

[Back](#)

The role of artificial intelligence in the clinical laboratory: challenges and opportunities Highlights from the artificial intelligence in the Clinical Laboratory Session at the 56th SIBioC Congress, 2024

Biochimica Clinica • Article • 2025 • DOI: 10.23736/S0393-0564.24.00007-0

[Carobene, Anna](#)^a ; [Gruson, Damien](#)^{b, c}; [Cadamuro, Janne](#)^d; [Cabitza, Federico](#)^{e, f}; [Agnello, Luisa](#)^g; [+2 authors](#)

^a Laboratory Medicine, IRCCS San Raffaele Scientific Institute, Milan, Italy

[Show all information](#)

1 64th percentile

Citation

0.52

FWCI

[Full text](#) [Export](#) [Save to list](#)

Document

Impact

Cited by (1)

References (35)

Similar documents

Abstract

Artificial intelligence (AI) is revolutionizing laboratory medicine (LM), offering opportunities to enhance diagnostics, optimize workflows and services, and improve patient outcomes. AI's ability to analyze complex datasets holds great potential in LM, where vast amounts of data are processed. Key applications include hyper-automation, personalized medicine, and augmented diagnostics. However, AI integration may face challenges such as data security, algorithmic bias, and potential concerns about dehumanizing care. A European survey revealed gaps in AI adoption, with many laboratories lacking the necessary infrastructure and structured data for implementation. High-quality, interoperable data is essential for practical deployment. At the 56th Italian Society of Clinical Biochemistry-Laboratory Medicine (SIBioC) Congress (Bologna, October 2024), experts explored these opportunities and challenges. The session emphasized the need for explainable AI to build model reliability and clinician trust. A key point in the discussion was the robustness of AI models, which is crucial for their successful application. Comprehensive validation processes, including external validation, are required to ensure consistent

performance across diverse clinical settings. AI’s potential to transform sepsis screening through machine learning models using parameters like monocyte distribution width (MDW) was demonstrated, with promising results in early detection. This project, led by the SIBioC Working Group, highlighted the importance of rigorous validation. However, real-world implementation of AI demands infrastructure development, educational efforts, and regulatory frameworks. Scientific societies like SIBioC play a crucial role in fostering interdisciplinary collaboration to promote the responsible adoption of AI in LM. The session concluded that while AI holds great promise, its success depends on addressing ethical, technological, and practical challenges. © 2024 SIBioC.

Author keywords

Artificial intelligence; Laboratories; Machine learning

Indexed keywords

EMTREE medical terms

Article; artificial intelligence; clinical laboratory; hematological parameters; infrastructure; machine learning; machine learning algorithm; monocyte; sepsis

Corresponding authors

Corresponding author	A. Carobene
----------------------	-------------

Affiliation	Laboratory Medicine, IRCCS San Raffaele Scientific Institute, Via Olgettina 60, Milan, 20132, Italy
-------------	---

Email address	carobene.anna@hsr.it
---------------	----------------------

© Copyright 2025 Elsevier B.V., All rights reserved.

Abstract

Author keywords

Indexed keywords

Corresponding authors

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)

[Tutorials](#)

[Contact us](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗ [Cookies settings](#)

All content on this site: Copyright © 2026 [Elsevier B.V.](#) ↗, its licensors, and contributors.

All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the relevant licensing terms apply.

