

Biometric data from Health Patch for glycemic modeling

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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 (A²I).

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

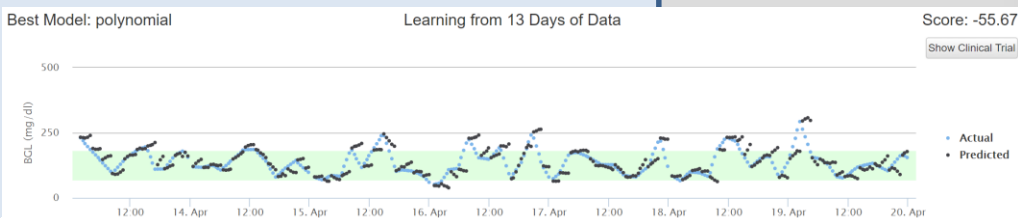


Fig 3: example of modeling

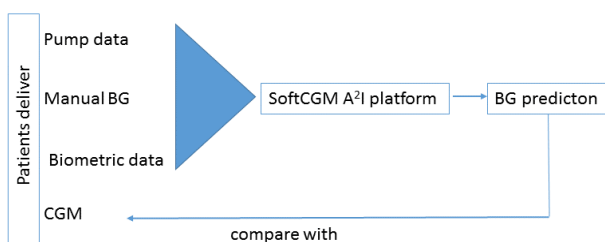


Fig 2: Tempo Health's Rhythm modeling

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.



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