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Integration of Continuous Glucose Monitoring (CGM) Dynamics into an AI-based model for Therapeutic Decision Making in Type 2 Diabetes (DM2)

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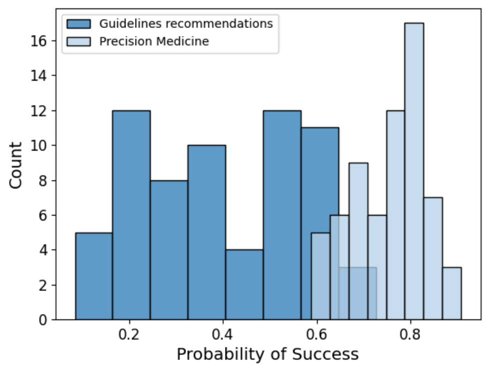
Background and Aims. Emerging technologies have the potential to aid complex pharmacotherapy choices that are optimally tailored to individual needs. Here we propose a precision medicine approach to support decision-making while simultaneously managing glucose and body weight.

Methods. Artificial intelligence (AI) has first been trained on a rule-based model and later optimized on routine care data, targeting an absolute -0.2% reduction in HbA1c over 6.5% without weight gain for a BMI over 28 kg/m2. In a second step, CGM-derived indices from a gluco-regulatory model were added to phenotypic markers, to evaluate the performance. Electronic health records of 626 patients were split into N=595 treatment regimens for training and 255 for testing, with 90 and 29 regimens including CGM data in each set.

Results. The dual HbA1c/body weight optimization target was achieved for actual clinical practice in 49% (N=127) cases. In cases where clinical guidelines were followed, the target was achieved in 50% (N=26) of cases. In comparison, the AI-model achieved 50% (N=24) without CGM data and 63% (N=19) when trained with CGM data.



Conclusions. While the number of patients remains small to evaluate a complex set of decisions, we demonstrate that an AI can achieve superior outcomes using CGM-derived glucoregulatory phenotypic markers. The AI identifies 22% (N=56) statistically significant alternatives in presence of CGM and 10% (N=25) in the absence of CGM suggesting further potential for our methodology.

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