
I'M PRZEMEK
CEO & co - founder of DLabs
and DiabetesLab

DIABETESLAB & SUGUARD – OSOBISTY ASYSTENT DIABETYKA. ZASTOSOWANIE SZTUCZNEJ INTELIGENCJI I ZAAWANSOWANYCH ALGORYTMÓW W ZARZĄDZANIU CUKRZYCĄ TYPU 1

DiabetesLab

OD CHOROBY DO BIZNESU, CZYLI JAK ODKRYĆ PASJĘ DO DATA SCIENCE I SZTUCZNEJ INTELIGENCJI DZIĘKI CUKRZYCY

DiabetesLab


Suguard
Smart mobile application
for people with type 1 diabetes


Once upon a
TIME...

I’ve had diabetes for 20 years.

My life is conditioned by:

Carbs counting

Insulin

Glucose monitoring

Physical activity

The problem is big

so is the market

Adults who died from diabetes, HIV/AIDS, tuberculosis, and malaria

5.0 million
from diabetes
2015
IDF

1.5 million
from HIV/AIDS
2013
WHO Global Health Observatory Data Repository 2013

1.5 million
from tuberculosis
2013
WHO Global Health Observatory Data Repository 2013

0.6 million
from malaria
2013
WHO Global Health Observatory Data Repository 2013

People with diabetes:

30 million
year 1985

415 million
year 2015

642 million
year 2040

35 million

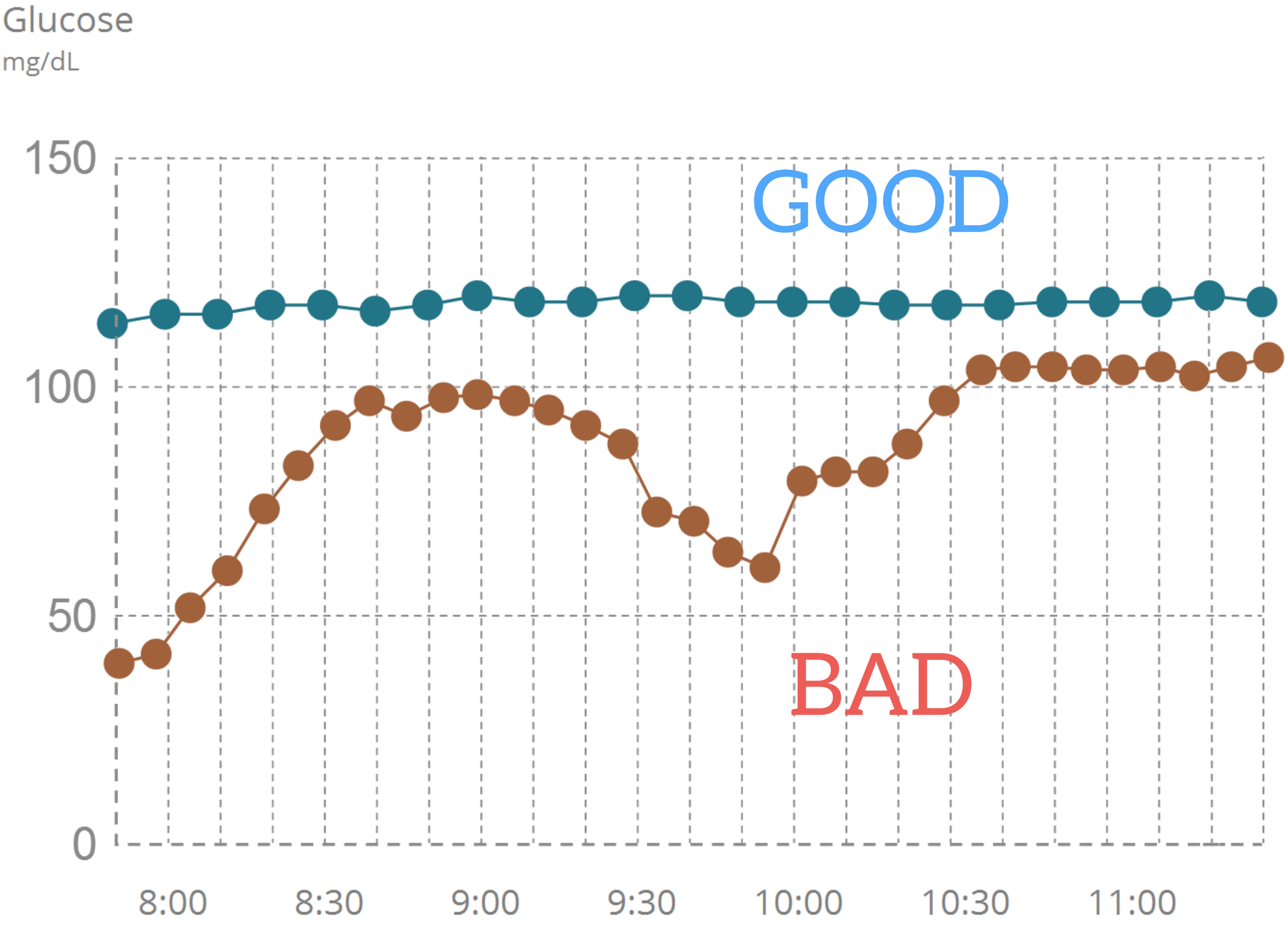
insulin users do sports

12 million

intensive sport enthusiasts
- first target market

So you have to know that:
physical activity affects diabetes therapy.

Nobody knows
how
to manage it.



It's hard to keep
glucose level stable
during
the physical activity.

It affects your health
in short
and long term.

Validation

%

We interviewed 100 people living with type 1 diabetes to learn more about their problems and current approaches of solving them.

The most common problem is that **unstable glucose levels affect wellbeing**:

> "**Too high and you feel rubbish**, need to correct, go for a walk, drink lots of water. **Too low and you feel like your body is shutting down**, have to take some sort of glucose. And both make you feel guilty, as in what did I do wrong?"

Our whole value proposition is **addressing this problem.**

100
Customer
interviews

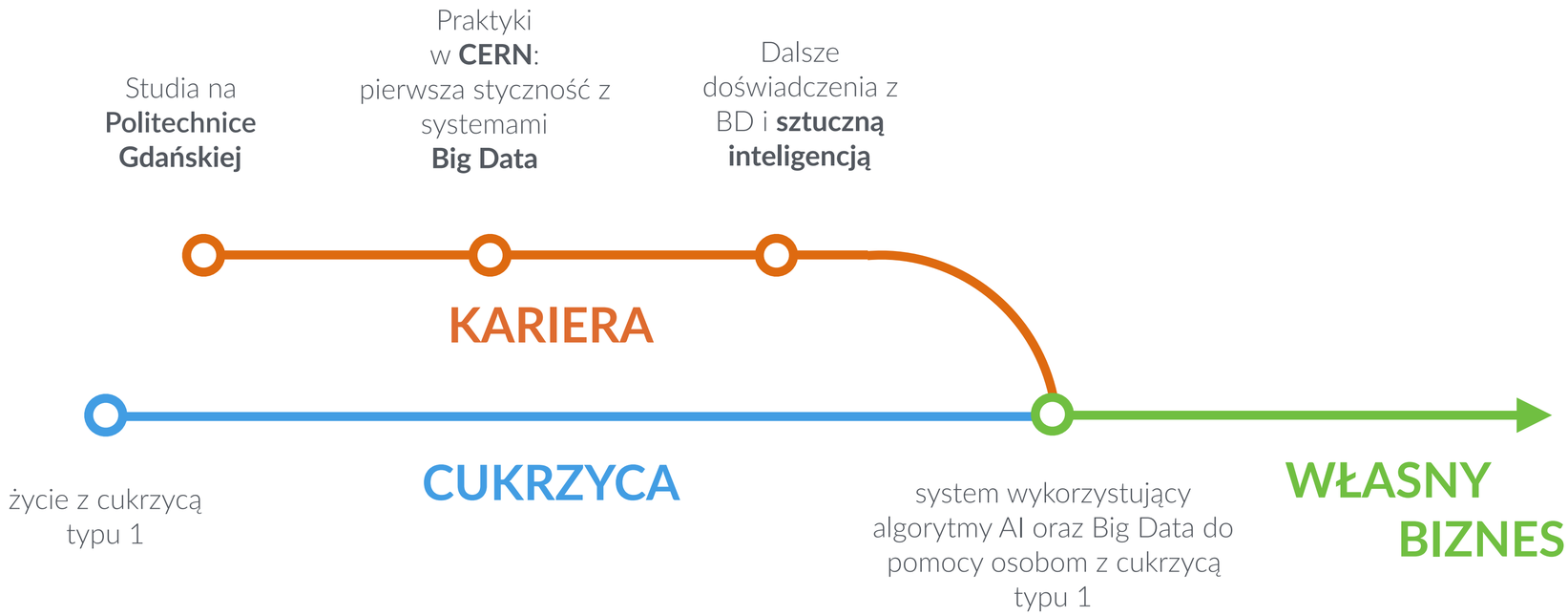
Keeping glucose levels
normal is **hard**

Defining
the **problem**

Solution

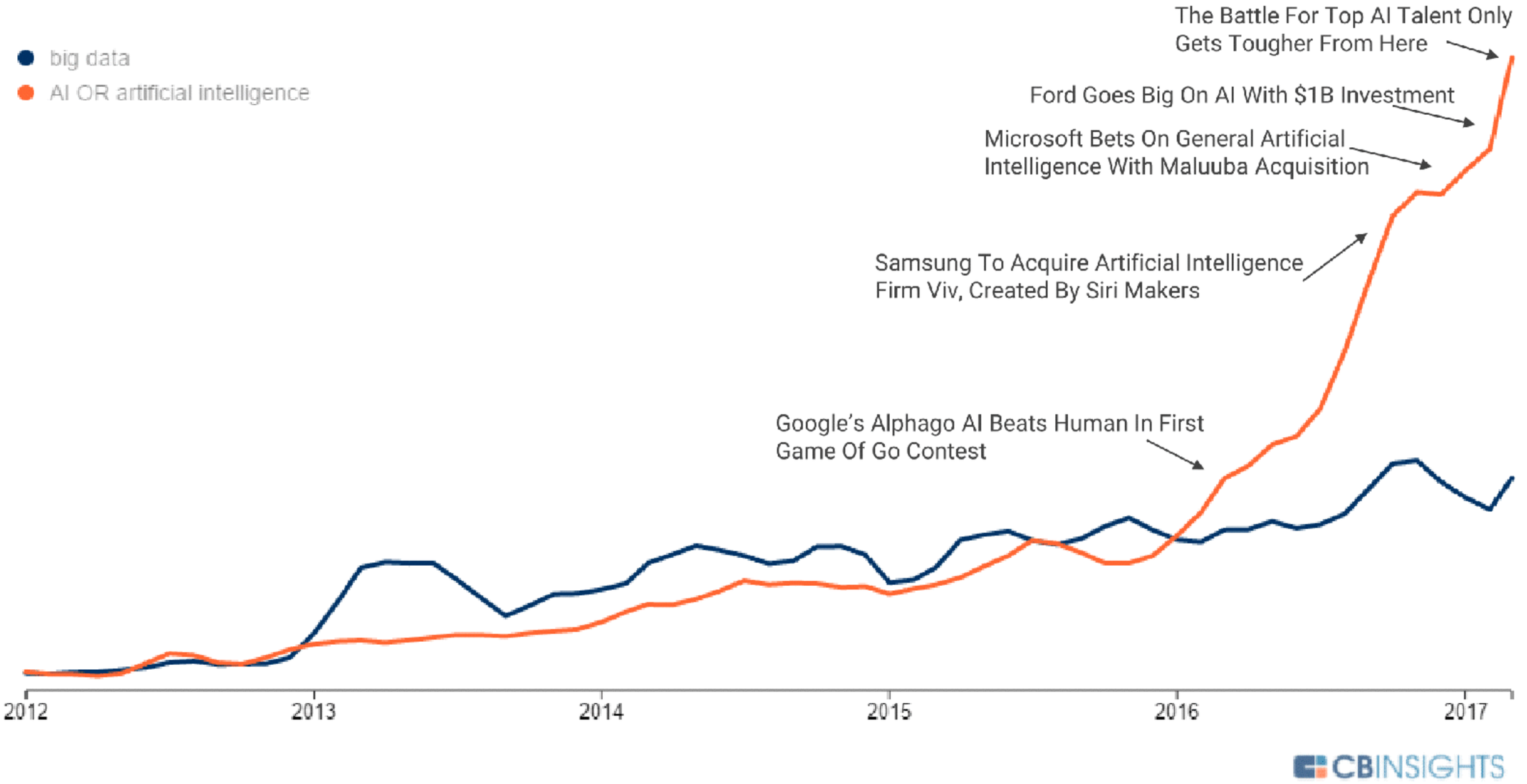
There's a need for **personalized** solution
which would detect complicated situations
and give to the user proper
action recommendations

HISTORIA


Studia na **Politechnice Gdańskiej**
Praktyki w **CERN**: pierwsza styczność z systemami **Big Data**
Dalsze doświadczenia z BD i **sztuczną inteligencją**
KARIERA
CUKRZYCA
życie z cukrzycą typu 1
system wykorzystujący algorytmy AI oraz Big Data do pomocy osobom z cukrzycą typu 1
WŁASNY BIZNES


REAR SETUP: INJECTION HOUSE BEAM

MEDIA TRENDS: AI VS BIG DATA



‘AI IS THE NEW ELECTRICITY’

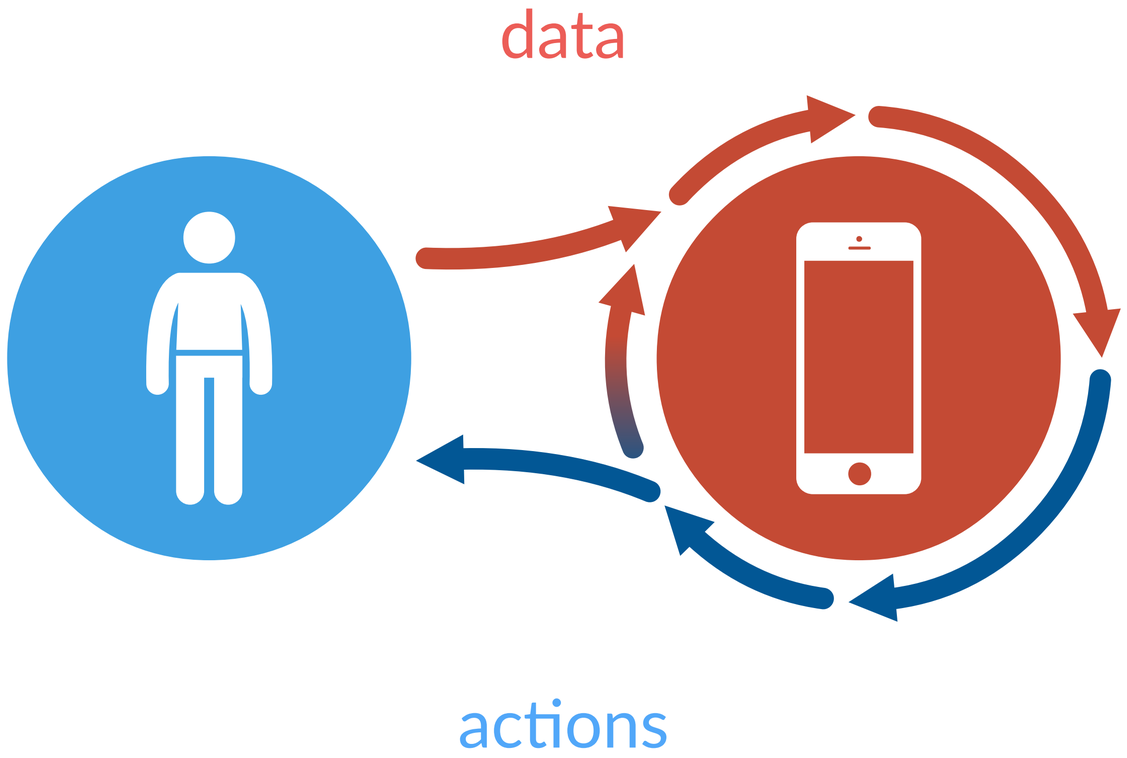
“Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don’t think AI will transform in the next several years.”

Andrew Ng

Former chief scientist at Baidu, Co-founder at Coursera

Solution:

using data to improve self-management
and to enhance involvement of patients with diabetes

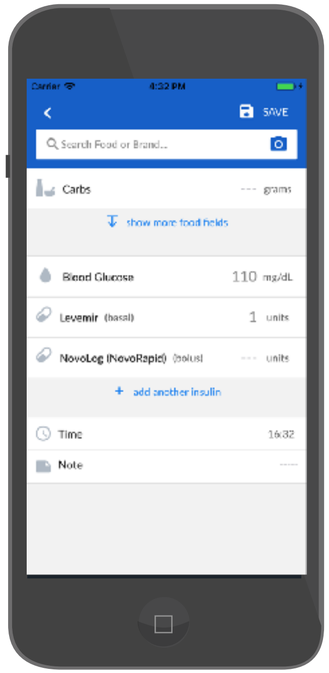


Algorithm solution that gathers health-related information from different sources

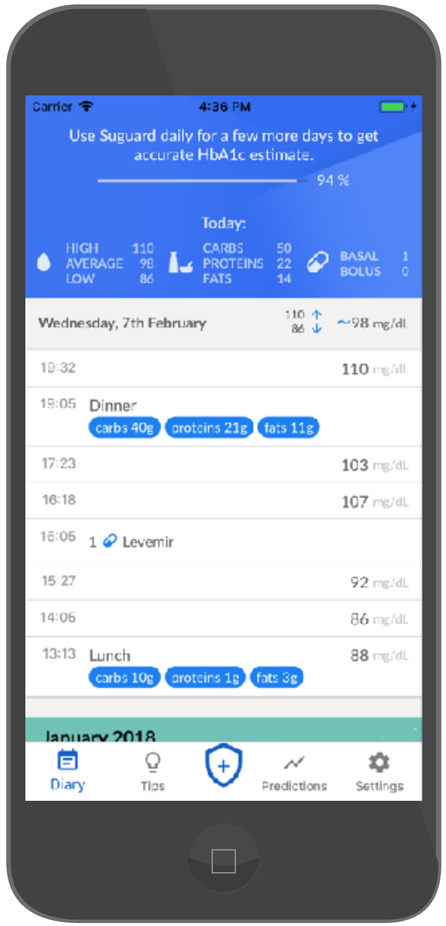
to

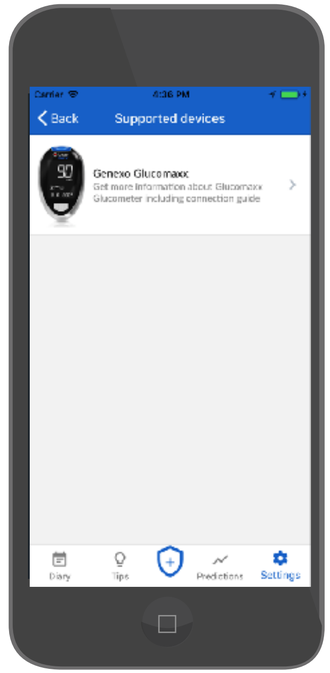
provide life-improving **suggestions** to person with diabetes.

PATIENT MOBILE APP



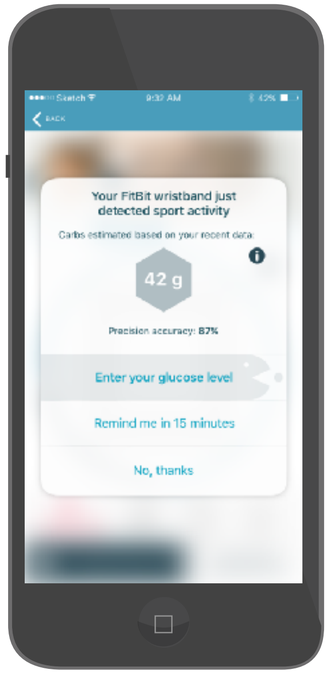
smart interactions
clear design



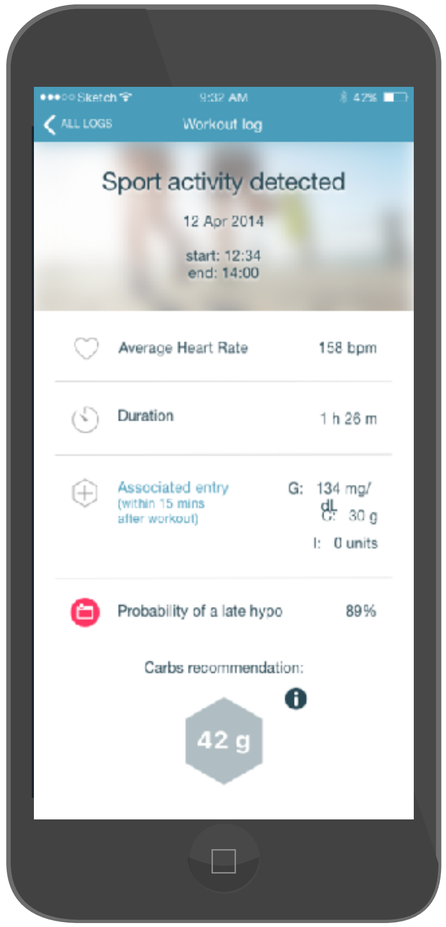


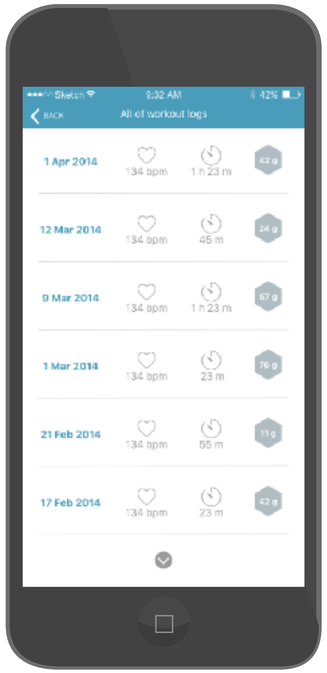
manual input by the user
set to minimum

FOR ACTIVE PATIENTS



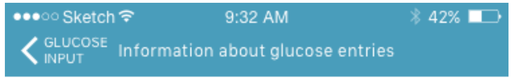
physical activity detection





activity log

EDUCATION

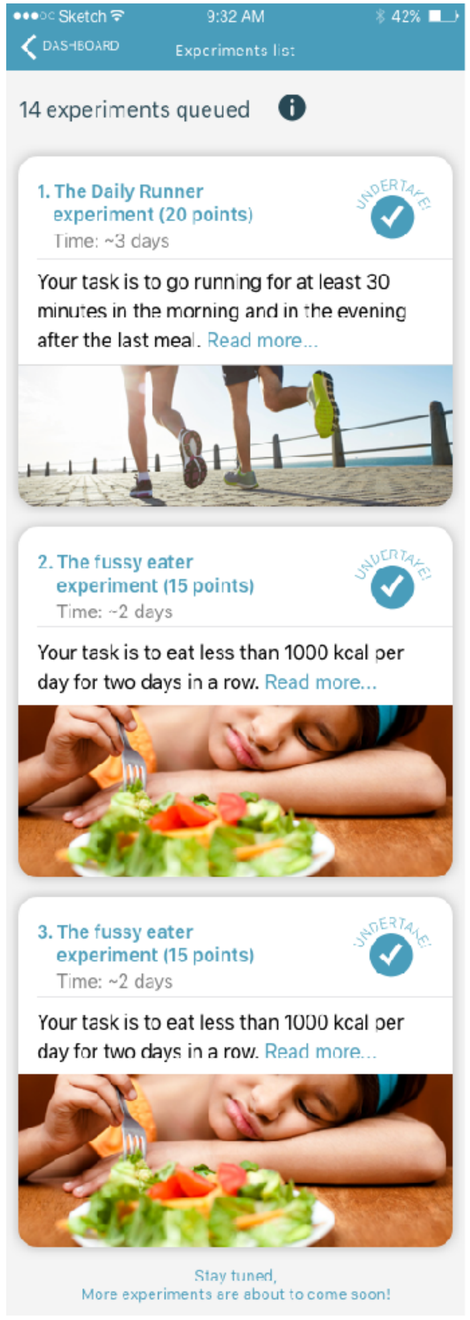


Why providing your glucose level often is important?

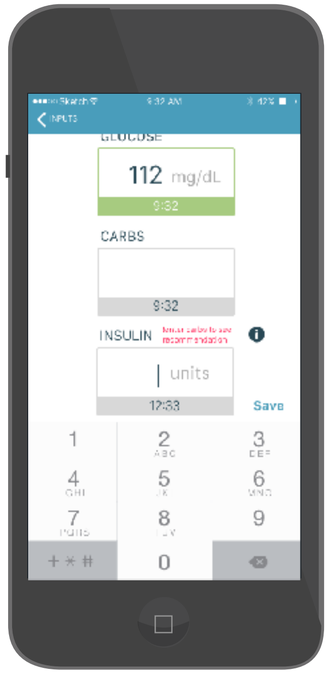
Vestibulum rutrum quam vitae fringilla tincidunt. Suspendisse nec tortor urna. Ut laoreet sodales nisi, quis iaculis nulla iaculis vitae. Donec sagittis faucibus lacus eget blandit. Mauris vitae ultricies metus, at condimentum nulla. Donec quis ornare lacus. Etiam gravida mollis tortor quis porttitor.

Keytar McSweeney's Williamsburg, readymade leggings try-hard 90's

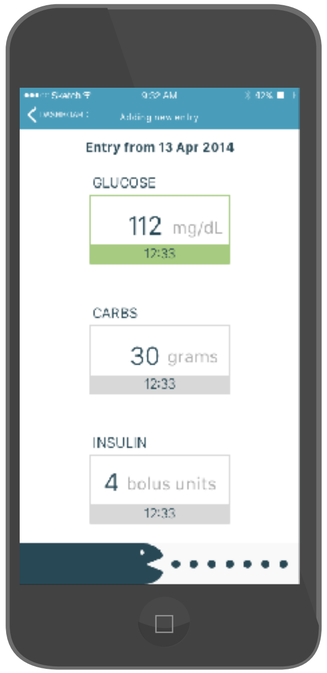
Bushwick meh Blue Bottle pork belly mustache skateboard 3 wolf moon. Actually beard single-origin coffee, twee 90's PBR Echo Park sartorial try-hard freegan Portland ennui. Selvage jean shorts 90's, Vice American Apparel try-hard food truck Shoreditch fap lomo



SUPPORTS DIABETES MANAGEMENT

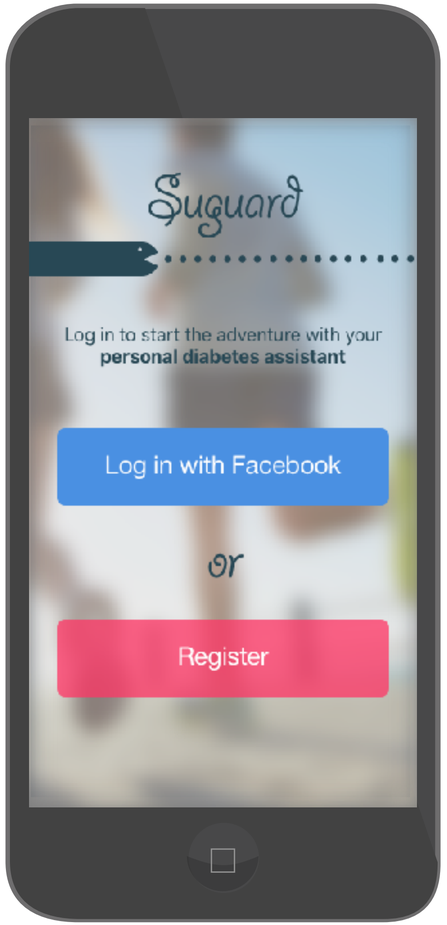


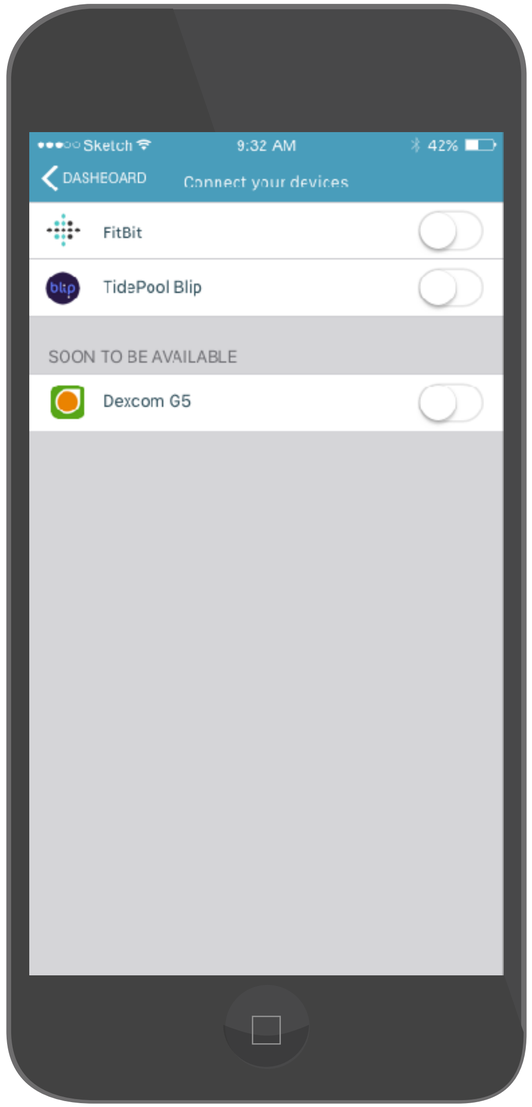
insulin dosage recommendations

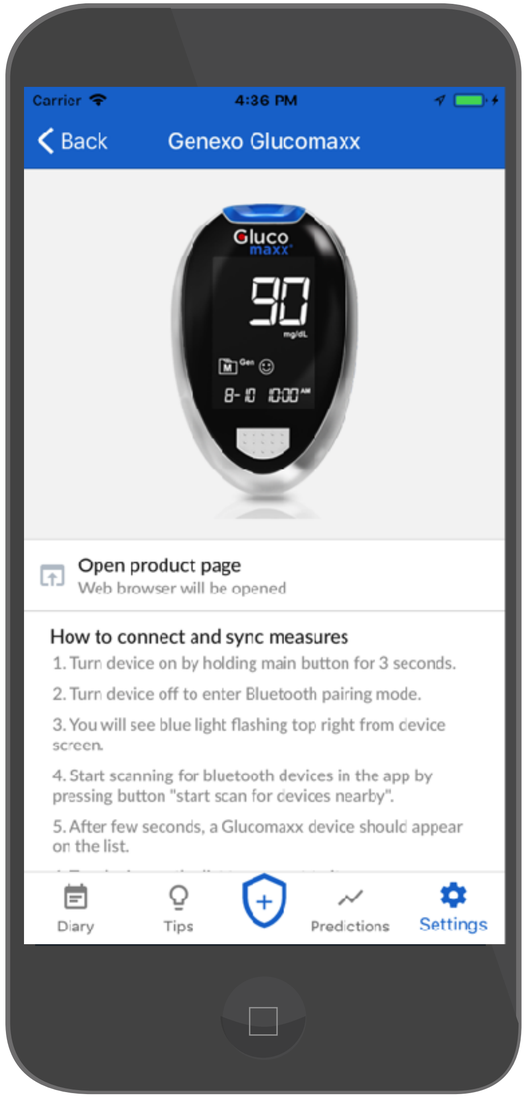


food & sport recommendation

INTEGRATIONS





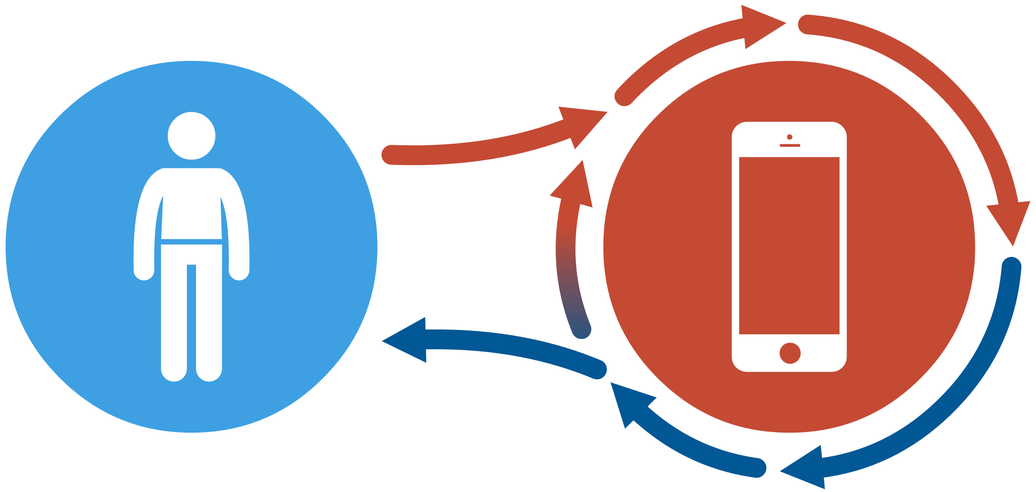


FOR MEDICAL DOCTORS

Data analytics

& medical feedback

CORE: ALGORITHMS



Data acquisition:
- glucose level
- carbs intake
- insulin doses
- physical activity

Recommendations:
- insulin dosage pre/post meal
- carbs intake e.g. after workout
- basal insulin dosage

„Data Driven” technology can be used in artificial pancreas solutions, mobile applications for people with diabetes, wearable technology and other dedicated devices.

Algorithm accuracy

In preliminary studies:

11.5 mg/dL mean error (RMSE)

when predicting 1h of glucose data based on the past 1h of data

Window/ Prediction	Mean RMSE	Median RMSE	90th Percentile	Max RMSE	No. of trials
1/1	11.5	6.42	19.73	53.13	154
2/1	11.29	7.27	22.30	41.25	147
3/1	8.98	2.68	24.33	30.54	140
4/1	7.70	3.93	17.92	28.39	133
5/1	7.31	4.00	22.64	24.23	126

AI

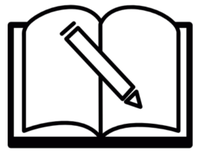
AI can predict diabetics' blood glucose levels in lab

KYLE WIGGERS @KYLE_L_WIGGERS SEPTEMBER 12, 2018 8:28 AM

MOST READ

Why Trump's trade war could be the tipping point for American manufacturing

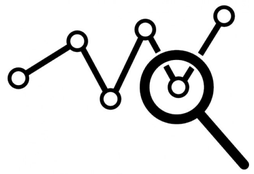
FEATURES



Diabetes journal

Recommendations

COMING SOON!



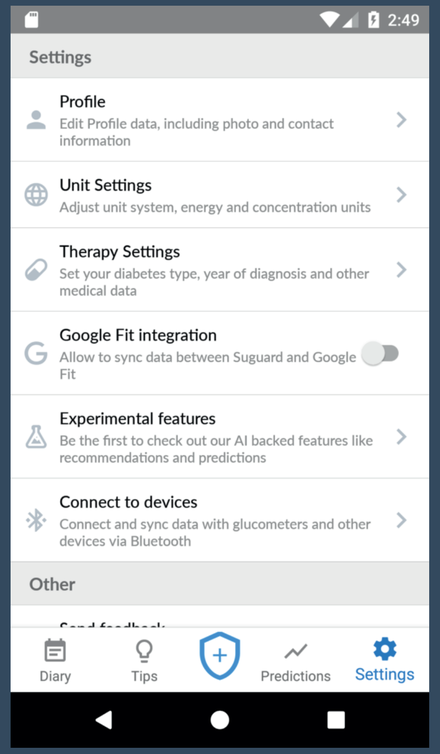
Predictions

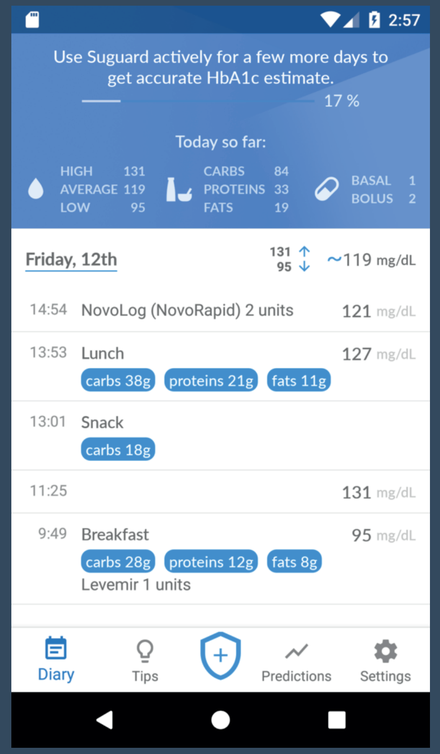
Meals recognition

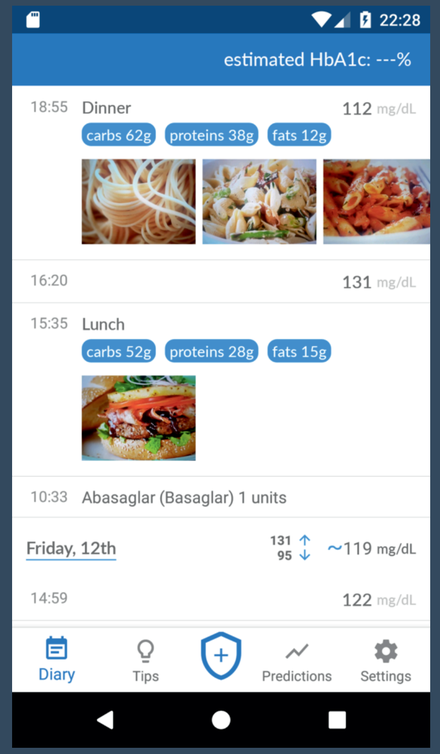
COMING SOON!

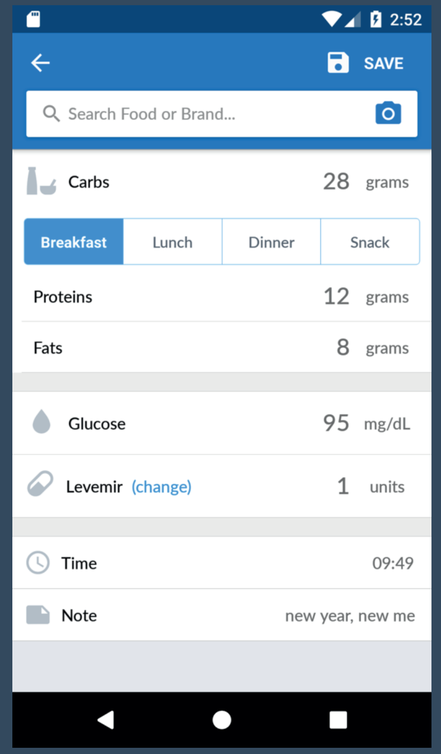
Suguard

How it works?









COLLECTED DATA

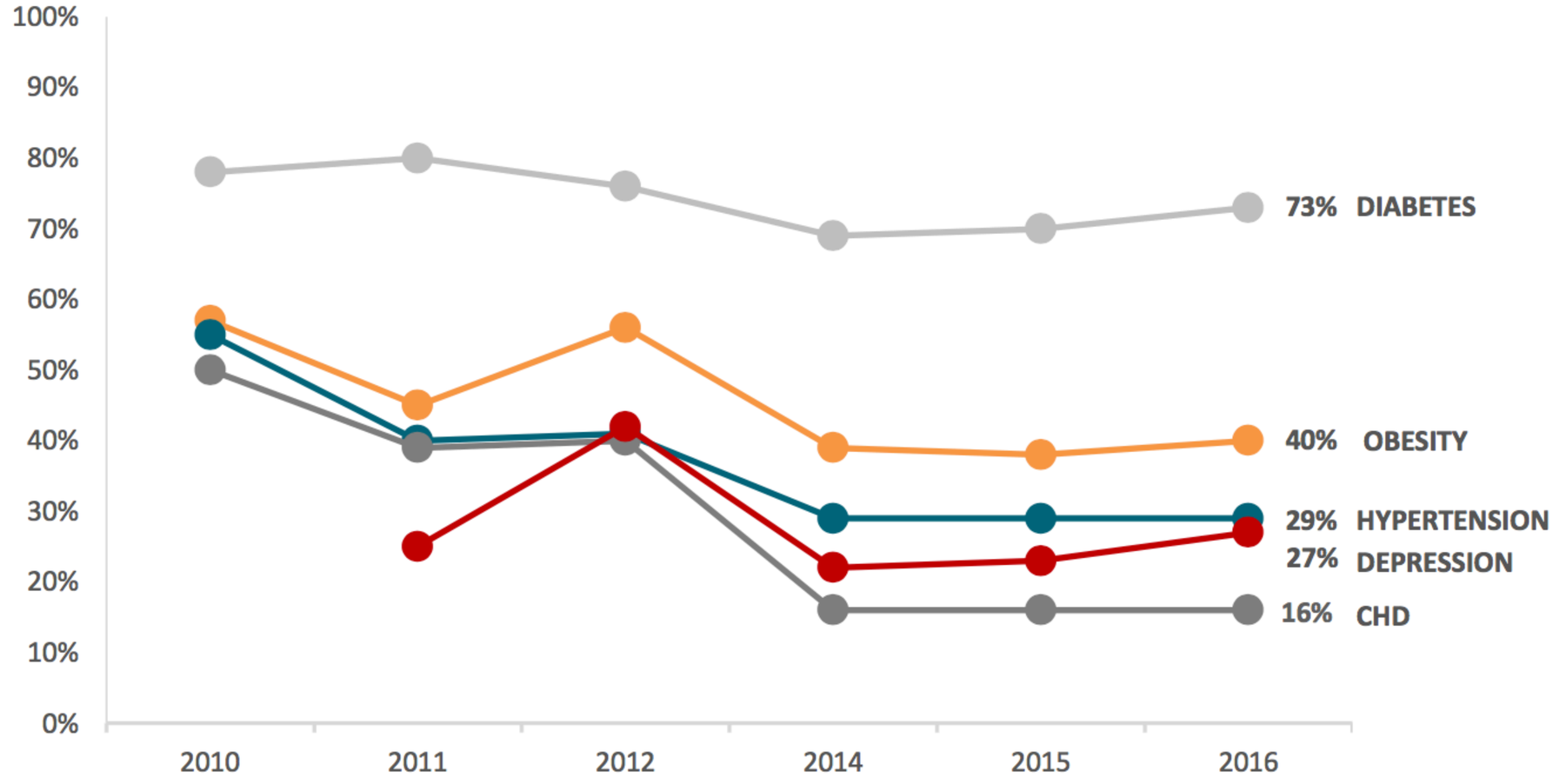
- glucose levels
- nutritional values of meals
- insulin doses
- data of physical activity

RECOMMENDATIONS RECEIVED

- doses of insulin to be taken before / after a meal
- amount of nutritional values, e.g. after physical exercise
- the dose of basal insulin

MARKET TRENDS

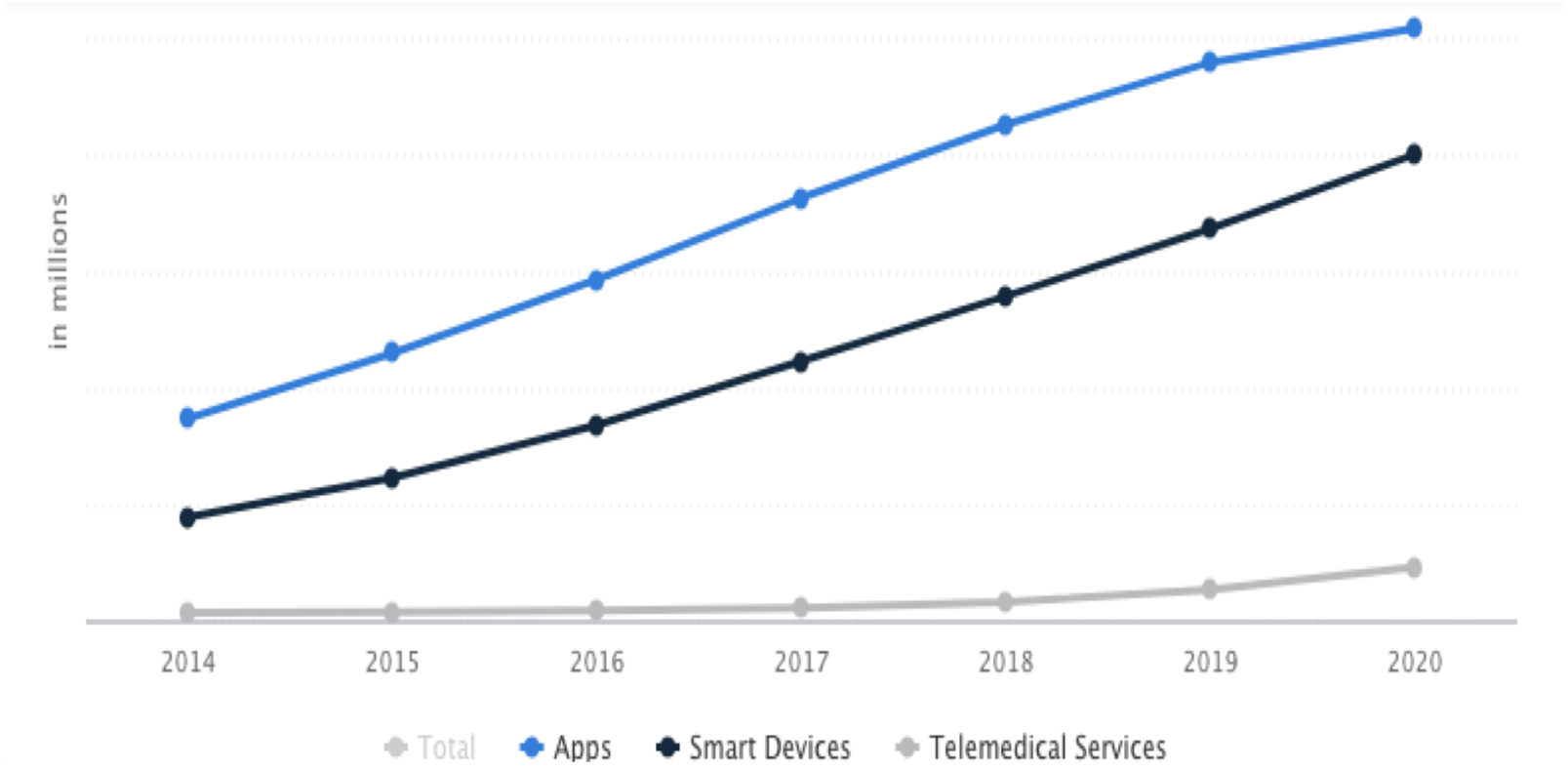
Which therapy fields offer the best market potential for mHealth in the next 5 years?



NOTE: STUDY WASN'T CONDUCTED IN 2013

Source: research2guidance - mHealth App Developer Economics study 2016, n=2600

Segment "eHealth solutions for Diabetes"
Users in millions



Source: Statista, December 2015

Next steps

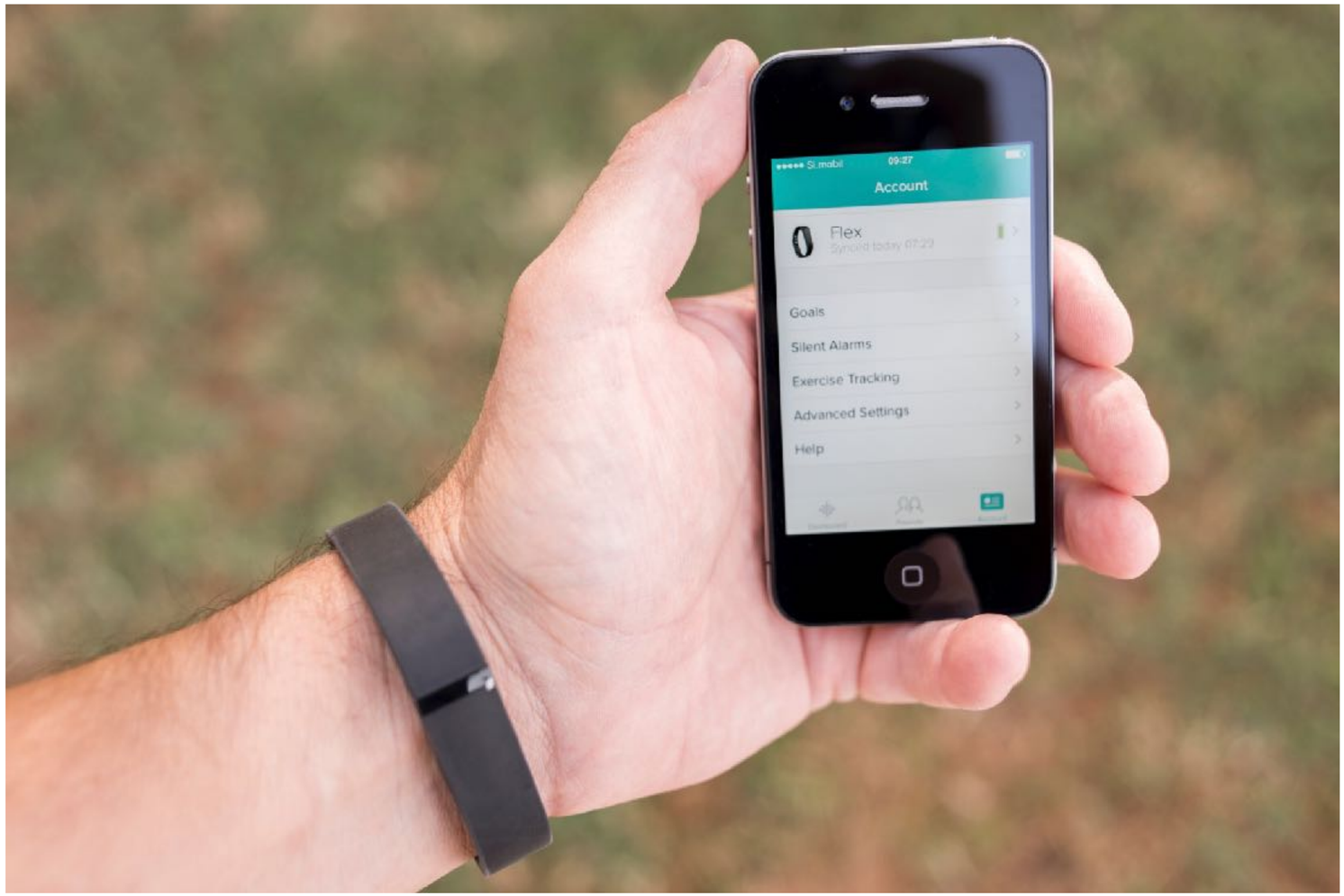
INSULIN PEN BAND

Sillicon based device for
any model of insulin pen

Detectors

Bluetooth Low Energy:
Band - Smartphone Data
Transmission Bus

FITNESS WRISTBAND



WSPÓŁPRACA

Współpraca ze studentami

...i kołami naukowymi:
wspólne pomysły

Granty

wspólne projekty B+R w obszarze cukrzycy

Prace dyplomowe

np. w obszarze innowacyjnych sposobów pomiaru glukozy we krwi

Hardware

współpraca przy tworzeniu różnego rodzaju **innowacyjnych urządzeń**

Badania i Rozwój

współpraca w konsorcjach przy realizacji prac B+R

Diabetes Lab

Let’s help people with diabetes together!

DISCOVER SUGUARD

Would you like to test Suguard mobile application before official market launch?
Let us know!

hi@diabeteslab.org

We are looking for partners!
Interested in cooperation? Want to change the world with us?
Write to us!

office@diabeteslab.org

www.diabeteslab.org

DZIĘKUJĘ ZA UWAGĘ!

PRZEMYSŁAW MAJEWSKI
MAJEWSKI@DIABETESLAB.ORG

BACKUP

COMPETITION: INSULIN CALCULATORS, DEVICE MANUFACTURERS, AND BIG PHARMA

Key players	Why it matters	Weak points
PredictBGL (Australia)	Claims to predict behaviour of glucose in the future. Calculates insulin and carb adjustments.	Lots of manual settings. Lack of clinical validation.
RapidCalc (Australia) Built-in bolus calculators in insulin pumps	Traditional insulin calculators well-known in the medical community.	Everything depends on manual settings.
Medtronic + IBM Watson	Vision to provide personalized recommendations based on data.	Designed specifically for Medtronic devices.
Dexcom + Google	Strong interest in data analytics.	No news.
Sanofi + Google		
Novo Nordisk + IBM Watson	Plans to create a “virtual doctor” who would give treatment advice to diabetes patients.	
Medtronic, Bigfoot Biomedical, Beta Bionics, Type Zero (USA), Pancreum, Inreda (Netherlands)	Big vision: to outsource most treatment decisions to the machine. Current solutions can already solve problems such as night-time hypoglycemia after exercise.	Most solutions are in R&D and are likely to have a high cost.

COMPETITION: DATA MANAGEMENT SOLUTIONS

Key players	Why it matters	Weak points
Glooko (USA) + DiaSend (Sweden)	An interest in creating a marketplace for intelligent data analysis. Pilot project with DreaMed: insulin pump settings adjustments.	Stronger interest in telemedicine rather than self-management.
mySugr (Austria)	Focus on self-management. Data collection from several connected devices.	Lack of intelligent decision support already on the market. Lack of personalized recommendations on insulin and carbs.
Timesulin (UK/Sweden)	Vision of collecting data from insulin pens for personalized recommendations.	
Dario (Israel) Philips (Netherlands) iHealth (USA) OneDrop (USA)	Data collection from glucometers. Interest in analytics.	
Social Diabetes (Spain) Glucosio (open source)	Community support.	

COMPETITION: EXERCISE-FOCUSED SOLUTIONS

Key players	Why it matters	Weak points
Glucose Advisors (USA)	- Engine One app is developing rapidly and is based on years of sports coaching practice. - Recommendations: how much to eat before exercise; real time tips during exercise; predictive warnings about low blood sugars, etc.	- Team does not have a strong background in technology and machine learning. - Recommendations are most likely based on average results across many participants. - Focus on physical activity, not scalable to other situations which need personalized approach.

– ExCarbs (UK)
– RunSweet (UK)
– Diabetes Motion (USA)

- education or coaching.
- no strong interest in technology-focused solutions.

BUSINESS MODELS

Mobile app	• B2C subscription: $2.99 per month (mySugr); $8-$19.95 per month (PredictBGL); $6-$8 per month (PredictBGL) • B2B: brand awareness deals (mySugr)
Mobile app + coaching and/or telemedicine	• B2C subscription: $39.99 per month (mySugr) • B2B KPI-based payment (Fit4D) • B2B subscription per user per month (WellDoc, Voluntis)
Glucose meter + mobile app + coaching + unlimited test strips	• B2C subscription: $33 per month (OneDrop), $75 per month (Livongo) • B2B subscription: $220 per user per month (D-Nav).
Device to download data + software	• B2C subscription: $59.99 per year (Glooko); • B2B subscription: $300/month (Glooko)
Education	• B2C: $129/year for an online course and mobile apps (mySugr) • Non-profit fundraising (DAFNE)

BENCHMARKS

HbA1c	• 0.91% HbA1c improvement over control group in a 6-month study (Voluntis) • 1.2% HbA1c improvement over control group in 1-year study (WellDoc) • 1.2% HbA1c improvement in 6-year study (DAFNE)
Cost savings	• Improving HbA1c by 1% means savings of $800-$1192 per patient per year (Milliman market report) • $380 of annual savings per patient for insurance companies (Fit4D) • 4 times: annual return on investment for insurance companies (Fit4D) • 3 times: annual return on investment for pharmaceutical companies (Fit4D)

Competition