

Adenocarcinoma, % 74.0

Ever smoker, % 93.4

Stage therapy, % 96.0

Questions

Will this patient achieve DCR with IO-based treatment?

YES NO

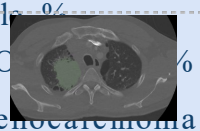
What is the most likely survival range for this patient?

<6m, 6-12m, 12-18m, ≥24m

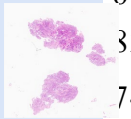
PHASE 2 - WITH XAI support

Patients' data

Clinical
demographic
lab
Genomics
molecular

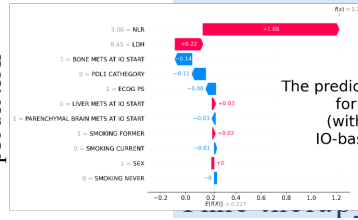


CT scan

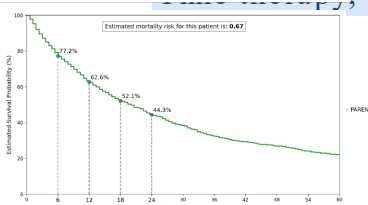


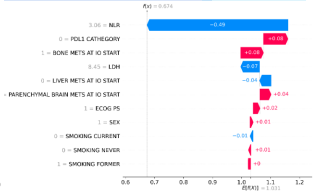
H&E slide

XAI DCR prediction



XAI OS prediction





Questions

After seeing the XAI DCR prediction Will this patient achieve DCR with IO-based treatment?

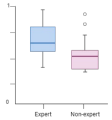
YES NO

After seeing the XAI OS prediction what is the most likely survival range for this patient?

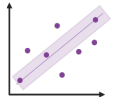
<6m, 6-12m, 12-18m, ≥24m

ANALYSIS

Phase 1 vs

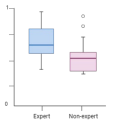


Difference in performance

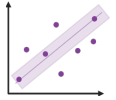


Agreement

Phase 2 vs



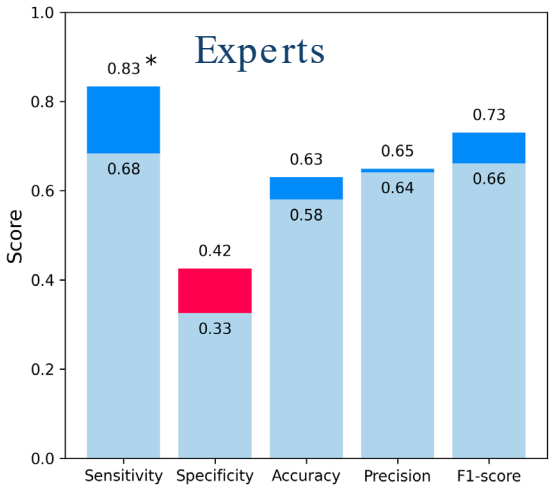
Difference in performance

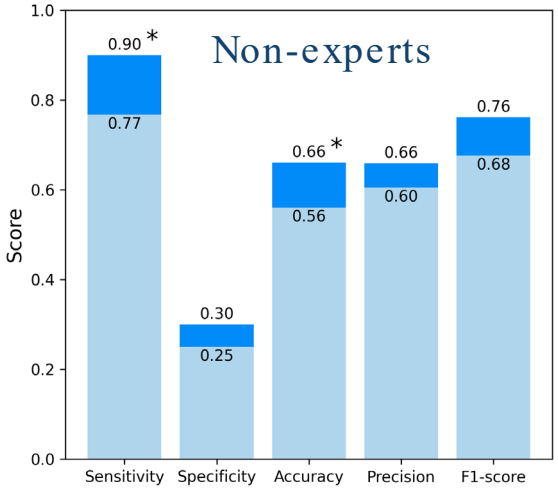


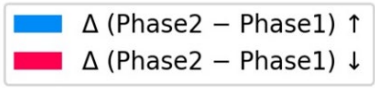
Agreement

Clinical Usability study: Results

DCR







XAI increases the probability of predicting the true DCR by 37% for all physicians:

53% for non-experts vs

23% for experts

OS

XAI increases the probability of predicting the true OS by 36% for all physicians:

61% for non-experts vs 14% for experts

ESMO ANNALS OF ONCOLOGY DRIVING INNOVATION IN ONCOLOGY

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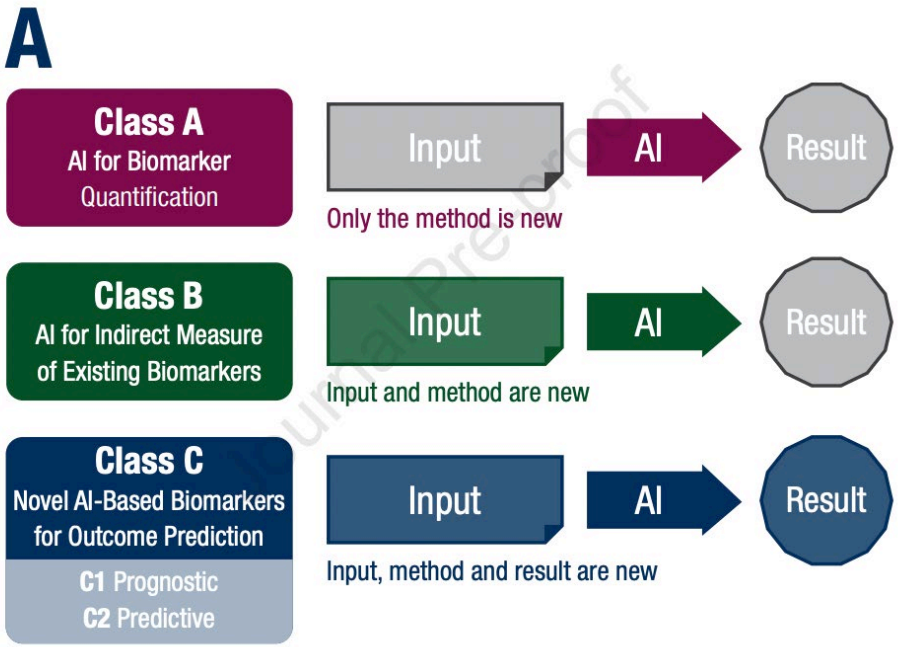
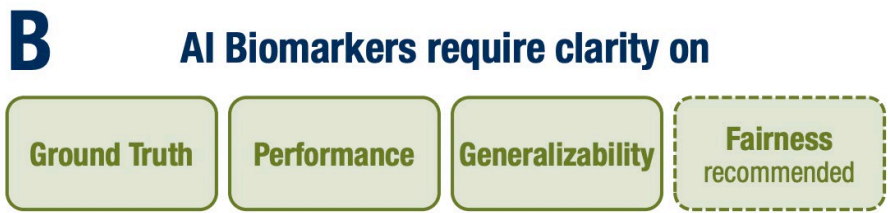
ESMO Basic Requirements for AI-based Biomarkers In Oncology (EBAI)

M. Aldea [1,2,3] · M. Salto-Tellez [4,5] · A. Marra [6,7] · R. Umeton [8,9,10,11] · A. Stenzinger [12] · M. Koopman [13] · A. Prelaj [14,15] · K.L. Kehl [3] · S. Gilbert [16] · M-E Leßmann [16] · J. Lipkova [17,18,19] · L. Provenzano [20,21] · F. Meric-Bernstam [22] · S. Halabi [23] · J. Wu [24] · A. Pellat [25] · K.P.M. Suijkerbuijk [26] · B. Besse [1,2] · B. Ryll [27] · C. Marchió [28,29] · M. Crispin-Ortuzar [30] · R. Fehrmann [31] · J. Vibert [32] · D. Ferber [33] · C. Pauli [34] · A. Valachis [35] · Federica Corso [14] · T.J. Brinker [36] · J. Mateo [37] · N. Harbeck [38] · E.C. Winkler [39] · F. Lopez-Rios [40] · R. Perez-Lopez [41] · G. Pentheroudakis [42] · S. Delaloge [1] · C. Benedikt Westphalen [43,44] · J.N. Kather [16,33,45] Show less

Affiliations & Notes Article Info





AI tools validation

LLMs for DM

LLMs as Clinical Decision Making

npj | precision oncology

Article

Check for updates

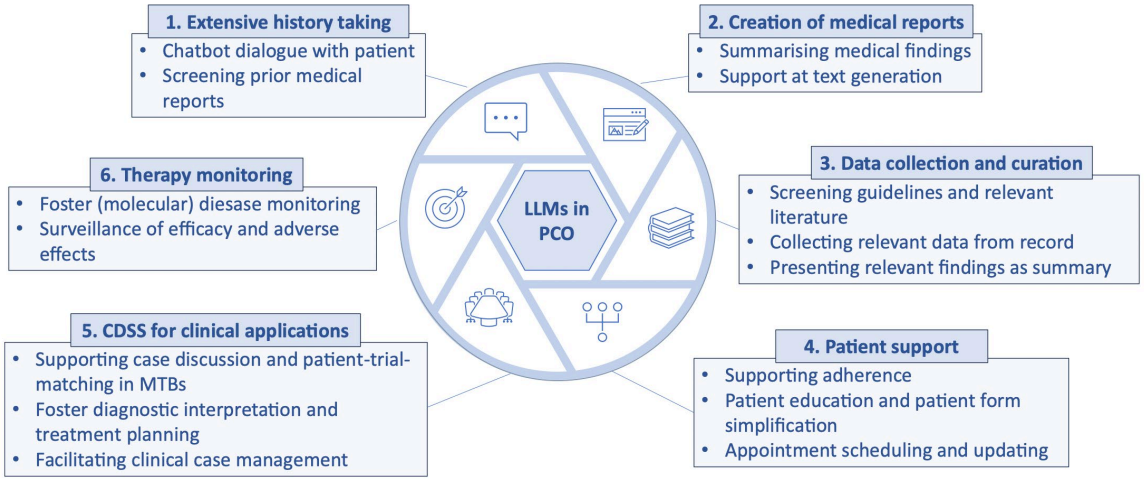
Sonja Mathes[1,2] ✉, Dyke Ferber[3,4,5], Tobias Dreyer[6,7], Kai J. Borm[8,9], Luise Modersohn[10], Theresa Willem[11,12], Richard Dirven[13,14,15], Julien Vibert[15,16], Simon Kreutzfeldt[15,17], Raquel Perez-Lopez[15,18], Arsela Prelaj[15,19], Fredrik Strand[20,21], Richard D. Baird[15,22], Martin Boeker[10], Jakob Nikolas Kather[3,4,5,15,23], Maximilian Tschochohei[10,24] & Jacqueline Lammert[6,7,10,25]

0.1038/s41698-025-01180-5

Collaborative framework on responsible AI in LLM-driven CDSS for precision oncology leveraging real-world patient data

https://doi.org/10.1038/s41698-025-01180-5

Article



LLM: Large Language Models, PCO: Precision Oncology, MTB: Molecular Tumor Board

ESMO GOOD SCIENCE BETTER MEDICINE BEST PRACTICE

ANNALS OF ONCOLOGY DRIVING INNOVATION IN ONCOLOGY

How we can use LLMs for clinical decisio-making?

SPECIAL ARTICLE

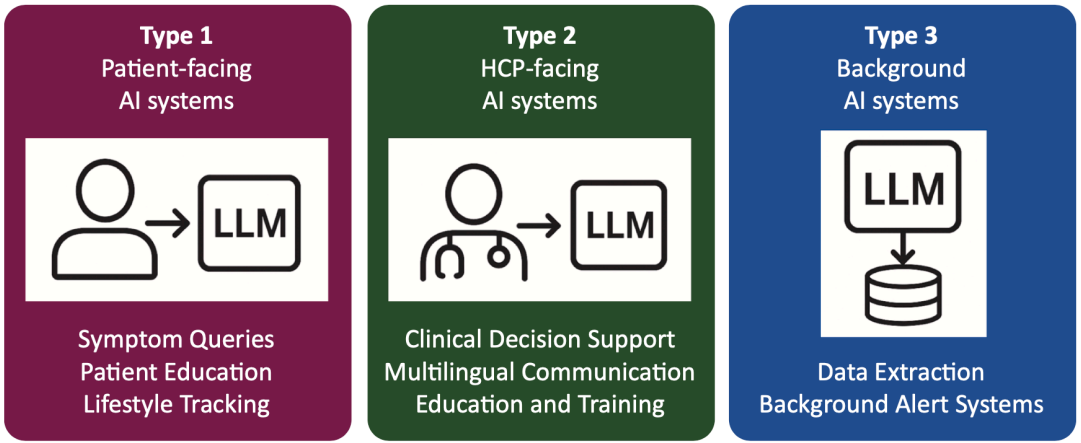
ESMO guidance on the use of Large Language Models in Clinical Practice (ELCAP)

E. Y. T. Wong[1†], L. Verlingue[2†], M. Aldea[3,4,5†], M. A. Franzoi[6,7], R. Umeton[8,9,10,11,12]. S. Halabi[13]. N. Harbeck[14]. A. Indini[15]. A. Prelaj[16], E. Romano[17], E. Smyth[18], I. B. Tan[1], A. Valachis[19], J. Vibe G. Kapetanakis[24], G. Pentheroudakis[25], M. Koopman[26‡] & J. N. Kathe

ELCAP

ESMO guidance on the use of Large Language Models in Clinical Practice

All current LLM uses in clinical decision-making are assistive, exploratory, and under strict human supervision.



Arsela Prelaj, MD, PhD Fondazione IRCCS Istituto Nazionale Tumori di Milano

From LLMs to AI Agent

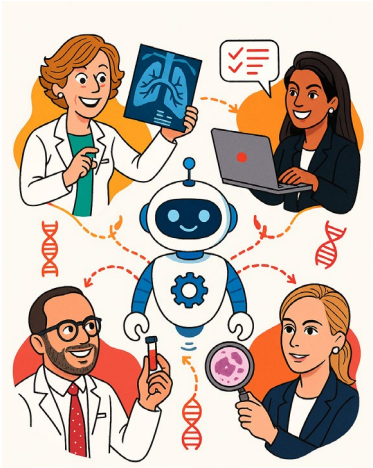
Role of AI agents

What defines an AI agent and its role in cancer?

From AI as tools → **To AI as teammates**

Doctor = User → Doctor = Supervisor

Human-AI collaboration



Key points:

- AI as *tool* = reactive, requires human action and continuous re-training
- AI as *agent* = proactive, context-aware, able to integrate data, track clinical histories, and propose solutions in a more autonomous way

The future AI agents will act as autonomous but supervised teammates supporting cancer decision-making process.

Multi-agent immunotherapy prediction

2025 ESMO AI & DIGITAL ONCOLOGY
Annual Congress

71MO: Collaborative Human-Agent for Therapeutic Decision-Making In Cancer Immunotherapy Prediction

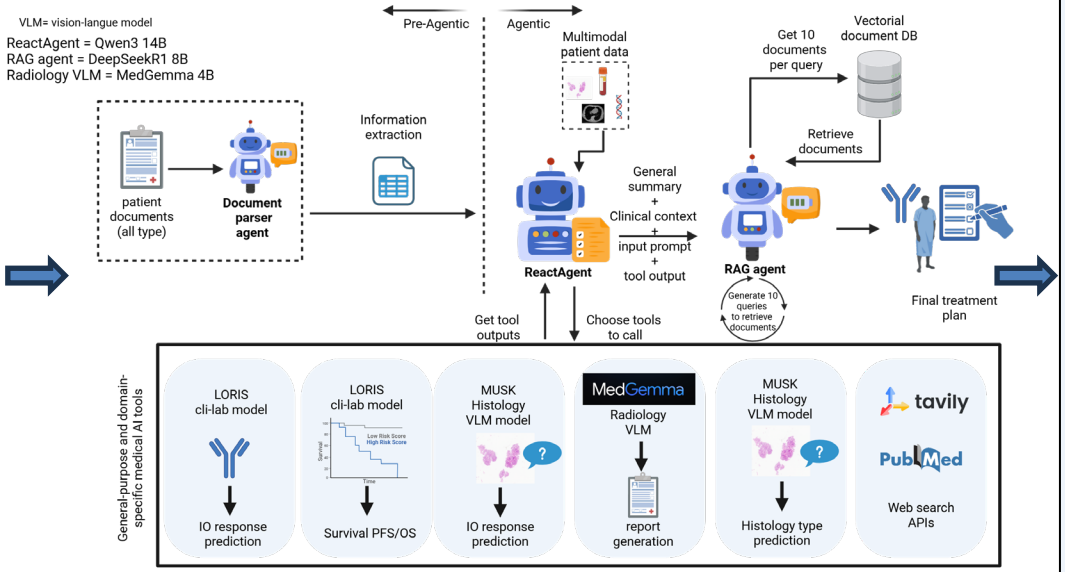
Federica Corso, PhD[1], Gabriele Carminati[2], Vittoria Peppoloni[1] Laura Mazzeo[1,2], Giulia Montelatici[1], Leone Giuseppe[1], Alberto Ferrarin[1], Daniele Lorenzini[3], Rebecca Romanò[1], Teresa Beninato[1], Giulia Corrao[1], Claudia Proto[1], Giuseppe Lo Russo[1], Filippo Maria de Braud[1], Alessandra Laura Giulia Pedrocchi[2], Marina Garassino[4], Paolo Baili[5], Vanja Mišković[1,2], Mark James Carman[2], Arsela Prelaj[1]

Agent input (clinical case)

Patient's clinical context:
{}

What is the best treatment plan?
Provide the best option among the following ones:
1. chemotherapy in combination with immunotherapy
2. immunotherapy alone, either monotherapy or combination of two different immune checkpoint inhibitors

Provide a detailed summary of the new information we received from the tools.



Agent output

#Key Findings:
1. **Diagnosis and Staging**: [..]
2. **Molecular Profile**: [..]
3. **PD-L1 Expression**: [..]
4. **Clinical Context**: [..]

#Analysis & Rationale:
While PD-L1 expression might suggest potential benefit from immunotherapy, the STK11 mutation makes it unlikely to be effective as monotherapy.

 # Treatment Plan:
The recommended therapy is chemotherapy + immunotherapy.

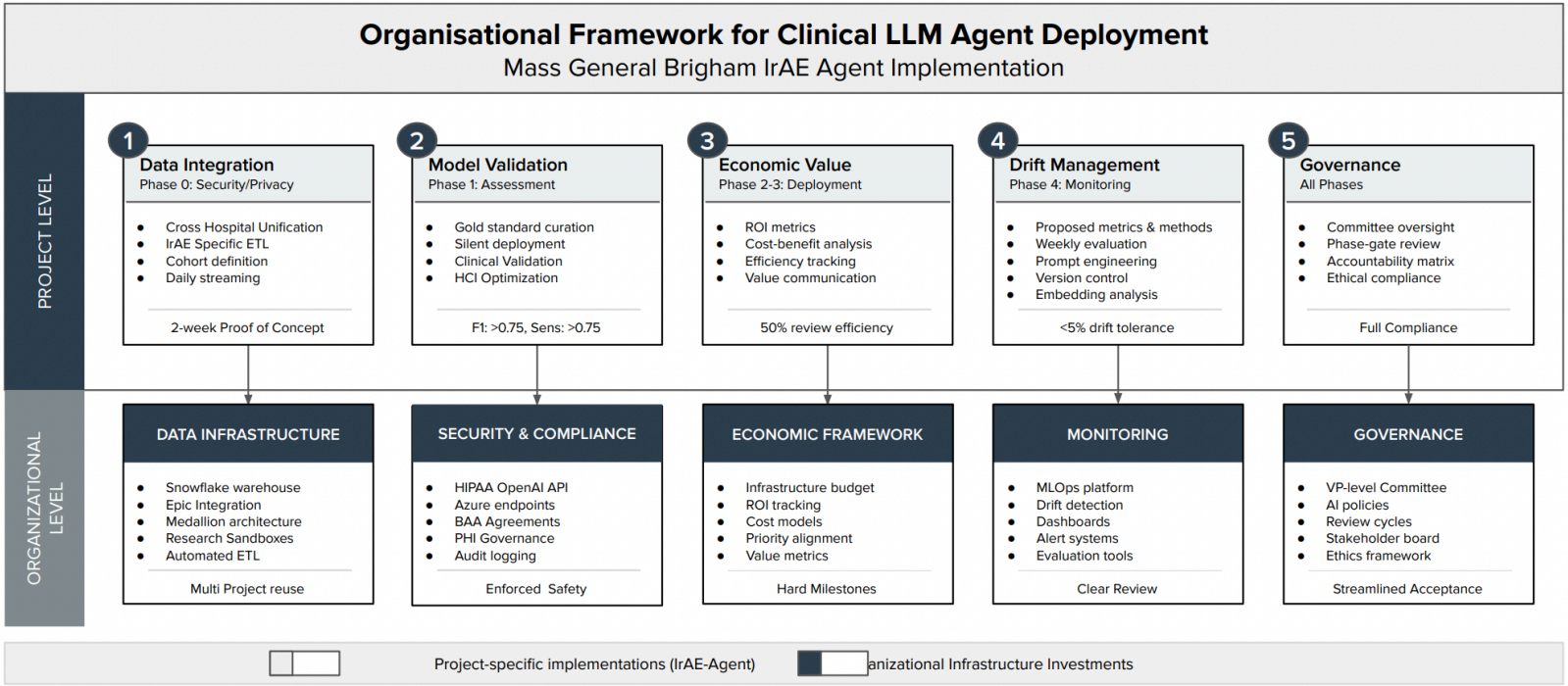
 # Ambiguities and Contradictions
Missing Data:
Regulatory Limitations:

Xiang, J., *et al. Nature* 638, 769–778 (2025)
Chang, TG, *et al. Nat Cancer* 5, 1158–1175 (2024)
Sellergren, A., et al. arXiv:2507.05201 v3

Federica Corso, PhD

AI-ON-Lab
Fondazione IRCCS Istituto Nazionale dei Tumori
Sistema Socio Sanitario Regione Lombardia
POLITECNICO MILANO 1863

Guide for Agentic AI in Clinical Practice



https://arxiv.org/pdf/2509.26153

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THE EUROPEAN INTERDISCIPLINARY SOCIETY OF ARTIFICIAL INTELLIGENCE FOR CANCER RESEARCH

ESAC Annual Meeting

Leonardo Campus main conference

The TRIFOGLIO Building

European Interdisciplinary Society of AI for Cancer Research

1st Annual Meeting - Milan, May 7-8th 2026 (4th Historical International Meeting)

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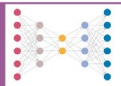
Prof. Marcello Restelli

Prof. Pietro Pinoli

Prof. Mark Carman

Trustworthy multimodal AI tools



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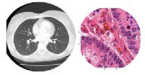
Aditya Ravi AI specialist

Medical images group



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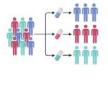
Cecilia Silvestri, MD

Arianna RIgamonti, PhD student

Michela Francesconi PhD student

Ai in clinical trials



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Fabrizio Baggio Project Manager

AI-ON-Lab

Acknowledgments

https://Ai-onlab.com

I3LUNG

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https://i3lung.eu

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