

CONNECTED AND PERSONALIZED HEALTH IN THE INTERNET AGE

Technologies for an integrated healthcare system
Health services on the move
Governance, regulatory framework and industry



DIGITALIZATION...



Somehow, we experience an “exponential” growth.

- Over one billion of smartphones (sold vs used – growth slightly slowing)
- Wearable sensors (over 40% of new smartphones with biometric sensors embedded by 2016)
- Internet of things (over 26 billions of connected objects by 2020)

Source: Gartner

A RISING HUMANISM IN MEDICINE



The Internet is revolutionizing the science of medicine. A new ecosystem flourished and enhances innovative processes.

- Knowledge, information sharing and best practices
- Newer (mobile) services for healthcare
- Patient/citizen centered
- Personalized and accessible
- Relationships, roles



WHO ARE YOU?

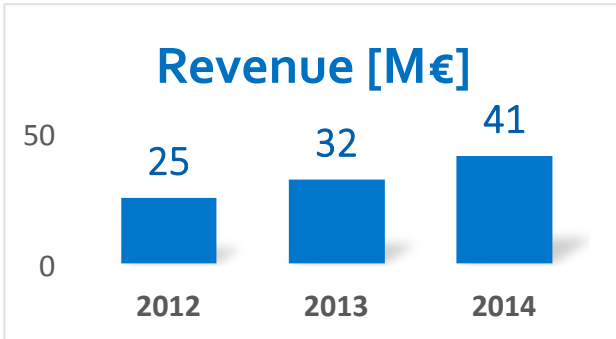
That is a major question.
We have to be sure that digital information is properly owned, stored and made accessible only to the right users and for allowed purposes.

About InfoCert

Highlights



- 3 Offices
- 200 Employees
- 41M€ in Revenue 2014



Main Businesses

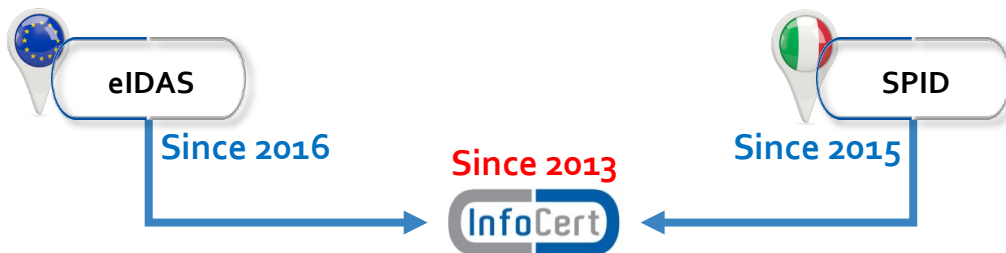


Certifications



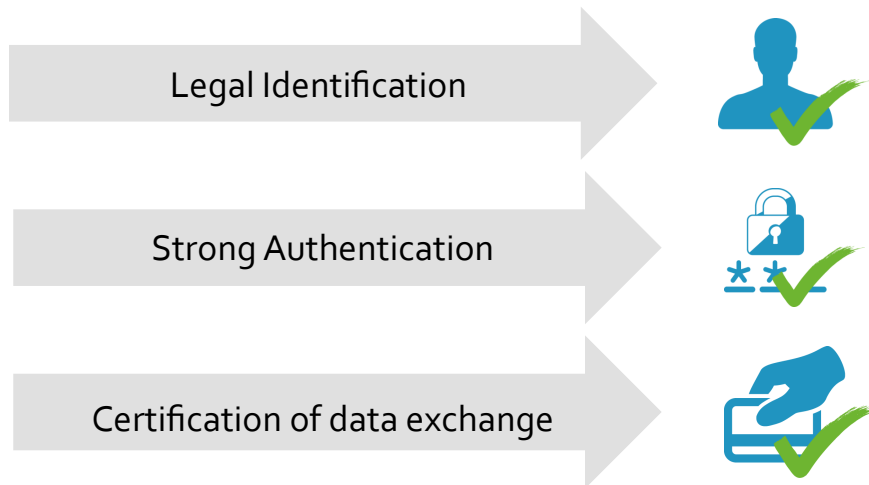
Digital Identity and the disruption effect

Digital Agenda
101011101110000100 2010-2020
for Europe



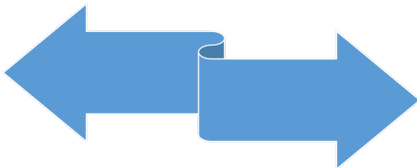
Pro.CI.D.A.

Project for certified identity in the digital agenda



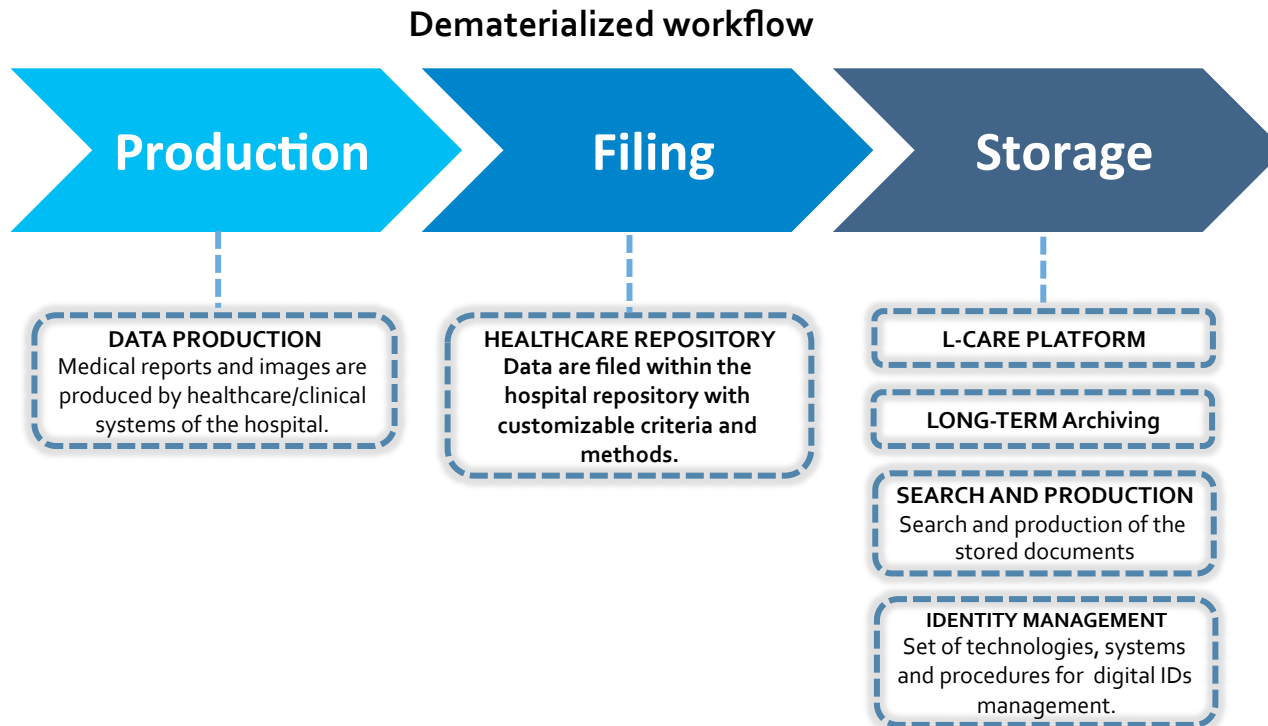
Electronic Health Record (EHR)

- Cover the Entire Life of patient
- Include all medical data
- Use standard application “L-Care”
- Protect Accessibility

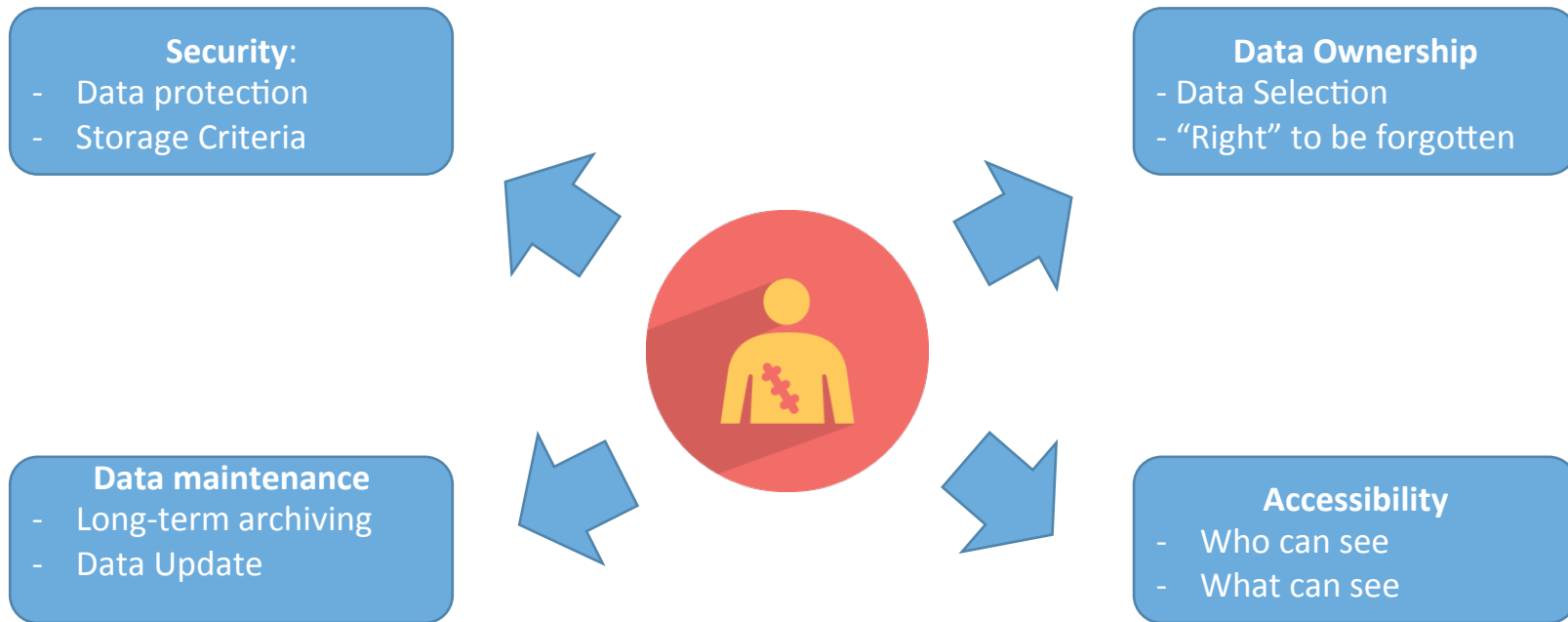


Digital Patient Dossier

- Related to a specific structure
- Cover the Clinical relationship with the structure
- It's a plus → not mandatory
- Patient chooses which data share.



Best practice sometime it's not a standard!



Why Best practices are not a standard



- ✓ EHR is a priority for 52% of Health Structures but there is no knowledge about cloud and interoperability
- ✓ There is no culture in digitalization of Health Care → 83% of Citizens don't Know what HER is!
- ✓ Only 1 out of 3 healthcare organizations have started a digitalization project such as online reservation
- ✓ There is a normative lack in relationship between government and local administrations in defining a standard models (Reform "Titolo V Costituzione"?)

Which eHealth Journey



Administrative
workflow



Patient Digital Life



Digital
Relationship



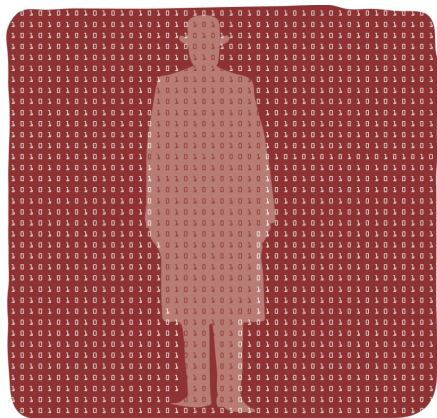
Integration &
Interoperability within
PAs



Shared services
&
Collaboration



- ✓ Thanks to the eIDAS regulation, the digital identity will enable doctors and medical staff to improve assistance and patient care through the use of tools such as electronic health records, with certain guarantee of identification
- ✓ The sharing of health information will be more effective and safer, allowing patient to digitalize its “health life” with several benefits in terms of speediness and accuracy of diagnosis, but keeping control over the time
- ✓ There remain a number of points with respect to data retention as there is no today a European regulation about cloud but only some recommendations
- ✓ It 'should also define a model of universal access authorization data, which must be given by the patients which should be able to revoke it in compliance privacy statements policies
- ✓ Trust Service Providers such as InfoCert will support the digitalization of health processes, being the “trust third part” able to guarantee the certification of identity and data sharing



A LEGAL ANALYSIS: DATA PROTECTION FOR DIGITAL(ISED) HUMAN BEINGS

What legal means do we have to protect the privacy of the individual?
And what means do we have to ensure the cyber security of that data,
for example from being hacked and stolen?
Medical records can be extremely valuable to cybercriminals.

- ◆ Nordic's largest cyber security consulting firm
- ◆ Founded 1988
- ◆ Employs security professional 160 in Finland
- ◆ Business in 25 countries
- ◆ NASDAQ OMX / First North listed since 2014
- ◆ Now growing by M&A and branch offices around N-EU

Kim Westerlund

#cybersecurity

#espoo

#bizcontinuity

#1975

#father

#nixuanSince2005

#swedish

#running

#privacy

#dining

#adventures

#eMBA



Meet VLAD



- Born 1996 in Chisinau
- Lives with his parents and 3 sisters
- Hobbies: computing, video games
- Family income 7000€/y
- Dreams to study in the Technical University





PREVIOUS STORY
◀ Windows 10 on small tablets looks a lot like Windows Phone

NEXT STORY
Lightning on wheels: the insane electric racing of Formula E ▶

SCIENCE US & WORLD

6
COMMENTS

29 million US health records exposed by data breaches between 2010 and 2013

Most of the information was stored electronically

By [Arielle Duhaime-Ross](#) on April 14, 2015 11:21 am [Email](#) [@ArielleDRoss](#)



(Carl Court/Getty Images)

THE LATEST HEADLINES

Marvel's Jessica Jones isn't a morning person in latest Netflix teaser

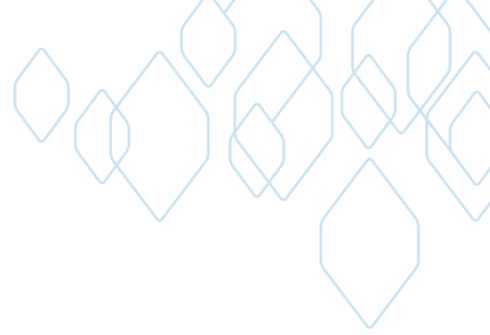
Can booze lure me back to a meal-delivery service?

iPhone 6S has twice as much RAM as iPhone 6, teardown confirms

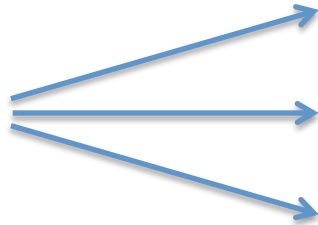
Boeing's secret stealth fighter jet from the '60s was decades ahead of its time

Ask Stoya: How do male

Solutions



Upfront
Regulation

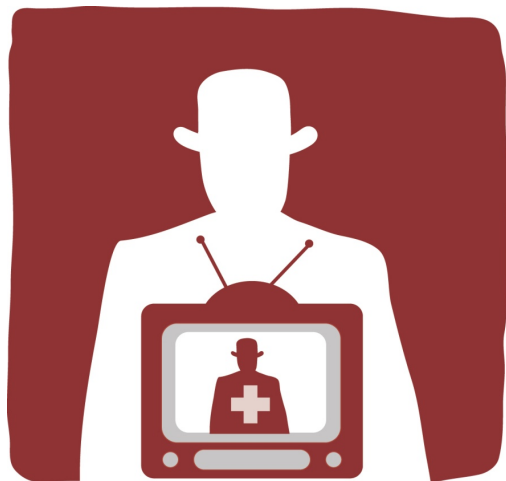


- Standards
- Open source libraries
- Public sector spearheads

Privacy-by-design – 7 foundational principles

1. Proactive not Reactive – Preventative not Remedial
2. Privacy as the Default Setting
3. Privacy Embedded into Design
4. Full Functionality – Positive-Sum, not Zero-Sum
5. End-to-End Security – Full Lifecycle Protection
6. Visibility and Transparency – Keep it Open
7. Respect for User Privacy – Keep it User-Centric

FROM MONITORING TO CARING



Innovate the processes by automation.
Providing services for inpatient, outpatient
and at home in a seamless way.
Perhaps "telemedicine" is getting an old
word. Better saying, that we develop
accessible services to care people.
And those services are accessible even from
the management point of view.

GIUSEPPE GRASSI – Director of Cardiology Division at ULSS 12 Veneziana, Italy
MARIO PO' – Executive Director, "Azienda ULSS 12 Veneziana", Venice, Italy



azienda Ulss 12 veneziana



“SS GIOVANNI & PAOLO” Hospital



The main
entrance of
the hospital



azienda Ulss 12 veneziana



“Scuola Grande di S. Marco”



Historical
Library



azienda Ulss 12 veneziana



“Scuola Grande di S. Marco”



Historical
Library



azienda Ulss 12 veneziana

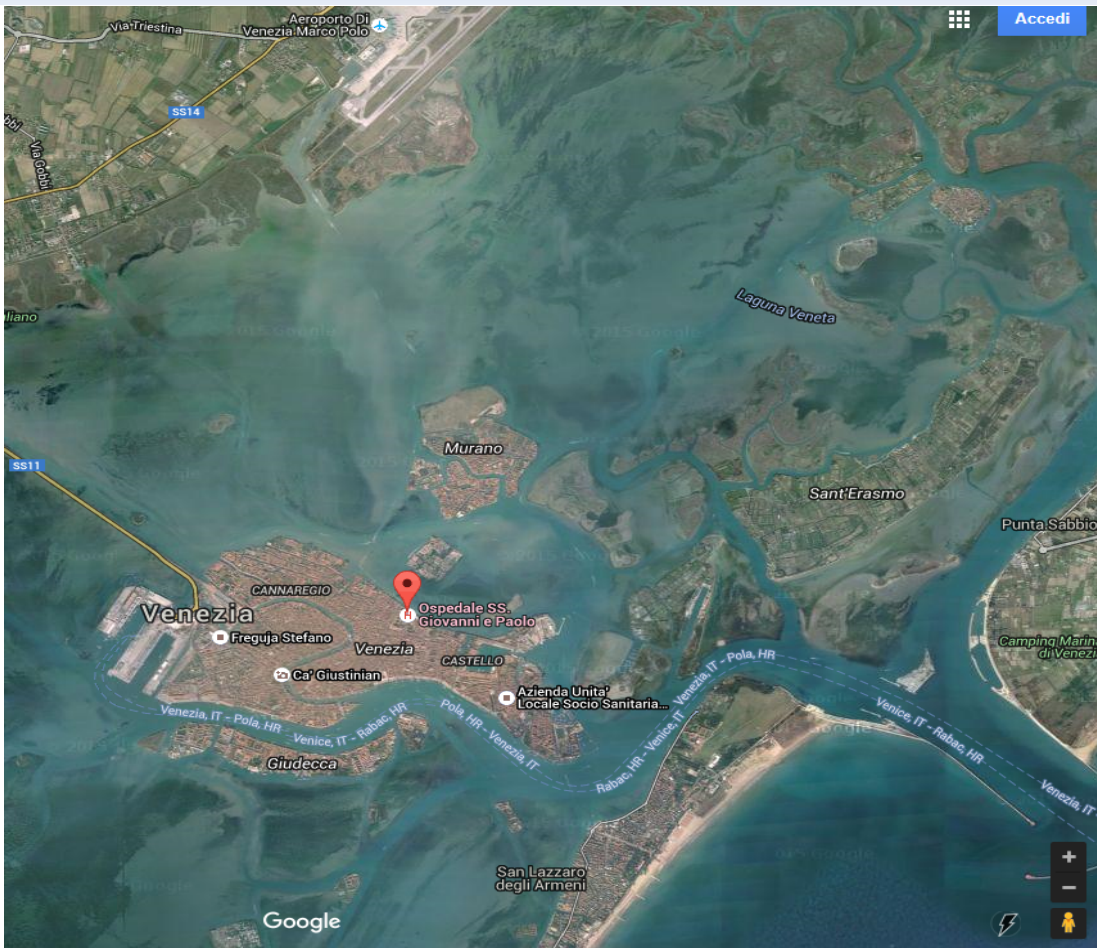


“SS GIOVANNI & PAOLO” Hospital, Heliport





azienda Ulss 12 veneziana



THE VENICE LAGOON



azienda Ulss 12 veneziana

Usual people-moving...



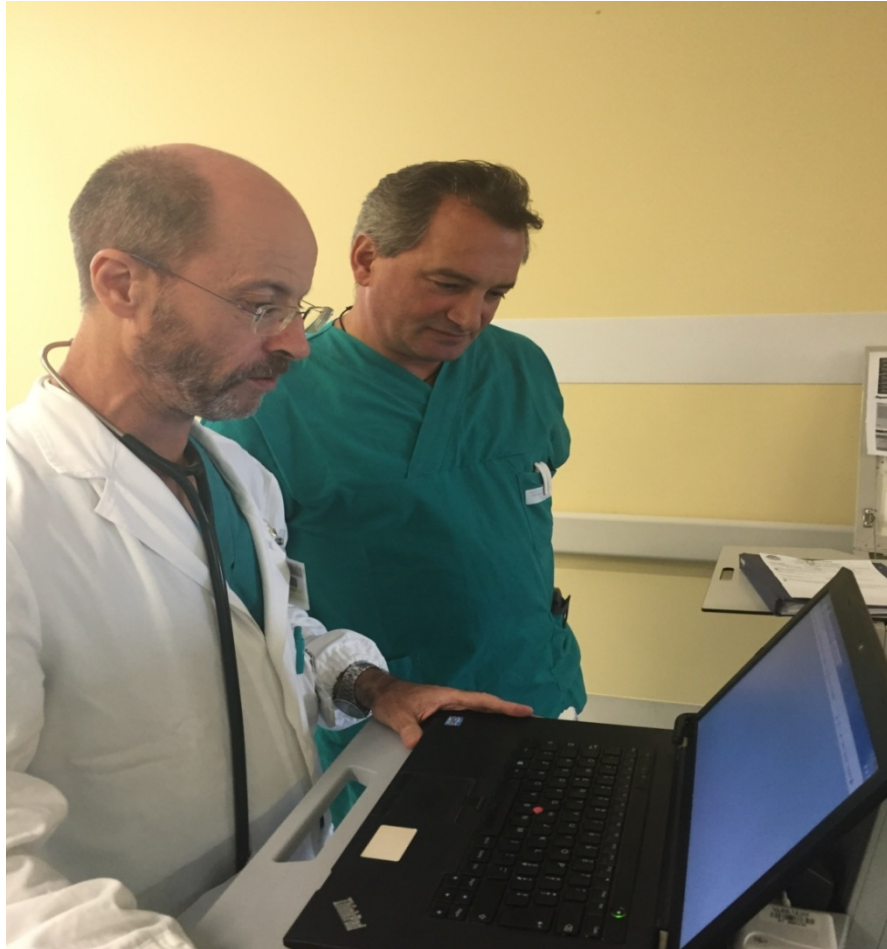


azienda Ulss 12 veneziana





ePRESCRIPTION



In our Cardiology Division ePrescription of medicines has been consolidated, reducing both prescriptive errors and pharmacological interactions, as well as allergic reactions and misdosing of drugs.



DISPENSING

Thanks to a dedicated software and computerized trolleys the patient is identified (by a bracelet) and the proper medication and the right time of administration by the automatic opening of a specific drawer of the trolley.





ROBOTIC STORAGE

The cabinet to store medications enables the robotic recognition with fingerprints, ensuring the precise identification of the drug, its expiring date and its storage.





Your doctor... anywhere, anytime...

We have also the opportunity to home-monitor our patients after hospital discharge by supplying them with some digital devices that can measure critical parameters.....



**Your doctor...
anywhere, anytime...**



EKG trace

Body
Temperature

Blood
pressure

Heart rate

SpO₂

Weight



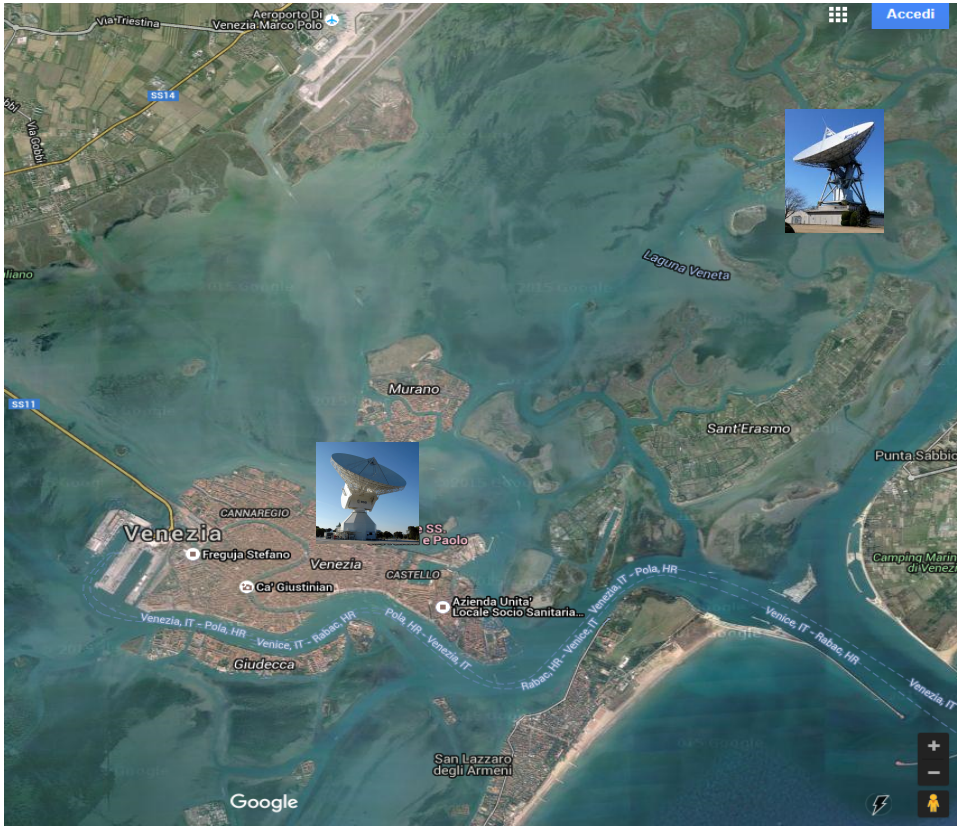
Your doctor... anywhere, anytime...



All these parameters are routinely assessed by a dedicated nurse and submitted to the doctor, who will modify the therapy without the need for the patient to go to the doctor's clinic for evaluation.



Your doctor... anywhere, anytime...



Venice with all its islands have been wired in almost all health districts; this allows digital health devices to perform evaluations of implantable devices such as pacemakers or defibrillators.

INFORMATION FLOWS



The physician, after having analyzed the clinical data, defines the therapy.

Then, by accessing the PHR, the therapy administration can be easily managed at home.

This is strongly enabled by "human-based" ICT.

Interactions amongst users and applications matter a lot.

MARITTA PERÄLÄ-HEAPE – *Director, Centre for Health and Technology (CHT)
University of Oulu*



**“I already diagnosed myself on the Internet.
I’m only here for a second opinion.”**

Internet age benefits whole society



Datam.me

INDIVIDUALS



Kanta

Public ORGANIZATIONS

- New platforms and data registries



HealthKit

ENTERPRISES

- AppleHealthKit, Microsoft Health, Samsung Health Platform,
- Google ResearchKit..

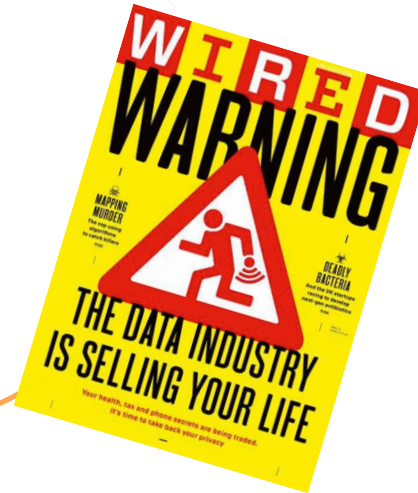
But...



"Error exposes 1,5 million people's private medical records on Amazon web services"

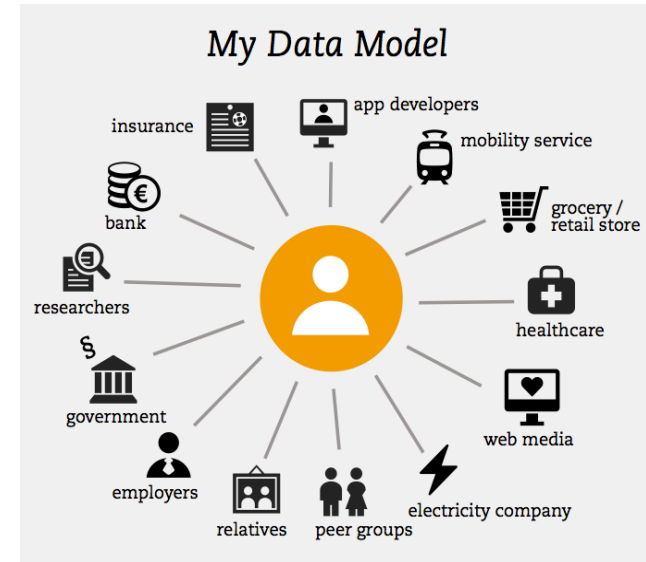
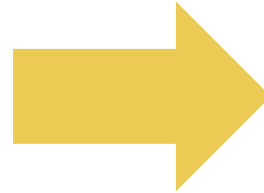
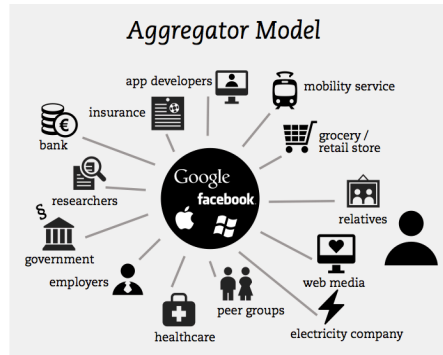
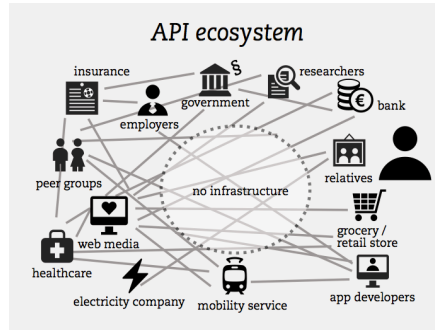
People are afraid that their data is abused

The power of personal data may be ignored in organizations

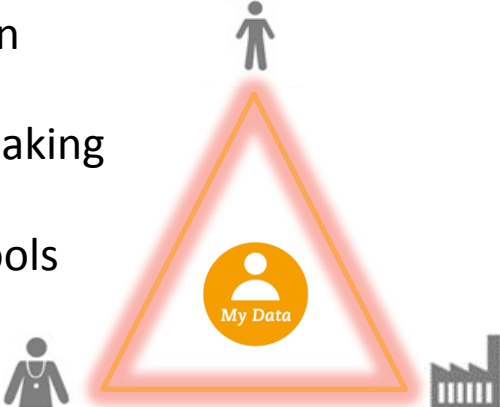


How to make it work?

By human centered data management and processing and Mydata-based service development (www.digitalhealthrevolution.fi)



Benefits of MyData approach for end users, healthcare sector and industry

- Better ways to interact with companies and public organizations
 - Easy-to-use tools for personal data management
 - Better privacy and transparency
-
- Personal data exploited in new care models
 - New tools for decision-making based on rich data
 - New risk management tools
-
- 
- The diagram features a central orange triangle with a glowing effect. Inside the triangle is a yellow circle containing a white person icon and the text "My Data". Surrounding the triangle are three grey icons: a person at the top vertex, a person at the bottom-left vertex, and a factory at the bottom-right vertex.

- Creation of new businesses, based on end user needs
- Tools to integrate third party complementary services into core services
- Strengthening of consumer trust and engagement

Thank you!

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 <https://www.facebook.com/chtoulu>



Centre for Health & Technology

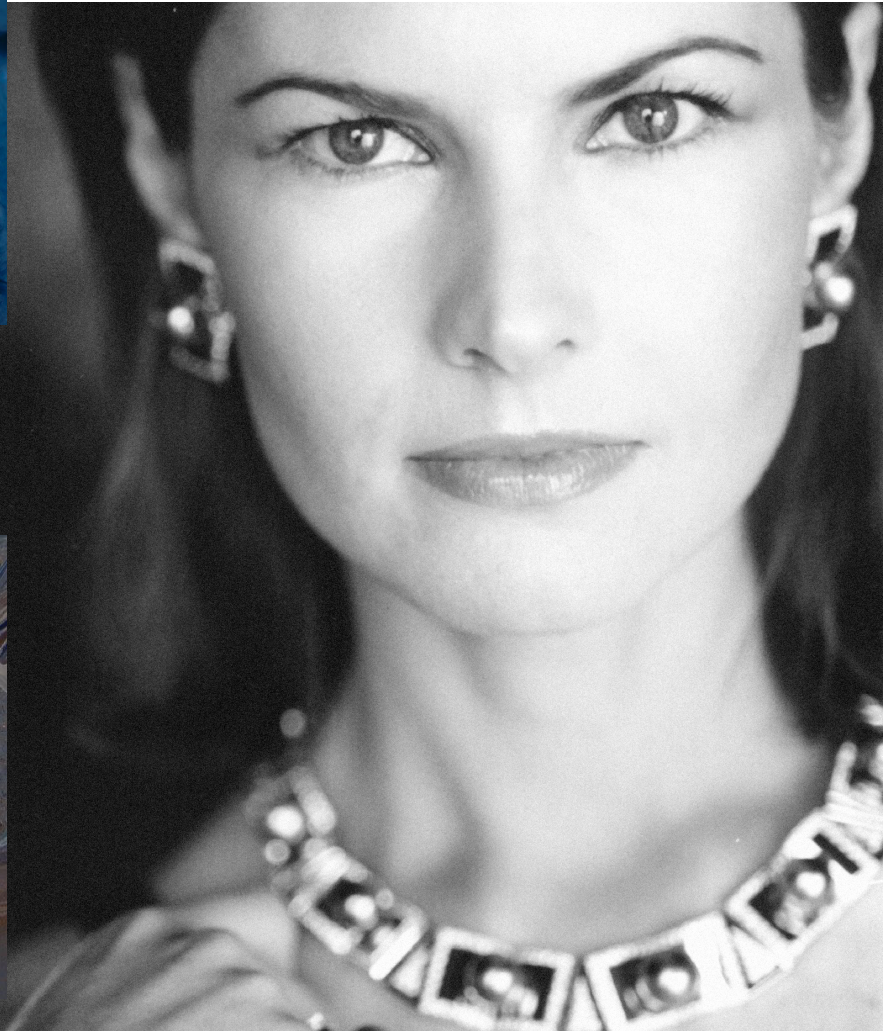


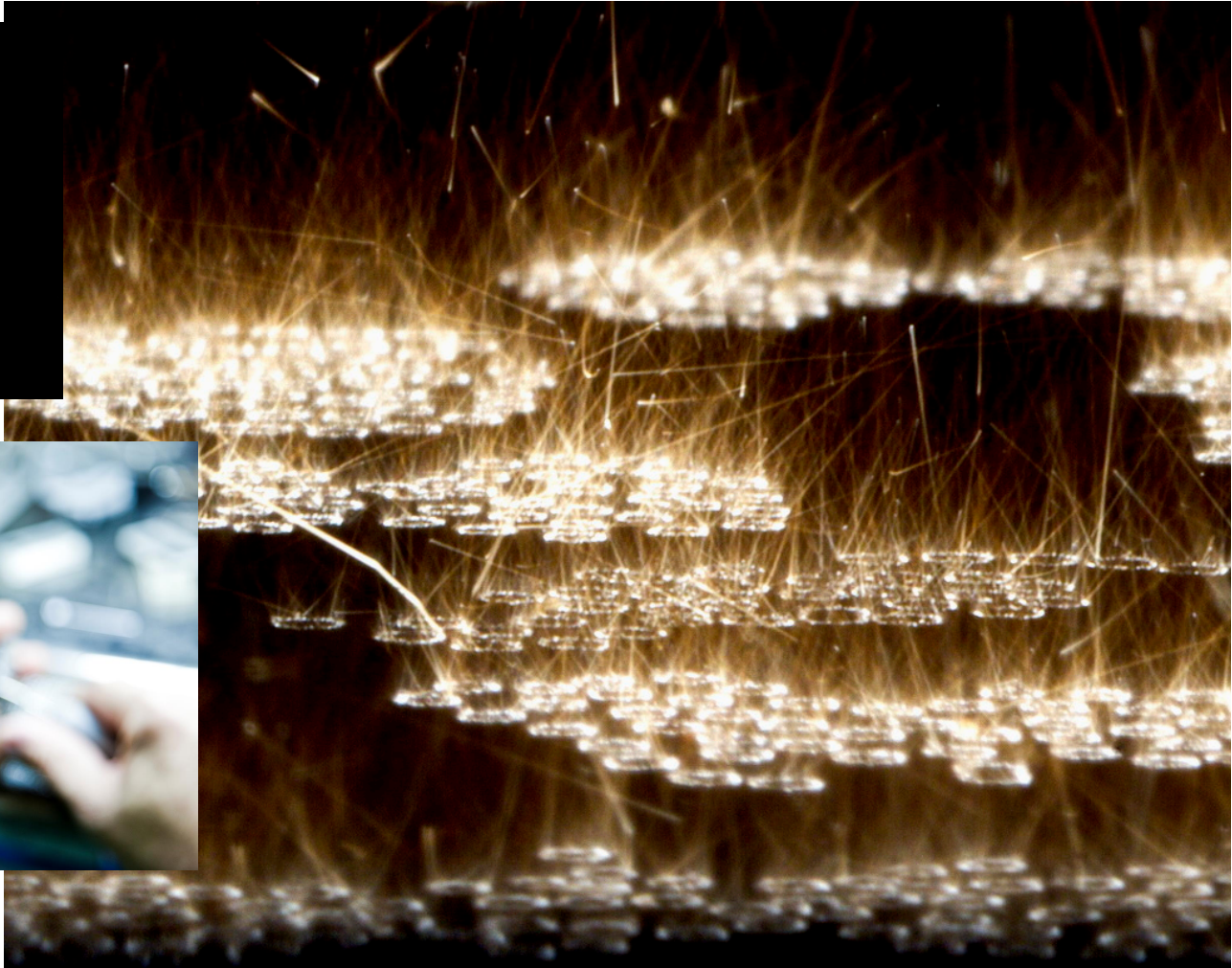
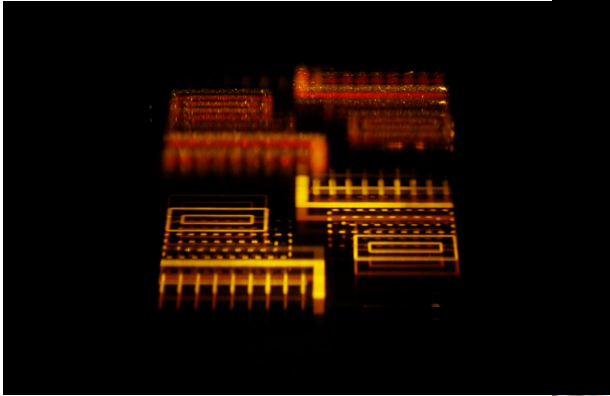
TAILORED IS BETTER

Starting from digital images, how to define a physical model to craft a personalized prosthesis by a 3D printing innovative system. That enables the development of a partnership with the medical staff, which is the key factor to success.



Sandi
SANDI GIOIELLI

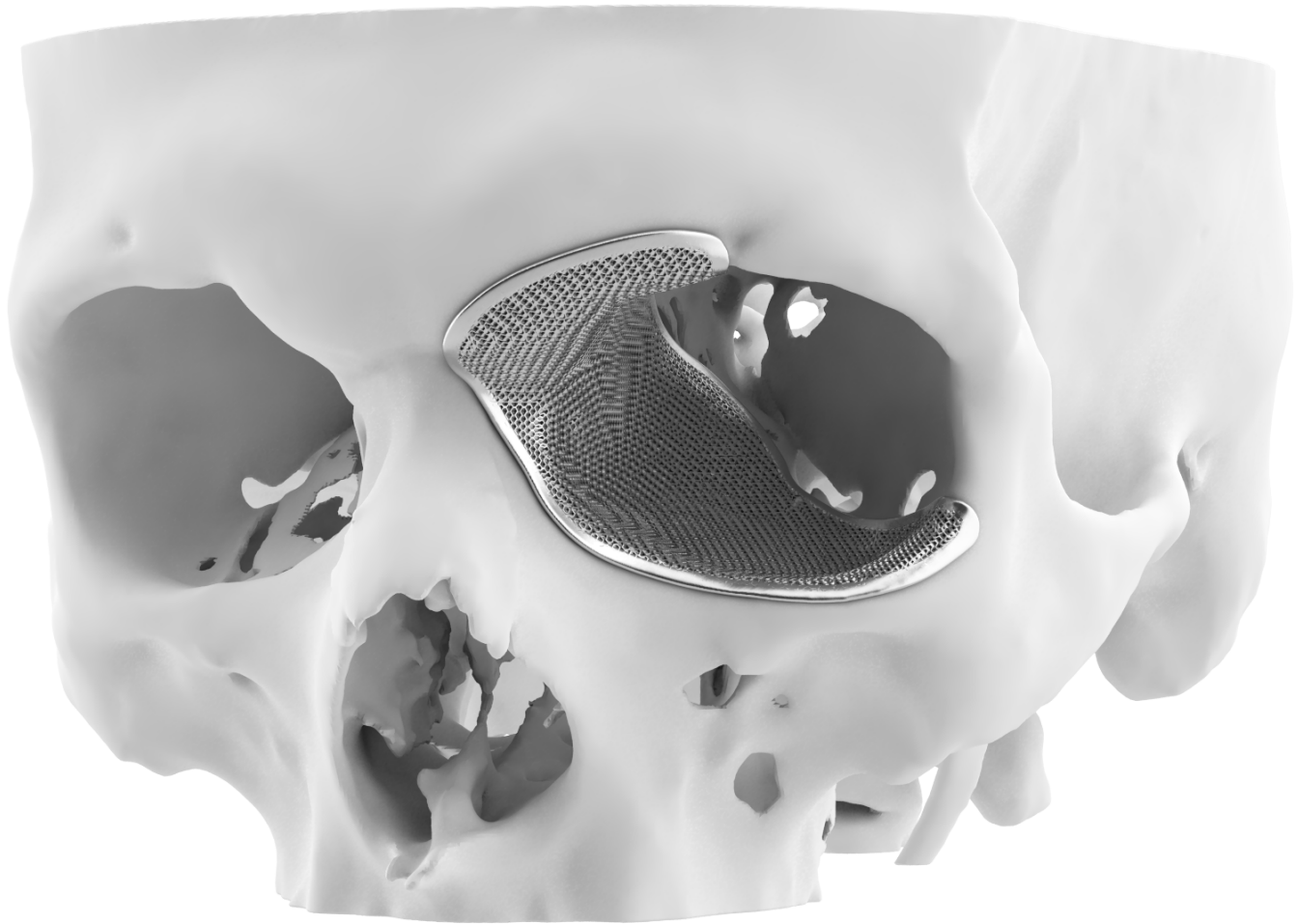




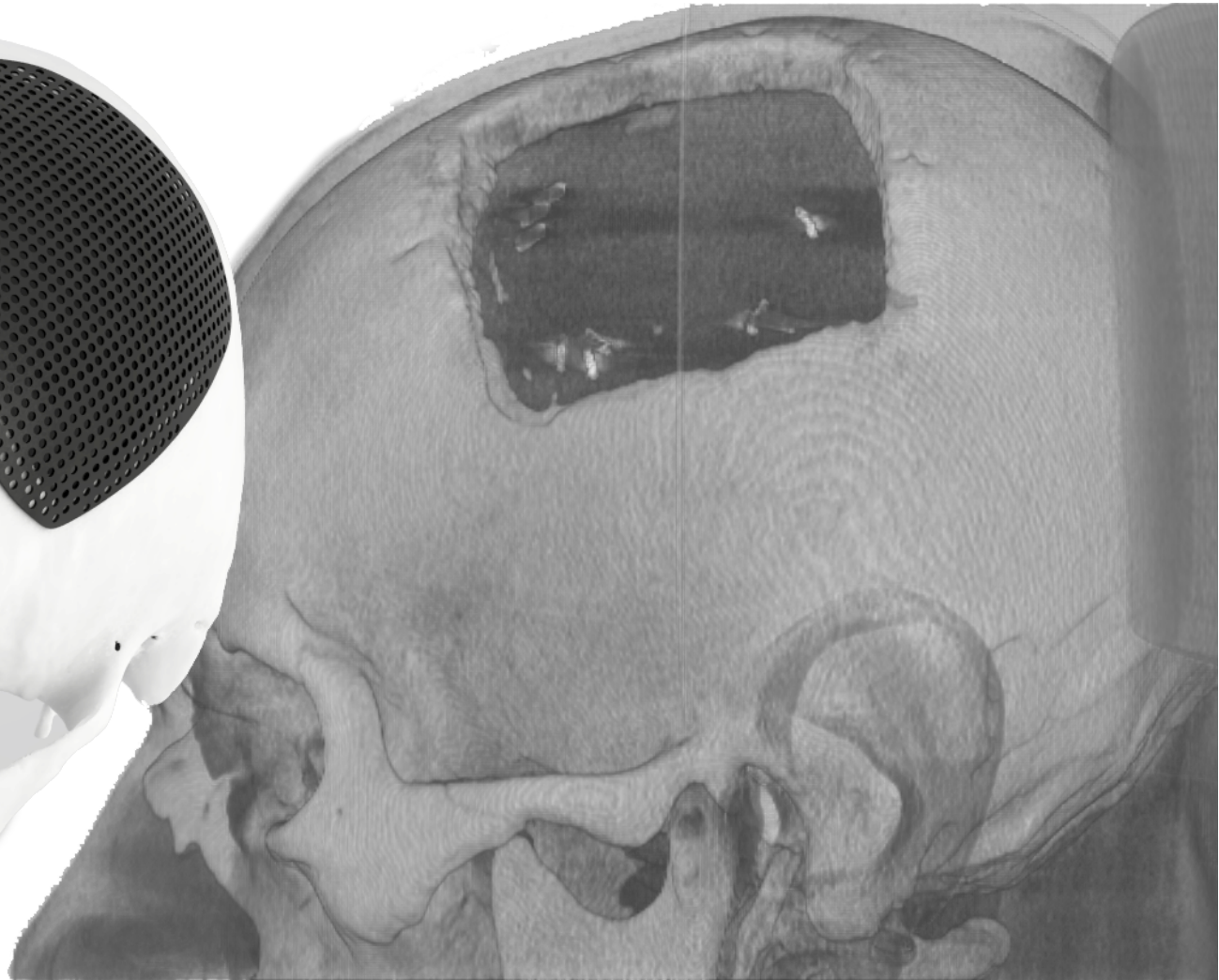


Video...

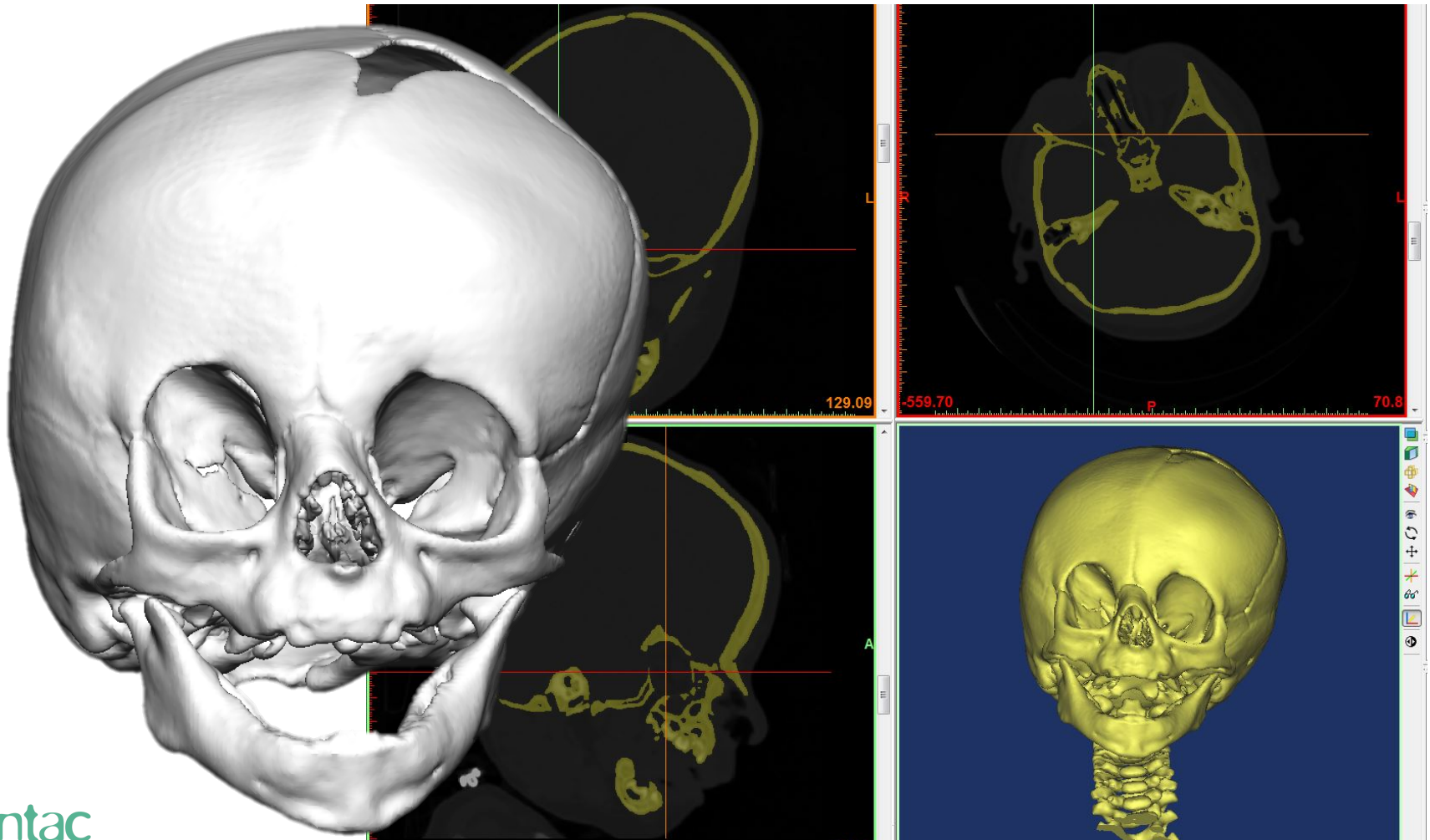


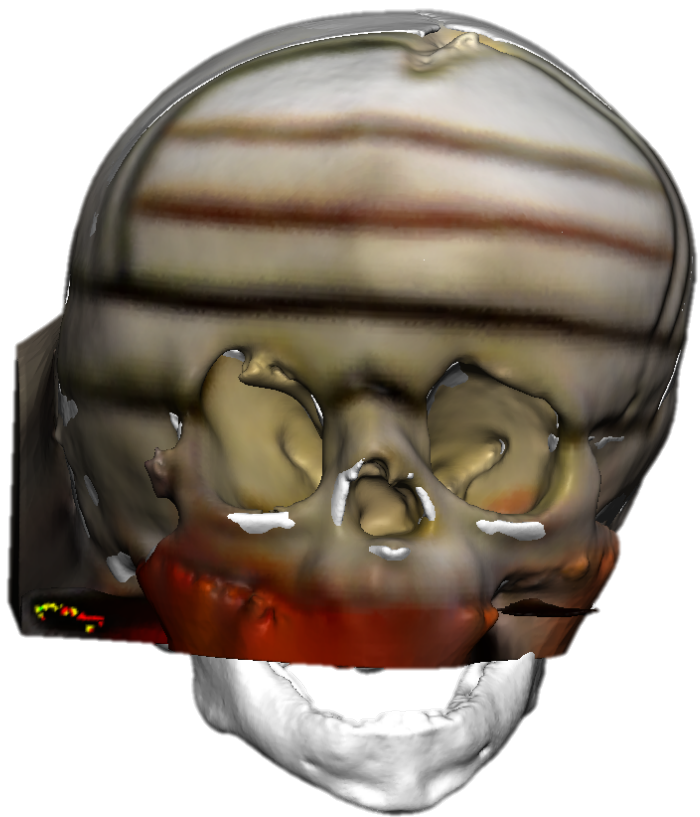












OPENING DATA AND BORDERS



Opening data is definitely a good practice to evaluate and improve quality and performance of healthcare services. Nevertheless, many issues still last when services require coordination and data exchange across borders.

What can be done?
Who is involved?

MICHÈLE THONNET – Official Representative of the French Ministry of Social Affairs and Health in the European & international e-Health Domain



KNOWLEDGE ON HEALTH

Properly communicate healthcare policies in order to effectively spread prevention and good practices to citizens, enables a universal health vision, that could be enhanced by welfare initiatives developed by private companies and institutions.

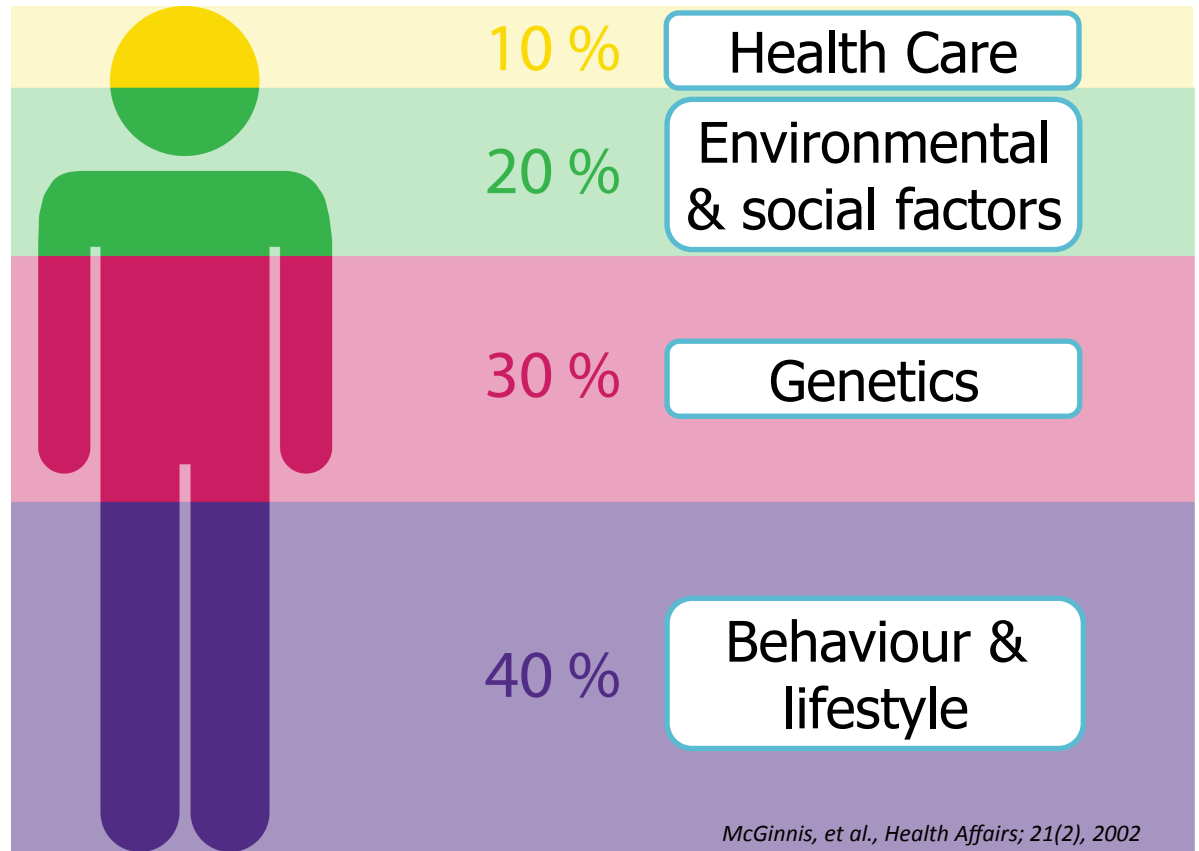
My education

- Tartu University, medical doctor
1996
- Tartu University, family doctor 2000
- Nordic School of Public Health
(Sweden) -Diploma in Public Health
2003
- Estonian Business School 2001-2003
ICT Management
- Tallinn University of Technology, PhD
(healthcare engineering) 2012
- Scripps Translational Science
Institute, San Diego, USA 2014-2015
Digital Medicine intern

Tiik, Madis M.D., Ph.D.



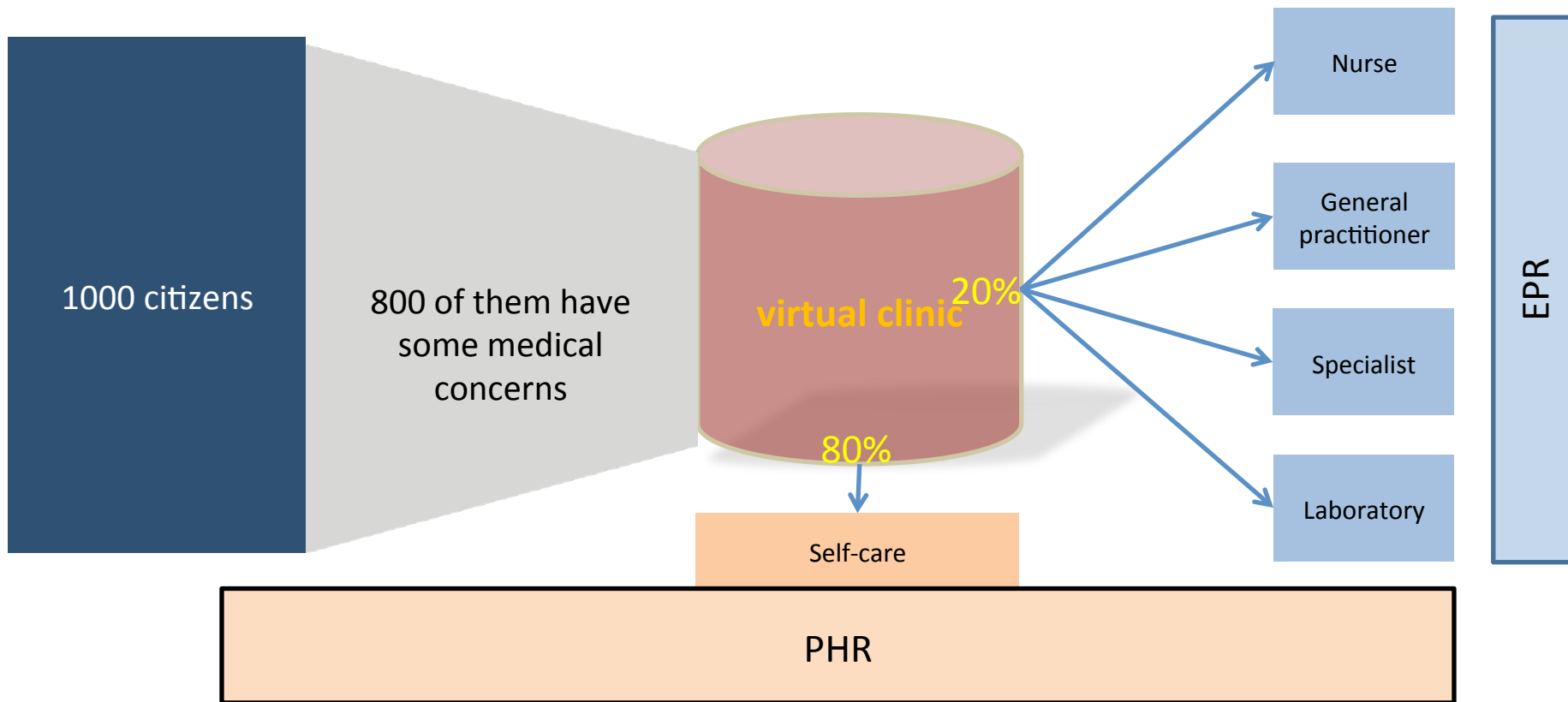
Several Factors Combine Together to Affect Our Health



McGinnis, et al., *Health Affairs*; 21(2), 2002

Sitra • Antti Kivelä • 25.5.2015

Virtual clinic and service flow

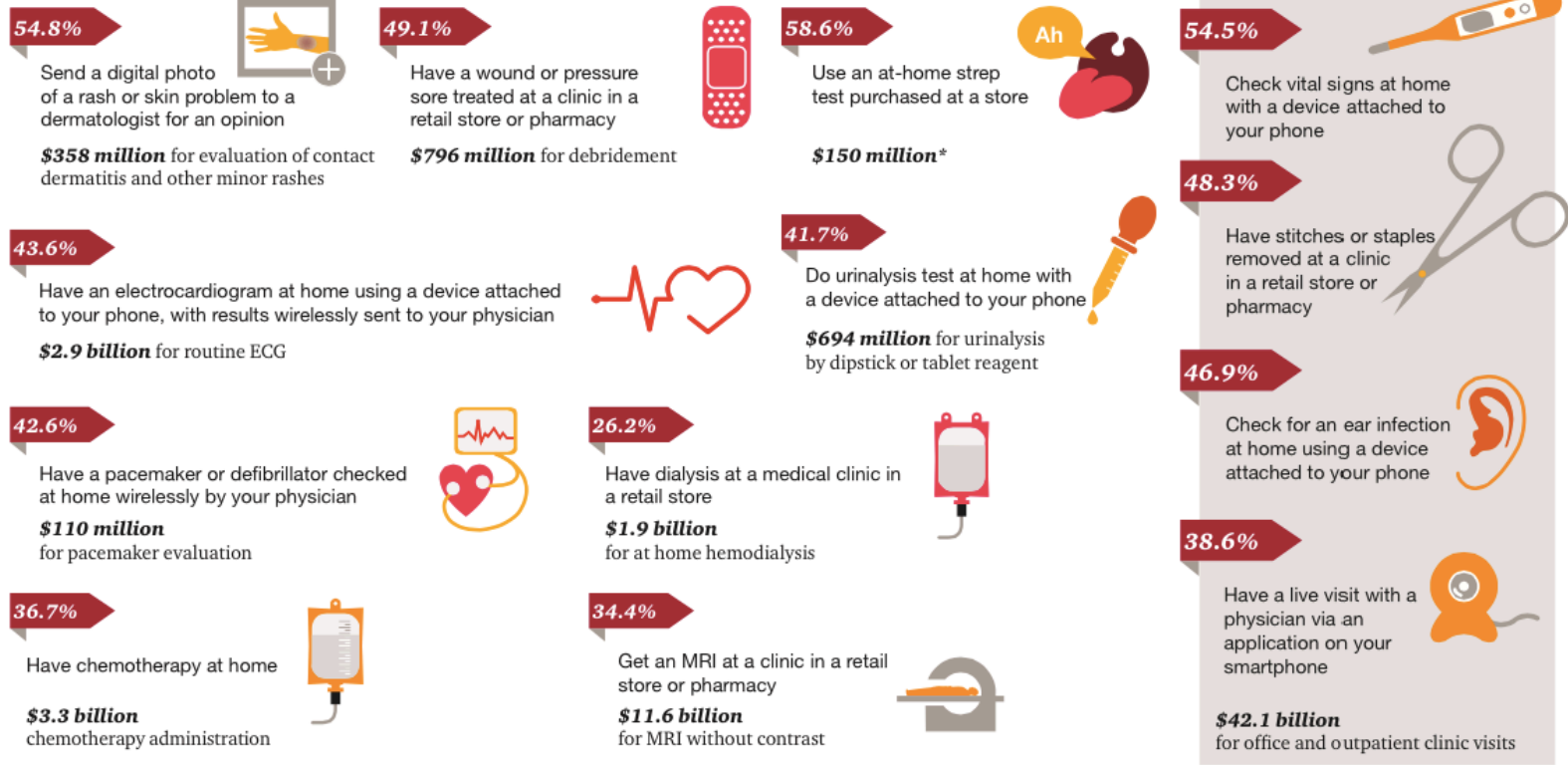


The Concept of Virtual Clinic



New entrants are creating options consumers want, threatening billions of dollars in hospital and physician revenue

How likely would you be to choose these options, if they cost less than the traditional choice.
Percent of respondents answering "Very likely" and "Somewhat likely"



*Strep revenues also included in office and outpatient visits.
Source: HBI consumer survey, 2013 and 2011 Truven Health MarketScan® Research Databases. See "About this research" on page 19 for more information.

The Potential of Big Data in Health Care:

Towards improved value
and preventive care



**Better health outcomes &
more personalized care**

TECHNOLOGY EXCEEDING HUMANITY?



What about bio-compatibility of technology?
Is technology compatible with human beings,
with life, with behaviors?

Services are moving out of the hospital.
What's the impact? Is this sustainable and
bio-compatible? Is this transition a real
innovation? Who benefits?



LIMITS TO INNOVATION?

Are technologies really sustainable, not merely about resources and funding, but about organizations and structures?

What does innovation mean? Should that be a continuous growth? Is our approach really global? What limits do we have to consider?



MANY THANKS TO

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Planning and execution
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