

# Biometric data from Health Patch for glycemic modeling

D. Mul<sup>1</sup>, P. Funke<sup>2</sup>, M. Monteiro<sup>2</sup>, R. VandenBerg<sup>2</sup>, HJ Aanstoot<sup>1</sup>, R. Bruinsma<sup>3</sup>, HJ Veeze<sup>1</sup>

<sup>1</sup>Diabeter, centre for pediatric and adolescent diabetes care and research Rotterdam, The Netherlands; <sup>2</sup>Aspire Venture, Lancaster PA, USA; <sup>3</sup>Tempo Health, Rotterdam, The Netherlands



## Introduction

**Predictive glycemic modeling of T1DM patients can help guide insulin replacement therapy. The addition of biometric data into glycemic models might improve the accuracy of glucose predictions.**

## Materials and Methods

### OBSERVATIONAL TRIAL

#### DATA

Biometric data were collected from 20 T1DM patients using commercially available combined continuous glucose monitors and pumps (Medtronic) and a patch-type, non-invasive biometric sensor (Vital Connect HealthPatch, figure 1).



Fig 1: HealthPatch

Participants provided (figure 2)

- continuous biometric data: heart rate, skin temperature, 3-axis accelerometry, and skin impedance,
- pump data, including, basal insulin, bolus insulin, meal-time carb estimates and
- blood glucose values by finger stick and
- continuous blood glucose values (CGM)

#### MODELING

Aspire combined biometric data with finger stick BGL readings, carbohydrate inputs, and insulin delivery tracking to build personalized BGL prediction models (figure 3), adapted to each patient on a daily basis with its proprietary Adaptive Artificial Intelligence platform (A<sup>2</sup>I).

*Tempo Health's Rhythm has the capability to shut itself off when it learns that is not able to reliably predict and control the patient's BG*

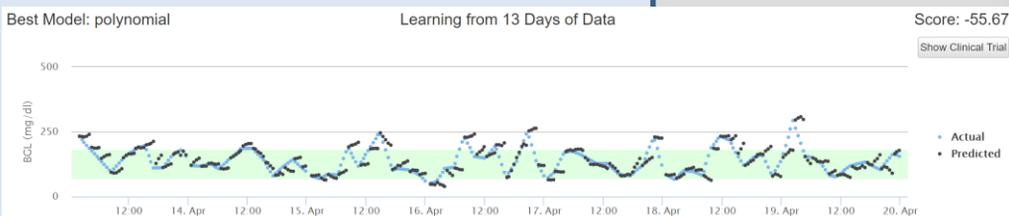


Fig 3: example of modeling

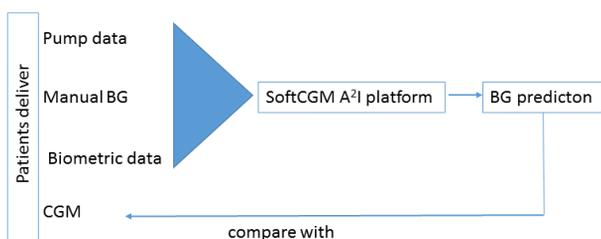


Fig 2: Tempo Health's Rhythm modeling

## Results

From the 20 patients 12 were **excluded** for incomplete datasets or less than 14 days combined data.

Eight patients **included** (6F), mean of most recent HbA1c: 7%, mean age 25.9 yrs (range 10-53)

In 7 of the 8 patients observed: by leveraging those predictive models in a very basic control system, compared to the sensor readings that were actually reached by the patient in that time period treated by the Diabeter team.

Tempo Health's Rhythm achieved:

- 20% increase in time in range (70-180 mg/dl or 3.9 - 10.0 mmol/L)
- 9% reduction in values below 70 mg/dl (3.9 mmol/L)

In one patient no reliable prediction could be obtained.

No statistically significant relationship between frequency of fingersticks and Rhythm results.

## Conclusions



Glycemic modeling based on the combination of non-invasive biometric data, pump data and a few manual blood glucose values was, in 7 patients, able to considerably increase time in range and decrease time in hypoglycemia compared to results obtained by an experienced team with CGM use.



d.mul@diabeter.nl  
www.diabeter.nl

