Digital Health in Novo Nordisk

12 September 2017

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TODAY, 387 MILLION PEOPLE HAVE DIABETES.
BY 2035, IT'S ESTIMATED THAT

592 MILLION

PEOPLE WILL HAVE DIABETES GLOBALLY

1 IN 2

PEOPLE WITH DIABETES DO
NOT KNOW THEY HAVE IT

ONLY HALF

OF THE PEOPLE IN TREATMENT FOR DIABETES
ACHIEVE THE PLANNED TREATMENT TARGETS

4.9 MILLION 

PEOPLE DIED OF DIABETES IN 2014

Type 2 diabetes

Type 2 diabetes develops when the beta-cells in the pancreas start to become inefficient and produce too little insulin for the body's needs.

Characteristics

- Progressive disease
- Manage you glucose level
- Too high glucose levels result in long term complications: Cardiovascular risk, amputations, dexterity, limited eye sigts
- Too low glucose levels result in dizziness, pass out, risk of death
- There are very few symptoms that you are not doing well

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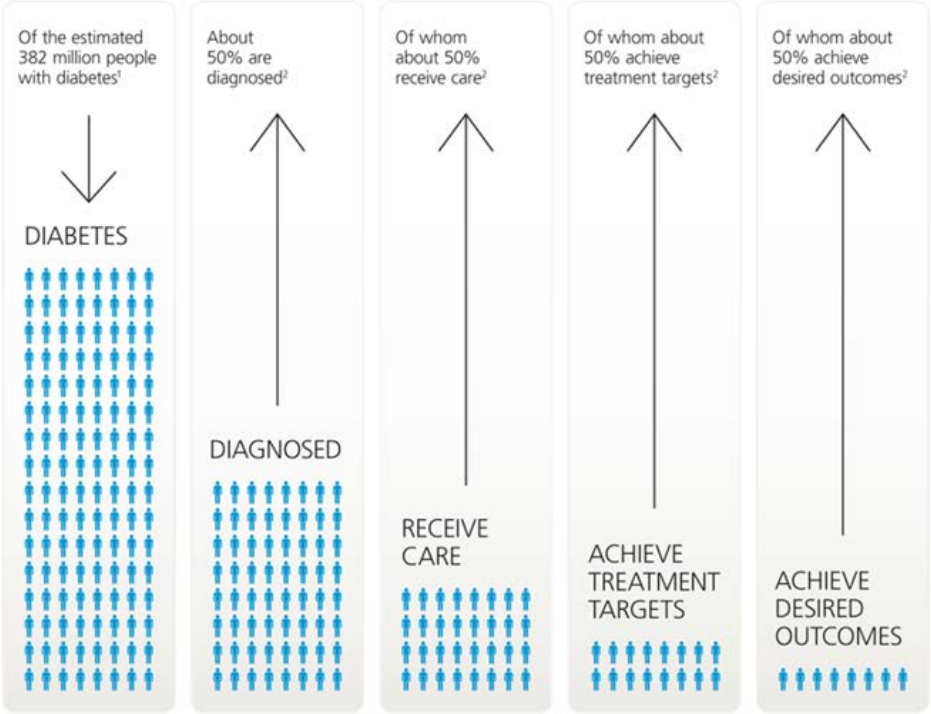
Why digital health?: Insights must be turned into action to close the treatment gaps in diabetes



- What is **needed** is **not prescribed**
- What is **prescribed** is **not picked up**
- What is **picked up** is **not used adherently**
- What is **used adherently** is **not optimized and adjusted** to you and your lifestyle

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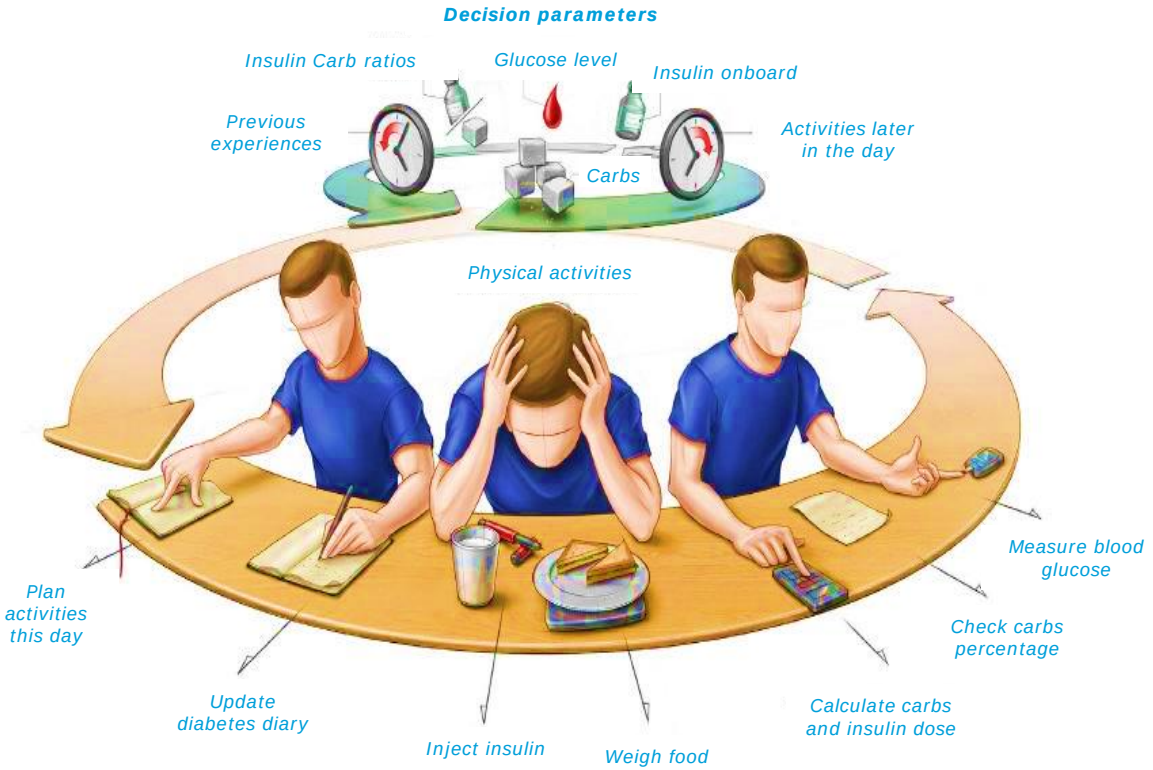
New technologies to support patients with better daily routines and disease management

Diabetes is complex!



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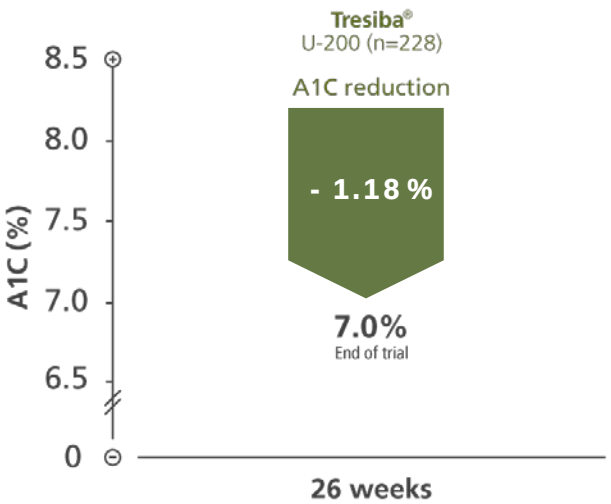
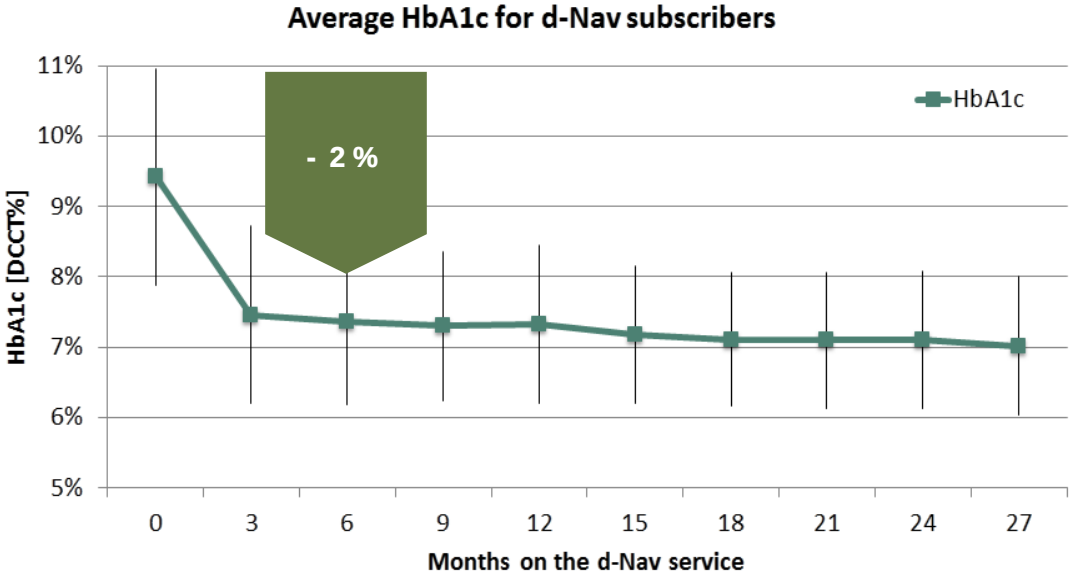
Can digital health solutions be more impactful than drugs?





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https://www.tresibapro.com/efficacy-safety/type-2-diabetes.html

https://hygieia.com/case-studies/; n=40% of 1800 SET users, 720

The competitive landscape is changing rapidly

Non-pharma players are entering in Health Care

TRADITIONAL PLAYERS HIGH BARRIER OF ENTRY

NEW AGE PLAYERS LOW BARRIER OF ENTRY

Pharma

Lilly, novo nordisk, MERCK, Boehringer Ingelheim, SANOFI

Sell more drugs; commercialize therapies; drug + device

Diabetes Management Platforms

livongo health, glooko diasend, WellDoc, TIDEPOOL, rimidi, CareLink, mySugr, VOLUNTIS

Claims based on improved compliance and Hba1c reduction

Blood Glucose / Pump

Medtronic, Roche, Animas, dexcom One Step Ahead, DARIO, LIFESCAN, Abbott

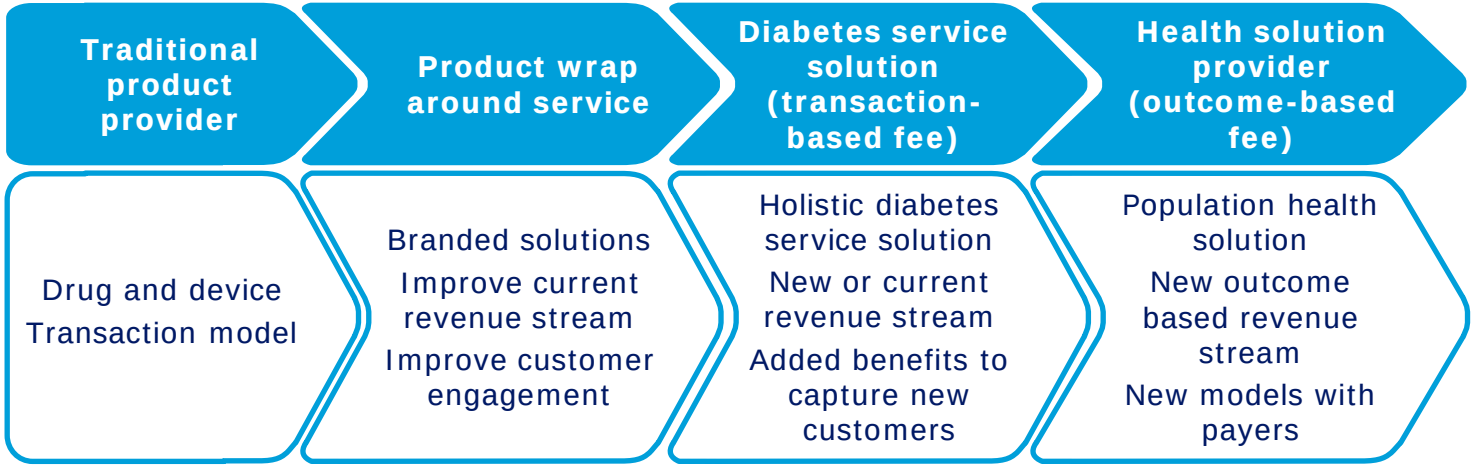
Sell more glucose monitoring devices/strips

Data / Predictive Analytics

Google, IBM, SAMSUNG

Consider data as most valuable

New business models are being explored



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Medical Devices: Volume of Patents Matters

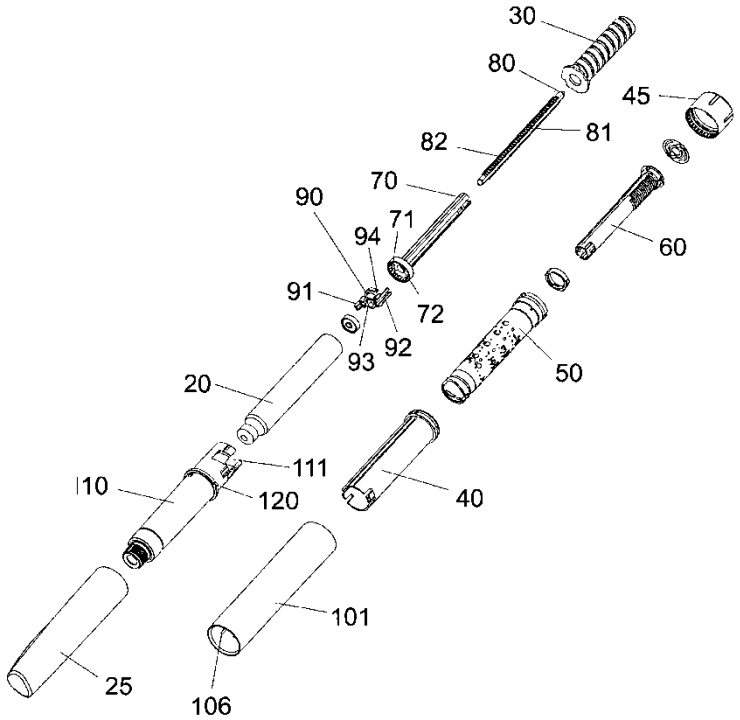

Fig. 4

Patent #1
Patent #2
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.
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Patent #n

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The digital health value chain

The building blocks of the value chain have started to mature

Devices → *Data Acquisition* → *Data Aggregation* → *Advanced/ Predictive Analytics* → *Feedback Loop*

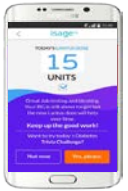
Hardware

HealthKit

Software

IBM Watson Analytics

watsonanalytics.com



Software

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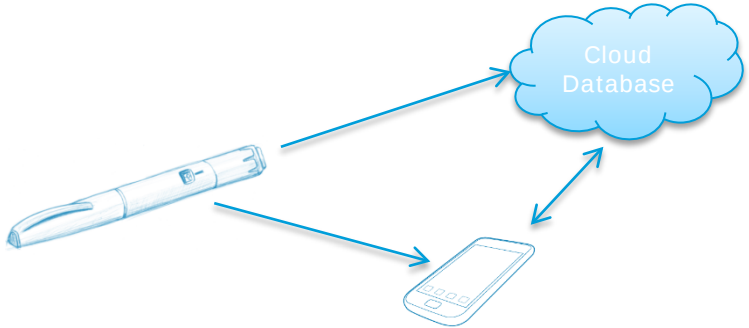
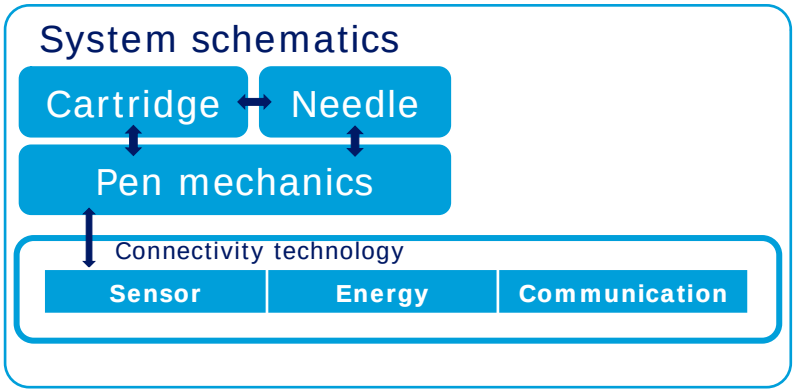
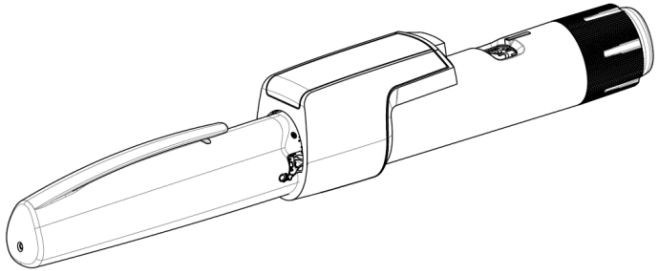
Technology areas patented by Novo Nordisk
Dose sensing
Connectivity
Fast self-titration
Dose guidance and safety
Adherence analysis and visualization
Tools for HCP optimization

Connectivity: Enabling Digital Health







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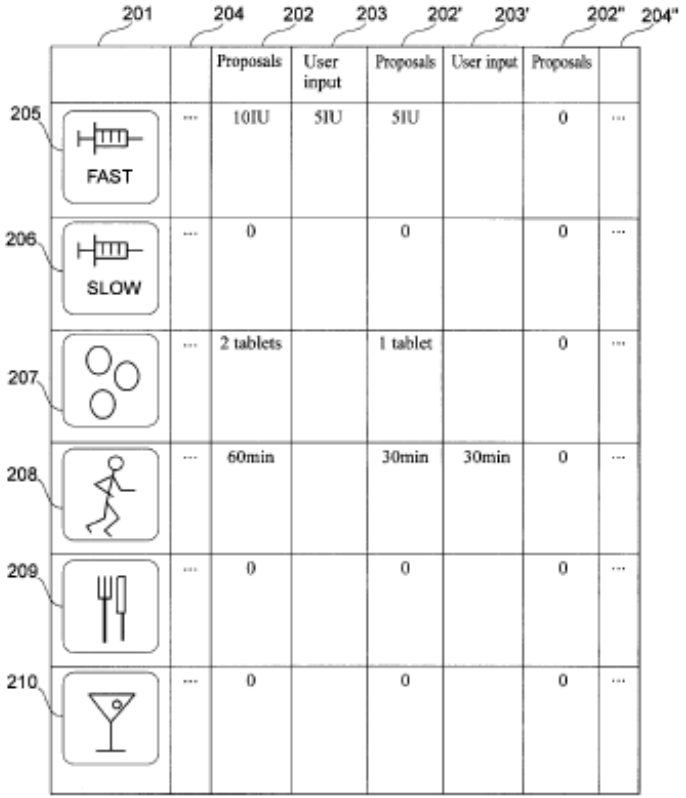
The Early Days of Digital Health Patenting (1998)

- A method for assisting a patient in self-treating diabetes:
- obtaining a value of a blood glucose level from a patient
- receiving other data relating to the patients condition;
- analyzing the data using a processor
- based on the analysis, proposing two or more alternative choices for treating the patient
- wherein each choice will result in adequate blood glucose levels.



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Recent Example: Patenting of Titration Algorithm

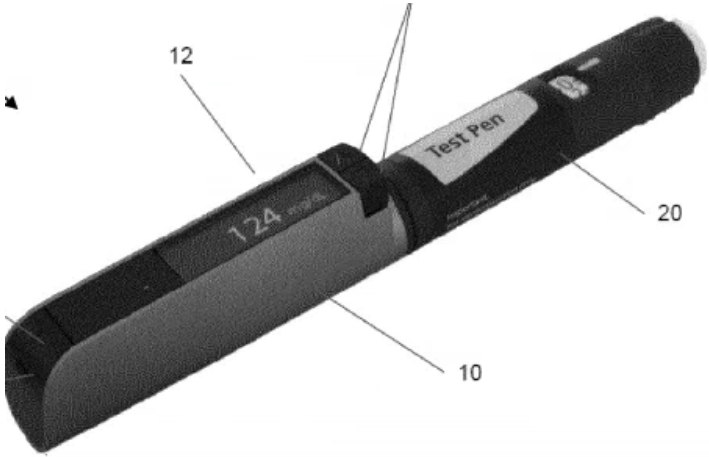
Safety factor dependent on individual glucose variance

(1) $IU_{Titration\ level}(n) = IU_{Titration\ level}\ (n-1) + Babystep(n)$

(2) $Babystep(n) = ISF_{average}(n)^* (Average_{FBG}(n) - Target_{FBG})^*SF(FBG_{Variance})$

$IU_{Titration\ level}(n)$ = New insulin titration dose [IU]

$Target_{FBG}$ = Target Fasting BG level [mmol/L]



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Thank you for your attention!

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