



Digitaler Tsunami

Surf or Drown?

Patient Power

Im digitalen Zeitalter von
Healthtech, AI und Machine Learning



Dr. Eva-Maria Kirchberger:



**Imperial College
London**

Ph.D., Entrepreneurship & Innovation, Business School

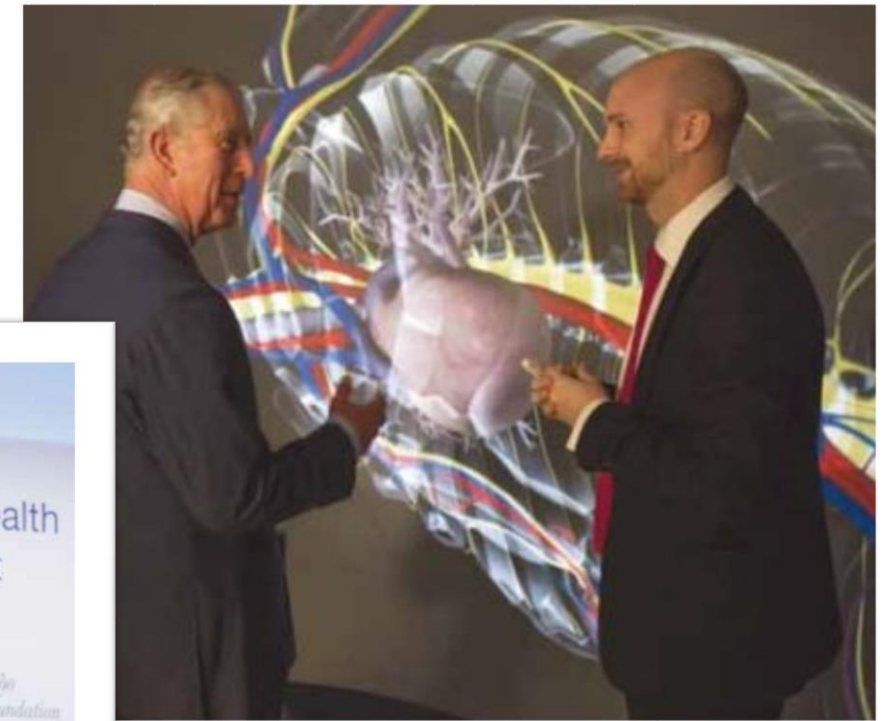
Data Sparks Coach, Data Science Institute

Design Engineering, Department for
EngineeringWunderlab Ltd Consulting



**Imperial College
London**

Imperial Global Health Innovation



David Cameron and Prime Minister David Cameron



President Xi Jinping of China being shown round the Hamlyn Centre for Robotic Surgery by Professor Guang-Zhong Yang

Agenda

2pm – 3:30pm:

- ① **Patient Power:** Die 5 P's der Patientenzentrierten Medizin in der Zukunft
- ② **Forschungsbeispiele:** Business Analytics und Data Science am Imperial College

Kafétscherl

4pm – 5:30pm:

- ③ **Take Aways & Workshop: Flipped Classroom, Learn Service Design Innovation Skills.**

Spielregeln

Inspiration & Provocation

Let's Discuss – there are no stupid questions!

Interaktiv: Lecture and Workshop

Altbekanntes & Neues: Diversity in Knowledge

Let's do it!

Introduction: Race against the Machine



Race against the Machine with



Warum Jetzt?

- Used to be limited to areas of work where knowledge could be codified, but not tacit, informal knowledge (experience driven, intuitive; Polanyi's Paradox, 1966)
- Now Machine Learning means to feed lots of data and the machine learns the algorithm itself – like with the Go-Game

In the case of ML, we find that:

1. Most occupations in most industries have at least some tasks that are SML.
2. Few occupations have all tasks that are highly SML.
3. Unleashing ML potential will require significant redesign of the task content of jobs, as SML and non-SML tasks within occupations become unbundled and re-bundled.

(Brynjolfsson, E. et al)

Machine Learning and Economy

1. Machine learning (ML) technologies will grow more pervasive.
2. Jobs are bundles of work tasks. The suitability for machine learning (SML) for work tasks varies greatly.
3. ML will rarely automate entire jobs. More often, it will lead to the reengineering of processes and the reorganization of tasks.
4. Analysis suggests that ML will affect very different parts of the workforce, including many professional jobs, compared with earlier waves of automation.
5. A shift is needed in the debate about the impact of artificial intelligence on work: Away from the focus on full automation of many jobs, and toward the redesign of jobs and processes.

(Brynjolfsson, E. et al)

OCCUPATIONS

Low SML occupations	SML	High SML occupations	SML
Massage therapists	2.78	Concierges	3.9
Animal scientists	3.09	Mechanical drafters	3.9
Archeologists	3.11	Morticians, undertakers, and funeral directors	3.89
Public address system and other announcers	3.13	Credit authorizers	3.78
Plasterers and stucco masons	3.14	Brokerage clerks	3.78

(Brynjolfsson, E. et al)

Min=1 SNL

Max = 5 SNL

AVG= 3.47 SNL

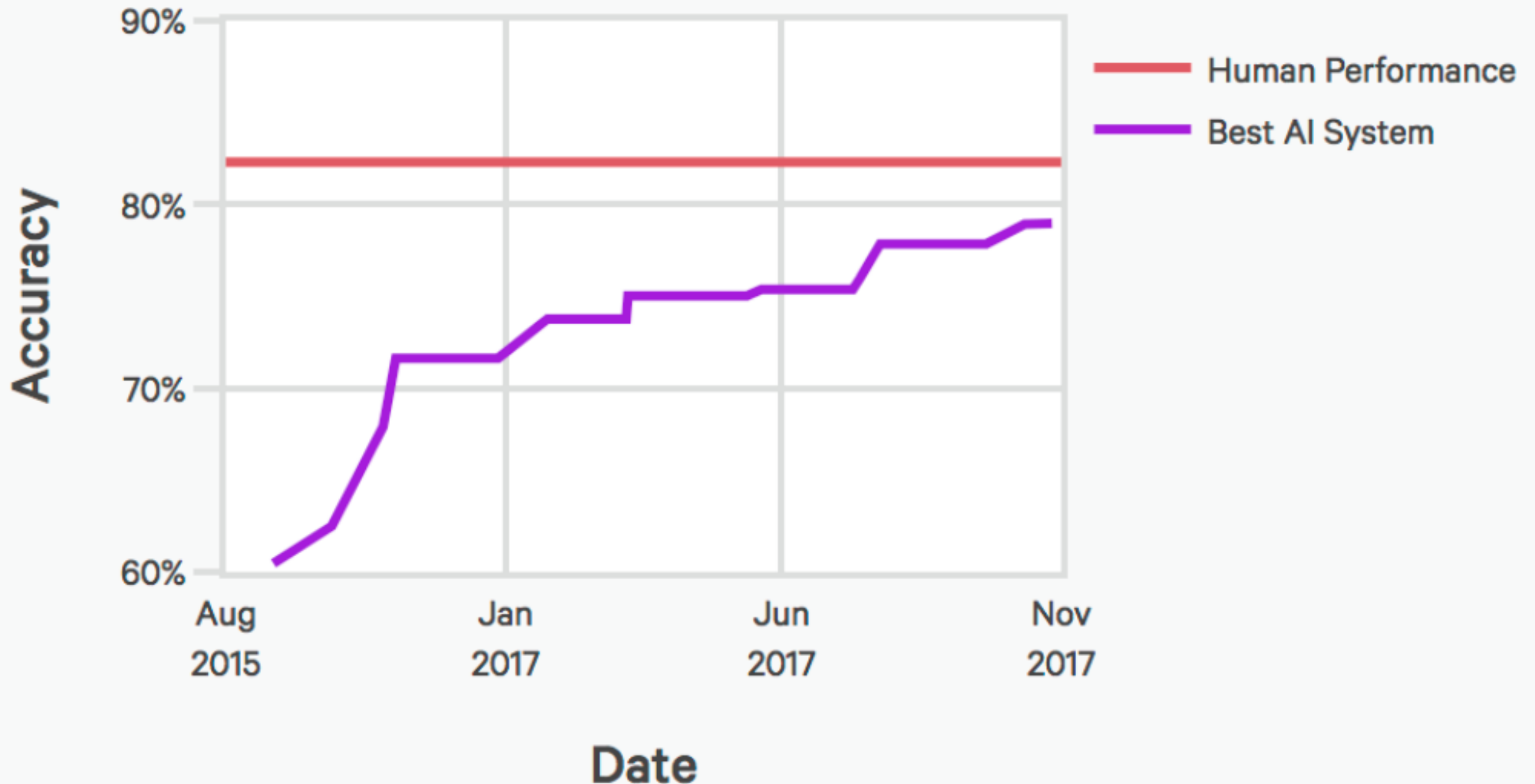
STD= 0.11

O*NET content model for 964 occupations in the U.S. economy joined to 18,156 specific tasks at the occupation level, which are further mapped to 2,069 direct work activities (DWAs) shared across occupations.

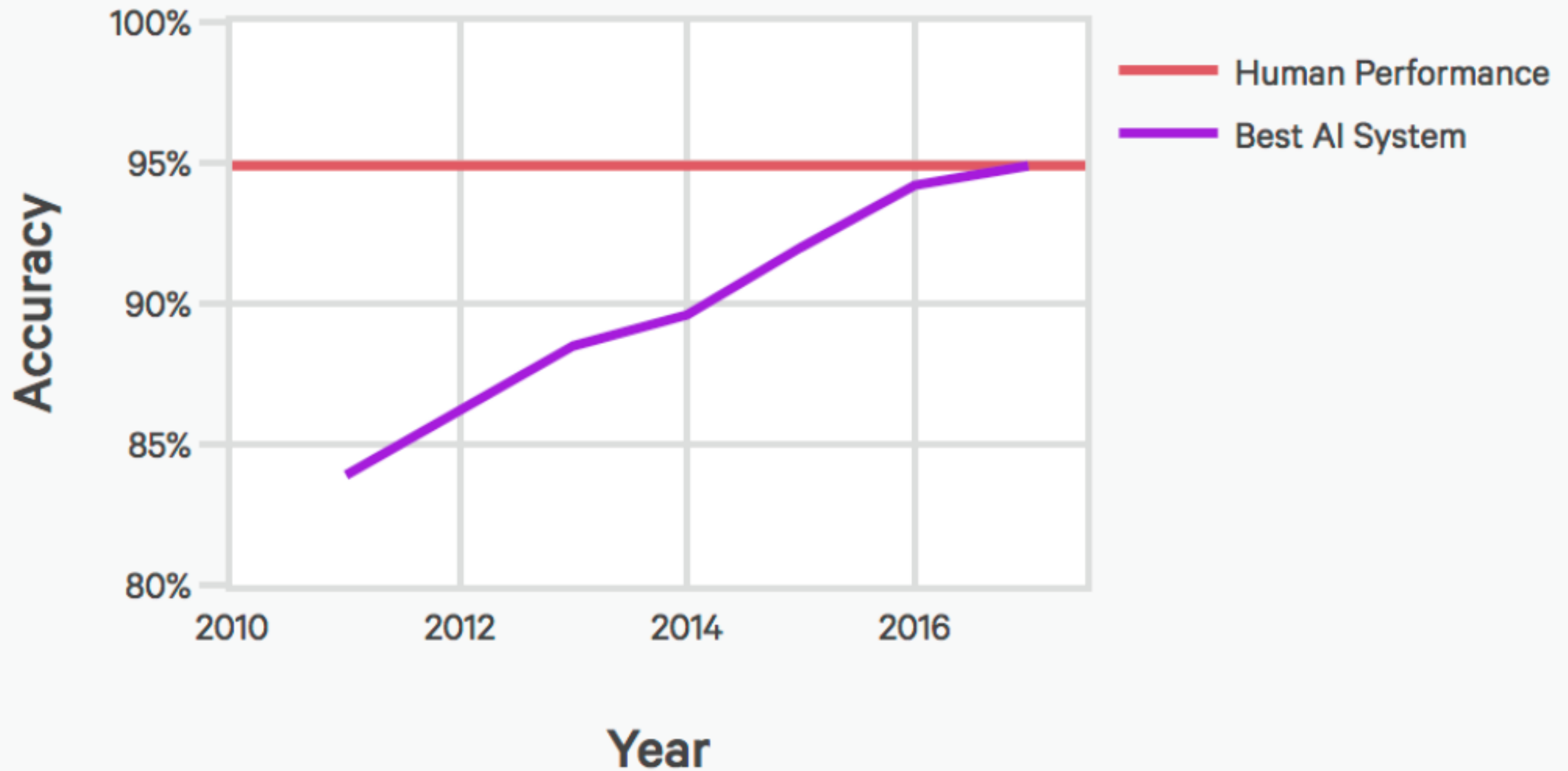
Applying a rubric of 23 questions, each DWA is scored for its SML by seven different people via the crowd-sourcing platform CrowdFlower

Question Answering, SQuAD v1.1

The performance of AI systems on a task to find the answer to a question within a document.



Speech Recognition, Switchboard HUB5'00



Diskussion: Was bedeutet dies für Medizinische Berufe?



- **MTD Austria:**

- biomed austria, Österreichischer Berufsverband der Biomedizinischen AnalytikerInnen

- Diaetologen, Verband der Diaetologen Österreichs

- Ergotherapie Austria, Bundesverband der ErgotherapeutInnen Österreichs

- logopädieaustria, Berufsverband der Österreichischen LogopädInnen

- orthoptik austria, Verband der OrthoptistInnen Österreichs

- Physio Austria, Bundesverband der PhysiotherapeutInnen Österreichs

- rtaustria, Berufsfachverband für Radiologietechnologie Österreich

- -> USW.. Including Ihre und Mein JOB!

- -> Andere Skills als früher werden neu gewürdigt.. Empathie, Care, Creativity

FESTUNG GESUNDHEIT...?



UNDER ATTACK

MEDIZIN
TECHNIK

START-
UPS

TECH
GIANTS

RETAIL

HEALTHTECH

WEARABLE
TECH

PHARMA

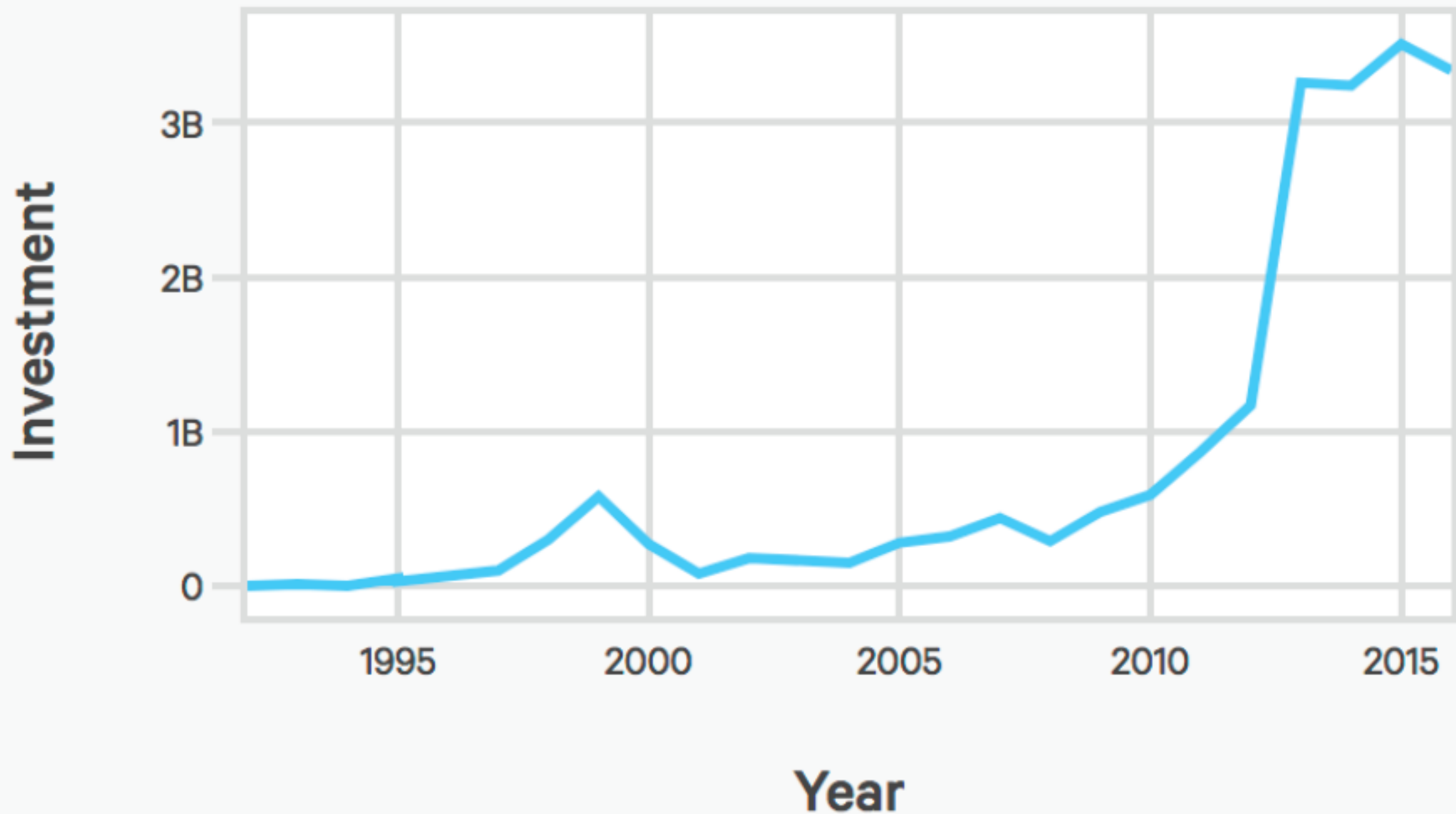


“Let’s hack Health...”



HACKATHONS...

Annual VC Investment in AI Startups



Sources: Crunchbase, VentureSource, Sand Hill Econometrics

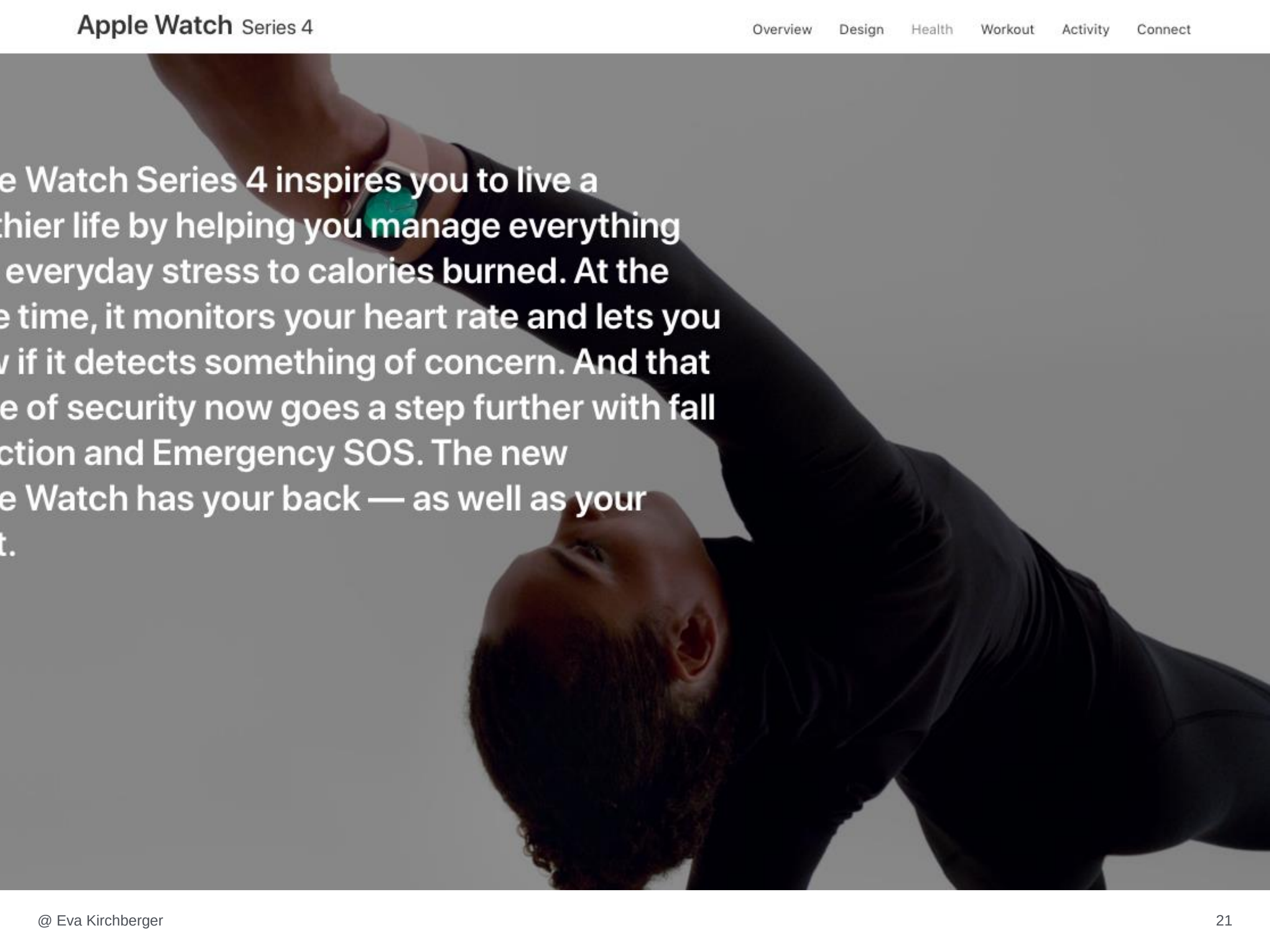
AIINDEX.ORG





START UPS (@WeWork)

©Eva Kirchberger



The Apple Watch Series 4 inspires you to live a healthier life by helping you manage everything from everyday stress to calories burned. At the same time, it monitors your heart rate and lets you know if it detects something of concern. And that level of security now goes a step further with fall detection and Emergency SOS. The new Apple Watch has your back — as well as your front.

*Things are changing from buildings,
people and products to
software, services and mobile devices.”*

Andrew Thompson,
Refilling the Innovator's Prescription

The background image is a blue-tinted photograph of a modern building with a glass facade. The building's windows reflect the surrounding environment. In the foreground, a person is sitting on a row of light-colored, rounded outdoor benches. The ground is paved with light-colored bricks. The overall scene is a modern, urban setting.

Von der Medizin Macht zu Patient Power

5 P's of PATIENT POWER

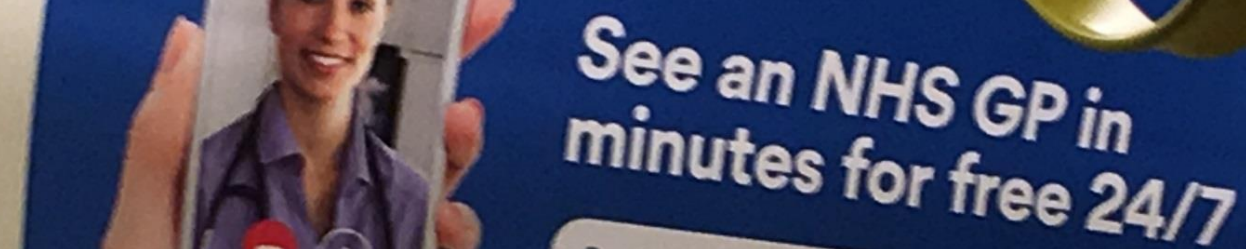
ENABLER	PERSONALISIERTE MEDIZIN
Patientenakte Datenintegration	Patient Platform
Wearable Tech AI Patterns	Prevent & Predict
Lifestyle Genome Sequencing	Profile 360 Degree
Groups Forschung, Meetings	Peer Profile Netzwerke
Regulation? Patient Choice	Pay per Data Protection

NESTA, 2017;
Kirchberger, 2017

The background of the slide is a photograph of a modern glass building. The building's facade is composed of large glass panels that reflect the surrounding environment. In the foreground, there is a paved plaza with a person sitting on a bench made of several large, light-colored, rounded blocks. The person is wearing a dark jacket and is looking down at something in their hands. The overall scene is bathed in a blue light, giving it a cool, modern feel.

Patient Power

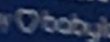
1. Patient Platform

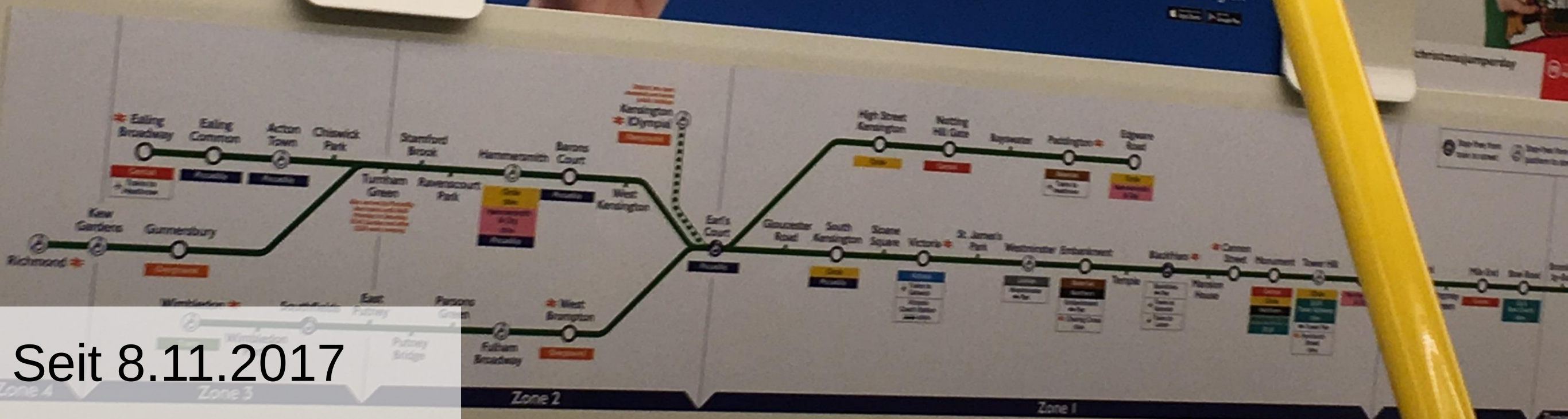


See an NHS GP in
minutes for free 24/7

Search 'NHS GP at hand'

or visit gporthand.nhs.uk

GP at hand
powered by 



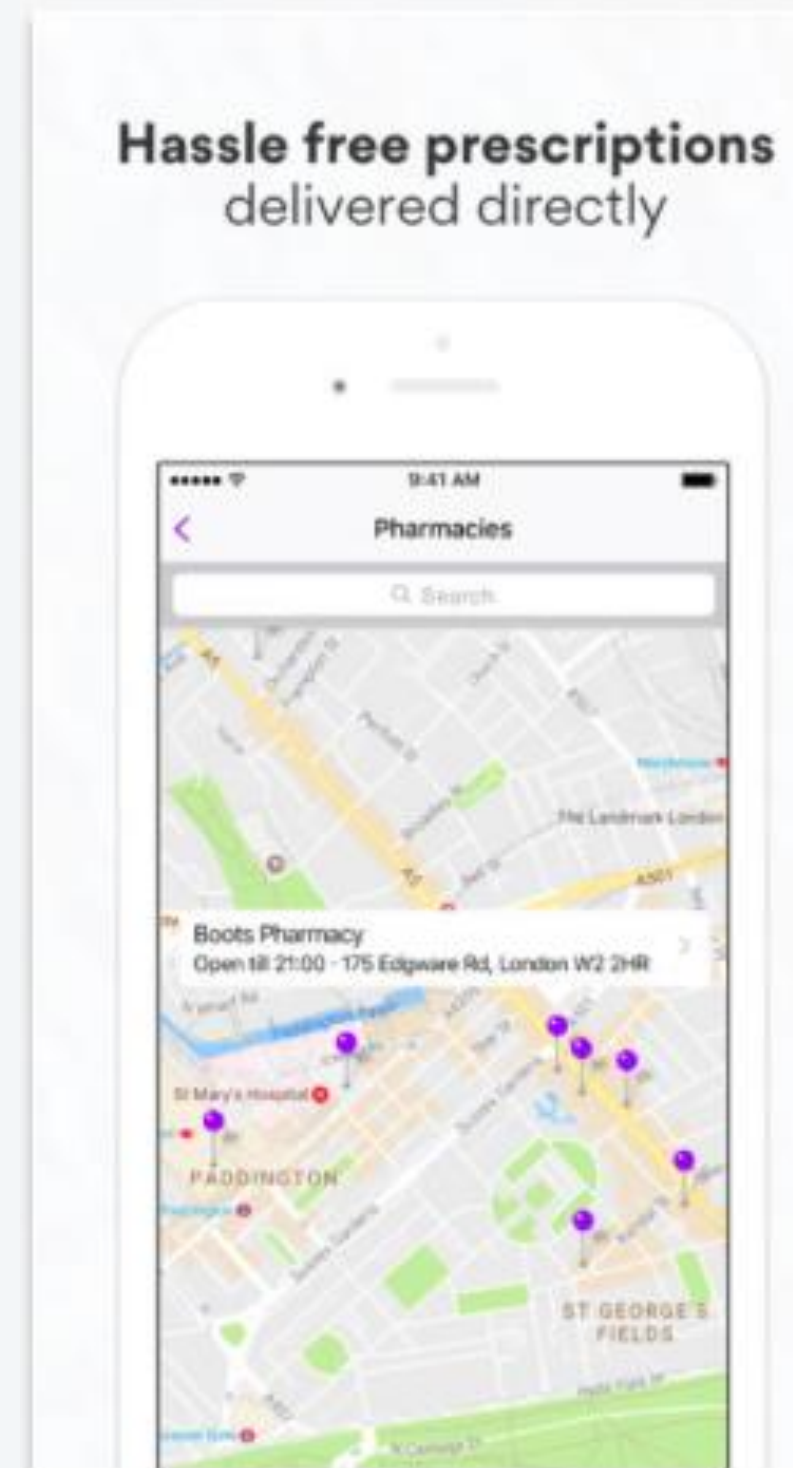
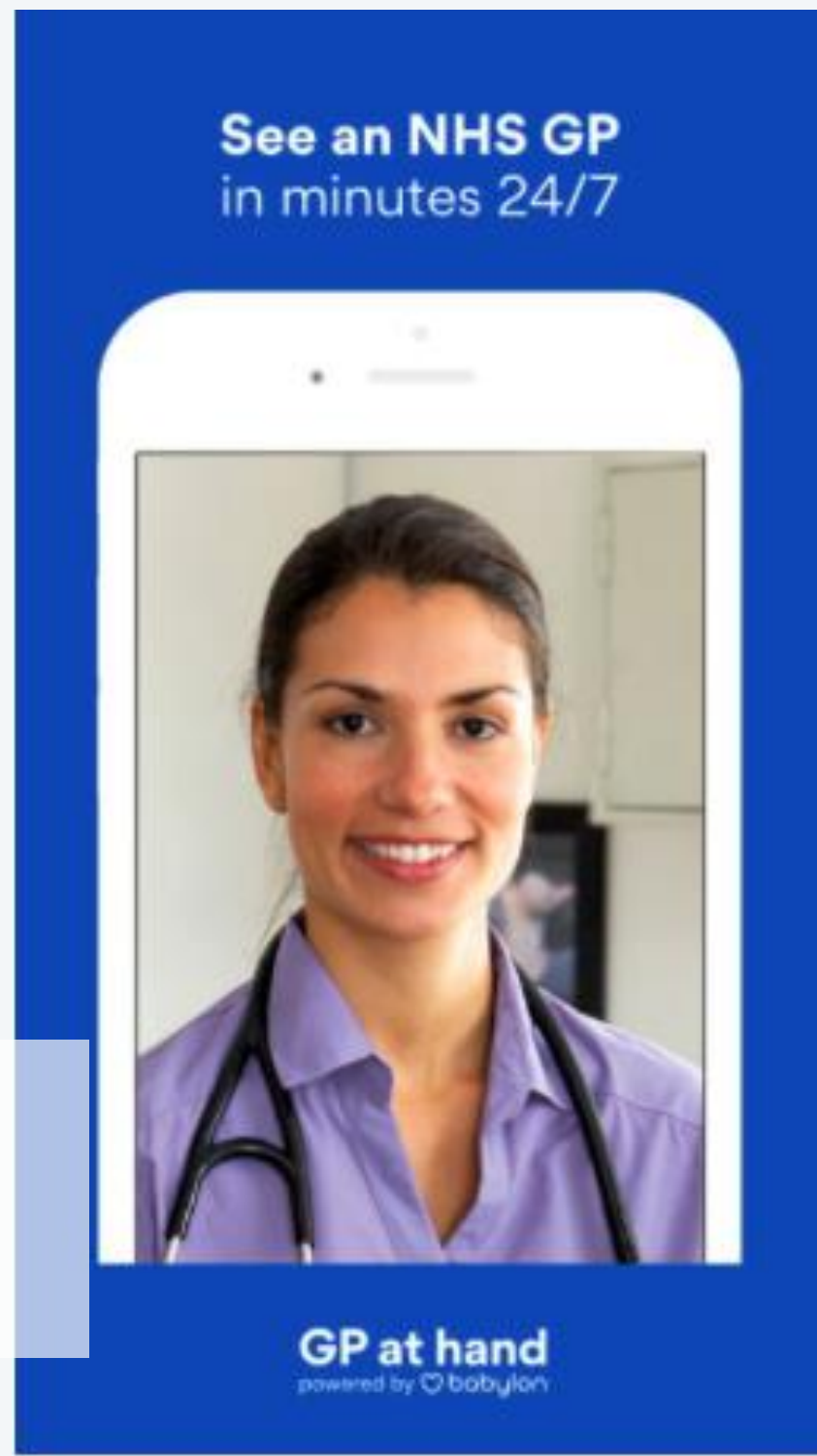
Seit 8.11.2017

3 MIO. Nutzer

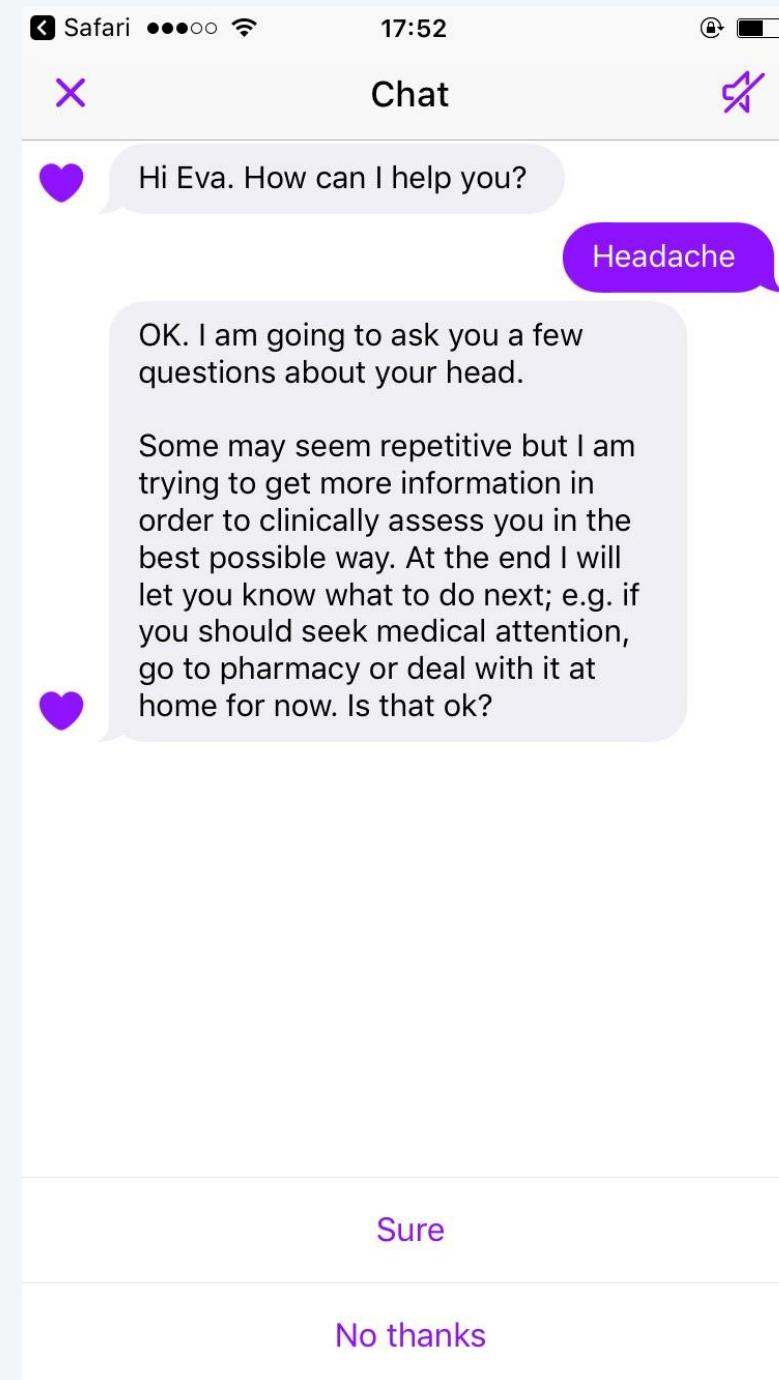
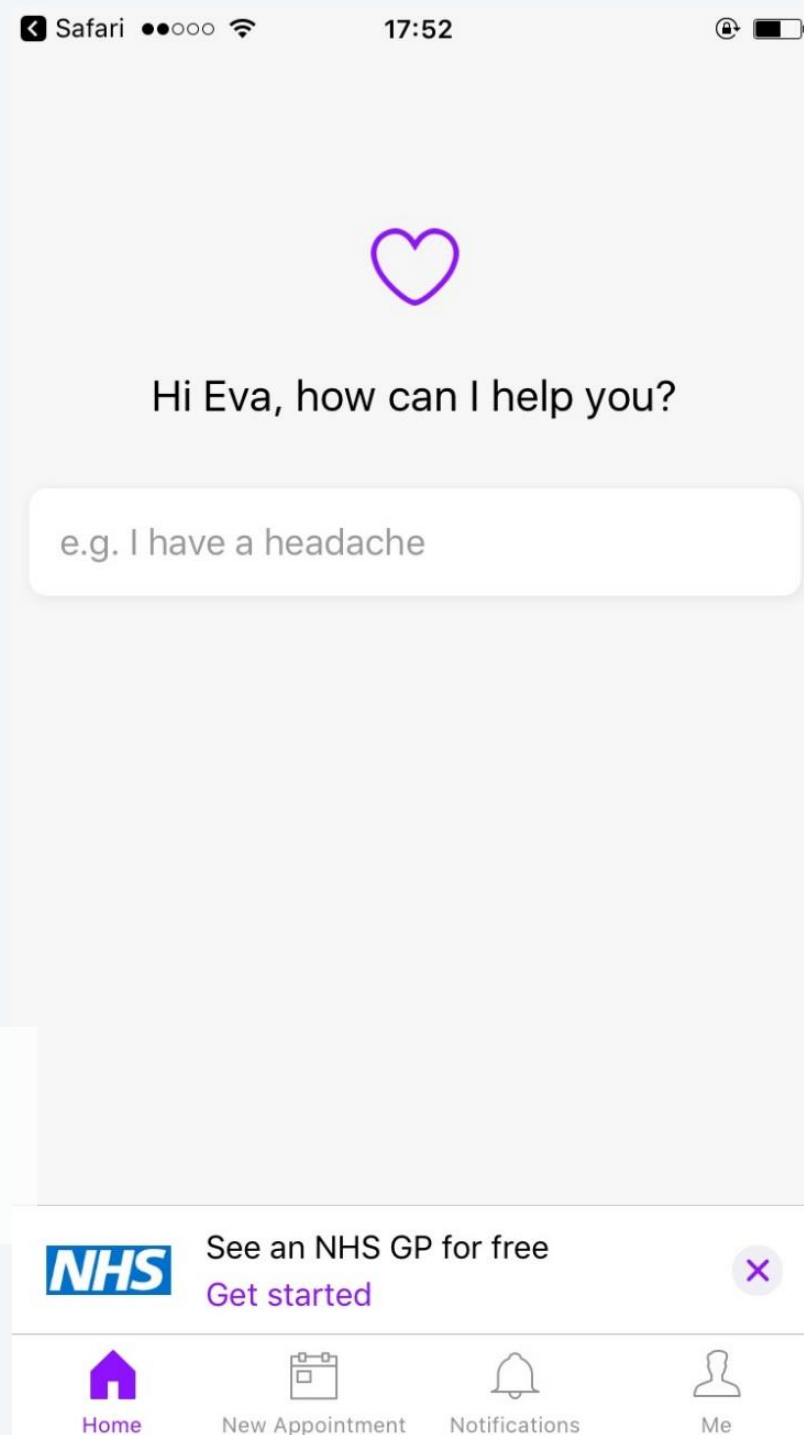
*“He added that patients are 'loving the service', with the **GP at Hand** app receiving a 95% approval rating from **users**...”*

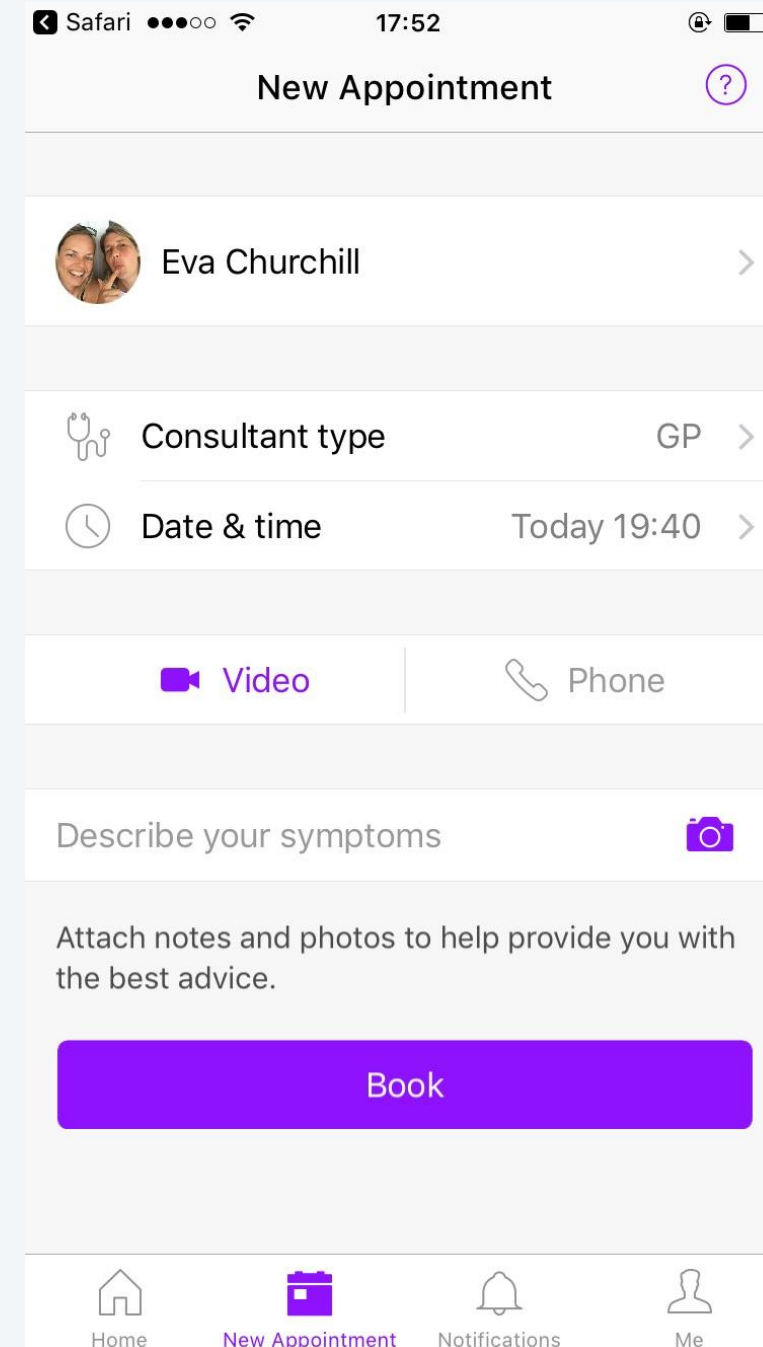
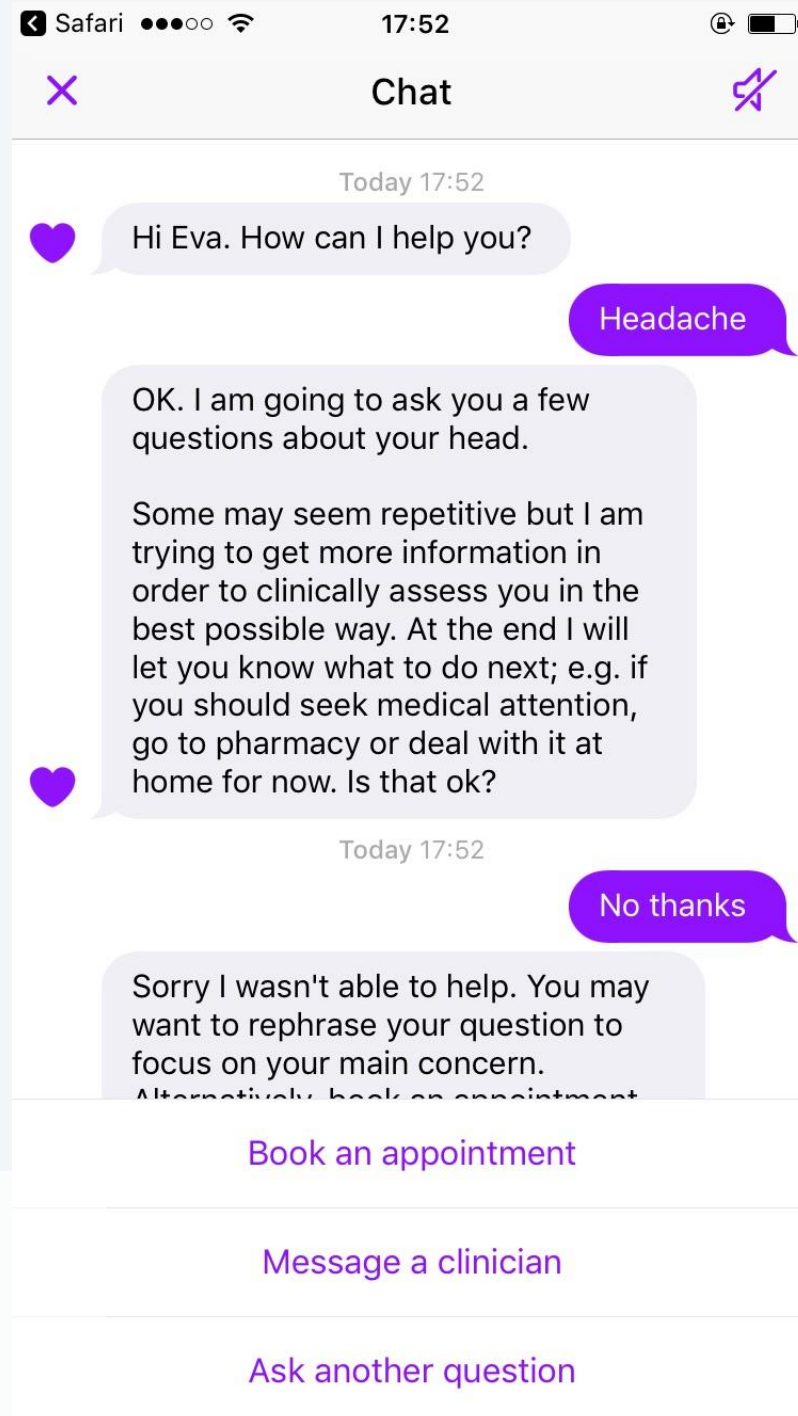
NHS APP

©Eva Kirchberger



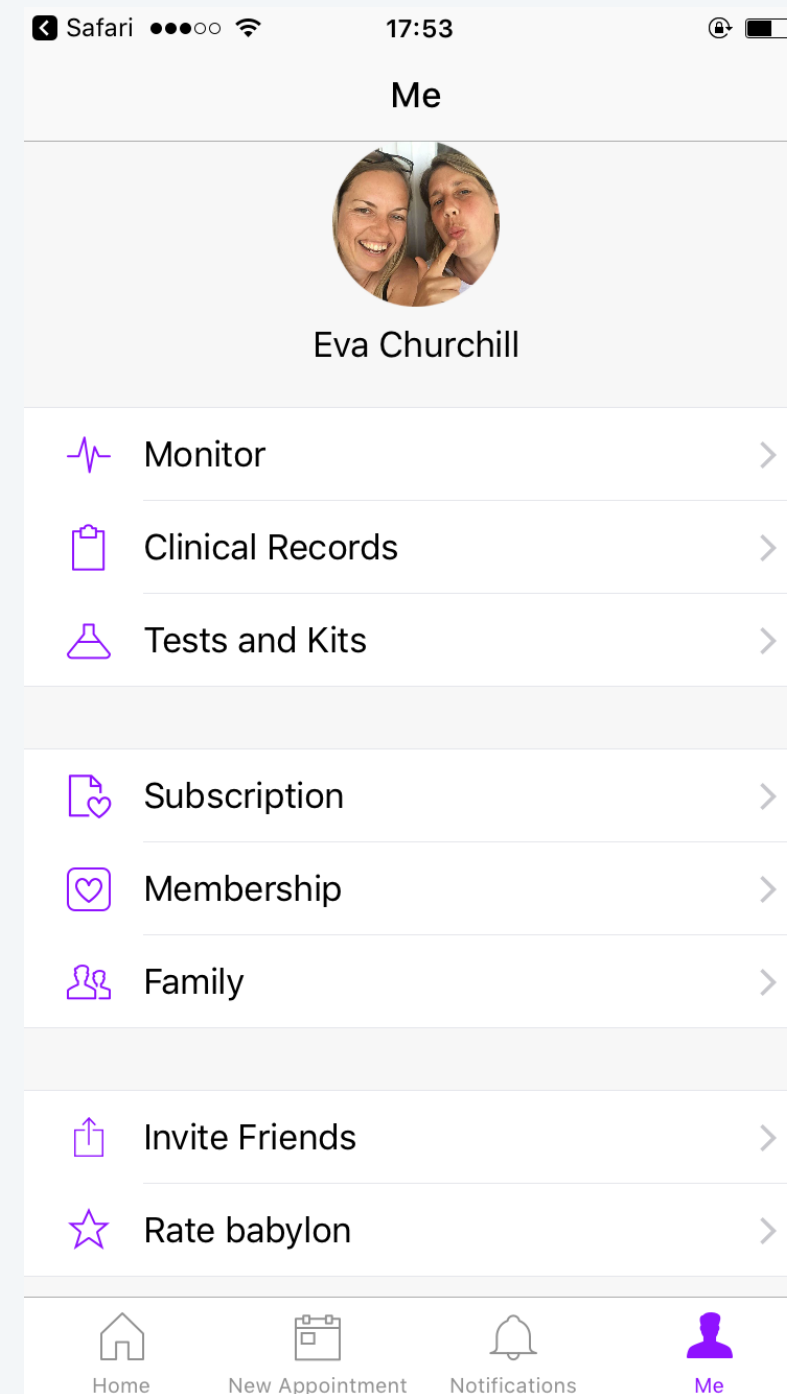
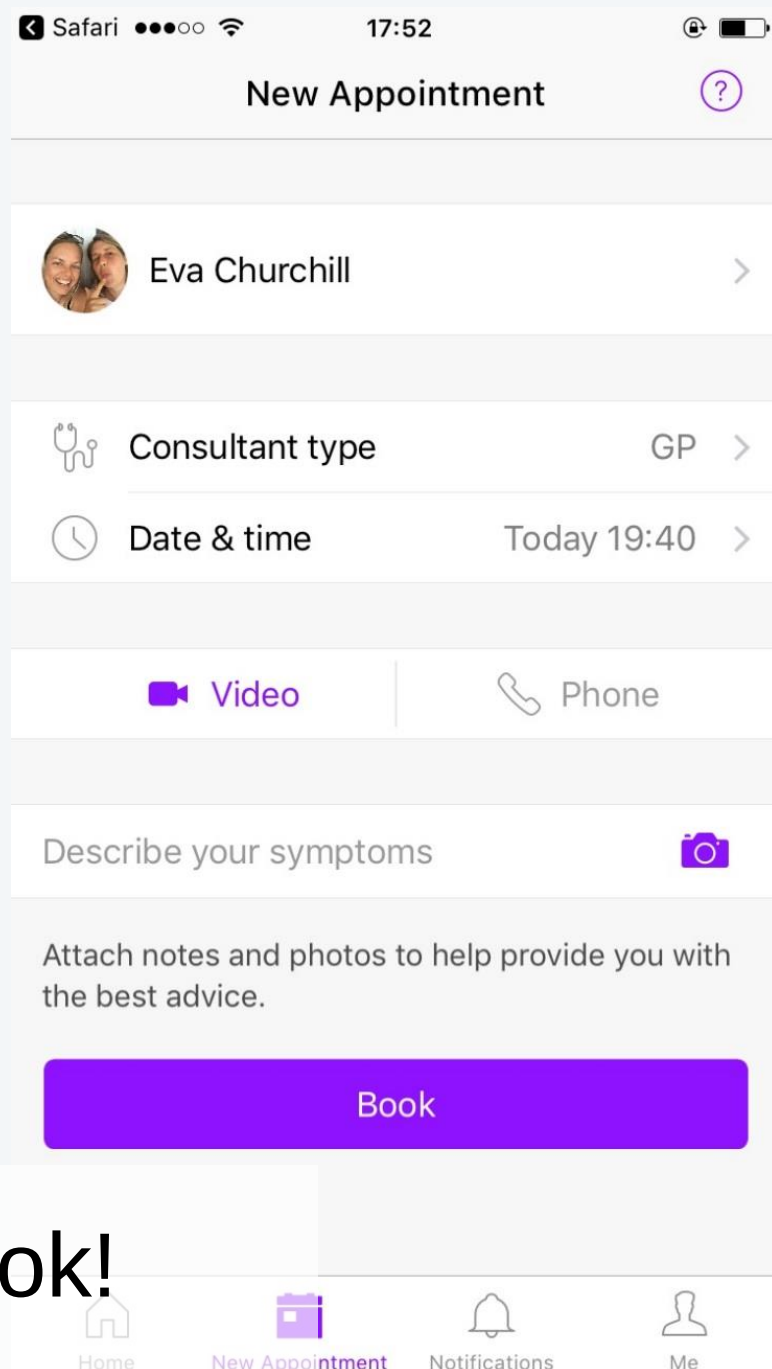
Chatbot





Termin

©Eva Kirchberger



Via Facebook!

©Eva Kirchberger

Health at your Fingertips...

Find digital tools to help you manage and improve your health

[Find out more](#)



FILTER BY CATEGORY

[All](#)

[Cancer](#)

[COPD](#)

[Dementia](#)

[Dental](#)

[Diabetes](#)

[Healthy Living](#)

[Learning Disabilities](#)

[Mental Health](#)

[Online Community](#)



myCOPD

✓ NHS Approved

myCOPD helps people with COPD to better manage their condition.

COPD



Cove

⚙️ Being Tested in the NHS

Create music to capture your mood and express how you feel with the Cove app.

MENTAL HEALTH



Chill Panda

⚙️ Being Tested in the NHS

Learn to relax, manage your worries and improve your wellbeing with Chill Panda.

MENTAL HEALTH



Blueice

Blueice is an evidenced-based app to help young people manage their emotions and reduce urges to self-harm.

MENTAL HEALTH

NHS DEVELOPER PLATFORM



Evergreen Life

Evergreen Life is a personal health record app that stores your health information in one place.

HEALTHY LIVING



Active 10 walking tracker

The Active 10 app will help you get into the habit of walking briskly for 10 minutes every day.

HEALTHY LIVING



Patients Know Best

Patients Know Best works with the NHS to give patients instant access to their medical records.

OTHER



MyChoicePad

MyChoicePad helps people with learning disabilities communicate better.

LEARNING DISABILITIES



HealthUnlocked

Find and connect with people with a similar health condition using HealthUnlocked.

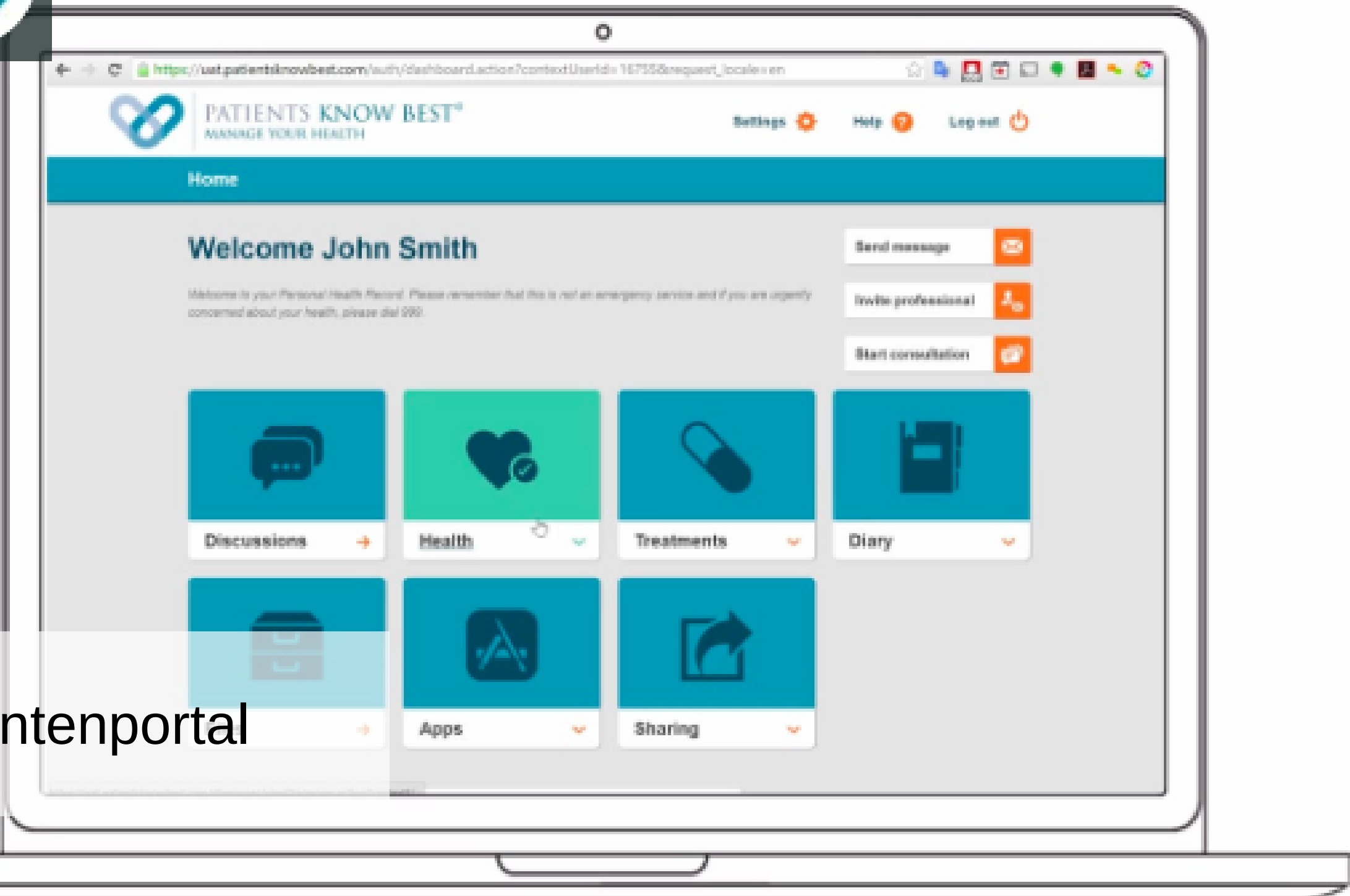
ONLINE COMMUNITY



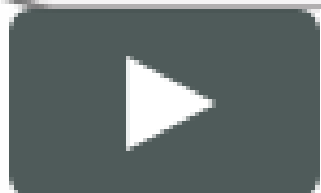
SilverCloud

SilverCloud is an online course to help people manage stress, anxiety and depression.

MENTAL HEALTH



Patientenportal



03:25

<https://www.patientsknowbest.com>

NEWS

You can now see a psychologist through KRY

With KRY, you can easily see doctors and psychologists via video at a time and place that suits you.

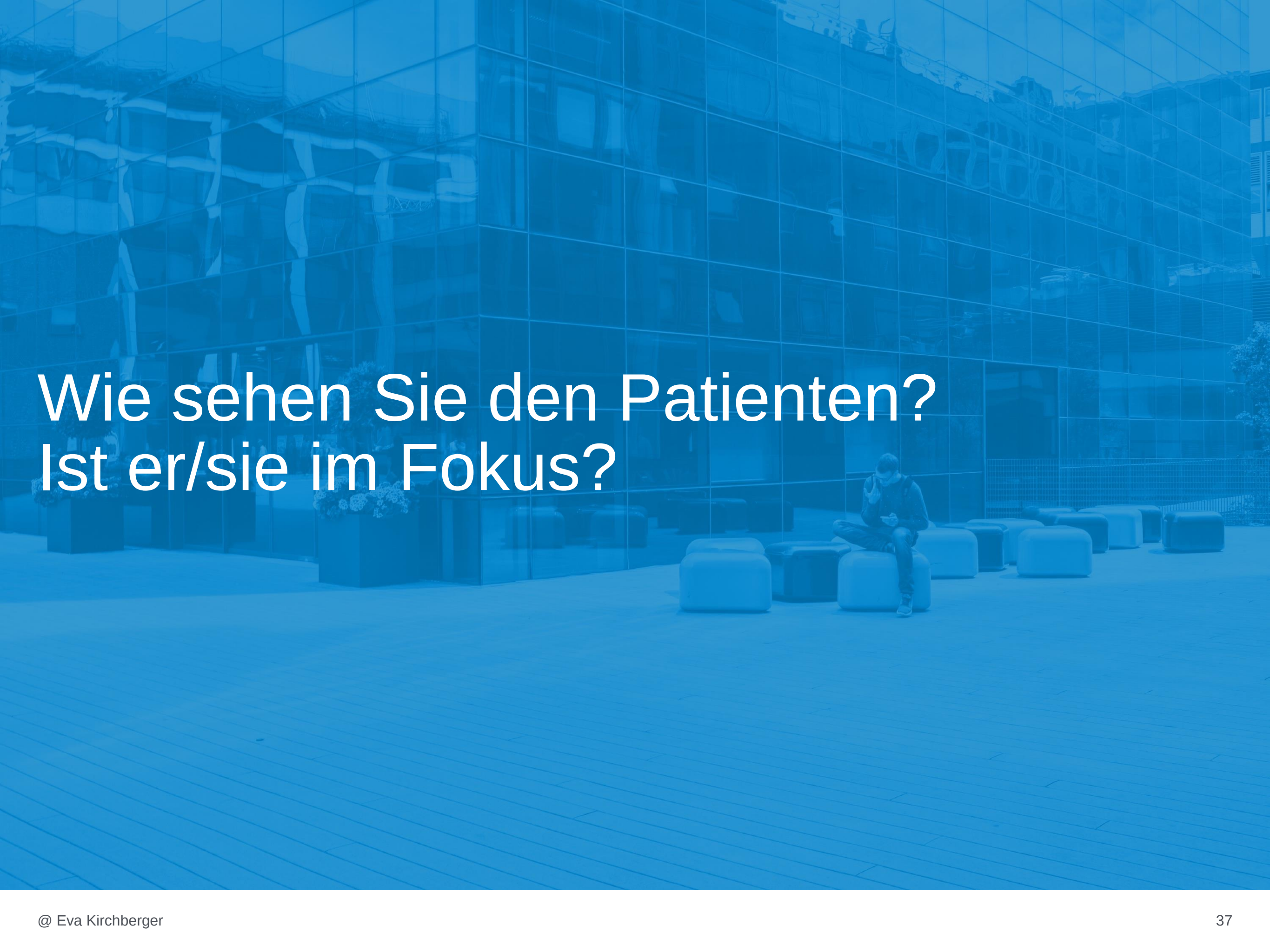




CX at the Interface Matters.

PATIENTENZENTRIERT



A photograph of a modern building with a glass facade, reflecting the surrounding environment. In the foreground, a person is sitting on a bench, looking down at a device. The image is overlaid with a blue tint.

Wie sehen Sie den Patienten?
Ist er/sie im Fokus?

The background of the slide is a photograph of a modern building with a glass facade, reflecting the surrounding environment. In the foreground, there is a paved plaza with several large, light-colored, rounded rectangular blocks arranged in a row. A person is sitting on one of these blocks, looking down at a device. The entire image is overlaid with a semi-transparent blue filter.

Patient Power

2. Prevent & Predict



Spital am Arm 24/7

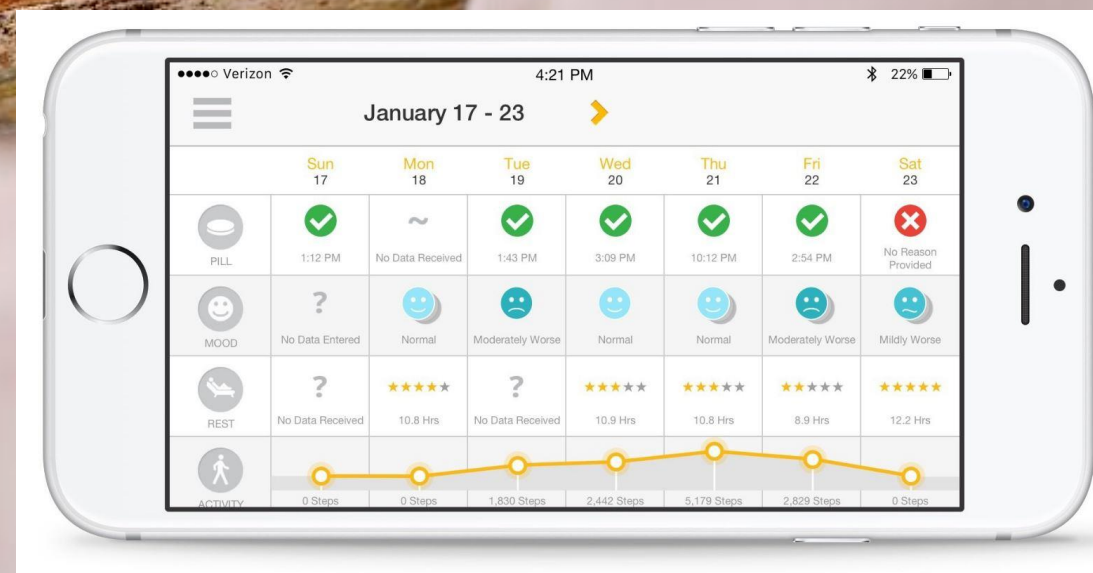


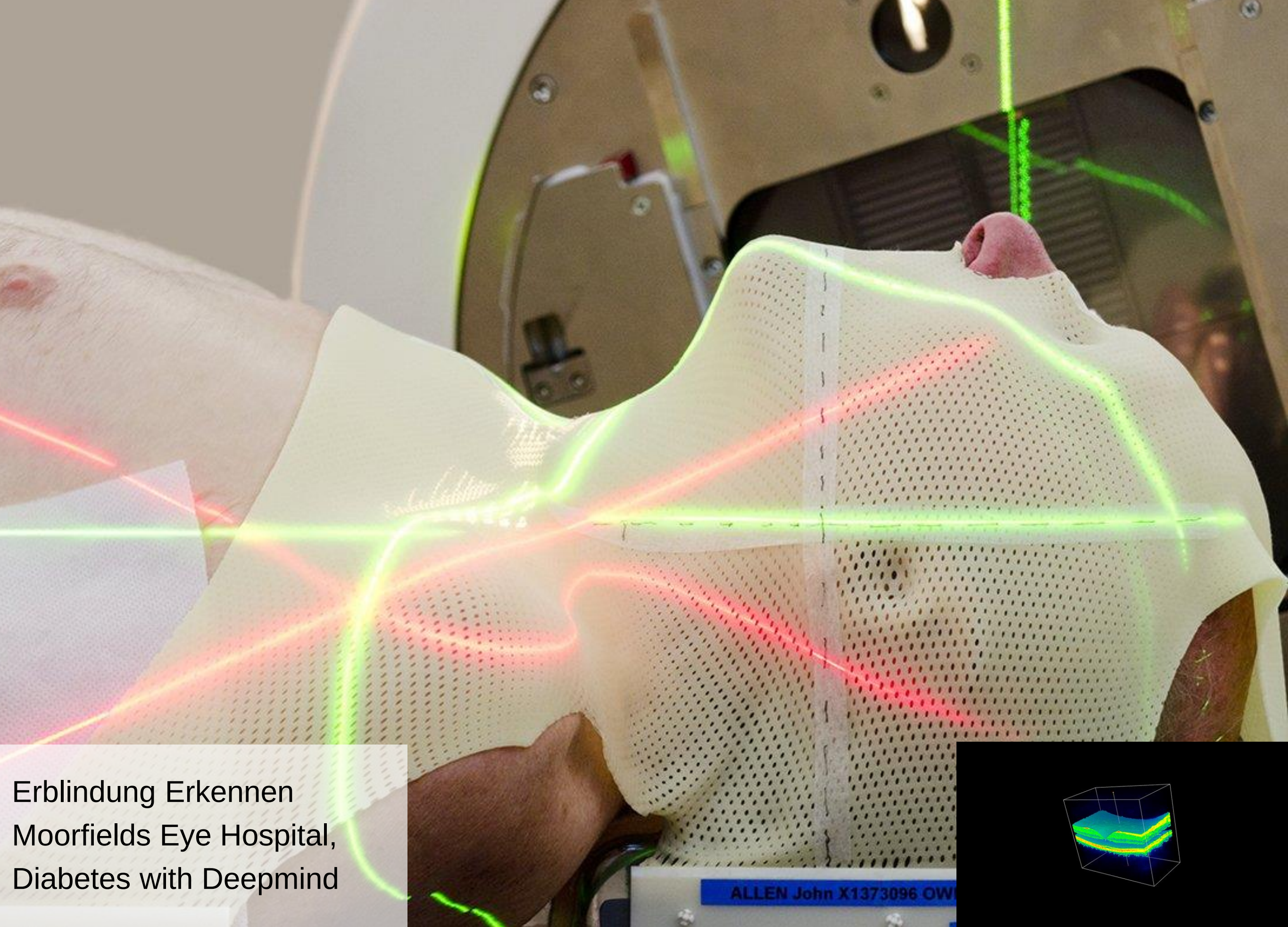
Das ist Bo –
Dein Digitaler Pfleger.

As well as being able to play games and music, share the news and weather forecast, **Bo makes basic conversation** and therefore offers some superficial company. **He also offers reminders, such as for taking any medication. Bo tracks a patient's basic functions and can report any falls**, thus alleviating some of the anxiety that often drives elderly people into care homes when they are mostly still able to take care of themselves. **Likewise, Bo keeps an eye on people**, either autonomously or via his telepresence functionality. **A carer can login and check on their patient remotely.** That being said, Bo does not by any means replace human care, merely complements it.

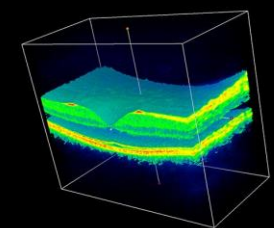
Abilify Digital Pill

©Eva Kirchberger

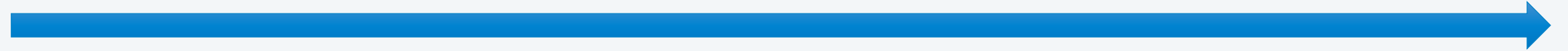




Erblindung Erkennen
Moorfields Eye Hospital,
Diabetes with Deepmind



ALT - PATIENTENVERLAUF



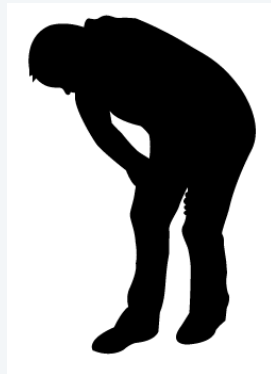
GESUND

GESUND SYMPTOME

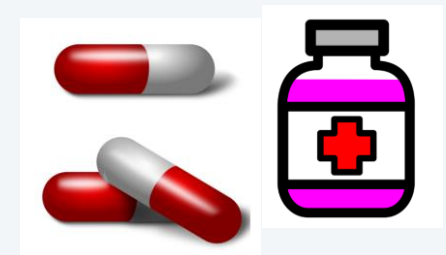
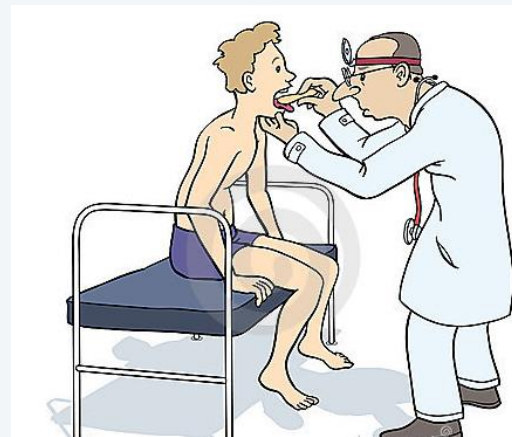
KRANK

UNTERSUCHUNG TESTS DIAGNOSE BEHANDLUNG

Patient



Mediziner



NEU: DER ENGAGIERTE PATIENT

**GESUND
ERHALTEN**

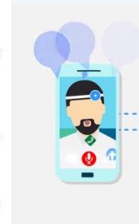
KRANK

PROFIL

RISIKO

BEHANDLUNG

THERAPIE



Mobile
Health

Telemedizin

Gaming

Personalisiert

**LEBENDIGES SELBST-
LABOR**

ÜBERWACHEN

**VIRTUELLER
ARZT
24/7**

**ENGAGIERTER
PATIENT**

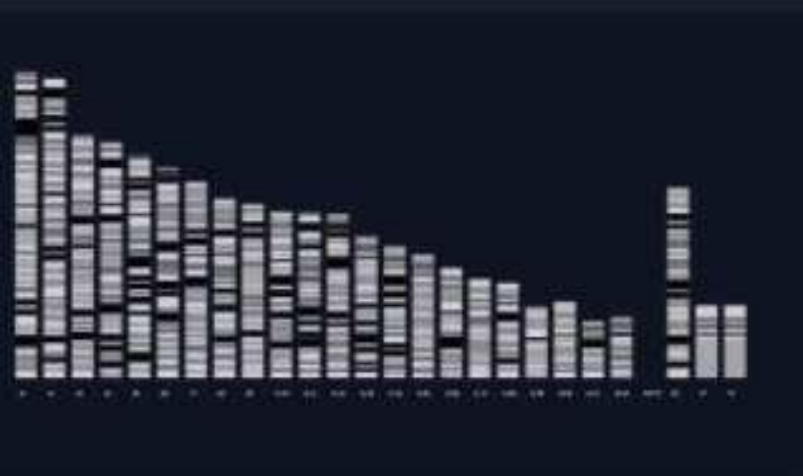


Patient Power

3. **P**rofile 360 Degree

基因组探索 / Genome Exploration

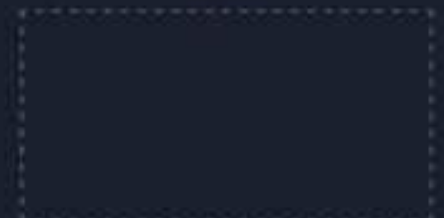
浏览和探索疾病相关基因的序列 / BROWSE AND ANALYSING THE SEQUENCES OF DISEASE RELATED GENES



Gene Signature
EU Biopred - Forschung

分子通路探索 / Molecular Pathway Exploration

研究疾病相关的分子通路 / STUDYING THE INTERACTIONS BETWEEN MOLECULES TO UNDERSTAND DISEASE MECHANISMS



A novel anti-inflammatory role for ginkgolide B in asthma via inhibition...
PMID : 21900868

DNA methyltransferase 1(DNMT1) induced the expression of suppress...
PMID : 24599782

DATA SCIENCE INSITUTE, 2017

HUMAN SUBJECTS

603

GENE EXPRESSION

242 2,379

CYTOKINES AND CHEMOKINES

242 2,205

IMMUNE RESPONSE CYTOF

27 205

MONOCYTES FACS

42 210

CLINICAL OBSERVATIONS

Findings

Vital Signs (8)

Diary (1)

Body Mass Index	
Diastolic Blood Pressure	
Height	
Heart Rate	
Systolic Blood Pressure	
Temperature	
Weight	

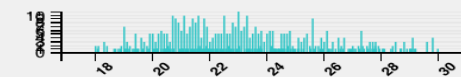
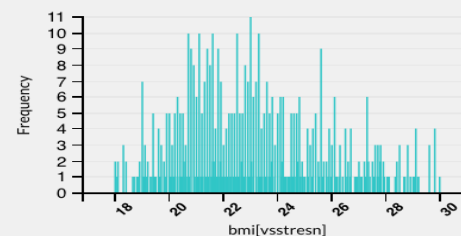
Events

Adverse Events (431)

Data Plots Findings Table Events Table

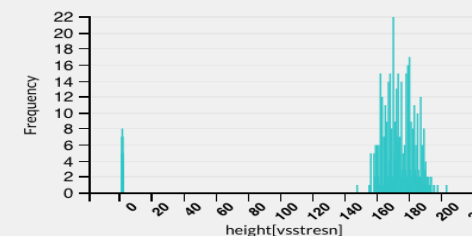
BODY MASS INDEX

NUMERIC RESULT/FINDING IN STANDARD UNITS



HEIGHT

NUMERIC RESULT/FINDING IN STANDARD UNITS



MOLECULAR OBSERVATIONS

GENE EXPRESSION PROFILING
AGILENT

CYTOKINES PROFILING
LUMINEX

CELL PROFILING
CYTOF

Sample Characteristics

TYPE	
Collection Day	

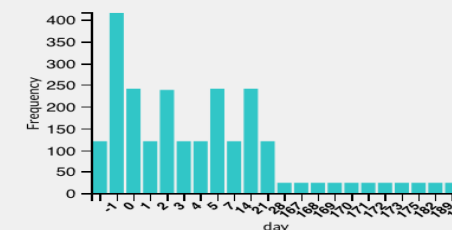
242 Subjects 2,379 Samples Features

TYPE

Sample
global_control
label_control



COLLECTION DAY



360 Profil
E-Trix.



Diskussion

Wie weit is man in Österreich?



Patient Power

4. **P**eer Profile Netzwerke



So wurden die Kliniken bewertet

Legende

+++
überdurchschnittliche Qualität – Krankenhaus zählt zu den besten 20 % im Bundesgebiet

++
durchschnittliche Qualität – Krankenhaus zählt zu den mittleren 60 % im Bundesgebiet

+
unterdurchschnittliche Qualität – Krankenhaus zählt zu den schlechtesten 20 % im Bundesgebiet

Krankenhaus
Agaplesion Diankoniekl. Hamburg
Albertinen-Krankenhaus / Albertinen-Haus
Asklepios Klinik Altona
Asklepios Klinik Barmbek
Asklepios Klinik Harburg
Asklepios Klinik Nord
Asklepios Klinik St. Georg
Asklepios Klinik Wandsbek
Asklepios Westklinikum Hamburg
Bethesda - Allgemeines Krankenhaus Bergedorf
Bundeswehrkrankenhaus Hamburg
die fachärztl. Klinik Hamburg
Endo-Klinik Hamburg
Ev. Amalie Sieveking-Krankenhaus
Evangelisches Krankenhaus Alsterdorf
Helios Marienhilf Klinik Hamburg
Israelitisches Krankenhaus in Hamburg
Kath. Marienkrankenhaus
Klinik Dr. Guth der Klinikgruppe Dr. Guth
Krankenhaus Tabea
PraxisKlinik Bergedorf
Schön Klinik Hamburg Eilbek
Universitätsklinikum Hamburg-Eppendorf
Wilhelmsburger Krankenhaus Groß-Sand

* Anzahl bewertete Behandlungsfälle AOK-Patienten 2009–2011

Blair Heuer
Edit My Profile

News Feed
Messages
Events
Friends

Groups Team
Frisbee Golfers
NU Crew
Heuer Family
Blue Team 2011
More

Apps
Photos
More

Friends on Chat

Groups Team
Closed Group

Share: [Post](#) [Question](#) [Link](#) [Photo](#) [Video](#)

Write something...

Bob Baldwin asked Where should we go for the team dinner next week?

☒ Madera @ The Rosewood

☐ Sundance The Steakhouse

☐ Palo Alto Sol

3 More...

about an hour ago · Like · Comment · Unsubscribe

Blair Heuer added photos to Groups New User Tour.

Groups New User Tour
3 hours ago · Like · Comment · Unsubscribe

Blair Heuer Let me know what you guys think of the tour!
3 hours ago · Like

András Biczó The new design will be even better!
2 hours ago · Like

Write a comment...

András Biczó
Project Goals

- Facilitate group communication and coordination
- Light-weight actions
- ...

8 hours ago · View Doc · Like · Comment · Subscribe

Michael Novati I'll read them in more detail later tonight and make some edits. Looks good.
4 hours ago · Like

Write a comment...

Members (9) [See All](#)

[Add Friends to Group](#)

[Chat with Group](#)

[Create a Doc](#)

[Create an Event](#)

[View Photos](#)

[Edit Group](#)

[Leave Group](#)

Docs (1) [See All](#)

[Project Goals](#)
Updated 27 minutes ago

Sponsored [Create an Ad](#)

My iPhone 4 Scratched!
iwowcases.com

Quality Metallic iPhone 4 Cases/Bumpers. From \$18.98. Premium Protect. BUY NOW!

ReadySetEat

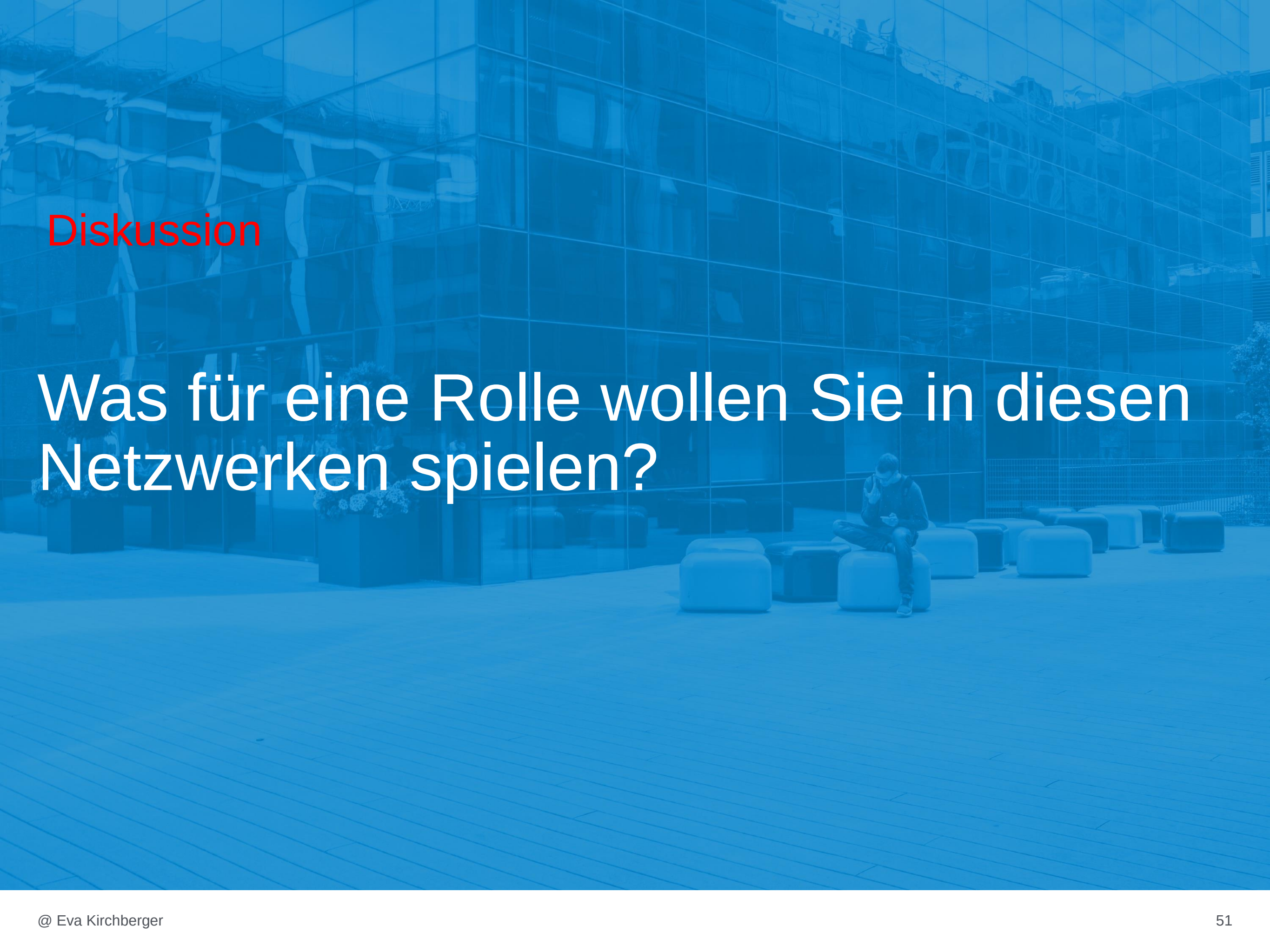
"Like" ReadySetEat and we'll show you the faster, smarter way to dinner!

[Like](#) · 986 people like this.

Brilliant Engineer Wanted
Stanford hacker wanted for venture backed startup in San Francisco

[Like](#) · 72 people like this.





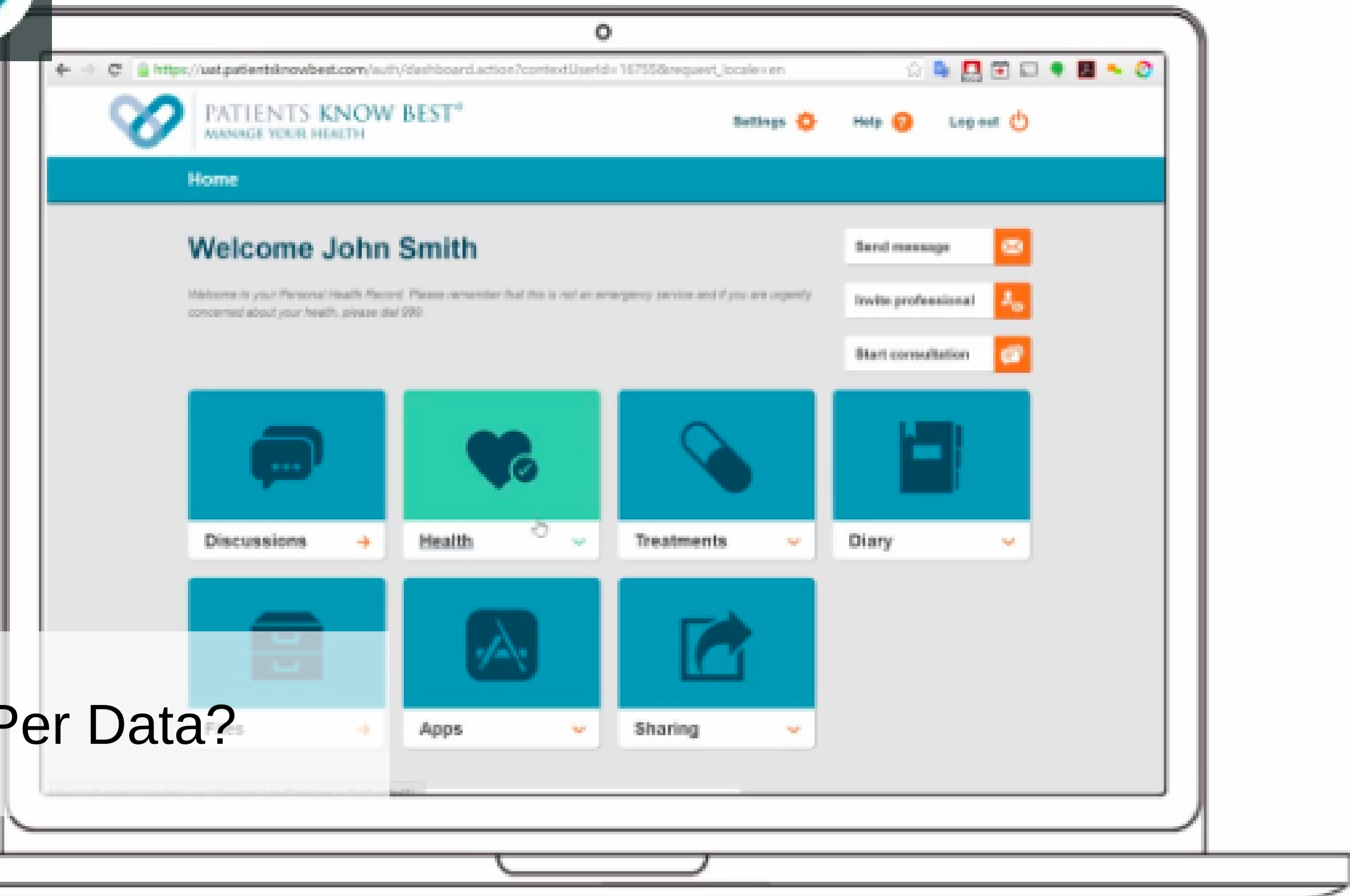
Diskussion

Was für eine Rolle wollen Sie in diesen Netzwerken spielen?



Patient Power

5. Pay per Data Protection



Pay Per Data?



03:25

<https://www.patientsknowbest.com>



The background image is a blue-tinted photograph of a modern glass building. The building's facade is composed of large glass panels that reflect the surrounding environment. In the foreground, a person is sitting on a bench made of several large, light-colored, rounded blocks. The ground is paved with light-colored bricks. The overall scene is a modern, urban setting.

Patient Power

Was denken Sie?

OPEN, FAIR DATA

Vorschlag zur Datenschutzregulierung EU-weit 2012: DNA and RNA

Datenschutzrichtlinie in Europa Ende Mai 2018

**Code of Practice in European
Research Projects**



PAUSE



WRAP UP

So What?

Patient Power.

Was heisst das für die andere Seite,
den Service Provider?

Wie wird sich die Gesundheitsbranche ändern?

Weniger
Krankenhäuser,
mehr kleinere Zentren

Plattform entscheidet

Tele-Arzte – weitere
Reach.

Zusammenarbeit mit
dem Privaten Sektor

Spezialisten
international gefragt

Besser informiert sein für Diagnosen
durch Patient / Clinical Data

Weniger Personal
notwendig

Pharma-firmen gewinnen an Macht

Grenzen verschwimmen –
Spital in der Tasche

Invest in One-Stop-Shop Allgegenwärtiges AI.

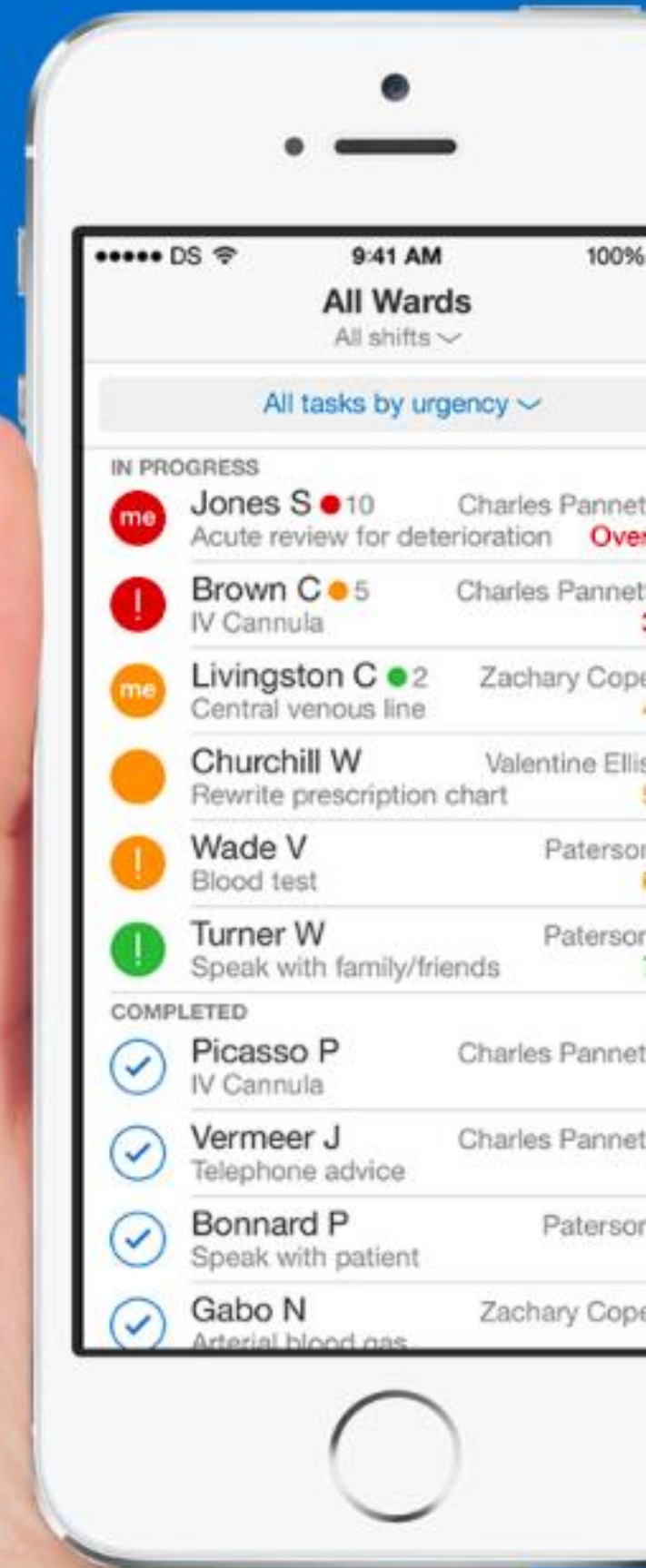


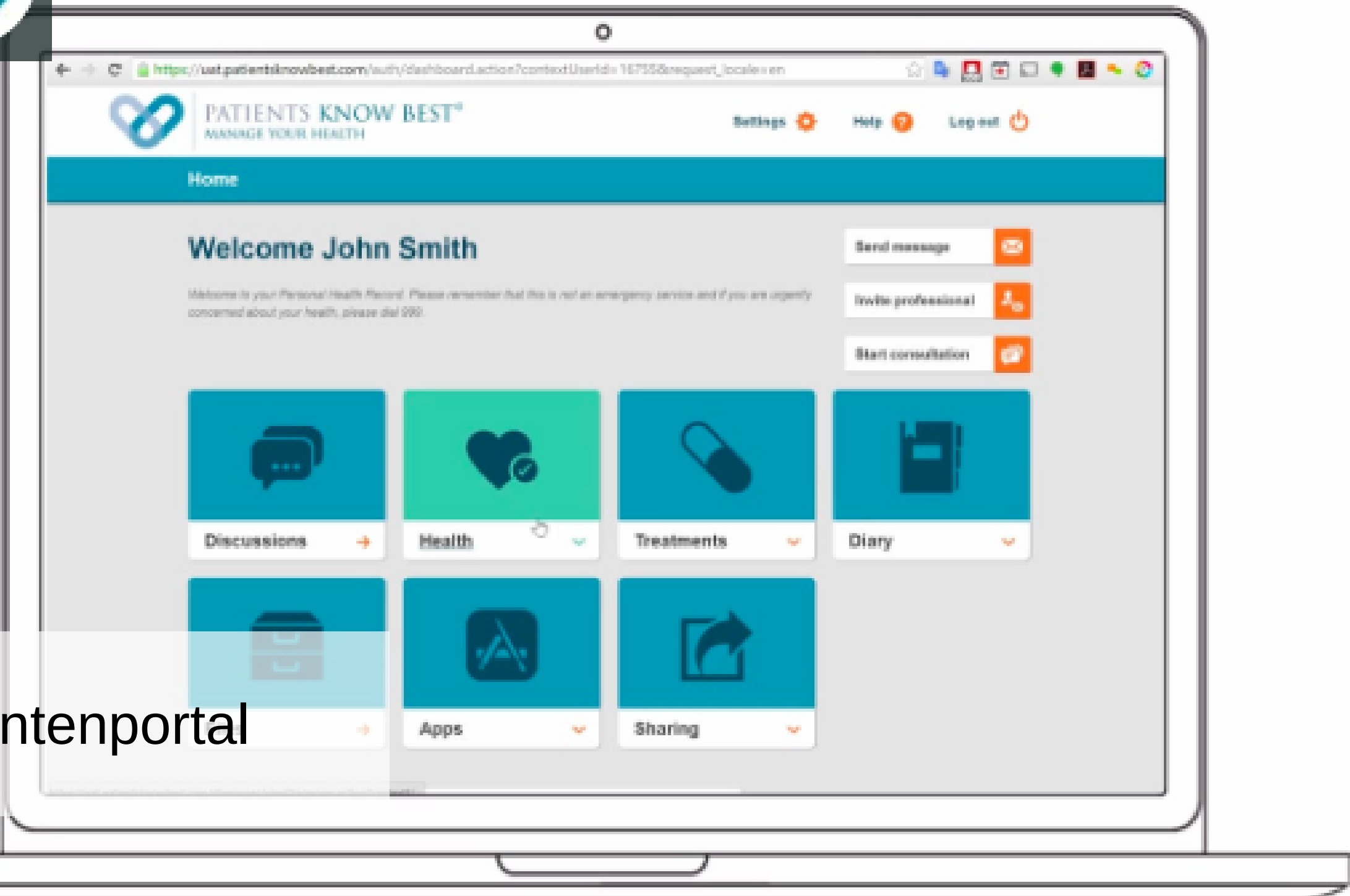
Transformative clinical task management

Hark prioritises who needs to do what, where and when across all aspects of hospital life. Using this data you can transform the way you deliver healthcare within your organisation, saving time, money, paperwork and ultimately, lives.

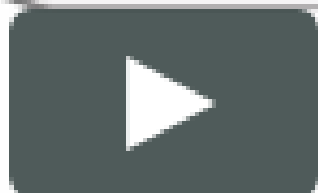
 [Request demo](#)

 [Watch video](#)





Patientenportal

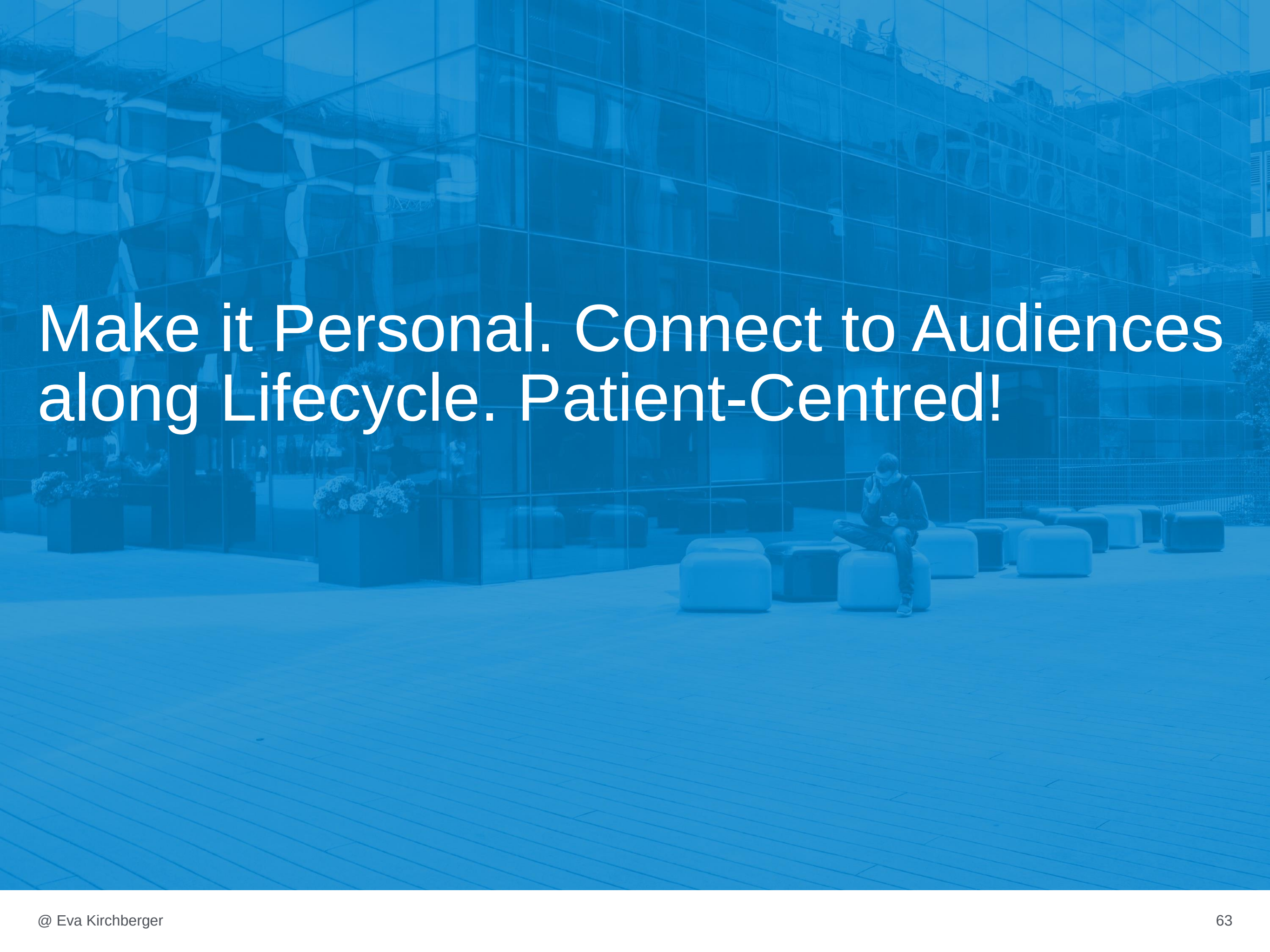


03:25

<https://www.patientsknowbest.com>

A photograph of a modern glass building with a person sitting on a bench in the foreground. The image is overlaid with a blue tint. The text "Optimise Processes, Learn from Data." is written in white across the middle of the image.

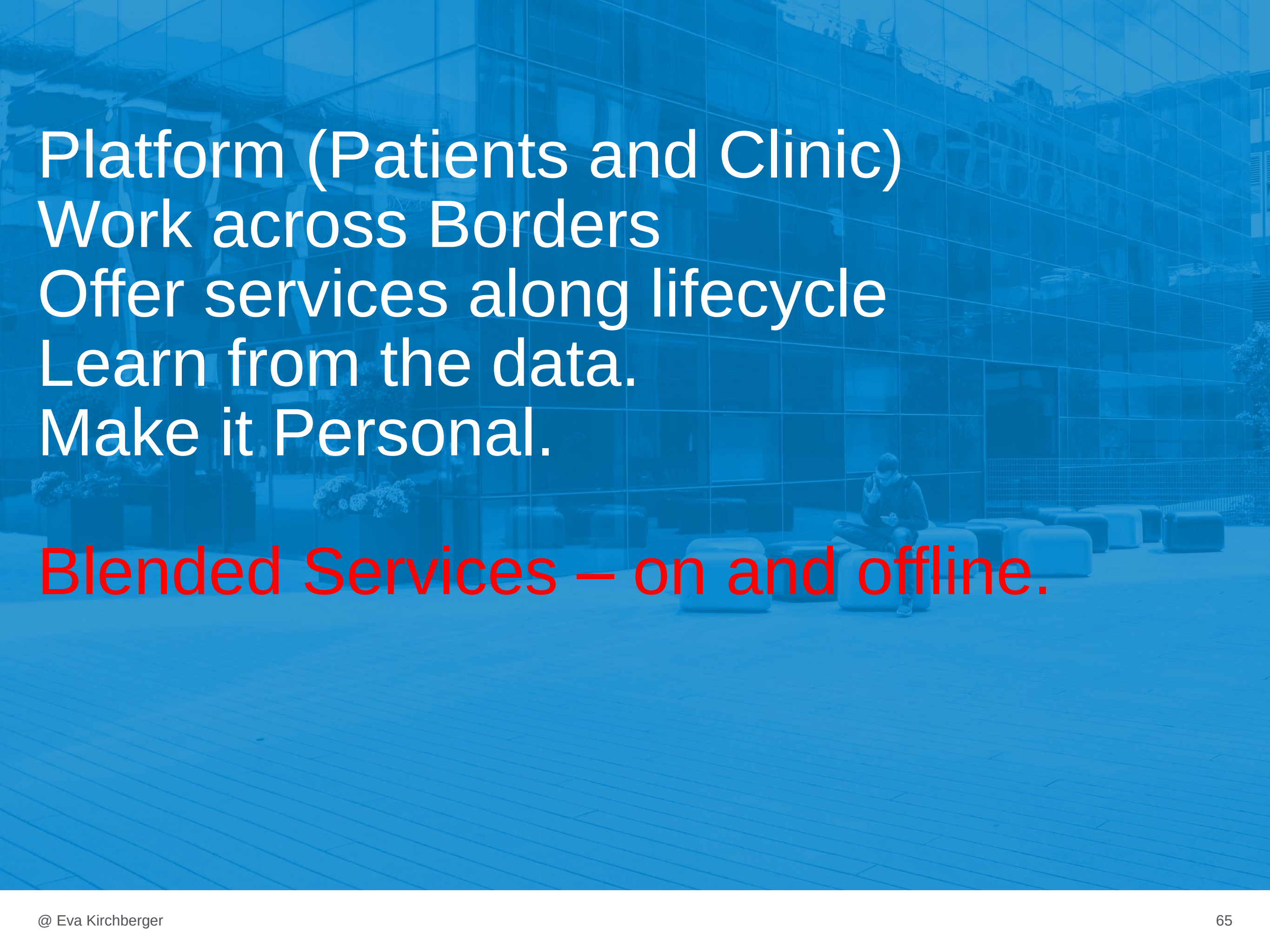
Optimise Processes, Learn from Data.

A blue-tinted photograph of a modern glass-walled building. In the foreground, a person is sitting on a white, rounded, modular bench. The building's glass reflects the surrounding environment. The text "Make it Personal. Connect to Audiences along Lifecycle. Patient-Centred!" is overlaid in white.

Make it Personal. Connect to Audiences along Lifecycle. Patient-Centred!



03:25



Platform (Patients and Clinic)
Work across Borders
Offer services along lifecycle
Learn from the data.
Make it Personal.

Blended Services – on and offline.

Workshop: Let's Innovate.

How do you integrate patients and professionals into the **development of new technologies**, thereby considering the diversity of the population?



Vielen Dank!
Blended Services

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WUNDERLAB LTD.