Website address:
https://www.gesundheitsindustrie-bw.de/en/article/press-release/new-ai-system-provides-treatment-recommendations-complex-blood-cancers

New AI System Provides Treatment Recommendations for Complex Blood Cancers

Researchers from the German Cancer Research Center (DKFZ), the HI-STEM* Stem Cell Institute, and the Heidelberg University Hospital (UKHD) have developed "HemaGuide," an AI assistant that supports physicians in making difficult treatment decisions. In extensive testing, the system has shown a high degree of agreement with the recommendations of experienced experts and could significantly improve access to specialized and personalized cancer care.

The treatment of blood cancers is becoming increasingly complex. Today, doctors must take many factors into account simultaneously: the patient's medical history, genetic alterations in the tumor, comorbidities, previous treatments, and an ever-growing number of new drugs. Difficult cases are therefore discussed in interdisciplinary tumor boards: case conferences in which experts from various disciplines work together to determine the best possible treatment.

However, such highly specialized conferences are time-consuming and require significant staff resources. Smaller hospitals, in particular, often lack dedicated specialists for each of the many—and in some cases very rare—forms of blood cancer. A research team led by Mirco Julian Friedrich (DKFZ, HI-STEM, UKHD) has therefore developed the AI-powered assistant HemaGuide, which supports treating physicians in making precisely these complex decisions.

AI Works Like a Digital Tumor Board

HemaGuide analyzes unstructured physician reports, systematically organizes the information they contain, and combines it with current treatment guidelines, a database of more than 2,000 real-world tumor board cases, and the latest scientific literature. Based on this, the system generates a treatment recommendation with transparent reasoning.

A unique feature is that HemaGuide can also perform the functions of a molecular tumor board—that is, a specialized conference that specifically evaluates a tumor's genetic alterations. If such alterations are present, the system assesses their clinical significance based on internationally established standards, automatically searches the relevant scientific literature, and—where appropriate—suggests targeted therapies. This molecular analysis takes less than a minute on average, whereas it has previously often required several hours and is available at only a few specialized centers.

Another advantage: HemaGuide can be run entirely on local hospital servers. This means that sensitive patient data never has to leave the hospital.

High Accuracy—Across All Types of Blood Cancers

In several studies, the researchers tested how reliably the system works. In 45 particularly complex patient cases, experienced hematologists rated HemaGuide's recommendations significantly higher than the responses from conventional AI language models that lacked the specially developed HemaGuide architecture—especially in terms of alignment with actual tumor board decisions and consideration of the individual patient's situation.

A test involving 555 tumor board cases from an independent university hospital demonstrated how well the results can be generalized to other clinics. These cases encompassed 47 different types of blood cancer—ranging from common to very rare forms. Across this entire spectrum, the AI recommendations aligned with the decisions of the expert panels in nearly 82 percent of cases. In a one-month prospective trial phase, during which HemaGuide processed current cases in parallel with the physicians without influencing their decisions, the agreement rate was even just under 83 percent.

Less experienced physicians also benefited from the support: In a simulated study, resident physicians achieved a level of performance nearly on par with that of experienced senior doctors with the help of HemaGuide. When automatically evaluating genetic tumor alterations, the system reliably aligned with international expert standards. Particularly important for patient safety: No clearly cancer-promoting alteration was mistakenly classified as benign.

Greater Equity in Cancer Care

"HemaGuide is intended to help improve access to highly specialized cancer care. Smaller clinics in particular could benefit from this support in decision-making," says Julian Zoller (DKFZ), one of the two first authors. His colleague Michael Kalz, also a first author, adds: "Because HemaGuide delivers molecular analyses in less than a minute, even established tumor boards at large centers can benefit from it and save time."

Study leader Mirco Julian Friedrich clarifies: "The system is not intended to replace medical expertise, but to complement it. It can ease the burden on tumor boards and make their knowledge more widely available—but the final decision is always made by the treating physician."

To investigate whether HemaGuide improves the quality of care and long-term outcomes for patients, the team is currently preparing a clinical trial.

Publication:

Julian Zoller*, Michael Kalz*, Xuewei Wu, Sven Cuntz, Linus Kruk, Niklas Kehl, Julius J. Michel, Cornelius Funk, Sarah Richter, Tobias Tix, David Sedloev, Jonathan Naboschni, Jan H. Frenking, Silvia Barbosa, Oliver L. Saldanha, Alanna Kirschner, Anna D. Metzler, Antonia Schach, René Onken, Tim R. Wagner, Martin Dugas, Andreas Trumpp, Martin Dreyling, Michael von Bergwelt-Baildon, Kai Rejeski, Tim Sauer, Peter Dreger, Marc S. Raab, Carsten Müller-Tidow, Jakob N. Kather, and Mirco J. Friedrich:
Clinical decision support in hematological malignancies using a case-grounded AI agent. *Nature Medicine* 2026,
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** Shared first authorship*

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Further information

- German Cancer Research Center (DKFZ)
- University Clinic Heidelberg HP (German)