

Innovative AI technology aids personalized care for diabetes patients needing complex drug treatment

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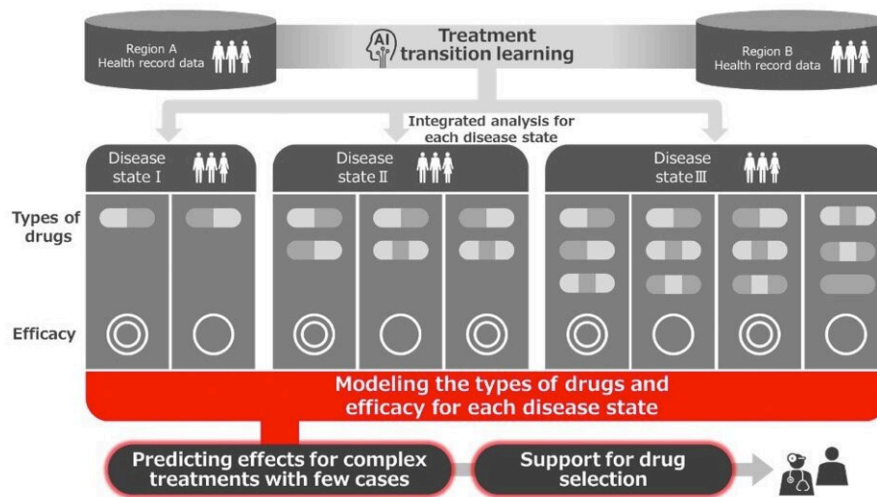


Image of the AI grouping patients and analyzing the treatment patterns & efficacy. Credit: Regenstrief Institute

Hitachi, Ltd., University of Utah Health (U of U Health), and Regenstrief Institute, Inc. (Regenstrief) today announced the development of an AI method to improve care for patients with type 2 diabetes mellitus who need complex treatment. One in 10 adults worldwide have been diagnosed with type 2 diabetes, but a smaller number require multiple medications to control blood glucose levels and avoid serious complications, such as loss of vision and kidney disease.

For this smaller group of patients, physicians may have limited clinical decision-making experience or evidence-based guidance for choosing drug combinations. The solution is to expand the number of patients to support development of general principles to guide decision-making. Combining [patient data](#) from multiple healthcare institutions, however, requires deep expertise in artificial intelligence (AI) and wide-ranging experience in developing machine learning models using sensitive and complex healthcare data.

Hitachi, U of U Health, and Regenstrief researchers partnered to develop and test a new AI method that analyzed electronic health record data across Utah and Indiana and learned generalizable treatment patterns of type 2 diabetes patients with similar characteristics. Those patterns can now be used to help determine an optimal drug regimen for a specific patient.

Some of the results of this study are published in the peer-reviewed medical journal, *Journal of Biomedical Informatics*, in the article,

Hitachi had been working with U of U Health for several years on development of a pharmacotherapy selection system for diabetes treatment. However, the system was not always able to accurately predict more complex and less prevalent treatment patterns because it did not have enough data. In addition, it was not easy to use data from multiple facilities, as it was necessary to account for differences in patient disease states and therapeutic drugs prescribed among facilities and regions. To address these challenges, the project partnered with Regenstrief to enrich the data it was working with.

The new AI method initially groups patients with similar disease states and then analyzes their treatment patterns and clinical outcomes. It then matches the patient of interest to the disease state groups and predicts the range of potential outcomes for the patient depending on various

treatment options. The researchers evaluated how well the method worked in predicting successful outcomes given drug regimens administered to patient with diabetes in Utah and Indiana. The algorithm was able to support medication selection for more than 83 percent of patients, even when two or more medications were used together.

In the future, the research team expects to help patients with diabetes who require complex treatment in checking the efficacy of various drug combinations and then, with their doctors, deciding on a treatment plan that is right for them. This will lead not only to better management of diabetes but increased patient engagement, compliance, and quality of life.

The three parties will continue to evaluate and improve the effectiveness of the new AI method and contribute to future patient care through further research in healthcare informatics.

More information: Shinji Tarumi et al, Predicting pharmacotherapeutic outcomes for type 2 diabetes: An evaluation of three approaches to leveraging electronic health record data from multiple sources, *Journal of Biomedical Informatics* (2022). [DOI: 10.1016/j.jbi.2022.104001](https://doi.org/10.1016/j.jbi.2022.104001)

Provided by Regenstrief Institute

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