

Mobile Prescription Therapy: The Potential for Patient Engagement to Enhance Outcomes

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Introduction

Mobile health is an emerging field of medicine which aims to leverage technology to improve health outcomes. Mobile health resources may coach patients with chronic medical conditions in between provider visits and may deliver clinical decision support to providers at the time of the visit. The first mobile prescription therapy (MPT), WellDoc, Inc's BlueStar, (1,2) was launched in 2014 for patients with type 2 diabetes. We report here on initial measures of patient engagement based on analysis of de-identified observational data of BlueStar users.

Methods

Starting in 2014, medical providers have been prescribing the product for patients with type 2 diabetes. The software is downloaded onto smart phones with the iOS or Android operating systems. Users interact with the product on the phone or on a personal computer via a web portal. Data is encrypted and uploaded to WellDoc servers. For the purpose of this analysis, user data was de-identified in accordance with the Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule. In this initial view of user engagement data, we report observations from commercially-insured users from a health plan for a 6 month enrollment period. A single engagement was defined as a user accessing any feature of the device, such as entering a BG or a medication. Persistence is defined as one or more user engagements per month.

Results

Prescription Data

Data collection period	Sep 1, 2014 – Mar 26, 2015
Number of prescriptions	226
Number initiated	198
Users longer than 4 months	137
Mean A1C	8.7%
Percentage A1C >7%	79%
Mean Age	53 (range 23 – 73)
Gender	59%M

Population demographics of MPT users shows that most users had uncontrolled diabetes and were older than expected.

User Entry Data: Web vs. Mobile

Group	Web portal use	Mobile phone use
All users	18%	82%

The majority of MPT users engaged with the product on their mobile device.

User Entry Data: Engagement

Total engagements	66,242
Medication entries	28,977
BG entries	11,149
User notes	3,710
Labs/exams/screenings	1,521

Engagement with various MPT features was high among active users

User Entry Data: Engagement by Age

Age group	Percent of total users	Percent of total engagements
>60	27%	34%
50-59	43%	42%
40-49	20%	19%

Engagement was seen across age groups with higher than expected engagement in the >60 age group

User Entry Data: Persistence

Engagement over time					
For users who activated MPT >120 days	1 month	2 months	3 months	4 months	>4 months
	70%	59%	54%	49%	47%

Over half of users were continuing to use this MPT product at 3 months

User Entry Data: SMBG

Number of BG entries by meal types (n=11,149)								
	F	BB	AB	BL	AL	BD	AD	BT
Number of BG entries	1403	3734	929	1093	695	1587	964	744

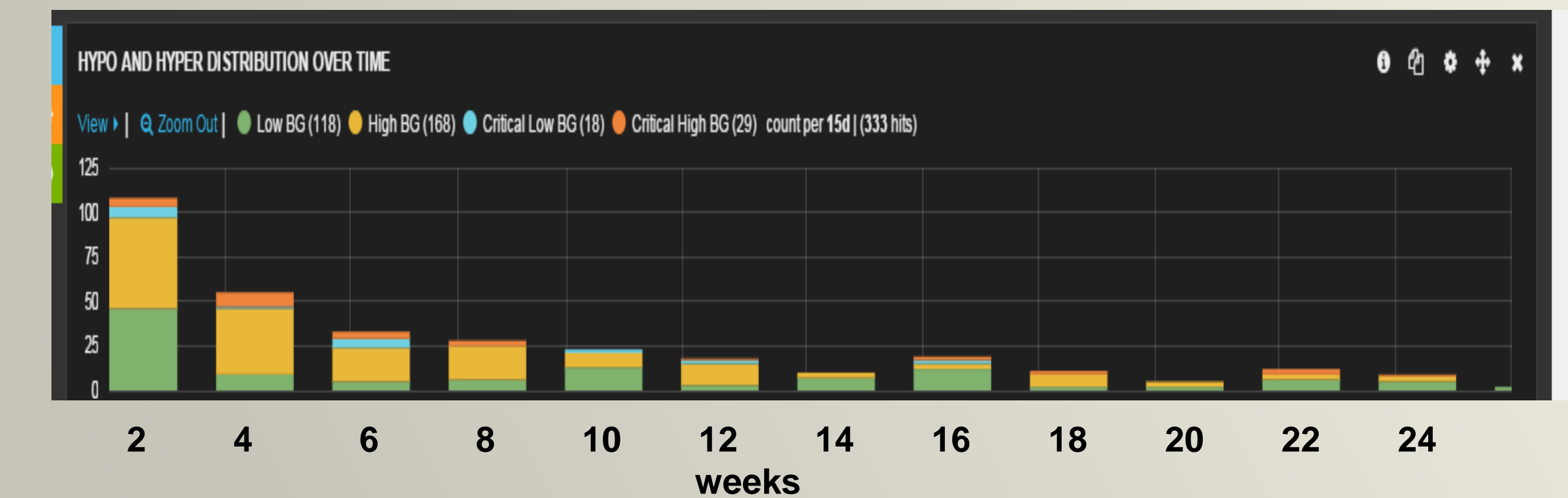
Users entered BG values across all meal types (F=fasting, BB=before breakfast, AB=after breakfast, BL=before lunch, AL=after lunch, BD=before dinner, AD=after dinner, BT=bedtime)

Change in BG values entered between day 1 and day 120

Change in mean BG (mg/dL)	fasting	post-prandial
	-31	-16

The mean BG of users was lower after 120 days of use. Fasting BG improved more than post-prandial BG.

Hyper- and Hypoglycemia Trends



Reductions were seen in MPT users in extreme BG value entries over time (low BG<70 mg/dL, critical low BG<50 mg/dL, high BG>300 mg/dL, critical high BG>400 mg/dL)

A1C Trends

A1C change (n=99)			
	Baseline A1C	2 nd A1C	Change
mean	8.72%	7.87%	-0.84%
SD	1.9	1.7	
Two-tailed t test p=0.001			

A subset of MPT users reported a second A1C value. The mean A1C of the second value was significantly lower than the first.

A1C change by baseline A1C (n=99)

Baseline A1C	n	Percent	Change in A1C
<7%	19	19.1%	0%
7-8%	24	24.2%	-.3%
>8%	56	56.6%	-1.4%

The users who were in target at baseline maintained their target; as expected, the most improvement was seen in users with high baseline A1C values; 61% of users had a second A1C at target or improved by >=1%)

Conclusions

In summary, high degrees of patient engagement are observed with this novel mobile prescription therapy platform. Engagement was surprisingly high in older users. Persistent use was seen across all age groups. BG values were entered across all meal types. Preliminary trends show improvements in BG entries as well as A1C reduction. This MPT platform appears to be an effective tool for engaging patients as key participants in improving diabetes-related outcomes.

References

- Quinn C et al. Cluster-Randomized Trial of a Mobile Phone Personalized Behavioral Intervention for Blood Glucose Control Diabetes Care September 2011; vol. 34 no. 9: 1934-1942
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