GLOBALHEALTH 2016 – PANEL
Self-managing Ambient Assisted Systems:
Challenges of Patient-driven Approaches

Moderator:
Wolfgang Leister, Norsk Regnesentral, Norway

Panelists:
Brendan O'Flynn, University College Cork, Ireland
Aoki Kyota, Utsunomiya, Japan
Jaap Ham, Eindhoven Univ. of Technology, NL
Hassan Khachfe, Lebanese International University
Gregory O'Hare, University College Dublin, Ireland

What are patient-driven approaches / self-management ?
Here are the opportunities:

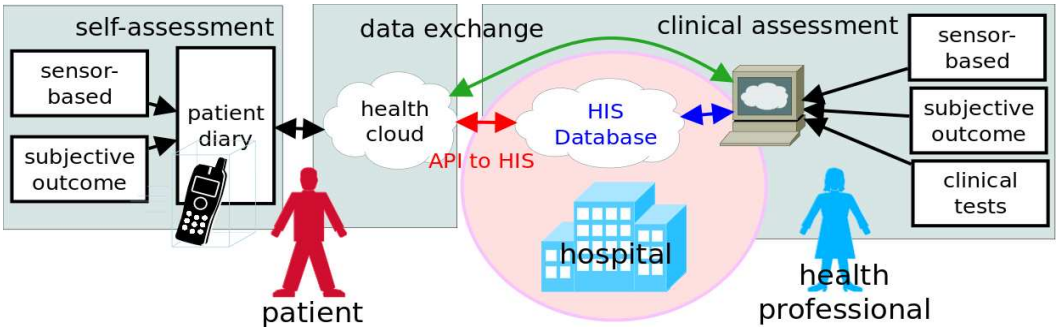
- Technologies that allow patients / citizens to manage their condition using technology.
- Use of smartphones / tablets / mobile devices / watches / sensors (generic & specific)
- Support life style changes and medical information.
- Communication with health personnel.
- Access to health records / archive.
- Decision support when incidents occur.
- Detection of deterioration – alerts if necessary.
- Interactive knowledge base & psychologic support.

NR

Which advantages do patient-driven approaches / self-management have ?

- Patient / citizen has «helper» in her / his pocket
  - Always available
- Reduce number of visits to hospital / health care unit
  - Cost reduction in health care service
  - Health personnel can concentrate on the «real» cases
- More complete documentation: health diary
  - Reminders can help patient to organise
- Can facilitate communication to health personnel
  - Health personnel can take informed decisions
- Better informed patients ...

Example how patient-health personnel collaboration can look like from a technical perspective



Example is taken from the MOSKUS project, supported by The Research Council of Norway, funding number 227251..

What are the challenges of patient-driven approaches ?

- Can patients trust the technology ?
- Are there cases when self-management does not work ?
  - Can death rate increase when using self-management ?
  - What if patients are cheating ?
- Obstacles for patient – health personnel communication ?
- Security and privacy ? Can data be used by others ?
- Data processing and cloud computing ?
- Do patient-driven approaches compete with health personnel ?
- Who shall bear the costs for self-management ?

Brendan O'Flynn, University College Cork, Ireland:

bridging the gap between clinicians / healthcare experts and ICT technologists: how to learn a common language to create solutions

Aoki Kyota, Utsunomiya, Japan

The IoT can promote activities to increase the QoL of the ageing population

Jaap Ham, Eindhoven Univ. of Technology, NL

The importance of situational influences in ambient assistive technology

Hassan Khachfe, Lebanese International University

Ensuring the Quality of Home-Based Healthcare using Mobile Technology

Gregory O'Hare, University College Dublin, Ireland

How to collect and fuse quality sensed data that can inform the learning algorithm; ... that can reflect the changing needs of the patient; ... that can deliver system personalisation?

The panel discussion went into a variety of issues (1).

- Specialists talk different «languages» and use different research methodologies. Maybe the suggested ABC ecosystem needs an extension by other professions ... and also the patient ...
- The use of the IoT vs. traditional healthcare; having a dog as a pet vs. a robot, ...
- Pokémon Go as a self-management system?
- The importance of preventing to be a patient ...
- Studying the effectiveness is important ...
- The psychology of therapy – being in a hospital vs. home healthcare

The panel discussion went into a variety of issues (2).

- Errors in the healthcare chain can happen – nurses, doctors, ... can make errors; devices can fail;
- When choosing a dog as a pet or a robot as a pet: consider that a robot can gather data while a dog cannot.
- Data is the key! Data can give valuable insights!
- Moral dilemmas can occur: ambient technology, the technology that enables independent living, can be used to decide when a person no longer can live independently ...
- ...

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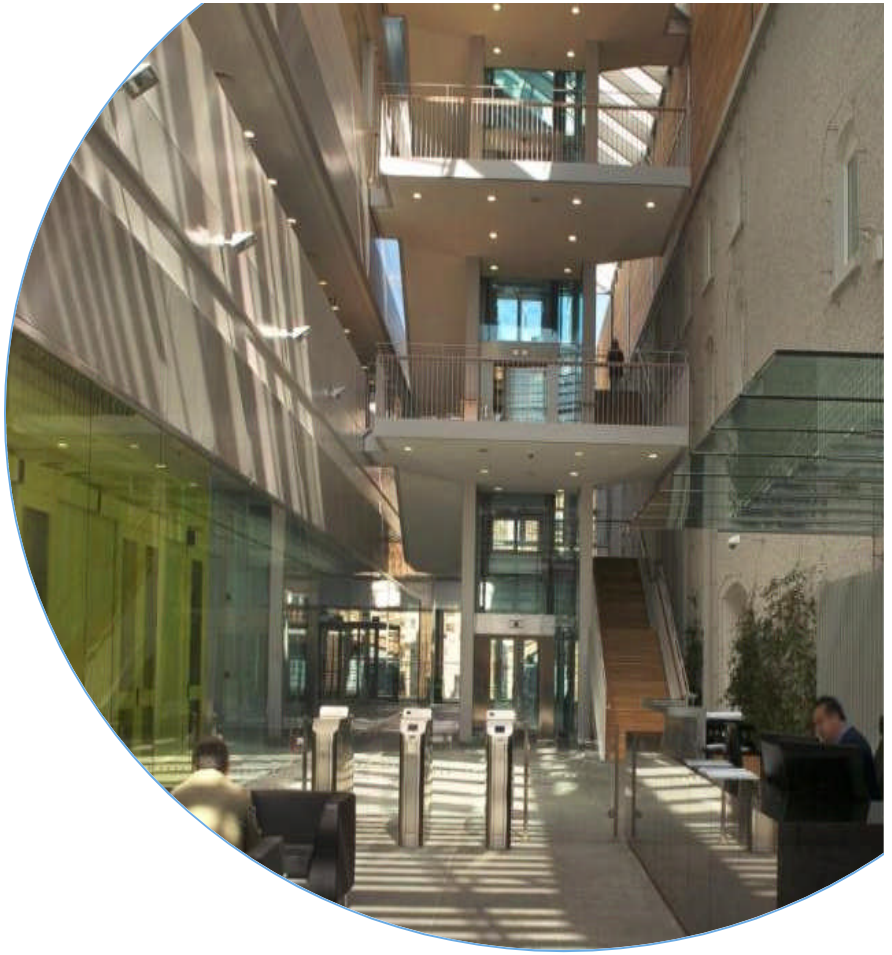
ICT Enabling Smart Therapeutic Solutions

It's a matter of ABC……..



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UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Ireland's European Structural and Investment Funds Programmes 2014-2020
Co-funded by the Irish Government and the European Union

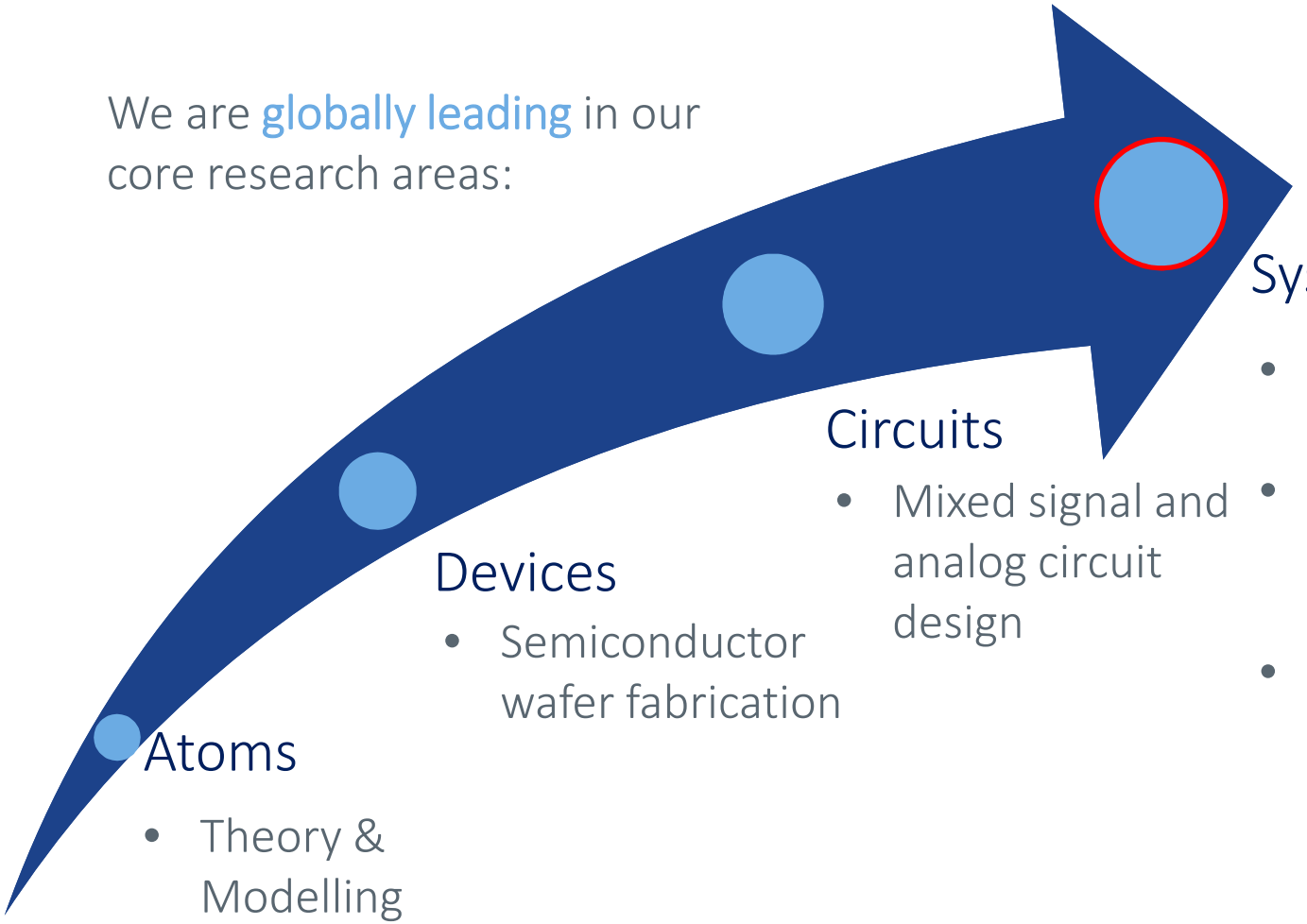
European Union
European Regional Development Fund

Vision

To be the premier
Information and Communications
Technology research institute worldwide
in generating economic impact
through excellence in research

Differentiation: from atoms to systems

We are globally leading in our core research areas:



Atoms

- Theory & Modelling
- Nano materials and device processing

Devices

- Semiconductor wafer fabrication

Circuits

- Mixed signal and analog circuit design

Systems

- Smart sensors and systems
- Optical communication systems
- Microelectronic and photonic integration

Integrated ICT enabling sectoral growth

Integrated ICT delivers smart systems to enable sectoral growth

Healthcare:
longer, healthy lives

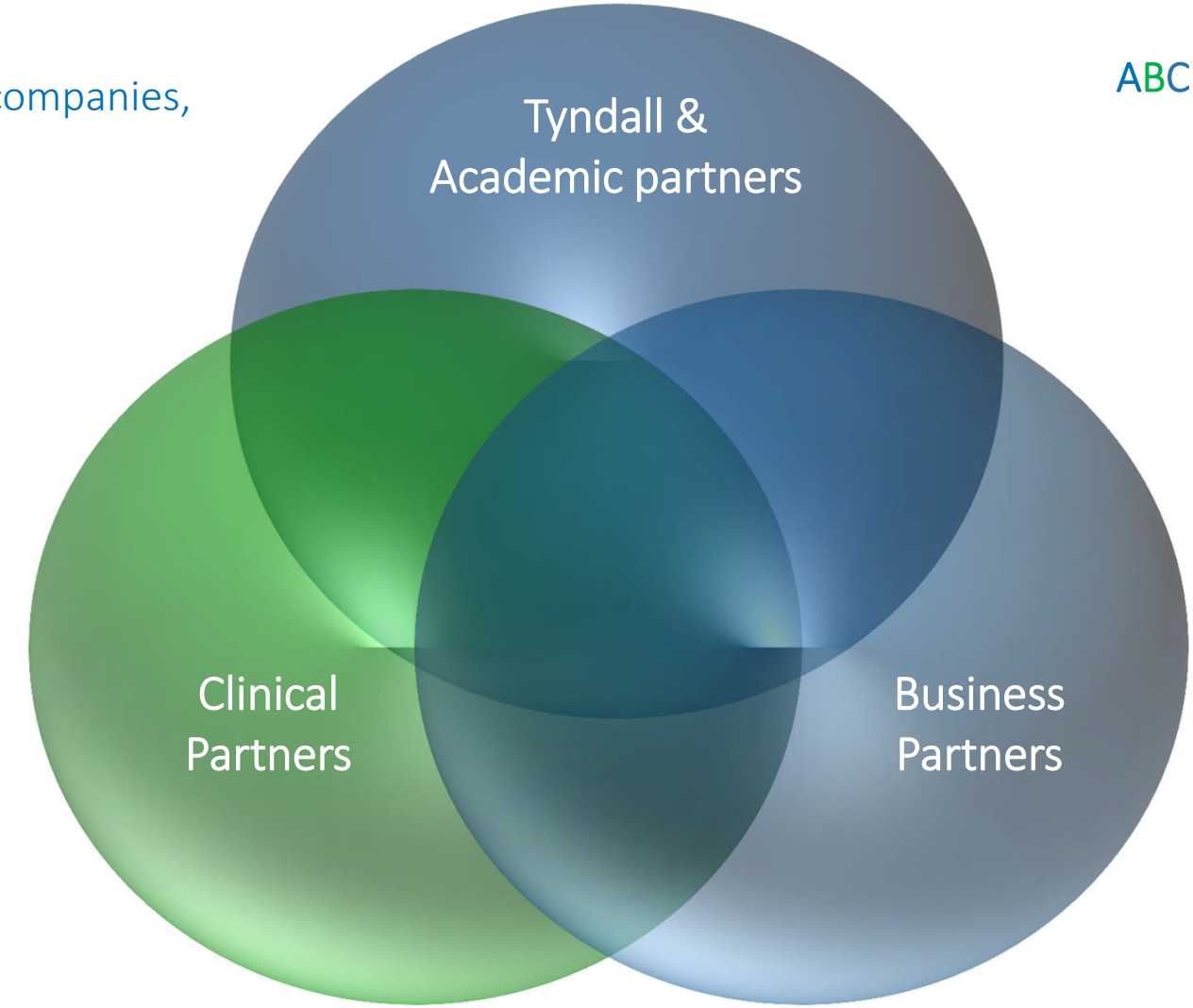
Communications:
efficient, reliable

Energy:
protected, safe, secure

Agri, Food, Environment:
sustainable, secure

ABC Ecosystem for Medtech & Pharma

Collaboration with
global **medtech** & **pharma** companies,
leading **clinicians** and
leading **scientists**.



ABC Ecosystem
Academic,
Business,
Clinical)

ABC Ecosystem

We **Collaborate** with global **medtech & pharma** companies, leading **clinicians** and **scientists**.

ABC Ecosystem
Academic,
Business,
Clinical)

Industrial Researchers-in-Residence

- Boston Scientific
- Lake Region Medical
- J&J ACOE
- Intel Corporation
- Analog Devices
- Applied Materials
- Endeco
- Infiniled
- X-CelePrint
- UTRC – incubated at Tyndall

Vision

- Smart Medtech Devices will enable Personalised Precision Medicine.
- Convergence in Medtech, Pharma and ICT manufacture and innovation.
  - Challenges and opportunities related to the transition to Smart Delivery Systems.
- Precision therapies
  - **Closed loop systems with delivery and monitoring -** dose is adjusted to achieve the desired effect based on real-time monitoring of the patient
  - **Big data -** data collection at the device, patient and population levels will empower big data analytics for managing the supply chain, quantifying the effectiveness of the devices / therapeutics, and enabling population level analytics.
- Service rather than product based business models will be the future basis for reimbursement.
- All enabled by A, B, C (Academics, Business, Clinicians)

Ireland's National Institute for ICT Research Development and Innovation

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Join the team!
Marie-Curie - Edge Co Fund

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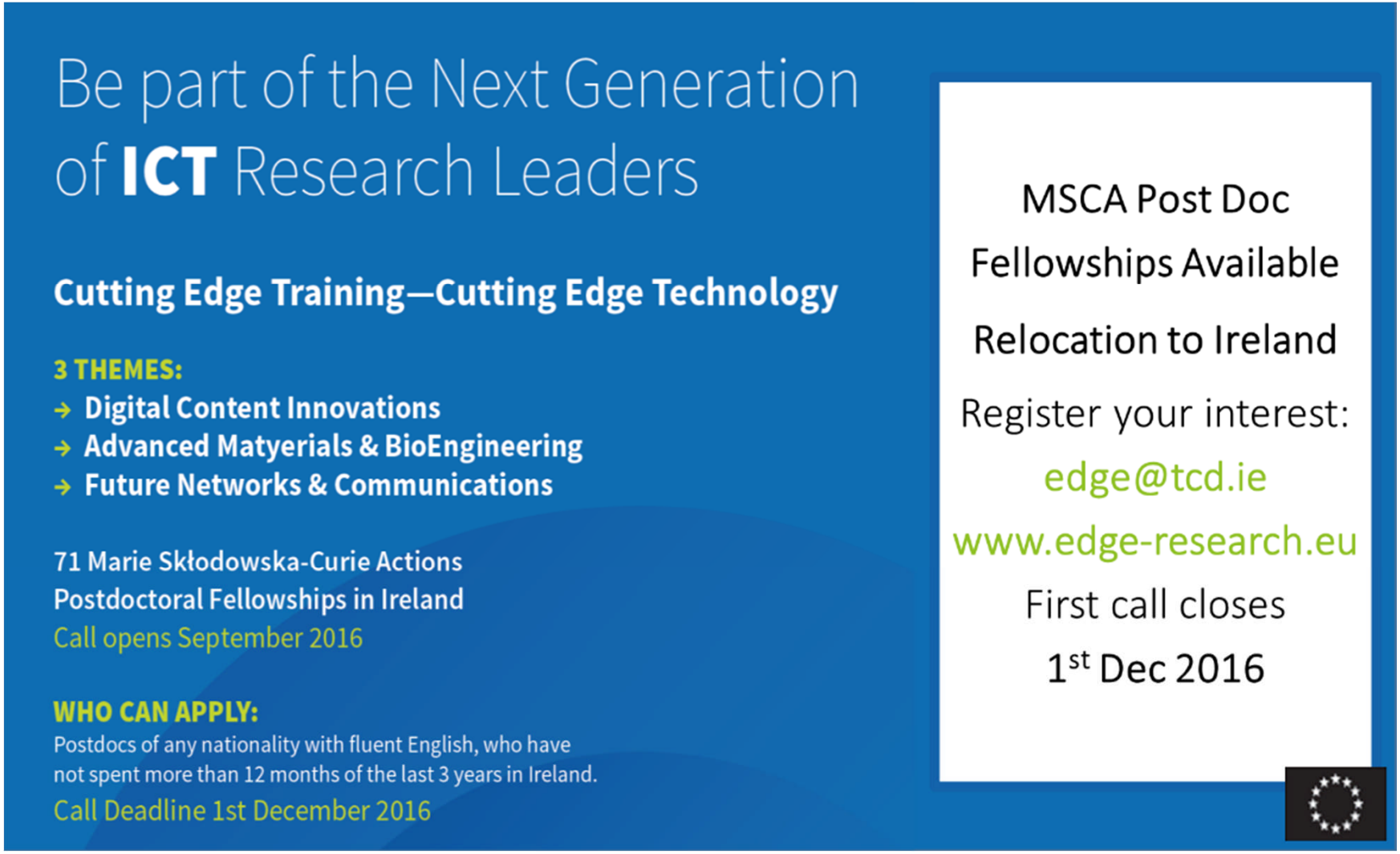

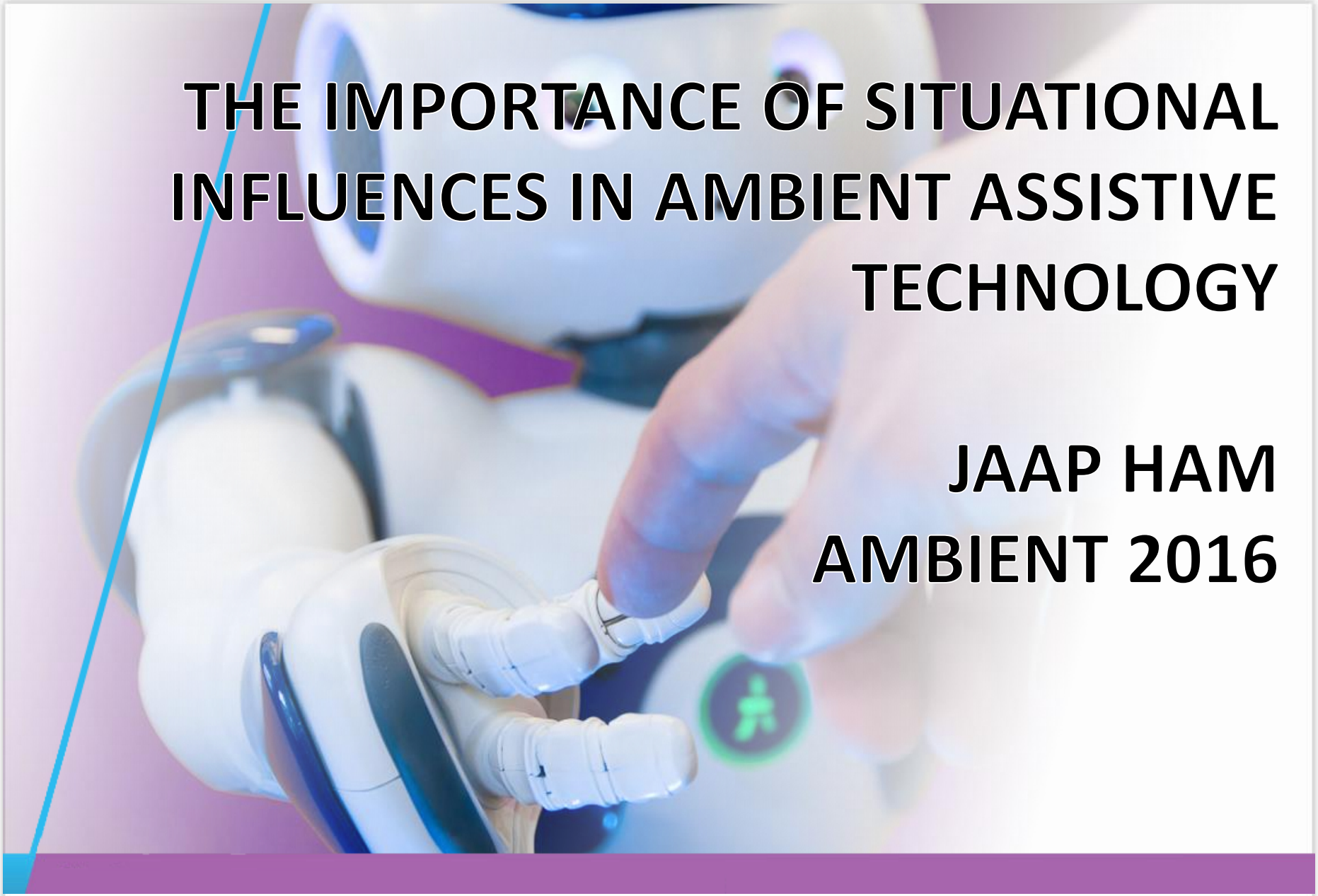

THE IMPORTANCE OF SITUATIONAL INFLUENCES IN AMBIENT ASSISTIVE TECHNOLOGY

JAAP HAM

AMBIENT 2016

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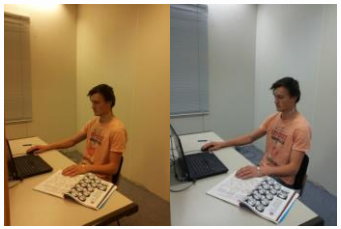
Research Group: Human Technology Interaction

Eindhoven University of Technology



Research topics:

--eCoaching (www.echw.science)

--Acceptance and trust in technology

--Persuasive technology → Health behavior

--Persuasive robots → Sustainability

--Persuasive lighting

eCoaching for Health and Wellbeing 2016

www.echw.science

Amsterdam, January 26-27, 2016.

Deadline for papers: November 1.




Patient-driven approaches

Patient-driven approaches in self-managing ambient assisted systems can lead to;

- increased user agency,
- user control allocation, and
- lower reactance and to
- stronger persuasion and
- improved behavior change.

Current societal problems

Environment

Health

Safety

Effectiveness =

Technology x **Behavior**

Environment

Health

Safety

Ambient influences: crucial driver of human behavior

Behavior = F (Person, **Situation**) (Lewin, 1932)

The importance of situational influences in ambient assistive technology.

THE IMPORTANCE OF SITUATIONAL INFLUENCES IN AMBIENT ASSISTIVE TECHNOLOGY

JAAP HAM

AMBIENT 2016

Panel on GLOBAL HEALTH / AMBIENT
NexTech 2016, 9-13 October 2016, Venice, Italy

Ensuring the Quality of Home-Based Healthcare using Mobile Technology

Dr. Hassan M. Khachfe
Prof. of Biomedical Sciences & Biomedical Engineering
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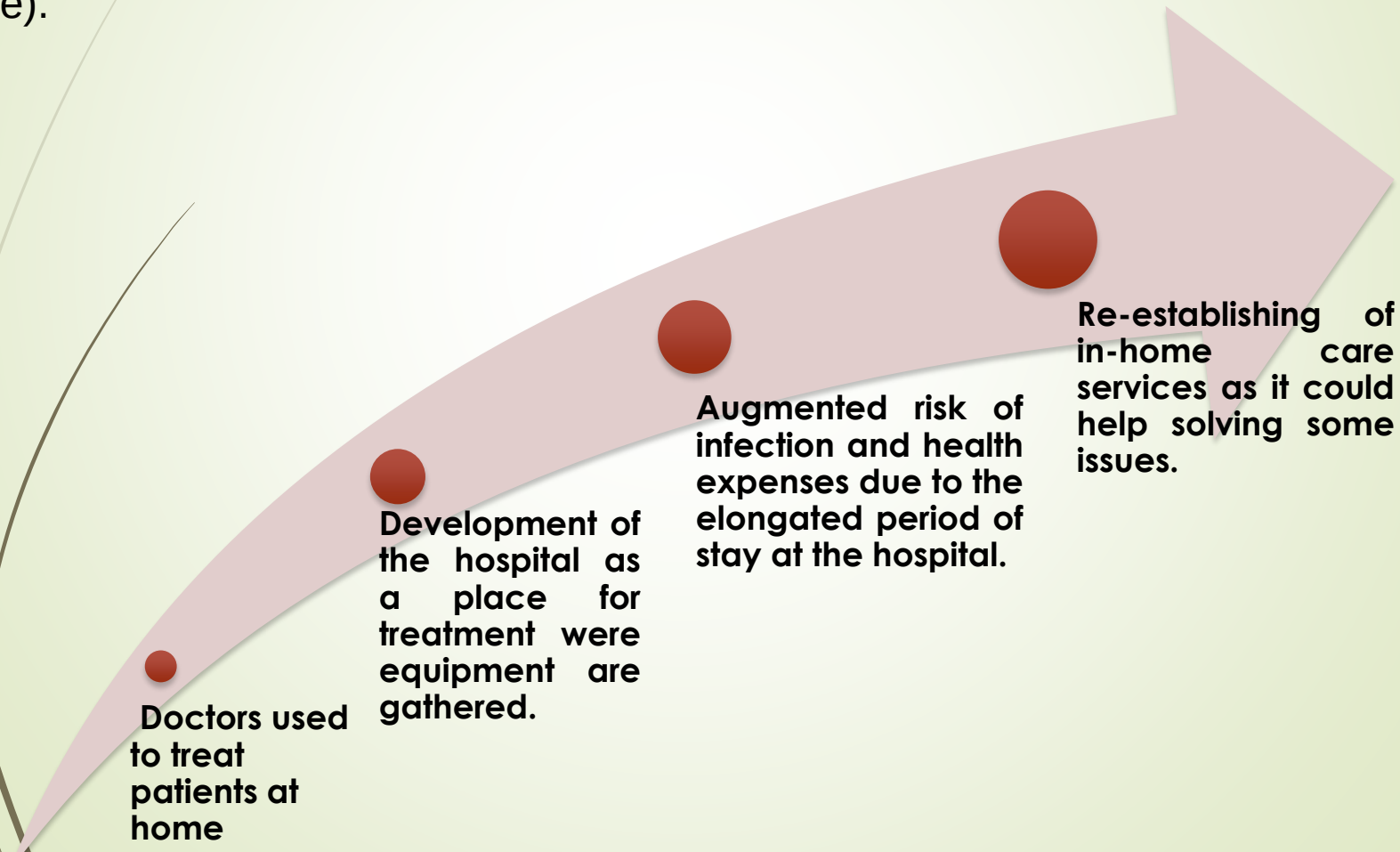
Home-Based healthcare: History and Development

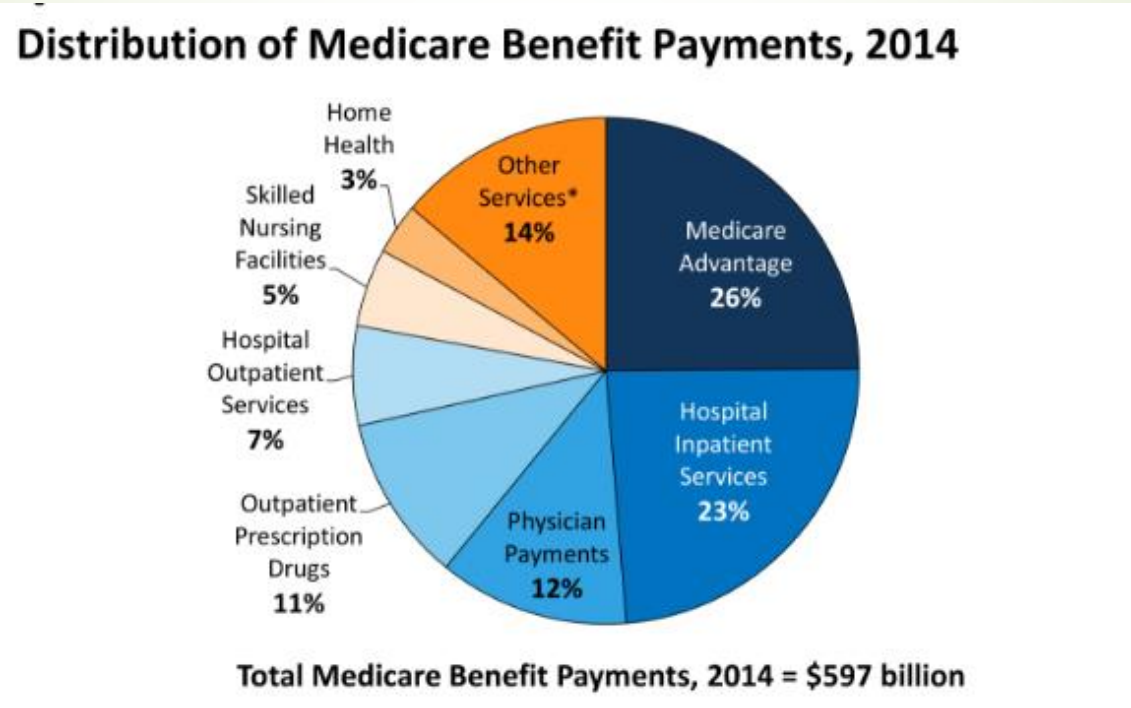
2

It is health care or supportive care provided in the patient's home by healthcare professionals (often referred to as home health care or informal care).



Current Situation

- Approximately 10 million individuals currently receive care from some 20,000 providers because of acute illness, long-term health conditions, permanent disability, or terminal illness.
- In 2014, annual expenditures for home health care were approx. $18 billion.



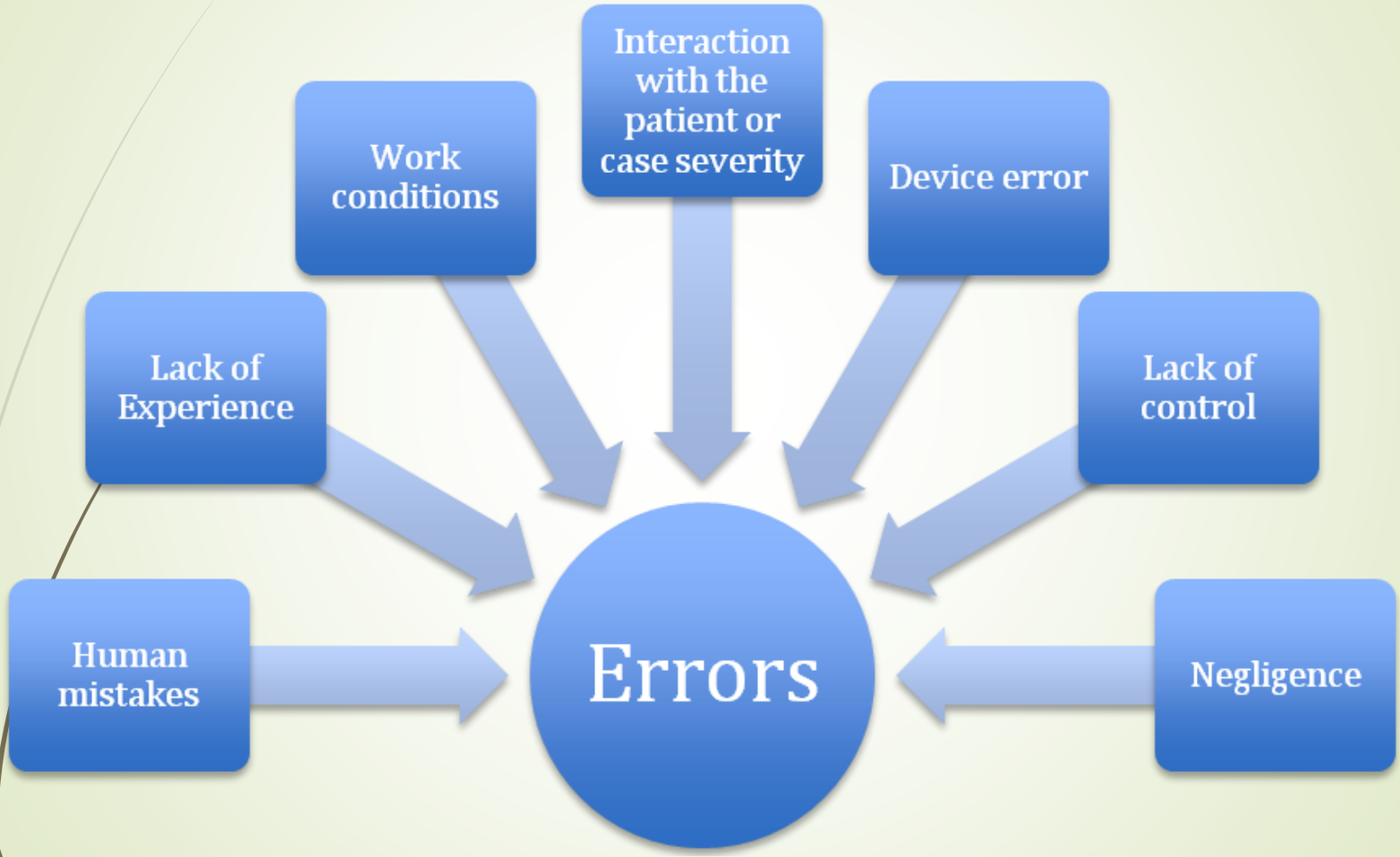
SOURCE: Kaiser Family Foundation analysis of data from Congressional Budget Office, 2015 Medicare Baseline (March 2015).

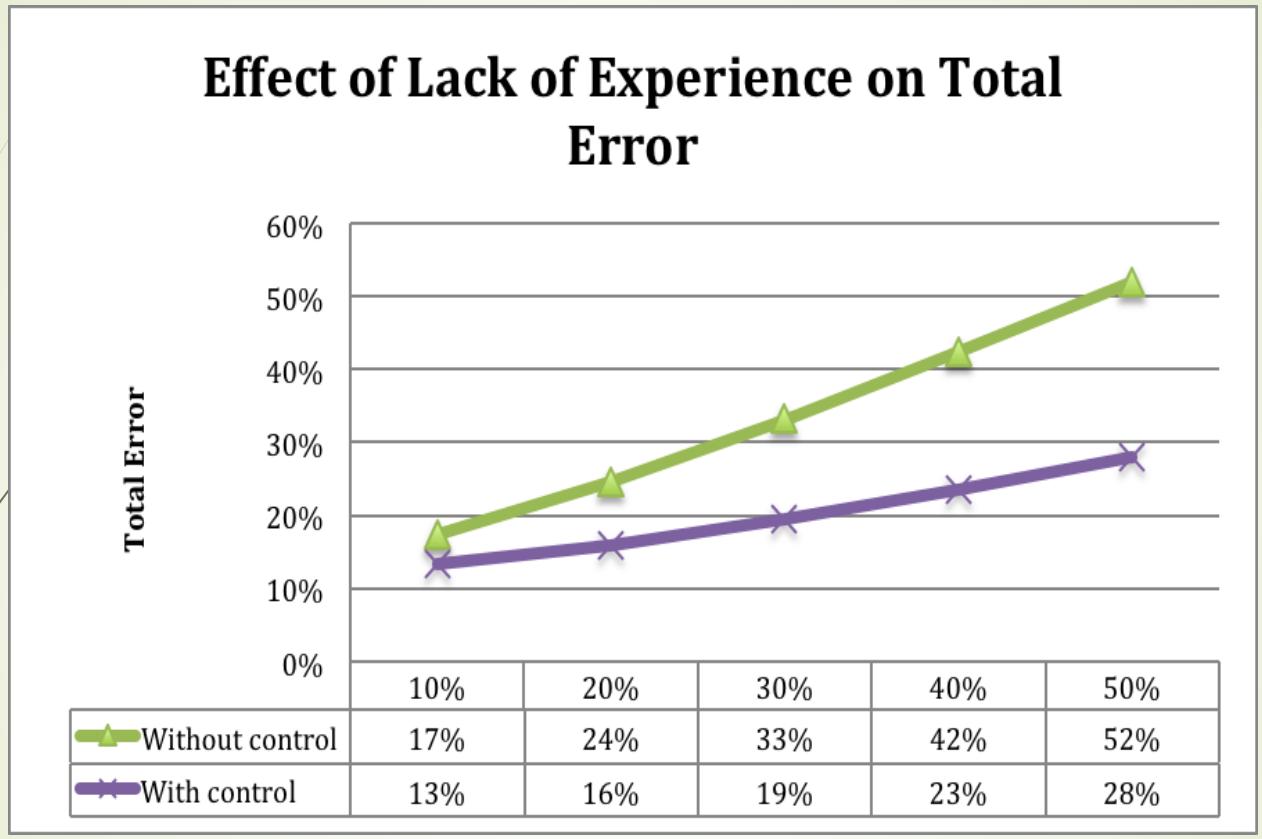
Current Situation: Services provided

- → Professional nursing care, physical, occupational, respiratory, and speech therapies.
- → Social work and nutritional care and laboratory, dental, optical, pharmacy, podiatry, x-ray, and medical equipment and supply services.
- → Services for the treatment of medical conditions usually are prescribed by an individual's physician.
- → Supportive services, however, do not require a physician's orders.

- → Home care services can be provided by the following: professionals, paraprofessionals, and volunteers.

Current Situation: Challenges



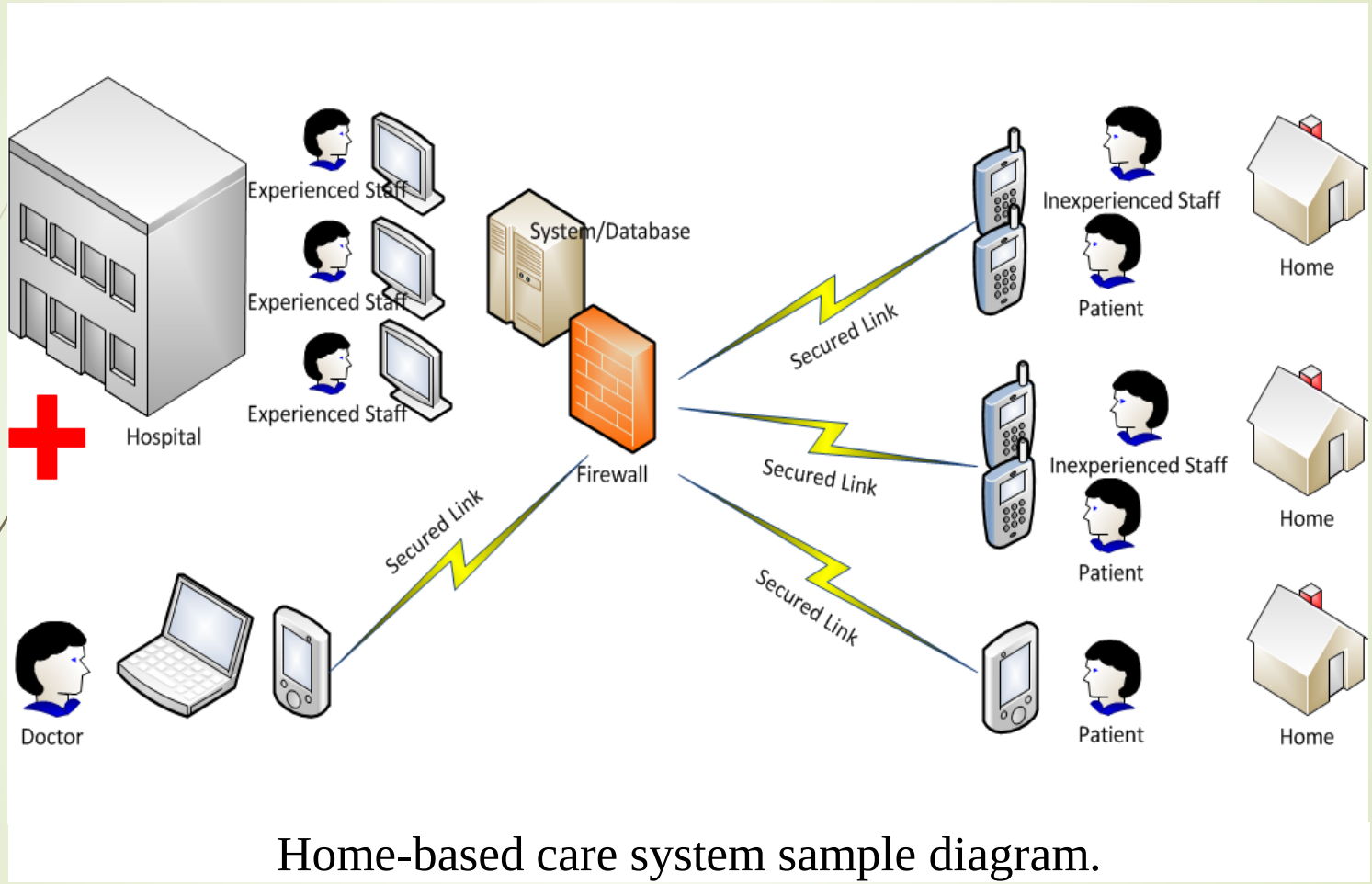


Total error in both cases with and without control.

Current Situation: Treatment process

The proposed Model

Home-based care system sample diagram

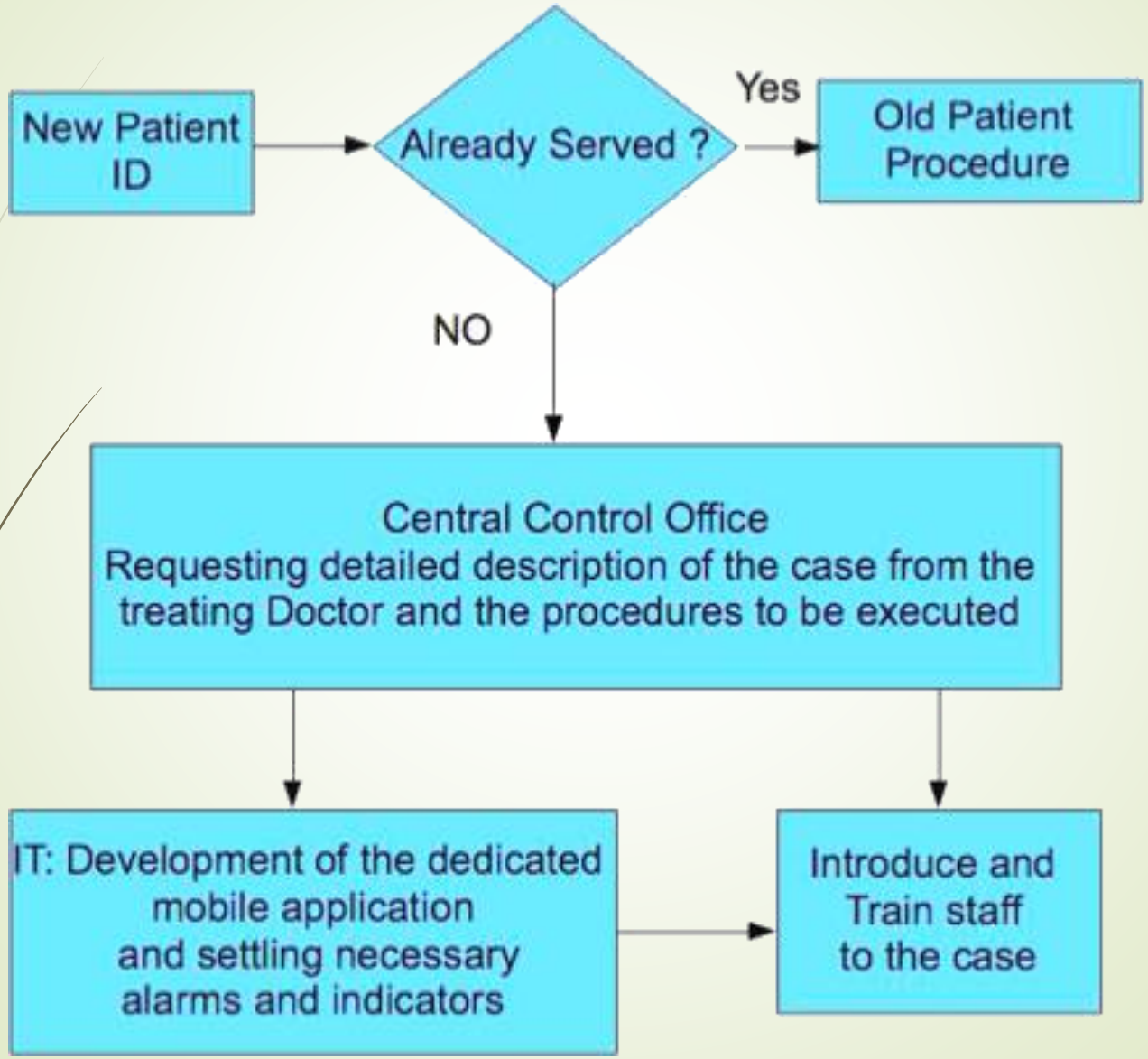


Home-based care system sample diagram.

The proposed Model: Mobile applications in healthcare

- → Enables Real-time access to healthcare information.
- → Healthcare providers and partners to have anytime-anywhere access to information while ensuring patient confidentiality.
- → The doctors can manage appointments at their finger tips and make instant decisions. They can view the patient scheduling and alter appointments as necessary. This gives them an over view of the work load. They can also trigger new prescriptions and prescription refills.
- → Mobilization of critical healthcare applications, forms & reports irrespective of the technology and data location.

The proposed Model: Sample (work flow of a new patient)

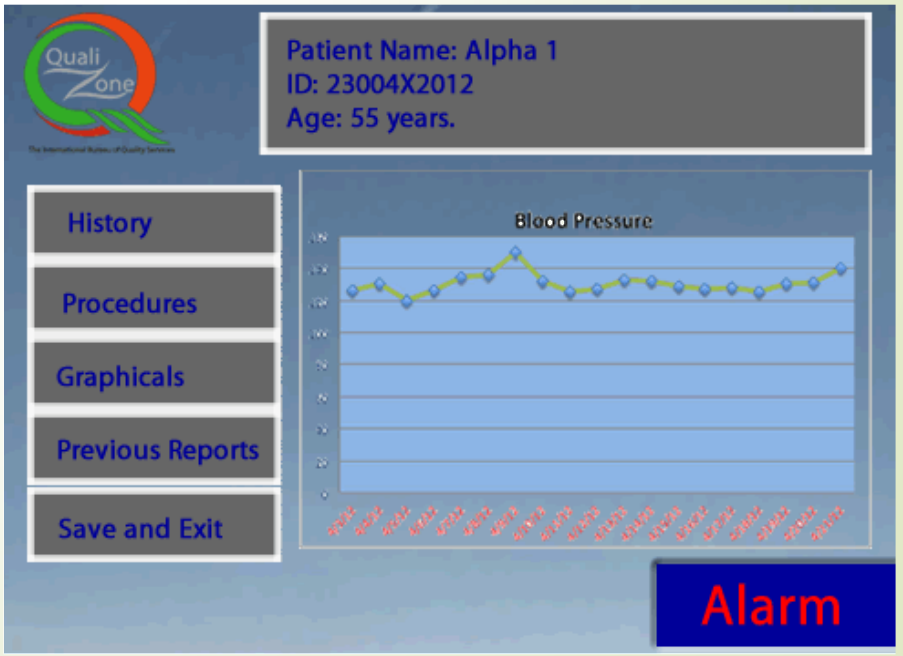


Simulations and conclusions

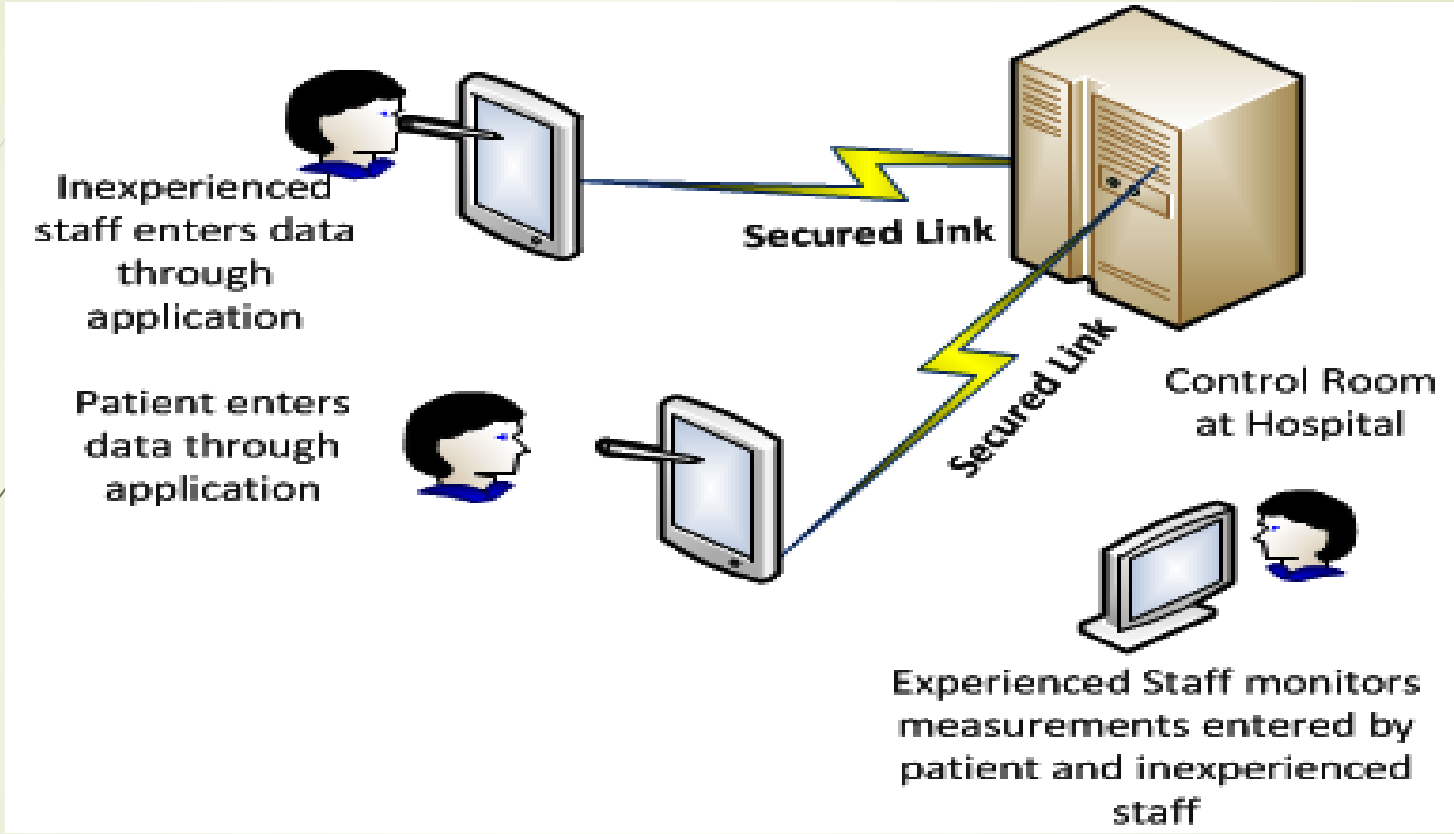
→Real time monitoring ensured

→Error decreased sharply.

→More patient satisfaction.

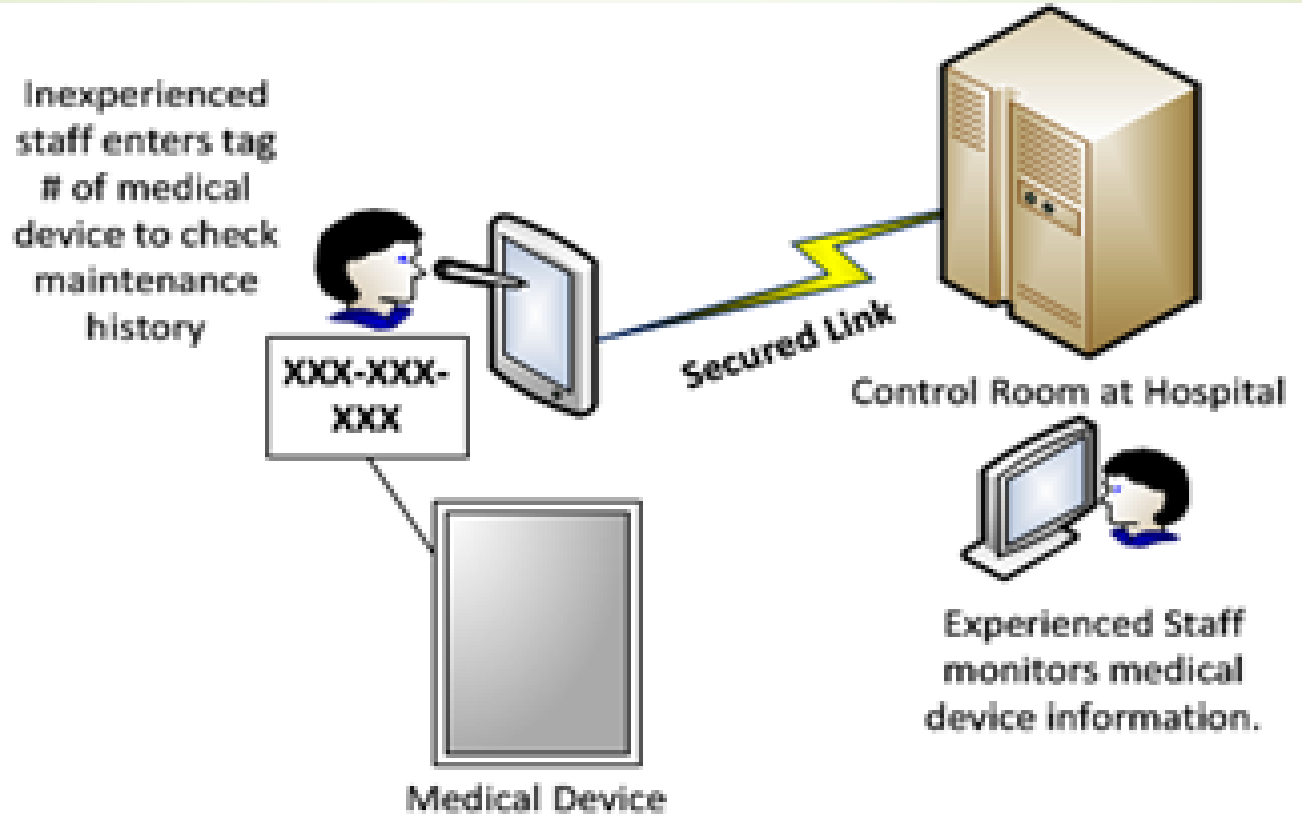


Involvement of the Patient



Communication scheme between the various key players.

Equipment maintenance tracking system



Thank You for your attention

感謝

Takk

شكراً

Merci

Hvala

THANK YOU

Bedankt

Gracias

grazie

Vielen Dank

IoT promotes activities.

To inactive elderly people

Population

- In JAPAN, many elderly peoples keep in an inactive state.
- Some peoples really have problems about their motor functions.
- Many peoples destroy their motor functions from their inactiveness.

Population

- We human is not strong enough to prevent bad customs.
- In JAPAN, already 30% of population is aged over 65 years old.
- For me, a beautiful young female trainer is best.
- However, there is not enough man-power in JAPAN.

Robot

- Soon, in 20 years, we can have a robot that helps us in day by day life.
- However, now we need their replacements.

- No single sensor can not have enough power to understand a human activity.
- Now, IoT: the cloud of sensors can understand a human activity.

IoT helps us to keep good customs.

- Good customs make us much more healthy.
- Good customs delay our aging process.
- Good customs increase our QOL.

Conclusion

- Patient-driven?
- Pre-patient-driven?

- We need a magic to make a human to learn good custom.
- The magic may be implemented with the help of IoT.
  - Understanding of a human activities.