

AI at ESMO 2025:

Navigating the New Frontier of Opportunity and Obstacles in Oncology

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For the first time in its history, the [European Society for Medical Oncology \(ESMO\)](#) dedicated an entire track to Artificial Intelligence (AI) at its 2025 conference. For those who partner with pharmaceutical and biotech companies to bring their innovations to market, this was a landmark moment. It signaled a definitive shift from AI as a theoretical novelty to a practical, albeit developing, force in the fight against cancer.

The sessions were filled with a palpable sense of excitement, building on the momentum of established successes like [Qure.ai](#) and [AlphaFold](#), and the rapid proliferation of AI tools across the oncology landscape. Yet, this optimism was tempered by a clear-eyed, honest assessment of the challenges that remain. The overarching theme was not one of unbridled hype, but rather a nuanced narrative of **opportunity and obstacles**. From the perspective of a commercialization partner, this duality is not a sign of weakness, but a map for the strategic path forward. It highlights where we can innovate today and where investment and collaboration unlock the full potential of AI for clients and patients tomorrow.

The Era-Defining Frontier: AI as a Clinical Reality

Dr. Charlotte Ortuzar's opening presentation on "AI in Pathology and Radiology" set an assertive tone, declaring that we are at an "era-defining frontier." The evidence is undeniable. A growing number of AI-powered medical devices are securing FDA approval, moving from algorithms in a lab to tools in the clinic. Imaging has become one of the most established applications of AI in oncology, with a host of solutions now available to augment the critical work of radiologists and pathologists.

This progress is not limited to established players. The proliferation of foundational models, visual language models, and even "home-brew" AI solutions is democratizing this technology, bringing advanced diagnostic capabilities to harder-to-reach clinical outposts.

From a commercialization standpoint, this is transformative. More accurate and accessible diagnostics mean earlier and more precise patient identification. This allows for more effective patient segmentation, improved clinical trial recruitment, and the ability to demonstrate the value of targeted therapies to the right patient population at the right time.

As AI enhances our ability to "see" disease with greater clarity, we can build more compelling narratives around the therapies designed to treat it.

Pockets of Progress: Illuminating the Path Forward

Across ESMO, specific use cases highlighted just how powerful AI can be when applied to long-standing challenges in oncology.

In the "Clinical Trials in the Age of AI" session, speakers detailed many successes reshaping how we approach drug development. Initial progress is clear in tools like **PyTrial**, **TrialMatch AI**, **MedMatch**, and **Trial Pathfinder**. These are moving beyond simple keyword matching to intelligently parse complex protocols and patient records, accelerating recruitment and improving the quality of trial cohorts.

Beyond improving trial logistics, the congress highlighted the next evolution: **the rise of “Oncology Agents.”** This represents a powerful leap from static tools to dynamic AI assistants. An “Oncology Agent” does not just match keywords; it actively reads medical literature from sources like [PubMed](#), checks patient-specific data across radiology and pathology reports, and synthesizes this vast information to answer a complex clinical query. As one presentation demonstrated in a compelling HER2+ breast cancer case study, these AI assistants can dynamically query publications, guidelines, and patient records to recommend specific treatment options.

This move toward dynamic, personalized insight was also evident in platforms like Singapore’s [CURATE.AI](#), which demonstrates how an individual’s unique response to treatment can be used to create a personalized dosing profile—a concept that could revolutionize efficacy and safety. To validate these advanced tools, the concept of **Silent Trials** was discussed as a powerful method to confirm AI’s clinical utility and ensure seamless integration into workflows without disrupting clinicians. For pharma, this combination of smarter agents and practical validation means faster, more efficient trials, a reduced burden on sites, and a clearer path to regulatory approval.

The excitement continued with a focus on AI’s growing role in basic and translational science. The ability of AI to target novel drugs, predict protein structures with tools like the Nobel Prize-associated [AlphaFold](#), and design new ones is dramatically shortening the early phases of drug discovery. Technologies like [Cell2Sentence](#) are helping researchers make sense of complex cellular data, accelerating the journey from biological insight to therapeutic candidate. This acceleration at the front end of the pipeline is a crucial commercial advantage, potentially reducing time-to-market by years.

An Honest Appraisal: The Obstacles We Must Overcome

While the opportunities are vast, the speakers at ESMO were refreshingly candid about the obstacles. These are not reasons for pessimism, but rather a strategic checklist of the problems we must solve together.

✔ **The Data Dilemma: Fuel for the Engine**

A recurring theme was the critical need for better, and more diverse data. In pathology, a significant operational stall in the digitization of tissue samples means a vast trove of potential data remains locked in analog form.

Furthermore, much of the current research and development is concentrated in a few high-prevalence tumor types, such as breast cancer, leaving a dearth of data in many other malignancies. This not only limits the applicability of current models but also risks exacerbating existing health disparities.

✔ **The Equity Imperative: AI for All**

The [Women 4 Oncology](#) forum and the session on patient advocacy brought the issue of equity to the forefront. Speakers like Alessandra Pedrocchi highlighted the very real problems of algorithmic bias. When AI models are trained on biased data, they perpetuate and can even amplify those biases. Gender and racial biases in datasets can lead to tools that are less accurate for women and minority populations. Language equity is another significant concern, as the dominance of English in AI development risks leaving non-native English speakers behind. Finally, access disparities for countries without first-world digital infrastructures mean that the benefits of AI may not reach the global populations that could benefit most. From a commercial perspective, an AI strategy that ignores equity is not only unethical; but also, bad business, limiting market access and failing to serve the total patient population.

✔ **The Gap Between Regulatory Approval and Clinical Validation**

A significant obstacle exists between regulatory approval and clinical trust. As one speaker noted, “FDA approval does not necessarily mean clinical validation,” revealing that clinical validation data is missing for over 40% of FDA-approved AI devices. This “validation gap” is a significant hurdle to commercialization. Without proven, real-world utility, widespread adoption by cautious clinicians will stall. For commercial partners, this underscores the necessity of designing studies that prove tangible clinical benefit, as this validation is essential for market success.

✔ **The Human Factor: Trust and Transformation**

The most critical obstacle is the human one. As Dr. Jakob Kather emphasized in his talk on “Chat GPT and Cancer Care,” there is no room for error in oncology. The consensus is clear: AI must keep the “human in the loop.” It should be a tool that augments, rather than replaces, the expertise of healthcare professionals. Building this trust requires a commitment to transparency, validation, and the development of clear guidelines.



This is precisely the goal of the newly announced Evaluation of Large Language Models in Clinical Practice (ELCAP) guidelines, which aim to create a framework for responsible innovation by emphasizing human oversight and systematic validation. By establishing a three-tier framework for LLM applications—from patient-facing systems (Type 1) to HCP-facing tools (Type 2) and background institutional systems (Type 3)—ESMO is creating a framework for responsible innovation. This guidance strongly cautions against unsupervised use and emphasizes the need for human oversight and systematic validation to mitigate risks around privacy and bias.

The Path Forward: A Commercialization Partner's Perspective

The dual landscape of opportunity and obstacles revealed at ESMO 2025 is the new strategic terrain for organizations navigating the future of oncology commercialization. Success in this environment calls for a three-pronged approach:

- ✔ **Strategize and Integrate:**
Move beyond pilots and proof-of-concept by strategically integrating AI into commercialization plans. Use AI-powered patient-finding tools to build robust market models, leverage real-world evidence to craft compelling value propositions, and integrate AI into patient support services for a more personalized and effective experience.
- ✔ **Champion Equity:**
Build an equitable AI strategy by cross-examining vendor algorithms for potential bias, designing patient engagement strategies that are inclusive and accessible, and ensuring that real-world data demonstrates value across diverse patient populations. An inclusive approach expands market access and ensures therapies reach those who need them most.
- ✔ **Foster Collaboration:**
Address challenges such as data digitization, algorithmic bias, and clinical validation through strategic partnerships. Collaboration among pharmaceutical innovators, AI technology developers, academic institutions, and patient advocacy groups is essential to build diverse datasets, ethical frameworks, and validation studies that move the field forward.

The message from ESMO 2025 was one of hopeful, pragmatic realism. The age of AI in oncology is here, not as a silver bullet, but as a powerful and complex new tool. The obstacles are significant, but they are not insurmountable. For those dedicated to connecting transformative therapies with the patients who need them, our course is clear.

We must embrace the opportunities with enthusiasm, confront obstacles with honesty, and commit to the collaborative work of building a future where AI helps us win the fight against cancer for every patient, everywhere.

Discover how our integrated solutions and dedication to responsible, patient-centered innovation, can empower your team to lead in [AI-powered oncology](#).



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