POSTER ABSTRACT

# A risk score of BMI, HbA1c and triglycerides predicts future glycemic control in type 2 diabetes

18th International Conference on Integrated Care, Utrecht, 23-25 May 2018

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**Introduction**: The average patient with type 2 diabetes does not exist, yet evidence-based guidelines are highly standardized, which might result in heterogeneous treatment effects. As a first step towards more effective patient-centered care, the objective of this study was to identify, predict and validate distinct glycaemic trajectories among patients with newly diagnosed type 2 diabetes treated in primary care.

**Methods**: We conducted a retrospective study on two cohorts using routinely collected individual patient data in primary care practices from two large Dutch diabetes patient registries. Participants included newly diagnosed, adult patients with type 2 diabetes between January 2006 and December 2014 n = 10,528, development cohort; n = 3,777, validation cohort. Latent growth mixture modeling LGMM identified distinct glycemic 5-year trajectories. Machine learning models were built to predict the trajectories with easily obtainable patient characteristics in daily clinical practice.

**Results**: Three different glycemic trajectories were identified: 1 stable, adequate glycemic control 76.5% of patients; 2 improved glycemic control 21.3% of patients and 3 deteriorated glycemic control 2.2% of patients. Similar trajectories could be discerned in the validation cohort. BMI, HbA1c and triglycerides were the most important predictors of trajectory membership. The predictive model, trained on the development cohort, had a receiver operating characteristic area under the curve ROC-AUC of 0.96 in the validation cohort, indicating excellent accuracy.

**Discussion**: This study identified three glycaemic control trajectories in patients with newly diagnosed type 2 diabetes from a diabetes patient registry in the Netherlands. The same trajectories were found in an independent, separate Dutch diabetes patient registry. Future glycaemic control could accurately be identified with only three patient features, i.e. BMI, HbA1c and triglycerides.

**Conclusions**: Patients with type 2 diabetes are a diverse group where current care does not fit all. The developed model could be used in practice as a quick and easy tool to determine patients' care needs and provided tailored diabetes treatment.

**Lessons learned**: The developed model can effectively explain heterogeneity in future glycaemic response of patients with type 2 diabetes.

**Limitations**: Prescription of glucose lowering drugs and insulin may have influenced the patterns of the trajectories.

**Suggestions for future research**: In further research, we will determine patients' care preferences per glycaemic control trajectory, using a discrete choice experiment. These preferences shall be paired with the corresponding glycaemic control trajectories, creating patient profiles that we will subsequently test in a feasibility study.

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