
Clinical Decision Support For Prostate Cancer Care



Urologists at University Hospital Basel are rising to the challenge of providing evidence-based prostate cancer treatment in an age of multidisciplinary care and accelerating medical progress. Thanks to artificial intelligence and smart data integration they can successfully deal with complexity and data overload.

Photos: Philip Frowein

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“Every patient has the right to be treated according to the most recent evidence-based recommendations,” says Professor Helge Seifert, head of the Department of Urology at University Hospital Basel (USB). For their prostate cancer patients, the urologists at USB are living up to this dictum. They treat around 200 patients with newly diagnosed prostate cancer per year. They also assess hundreds more cases presented at multidisciplinary tumor boards (MTB) by colleagues from other hospitals nearby and by ambulatory urologists from both Switzerland and Germany.

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Professor Helge Seifert, MD, Head of Urology at USB, wants to give evidence-based treatment to every prostate cancer patient.

Offering evidence-based treatment to every prostate cancer patient may sound straightforward, but in reality, it is not, according to Seifert: “We see big differences in care standards in different institutions.” An important reason for these variations in clinical practice is information overload, says senior USB urologist Christian Wetterauer, MD: “The amount of data that we have to take into account for our clinical decisions in prostate cancer patients is increasing exponentially. This makes it very difficult for many urologists to stay up to date.”

Information overload can be especially difficult to handle for smaller institutions with fewer staff than university hospitals. It is also a challenge for a center of expertise like USB, says Seifert, since the weekly MTB conferences take longer and longer, and preparing patients for the MTB becomes ever more time-consuming: “Our MTBs take place once a week, and they exceed core working time regularly. We discuss on average 15 to 20 patients now.”

Evidence-based, patient-specific support at the urologist’s fingertips

To address the challenges posed by complexity and overwhelming amounts of data, urologists and IT specialists at USB have entered into cooperation with Siemens Healthineers to become the global pilot site of a totally new type of CE-certified decision support solution for clinicians. AI-Pathway Companion Prostate Cancer aggregates and integrates individual patient data from various sources and creates a personalized disease-specific model for each patient. With the help of artificial intelligence algorithms, the digital solution also provides up-to-date decision support along the clinical pathway in accordance with the evidence-based guidelines of either the European Association of Urology (EAU) or the National Comprehensive Cancer Network (NCCN). “AI Pathway Companion provides a comprehensive overview of every patient in every clinical situation” says Wetterauer.

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Christian Wetterauer, MD, senior urologist at the USB.

For example, thanks to natural language processing, radiology and pathology results are correlated and visualized. A patient-specific risk assessment is provided according to guideline recommendations. The patient is mapped along the clinical pathway and, according to the individual situation, relevant diagnostic steps or recommended treatment options are provided. All this and much more is presented in a way that is highly intuitive to practicing clinicians: “A big strength of this project is that clinicians have been involved in the development very early on. The software really mirrors the specific requirements of routine clinical users,” says Wetterauer.

Use case: Multidisciplinary tumor board

An important use case for the new solution at USB is the aforementioned MTB. Until now, it has taken between 5 and 12 minutes to prepare a

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patient for the MTB. Discussing each individual case in the MTB takes about 5 minutes on average. Using AI-Pathway Companion both for patient preparation before the MTB and for patient presentation during the MTB, much time will likely be saved, says Wetterauer: “We don’t have to put together the information we need manually before an MTB anymore, because data aggregation for each patient happens automatically. This should reduce preparation time considerably, ideally to close to zero.”

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Christian Wetterauer values AI-Pathway Companion, the new digital solution.

Using the solution from Siemens Healthineers in the MTB will not only help to save time, but will also lead to a more standardized and much more consistent presentation per patient, which in turn will enable far more transparent recommendations. Therapeutic options and diagnostic requirements can be illustrated more clearly to both USB participants and external colleagues who join the MTB via teleconferencing.

“A tool like this will lead to better quality of care”

The MTB is not the only use case. For Wetterauer, AI-Pathway Companion could well evolve into the primary user interface for clinicians engaged in prostate cancer care, because it integrates information from all the different clinical systems and provides a comprehensive overview of every patient in every clinical situation: “Apart from the gain in convenience, the solution can be considered an educational tool, too. It is not a black box, but makes evidence transparent. This will be particularly valuable for younger colleagues who don’t yet know the latest guidelines by heart.”

Ultimately, tailored recommendations for individual patients based on the most recent guidelines and clinical trial results will translate into improved outcomes, says Seifert: “A solution like this will lead to better quality of care. It will be especially valuable in peripheral hospitals and smaller medical institutions with a high case load. We won’t be able to offer patient care in the future without integrating evidence-based knowledge and patient data.”

The urologist remains in the driving seat

At USB, AI-Pathway Companion will soon be used and evaluated during the MTB. Colleagues are really excited when they see the new software solution for the first time, says Wetterauer: “Something like this has not been available so far.” What urologists like about the approach, apart from the clearly arranged user interface, is that it is not about replacing doctors at all: “The solution uses data integration and AI tools to give doctors a helping hand and relieve them of routine tasks. This is much appreciated.”

It is also what patients expect when they come to be treated for prostate cancer, according to Seifert: “Patients want to be treated in line with available standards, but they also want individual recommendations by their doctor, and they want them face to face. Software definitely won’t replace the doctor. But it helps to make well-informed, evidence-based recommendations, and it can make different treatment options more transparent.”

About the Author

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“Seeing patient-specific decision trees unfold is very helpful”

Guidelines are prime resources for clinicians. Professor Philip Cornford, cancer lead at Royal Liverpool University Hospitals Trust and vice chair of the European Association of Urology (EAU) Prostate Cancer Guideline Panel, discusses the merits of digital tools for guideline-based medicine.

How has guideline writing evolved over the last decade?

There has been a massive change, really. In the old days, experts were sitting in a room and writing down what they thought. Today, good guidelines are based on a formalized literature research, and grades of recommendations depend on the available evidence. We have also become much faster. The EAU prostate cancer guidelines are updated every spring, and often there is an additional interim update in autumn. Last year alone there were 4,500 new publications on prostate cancer. The literature search is partly outsourced. Eight associate members of our Guideline Panel scan the abstracts, and around 20 panel members from different specialties work on the final recommendations.

What do we know about guideline adoption in different places and countries?

The EAU prostate cancer guidelines are considered the official guidelines in 78 countries all around the world. We know surprisingly little about how guidelines are actually adopted in different countries, and neither do we know enough about how different institutions adopt guidelines within a country. What seems clear is that there are big gaps between what guideline committees say and what really happens when a doctor sits in front of a patient. We need to find out much more about that.

Can a guideline-based digital tool help spread the word about diagnostic and therapeutic standards?

A digital tool that provides evidence-based information in the context of individual patients will likely raise awareness for guideline recommendations. It is always helpful to have knowledge available at the point of care, and it is very helpful for clinicians to see patient-specific decision trees unfold. For this, you really need a software solution. These pathways are too complicated to print and pin on a wall.

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Could such software also help guideline panels in their work?

This is in fact what we at EAU find most exciting about our cooperation with Siemens Healthineers on the AI-Pathway Companion solution: We can get feedback on how guidelines are actually implemented in daily practice. A really big issue is that many doctors are well aware of the guideline recommendations and still don't always follow them. This suggests that there might be some recommendations that don't really fit to the real world. We very much hope that by cooperating on a software solution like this we will learn more about what is really helpful for clinicians and what is not. In the end, this will help us to write better guidelines.

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