

# Users with Type-2 Diabetes Using a Digital Platform Experienced Sustained Improvements in Blood Glucose Levels

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## Introduction

Reduction of elevated blood glucose and blood pressure and maintenance of target blood glucose levels and pressures are significant challenges in managing diabetes and hypertensive disorders <sup>1</sup>. The present study assesses clinical outcomes of patients using a digital health platform to drive durable behavior changes that enhance patient awareness and treatment adherence over time.

## Method

A retrospective evaluation was performed on the Dario® database started in 2018. A population of active users (users with a minimum average of 18 measurements per month with the Dario® System) with non-insulin treated Type 2 diabetes (T2D), was evaluated over twelve months. Blood glucose readings were assessed in their first month of use until month 12. A subgroup of users who initiated monitoring of their blood pressure using the Dario blood pressure monitoring system over the course of the study were also evaluated for their Systolic and Diastolic pressures on the first and third months.

## Results

### Blood Glusocse

Changes in glucose readings levels are presented in Table 1, Figures 1 & 2.

Table 1: Changes in Blood glucose levels over 12 months.

9200 users activated during a full year		
Events	Change over year	% of Glucose measurements month 12 vs. month 1
180-400 mg/dL	-26%	18.62% vs. 23.43%
>250mg/dL	-33%	4.65% vs. 6.93%
FBG*<126 mg/dL	+16%	40.59% vs. 34.92%

\*FBG – Fasting blood glucose

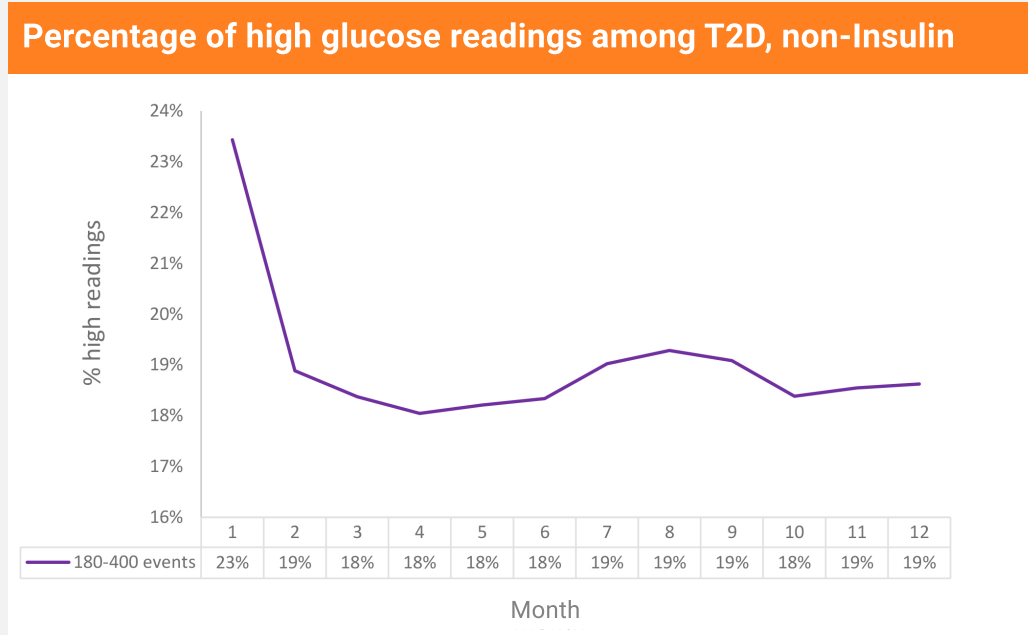


Figure 1: The graph represents the percentage of high blood glucose events (180-400 mg/dL) over a year in Dario users. The table summarizes the percentage of 180-400 mg/dL events from total measurements per active month (1-12) on average.

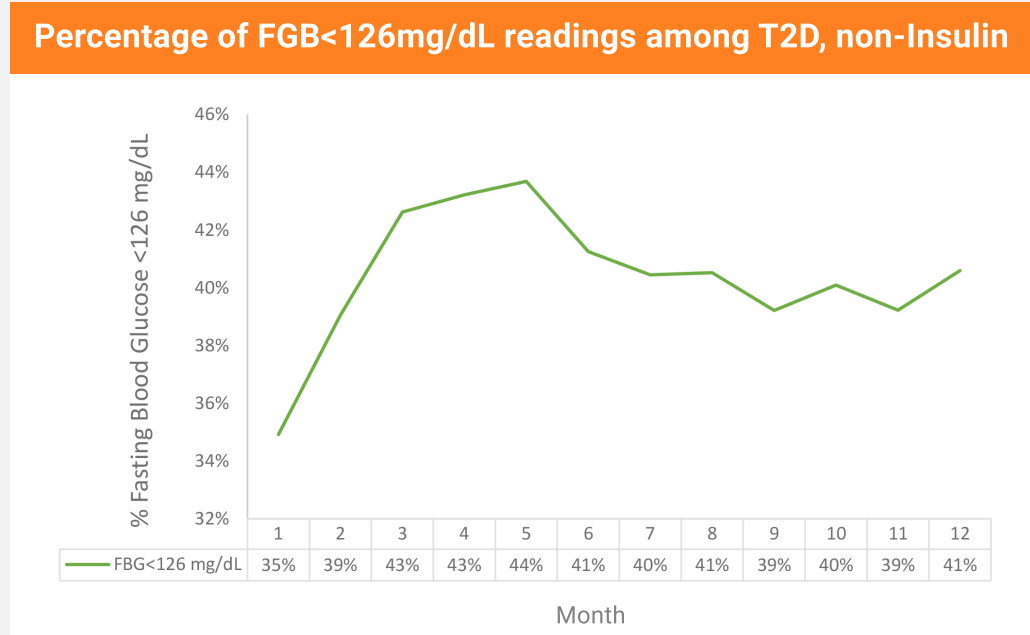


Figure 2: The graph represents the percentage fasting blood glucose (FBG) <126 mg/dL events over a year in Dario users. The table summarizes the percentage of <126 mg/dL events from total FBG measurements per active month (1-12) on average.

### Blood Pressure

A subgroup of 95 study participants recently began using the blood pressure monitoring system and were analyzed during 3 months of use. 23 users showed controlled/normotensive levels at baseline. 72 (non-controlled) users started at levels of hypertension (HT) stage 1, hypertension stage 2 or hypertensive crisis.

- 51 (71%) non-controlled users reduced their systolic blood pressure by 8.1 mmHg (133.9±10.7 vs. 142±13.1 mmHg) and diastolic by 6.0 mmHg (83.2±8.3 vs. 89.2 ± 10.8 mmHg) on average over three months.
- 27 out of 72 (38%) of the non-controlled users shifted towards a lower blood pressure level (Figure 3). In addition, 7 out of 72 (10%) of non-controlled users shifted to controlled level after 3 months (Table 2).

Table 2: Changes in blood pressure levels in users at 3 months.

95 Blood pressure monitoring system users		
Users	Month 1	Month 3
Controlled/Normotensive (Normal/Elevated)	23	30 (+30%)
Not - Controlled (HT stage 1/HT stage 2/ HT Crisis)	72	65 (-10%)

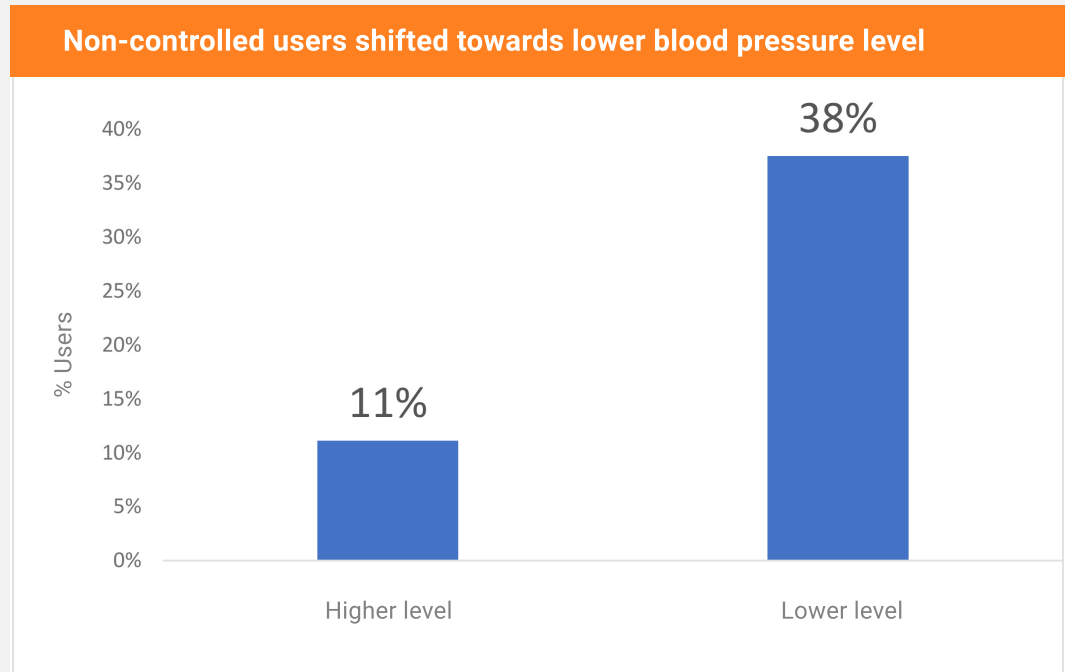


Figure 3: The graph represents the percentage of HT users that shifted one level of blood pressure over three months.

### References

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## Discussion

A large, real-world group of people with Type 2 diabetes not treated with insulin was examined in this study to analyze important components of diabetes and hypertension management in clinical practice. Digital engagement can play key roles in enhancing patient understand and management of chronic diseases <sup>2 3</sup>.

- In this study it is observed that for 9200 active users the average ratio of high blood glucose events (180-400 mg/dL) was reduced by 26% and sustained during a full year (Table 1, Figure 1). Reduction of high blood glucose events is known to reduce the complications of T2D <sup>4</sup>. The American Diabetes Association (ADA) notes that keeping blood glucose at target levels and reducing postprandial glucose values to less than 180 mg/dL helps people avoid serious complications <sup>2</sup>.
- Fasting measurement (Fasting Plasma Glucose ≥126 mg/dl) is one of the criteria for diagnosis of diabetes and remains a strong predictor of mortality, even after accounting for other risk factors <sup>1</sup>. ADA classifications consider Fasting blood glucose levels below 126 mg/dL to be either prediabetes (100-125mg/dL), or normal (less than 100 mg/dL) levels. In the present study, Dario users with type 2 diabetes gradually increased their average percentage rate of fasting measurements that are less than 126 mg/dL by 16% and sustained these improvements over a full year (Table 1, Figure 2).
- Hypertension is a major contributor to cardiovascular disease representing approximately 10% of all global health care spending. A subgroup analysis in the present study revealed that within a group of T2D users connected to the Dario Blood Pressure Monitoring System, 38% of HT users succeeded in reducing their blood pressure level (Figure 3) <sup>5</sup>. Moreover, HT users reduced their systolic BP in 8.1mmHg and diastolic BP in 6.0 mmHg following three months. These findings may be driven in part by the finding that home-based blood pressure monitoring enhances patient engagement, which independently plays an important role in medication and lifestyle adherence <sup>6</sup>. A recent meta-analysis showed that for a BP reduction of 10 mmHg systolic or 5 mmHg diastolic, there was a 22% reduction in coronary heart disease events and a 41% reduction in stroke <sup>7</sup>. This group had their blood pressure logged automatically into the mobile app, and this alone may have provided the users a better visualization of their blood pressure, which may have increased their awareness and resulted in this clinical improvement.

## Conclusion

The study demonstrates that a digital management platform may assist users to better manage their blood glucose and blood pressure levels and sustain behavioral change. This observational study demonstrated a reduction in high glycemia readings ratios, and an increase in lower fasting blood glucose levels sustained over one year, with additional improvement in blood pressure levels.