

AI: Opportunities, Capabilities and Limits

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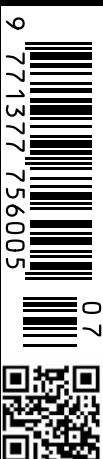
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Decision Support



Clinical Decision Support – Benefits and Application in Healthcare

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†Werner Leodolter was the CIO of KAGes. He was a Professor of Applied Business Management in Healthcare at the University of Graz and a lecturer at the Medical University of Graz and Graz University of Technology. Prof Leodolter was also the author of two books, “The Subconscious of Organizations - New Technologies - Rethinking Organizations” and “Digital Transformation Shaping the Subconscious Minds of Organizations – Innovative Organizations and Hybrid Intelligence”. He was the co-founder of the company, The Consulting Decision Support Systems. HealthManagement.org spoke to Prof Leodolter about clinical decision support and how it can help improve the delivery of care.

How would you define clinical decision support, and what tools fall under its umbrella?

Clinical decision support refers to a system where the computer assists the doctor or the nurse in using available data by providing relevant information, giving warnings, and detecting, categorising and quantifying suspicious areas in images from radiology, pathology, dermatology, gastroenterology etc. In other words, there is a broad field of application for clinical decision support.

What are the most important factors that healthcare providers and staff consider when evaluating clinical decision support tools?

Clinical decision support tools should bring benefits to the patients in terms of patient security. At the same time, they should benefit medical staff by increasing efficiency, saving time for retrieving information, and improving the decision-making process. On the other hand, it is also important to consider the risks for an organisation when computer assisted decisions go wrong, for example, when malign lesions and cancer are not detected. Therefore, it is important to consider the pros and cons when evaluating clinical decision support tools and determining what these tools are to be used for within a healthcare organisation.

What benefits can healthcare facilities and healthcare providers derive from clinical decision support?

Some of the most important benefits are saving time finding

relevant data and their interpretation and freeing time for interaction with patients thus motivating their staff. The quality of healthcare services can be improved with better diagnosis and more prevention.

What are the primary criteria for doctors to be able to trust and adopt decision support tools?

The algorithms have to be validated where appropriate and certified as medical devices. Wherever possible, they have to be explainable for the user, for example, by providing the clinical parameters of the patient indicating the predicted risk for the patient and thus supporting the clinical reasoning of the doctor or the nurse. From my point of view, explainable AI is a prerequisite to increasing trust by healthcare staff. If the staff does not trust in clinical decision support AI, they won't use it because, in the end, they are responsible for the decisions that are made.

The future of healthcare will be an intelligent mix of human and computers/technology. What major trends do you foresee?

A time will come when it will not be state-of-the-art anymore to make no risk profiling based on available data or to get no second opinion of the computer when assessing pathology images etc. A time will come when interpretation of genomic analyses will become standard supporting diagnostics due to falling costs for sequencing. Clinicians require assistance in decision-making. Therefore, AI will become part of everyday

business. It's not there yet, but the time is not too far.

How do you think this collaboration can be optimised, and how can healthcare efficiently benefit from the cooperation between humans and technology?

We will have to shape and establish some sort of hybrid intelligence with good collaboration between human and artificial intelligence - with the human staying in the driver's seat and the AI assisting. Thus we have to deliberately shape the subconscious mind of the respective healthcare

workload. Will he be a good doctor in situations without clinical decision support due to cybercrime, blackout etc.? Will he have enough self-confidence? I think not. AI and decision support tools provide an opportunity to free clinician time for the patient. But when implementing these technologies, healthcare organisations must focus on giving clinicians enough time for clinical reasoning. Decision support tools should be used to give information to the doctor, but when a doctor thinks a particular prediction is wrong, the doctor's decision should be the one that takes priority. If there are

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organisation and provide high quality decision making and patient safety by providing excellent processes, controls and checks in this new hybrid world.

The pandemic revealed significant weaknesses in healthcare systems worldwide. Do you think clinical decision support tools can help increase operational effectiveness in healthcare?

There is a good chance of it. Risks for severe illness after a COVID infection or even necessity for an ICU-bed will be more predictable and those at risk can be closely monitored at home and provided with special medication. The transfer to the hospital will thus be well controlled and reduced to really necessary transfers. The same idea is also applicable to other diseases. With the new possibilities of home telemonitoring, lab-on-a-chip etc., there are now multiple opportunities to combine telemedicine/telemonitoring with AI and clinical decision support tools.

How do you think clinical data can be better utilised?

Currently, there are some obstacles here, especially in Germany and Austria, because there is a high sensitivity concerning data privacy and the way GDPR is interpreted. However, in Northern Europe, countries have found good solutions to enable the secondary use of clinical data. For example, Finland, Estonia and Denmark are far ahead of Germany or Austria in this respect. They demonstrate that reasonable secondary use of healthcare data can be organised in compliance with GDPR.

Do you think there are threats or risks associated with AI if our dependence on it increases?

There are significant threats. Imagine a young doctor who always says yes to proposed decisions for 10 years without practicing extensive clinical reasoning – maybe due to

any biases in the system, they cannot be used. Hence, AI-based support tools should not be used without continuous monitoring.

Decision support systems come with a price tag. Do you think it's worth investing in these new systems?

That depends on the price tag and the use case. What is the scenario in which it is being used? It is important to validate and check how it fits an organisation's decision and clinical pathways. It is important to look at the big picture. If the goal is to improve the quality of imaging, an organisation may have to consider big scanners. But if the goal is to enable remote assessment of images, an organisation can evaluate the resources it already has. It might not be too difficult to take digitally available images and run them through AI, maybe in the cloud. Hence, the price tag is not only the price tag of the provider but also the price tag of the implementation as a whole. It is also important to consider the benefit to clinicians and to the patients. I am convinced that these tools will be affordable in the future. And as I said before, a time will come when it won't be state-of-the-art anymore not to use this.

Is there anything else that you would like to add?

Prediction is feasible not only with algorithms based on very big data or by collecting patient data from many sources - probably in conflict with GDPR. Good data curation and federated learning can provide excellent predictive results with not so big data. There are a lot of possibilities with AI and decision support tools, and very dynamic development is ahead of us. ■

Watch the full interview [here](#)