Your Guide to the YLH 24 hrs Social Entrepreneurship Challenge on E-Health

Welcome to the YLH 24 hrs Social Entrepreneurship Challenge on E-Health!

We are happy to welcome you to the first edition of our innovative endeavour. This year's topic is Interoperability - bridging health care, social care & self care. The YLH 24 hrs Social Entrepreneurship Challenge is about applying practical, innovative and sustainable approaches to benefit society in general, with an emphasis on e-Health systems.

During the course of the weekend, interdisciplinary teams comprising of students and young professionals from different fields of expertise, will with the help of their designated mentors, wade through their project ideas, finding sustainable solutions that can be implemented in the field of e-Health.

Until organising the 24 hrs Social Entrepreneurship Challenge YLH's focus has been on advocacy, diplomacy training and content work on various topics. Some of the topics include: disaster and risk management, antimicrobial resistance as well as leadership.

We at YLH have noticed that when bright young people are invited to gatherings of experts and asked for their input, it frequently occurs that established people in their line of work are not really listening to what students and young professionals have to say.

YLH is aware that most young people do not have the legitimacy to call call themselves experts yet. However, YLH believes that most young people have the creativity, knowledge and skills to come up with solutions to problems that they want to tackle. This is why we at YLH came up with the concept of the 24 hrs Social Entrepreneurship Challenge.
Together, we want to find sustainable solutions to issues that young people (the participants) notice in their communities that can perhaps be translated onto a global scale.

We at YLH are of the opinion that in a fun and creative setting, with other open-minded, interdisciplinary team players, students and young professionals have the ability to think beyond the current paradigm.

We at Young Leaders for Health have chosen the topic of Interoperability in E-Health as this year's topic for the 24 hrs Social Entrepreneurship Challenge since we do not want to create things that stand alone. We want to connect existing tools with new ones, pushing the boundaries and making E-Health technologies and innovations sustainable and more efficient. In an interdisciplinary environment, E-Health is beneficial to all stakeholders interested in a well-functioning, easy to comprehend and user-friendly public and global health system.

Table of contents

Programme of the Challenge

Time	Friday	Saturday	Sunday
9:00-9:30		Keynote: Dr. Krishnamurthy	
9:30-10:00			
10:00-10:30			
10:30-11:00			
11:00-11:30			Keynote: Dr. O'Donoghue
11:30-12:00	Registration	This is where the magic happens: From now on, the teams will have 24 hours to work on their projects. They will have separate rooms available to them for the whole time, encouraging them to work non-stop. The mentors will be there, helping their teams and sharing their valuable expertise with them.	Introducing the Jury
12:00-12:30			Project Pitches
12:30-13:00	Keynote: Prof. Dr. Ross		Project Pitches
13:00-13:30	Break		Project Pitches
13:30-14:00	Keynote: Mr. Brandstätter		Break
14:00-14:30	Team Building Exercise		Project Pitches
14:30-15:00	Team Building Exercise		Project Pitches
15:00-15:30	Team Building Exercise		Project Pitches
15:30-16:00			Jury retrieves
16:00-16:30			Declaring the winner
16:30-17:00			Celebratory drinks & networking
17:00-17:30			Celebratory drinks & networking

1. Content Guide

Table of Content

1. What is e-Health?
a)   <u>Concepts & Definitions</u>

A variety of definitions for "e-Health" exist, as well as a number of terms that are encompassed in the concept or used similarly - "electronic-health", "telehealth", "telecare", "telemedicine", "patient-self monitoring", "IT health", "technology enabled health", "mobile-health", "internet medicine", are some of those.

A large number of definitions are provided by many organizations from different sectors, although, they seem to go in the same direction. We picked different elements from these different definitions to create the most comprehensive one.
We used the content of the WHO, the European commission, the Minister of Health of Canada and Gunther Eysenbach, founder, CEO, editor in chief and publisher for the Journal of Medical Internet Research.

What is it :
E-Health refers to the range of tools and services using information and communication technologies (ICT) for health used today to describe the application of information and communications technologies in the health sector (WHO).

In 2001, G. Eysenbach from the Journal of Medical Internet Research defined e-Health as a broad concept including:

1. Efficiency	6. Education
2. Enhancing Quality	7. Enabling
3. Evidence Based	8. Extending
4. Empowerment	9. Ethics
5. Encouragement	10. Equity

In addition to these 10 essential e's, Eysenbach added that e-Health should also be:
-       easy-to-use,
-       entertaining (no-one will use something that is boring!) and
-       exciting

What is the purpose:

E-Health can help support a range of activities in healthcare. These activities include conducting research (we should be more precise here: what type of research), educating the health workforce, tracking diseases and monitoring public health (what do we mean by this). Hence, E-Health can be used as a tool, which allows the prevention of pandemics, which is not only of interest to single governments but to all stakeholders interested in global health.
Moreover, patient-physician interactions as well as the way patients self-manage their care can be impacted by E-Health.

At the global community level, e-Health can improve access to care and quality of care make the health sector more efficient. The goals of the European Commission regarding e-Health are to make life-saving information available via e-Health tools, between countries when necessary; to increase quality and access to care by making e-Health part of health policy and countries political, financial and technical strategies; and to involve professionals and patients in strategies, design and implementation of e-Health tools to make them more effective, user-friendly and widely accepted.

Sources:
WHO definition, « eHealth », retrieved December 28th 2016 from   http://www.who.int/topics/ehealth/en/
European Commission definition, "EHEALTH",, retrieved December 28th 2016,   from http://ec.europa.eu/health/ehealth/policy_en
Minister of Health of Canada, Health Canada definition, "eHealth", retrieved December 28th 2016, from http://www.hc-sc.gc.ca/hcs-sss/ehealth-esante/index-eng.php
G. Eysenbach , "What is e-health?", Journal of Medical Internet Research, 2001, retrieved December 28th 2016, from from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1761894/

b)   Types of applications

How do we use it:

It encompasses a whole range of purposes from purely administrative through to health care delivery, as well as the areas of continuous medical education and public health awareness and education. A fundamental building block of all these applications is the Electronic Health Record (EHR) which allows the sharing of necessary information between care providers across medical disciplines and institutions.

It also contributes to information and data sharing between patients and health service providers, hospitals, health professionals and health information networks; electronic health records; telemedicine services; portable patient-monitoring devices, operating room scheduling software, robotized surgery and blue-sky research on the virtual physiological human

At different levels:
-      in the hospital setting, e-Health refers to electronic patient administration systems; laboratory and radiology information systems; electronic messaging systems; and, telemedicine -- teleconsults, telepathology, and teledermatology, to name a few
-            within the home care setting, examples include teleconsults and remote vital signs monitoring systems used for diabetes medicine, asthma monitoring and home dialysis systems
-      within the primary care setting, e-Health can refer to the use of computer systems by general practitioners and pharmacists for patient management, medical records and electronic prescribing.

Patients are also milestones actors in e-Health. And e-health can enhance patient engagement, empowerment, communication with professionals, self-management.

Smartphones, telephones, computers and tablets, as well as other tools such as bracelets, screens, camera, moves and falls detectors or even robots are some of the devices used for e-Health applications.

d)   Interoperability

The term interoperability was initially defined for information technology or systems engineering services to allow the exchange of accurate, effective and consistent data. Interoperability allows different systems to exchange information and also understand the meaning of the information exchanged automatically. This is also called 'semantic interoperability', which is very important in health care. Semantic interoperability is the ability to automatically interpret the information exchanged meaningfully and accurately in order to produce useful results as defined by the end users of both systems. To achieve semantic interoperability, both sides must refer to a common information exchange reference model. The content of the information exchange requests are unambiguously defined: what is sent is the same as what is understood. With respect to software,

the term interoperability is used to describe the capability of different programs to exchange data via a common set of exchange formats, to read and write the same file formats, and to use the same protocols.The lack of interoperability can be a consequence of a lack of attention to standardisation during the design of a program.

With regards to eHealth and the healthcare sector, the HIMSS (not-for-profit organization focused on better health through information technology) board approved the following definition of interoperability on April 5, 2013:

"In healthcare, interoperability is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged. Data exchange schema and standards should permit data to be shared across clinicians, lab, hospital, pharmacy, and patient regardless of the application or application vendor. Interoperability means the ability of health information systems to work together within and across organizational boundaries in order to advance the effective delivery of healthcare for individuals and communities. There are three levels of health information technology interoperability: 1) Foundational; 2) Structural; and 3) Semantic." HIMMS Definition of Interoperability, April 5, 2013, original source: Wikipedia. Retrieved from: http://www.himss.org/library/interoperability-standards/what-is?

For more information on how to achieve interoperability see also the chapter on health informatics.

Source: http://library.ahima.org/doc?oid=60942#.WGQB-rkYGAo

Barriers & success factors

Different barriers may rise while implementing e-Health tools: lack of understanding or knowledge about internet or information technology systems, concerns about technology literacy, lack of time, unwillingness, resistance to change, no friendly-user design, complex use, lack of communication or miscommunication, lack a sharing information within organization and/ or between them, concerns about costs, added workload and workflow demands, liability issues, confidentiality and privacy risks, confidence of professionals and patients in communicating, writing and using online tools, concerns about organizational infrastructures and incentives

http://www.himss.org/library/interoperability-standards/what-is-interoperability https://www.jmir.org/2015/11/e267

Success factors: the degree of acceptance by its users, where health care professionals and patients are key stakeholders to adoption and use, as well as appropriate infrastructure. The design of e-health tools should benefit both patients and professionals

Innovation characteristics

- Adaptability: the ability of the technology to be adapted to fit the local context. Technologies that can have technical adjustments made to them to suit the constant modifications of the environment may have greater acceptance and adoption. End user input in the design and development of e-health technologies should be considered as a way of overcoming barriers of adaptability.

  Related to adaptability is the interoperability of systems reported by many studies. To promote their acceptance and use, systems must be able to adequately interface with other IT systems and exchange information. For example, a major barrier to the adoption of Electronic Health Records (EHR) is the inability of new systems to exchange information with systems already in place, due to a lack of consistent data standards.

- Complexity: Complexity factors such as slow system performance, software and hardware that are difficult to use, the need for extensive software modifications , the work involved in transferring records between two systems, the inability to provide real-time access, data

handling, reliability, slow speed, unplanned downtime and connectivity issues influence implementation of systems in healthcare settings. Often issues of complexity are linked to health professionals being unable to master the technologies that were implemented. Vendors of e-health systems should aim to make systems as user-friendly as possible, involving end users in the design and development, providing guides to their use and providing technical assistance

- Cost: The cost of e-health system and costs associated with their implementation are reported as important implementation factors. Some studies cited cost-related factors as the main barrier to implementation. Cost factors are related to start-up costs, ongoing costs, costs related to a loss of revenue and potential savings to put against these costs.

High set-up costs including purchasing and installation costs are cited as barriers to the initial adoption of e-health systems. Financial incentives to adopt e-health systems from insurers and government agencies facilitate adoption decisions in some case.

Concerns about ongoing costs are also reported as barriers to adoption. Evidence of cost-saving and returns on investment were shown to be important in ongoing use of technologies. Establishing cost-effectiveness through formal evaluations, financing of services on a bigger scale, and redesigning business models and incentives are suggested as strategies to help overcome cost-related barriers.

Outer setting

External policy and incentives: An absence or inadequacy of legislation and policies and liability concerns may hamper the implementation of e-health systems at the organisational and health professional level. The need for recognised standards for the provision of e-health systems is described by many studies. The creation of standards may serve to reduce health professionals' concerns over patient data safety and professional liability and facilitate the exchange of electronic health information between systems and organisations while maintaining data integrity.

Incentives by government organisations and other external stakeholders may facilitate adoption by healthcare organisations. Financial incentives include the provision of initial funds to cover upfront costs, financial sponsorship, reimbursements for adoption, and pay-for-performance initiatives.

Inner setting

Implementation climate

Implementation climate includes the compatibility or general fit between the e-health intervention and the organisation. The fit between e-health systems and workflows in particular is discussed by the majority of studies on the topic. A frequent reason for unsuccessful implementation is that the information systems do not fit well with work practices or daily clinical work. Health professionals' perceptions that e-health systems disrupt workflows, and the delivery of care, are a barrier to both the implementation and use of these systems. When there is a good fit, or perceived fit, between e-health systems and workflows, and when systems positively influence workplace efficiency, this facilitates use. Incorporating workflow analysis into system design, the integration of systems into the usual process of care, user-friendly systems and minimising workflow interruptions during implementation may minimise disruptions to workflow.

Alterations to workflows created by the introduction of e-health systems may also disrupt established professional roles, responsibilities and working styles. Physician resistance to e-health implementation is reported by several studies to be related to fear of, dissatisfaction with and uncertainty over new roles and responsibilities, created by the introduction of e-health systems. The quality of project management during the implementation period, careful study of the downstream effects of implementation on workflow, additional training, the adaptability of technologies to fit with roles, tasks and workflows and dedicated technical support staff are

suggested as strategies to reduce barriers related to disruptions to workflow, roles and responsibilities that e-health implementation may bring.

Leadership engagement at all stages of the development and implementation processes can help improve the effective implementation of e-health systems and a lack of involvement can be a barrier to implementation. Management support is also important for implementation success.

Available resources including the availability of suitable infrastructure are important for implementation success. Infrastructure features included electricity supply, available bandwidth, access to reliable internet connectivity, access to computers, electrical power and access to phone lines and mobile phones. The availability, or lack thereof, of time to learn new e-health systems, implement them and train staff to use them is reported as a resource factor important for implementation. Providing a period of transition in which end users can become familiar with and learn how to use new systems is advocated.

Access to knowledge and information is also important for the implementation of systems across all e-health domains. Education is reported to increase staff acceptance of e-health systems including education around anticipated benefits and when those benefits could be expected. A lack of knowledge and a limited understanding of benefits afforded by the systems act as a barrier to implementation. Reference to training and support in relation to implementation and acceptance of e-health systems are made. Generally, access to appropriate, high-quality, well-funded, and easily available training is reported as a facilitator to implementation, whereas it was reported as a barrier when it was non-existent or existent but inadequate. Access to ongoing support to use systems is important for system use and a barrier to implementation when it was lacking
Individual characteristics

- Knowledge and beliefs: Attitudes and beliefs are reported to act as both facilitators and barriers to implementation and acceptance of e-health systems across all e-health domains. Positive attitudes of practitioners toward e-health systems and their implementation increase acceptance and implementation, whereas negative attitudes and staff resistance act as barriers. Positive staff attitudes are described as: beliefs that the new systems would benefit patients, interest in the technologies, perceived usefulness and motivation in working with the systems. Negative perceptions include beliefs that electronic systems would disrupt the delivery of care; doubts that these systems can improve patient care, clinical outcomes or improve the quality of medical practices; and distrust in the systems as well as a more general staff resistance to change. Strategies to challenge negative attitudes include fostering a culture of communication and cooperation, involving the eventual users of systems in the development and implementation, leadership, friendly and context-aware user interfaces which promote perceived ease of use and usefulness, better education, and clearly and prospectively communicating intended benefits and realistic expectations for the system. The attitudes of colleagues and patients are also reported to influence staff attitudes with regard to e-health acceptance as were staff demographic factors.

Specifically, fears over a loss of autonomy, concerns about liability, concerns over patient privacy and security being compromised, and perceived threats to patient and health professional relationships through the introduction of e-health systems are repeatedly reported as barriers to use.

- Other personal attributes: Healthcare professionals' computer skills, abilities and experience are cited as influencing implementation and acceptance of e-health systems. Training and financial incentives are cited as strategies to overcome skill-related barriers. Demographic factors such as age, education, sex, nationality, and clinical experience may influence healthcare professionals' attitudes towards e-health systems; however, no clear

relationships between these characteristics and attitudes could be established.

Process

- Planning: Planning for implementation is important for success, whereas the lack of a strategic plan is seen as a barrier to e-health implementation. The work of planning includes the delineation of roles and responsibilities, securing time to invest system selection and procurement, evaluating other concomitant policy and process changes, needs assessment and analysis, development of a business plan, early identification and engagement of champions, involving end users, establishing a guiding philosophy, testing organisational readiness, development of incentive and innovation structures, communication of the strategy to all staff, and development of protocols for using the system and for provision of training. Incremental implementation strategies where features are made available to users according to a plan were cited as preferable to 'big bang' approaches to implementation within complex organisations. The need for ongoing effort after the initial 'go-live' phase, referring to the 'under-recognised maintenance phase of implementation is also reported.

- Engaging: The designation of champions may be important for implementation success. Engagement of key stakeholders in the development and selection of e-health systems and in the planning and execution of implementation processes are important for implementation through fostering a sense of ownership, confidence, acceptance, enjoyment and self-pride towards the e-health system and increasing buy-in.

- Reflecting and evaluating: Evaluation is seen as important to ensure system benefits, to increase health professional acceptance through demonstration of benefits and to secure ongoing funding, whereas a lack of evaluation and evidence may act as a barrier to implementation.

Recommendations:

Recommendations for implementation based on data from reviews

- Selection of an appropriate e-health system needs careful consideration taking into account:
  o Complexity
  o Adaptability
  o Compatibility with existing systems and work practices
  o Cost
- Key stakeholders and implementation champions should be included as early as possible in the implementation process.
- Sufficient financial and legislative support needs to be in place to support implementation.
- Standards for technology which address inter-operability, security and privacy may improve acceptability and implementation.
- Planning implementation is a critical step which includes ensuring that organisations are in a state of readiness.
- The provision of training and education to all those involved with implementation is a key success factor.
- Implementation does not stop with 'go-live'—there is a need for ongoing monitoring, evaluation and adaptation of systems to ensure intended goals are being met, benefits realised, and ongoing identification of barriers to effective use, along with strategies to overcome these barriers.

Source: Factors that influence the implementation of e-health: a systematic review of systematic reviews (an update), BioMed Central, October 2016, retrieved the 22.01.2017, from https://implementationscience.biomedcentral.com/articles/10.1186/s13012-016-0510-7#Tab3

2. E-Health for Healthcare Professionals
a) Who are healthcare professionals? What do they use?

The healthcare professionals using e-health can be physicians in hospital as well as GPs, nurses, care coordinators, researchers (not exhaustive)

E-health solutions such as e-health portal administrative efficiencies, improved responsiveness to patients' needs, decreased utilization of health services, more effective care, and cost savings https://www.jmir.org/2015/11/e267

For Clinicians
  •   Improves efficiency of clinical decision-making

  •   Faster access to valuable patient information

  •   More time for patient care by reducing the amount of time spent on administrative tasks

  •   Improves the ability to manage, coordinate and plan patient care

  •   Provides a more complete picture of patient health information across the continuum of care

  •   Improves the ability to monitor patient outcomes

https://www.ehealthontario.on.ca/en/for-healthcare-professionals/connectingontario

3. E-Health for Citizens & Patients

a) Who is the patient? (different patient groups)
Patients are very diverse and the role of the patient is changing. Patients are the main user group of eHealth tools. Whether someone is acutely ill, diagnosed with a disease or going through normal events of life such as getting pregnant, at some point in life, everyone is a patient. Remembering the varying characteristics and the diversities of patient is important when it comes to designing and implementing eHealth for patients. The patient role depends on both the individual person and the context of health care. Being at risk for a disease, suffering from an acute or a chronic disease or being elderly living in a nursing home are just a few examples of how different a patient can be. Patients with chronic or long-term disease often become experts of their own symptoms and this expertise is very important for eHealth to acknowledge. These e-patients are empowered individuals who communicate with different health care providers during their care process, who use online resources to obtain knowledge and who connect with other people in the same situation.

b) E-patients and empowerment
For Patients
  •   Health care team can make faster, more informed decisions about patient care

  •   Reduces unnecessary/duplicate tests and procedures

- Puts information in the hands of the people who need it so patient can experience better, coordinated care between different members of patient care team including patient family doctor, hospital and community care access center

- Improves transitions between health care providers

- Avoids the need to repeat patient medical history when he/she goes to different health care providers like a social worker or a surgeon at the hospital

- Reduces patient wait times

Source: Connecting Ontario, e-Health Ontario retrived from https://www.ehealthontario.on.ca/en/for-healthcare-professionals/connectingontario

The term e-patients was shaped by Tom Ferguson. He was an American doctor and a strong believer in self-care and the patient's own abilities to contribute to their health and well-being. According to Tom Ferguson, and epatient is equipped, enabled, empowered and engaged. Epatients often have one or more chronic conditions, they take an active role in their health and often have just as much knowledge on their condition as a doctor. Epatients are very active on social media and have a large network of other patients, sharing experiences. They are very open towards new technologies and applications that help them make their lives less challenging.
Ferguson, T. (2007). e-patients: how they can help us heal healthcare. Patient Advocacy for Health Care Quality: Strategies for Achieving Patient-Centered Care, 93-150.

Click the Link to watch a video about epatients.

Patient empowerment describes both the desired state and result of well-delivered health care, as well as the process of transformation from a less engaged patient to a more engaged one. The scientific framework for patient empowerment has its roots in the theories of Albert Bandura.He developed the social learning theory and the theories around self-efficacy. Self-efficacy is the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations. Patients who have a high self-efficacy are more active in the management of their disease and have better outcomes and have a lower use of health care resources. Those patients are often very active in helping other patients in their community or in virtual life. But there are also challenges that come with very well informed patients. For further reading we recommend you the article by Rosamund Snow and colleagues (2013) on what happens when patients know more than their doctors.

c)   Personal health records (PHR's) and electronic health records (EHR's)

In 2005, the International Standardization Organization, ISO, defined the key features of the PHR to be that it is under the control of the subject of care, and that the information it contains is at least partly entered by the subject itself, which may be the consumer or patient. According to this standard, the PHR can be considered in at least four different forms
 1.   a self-contained EHR maintained and controlled by the patient or consumer
 2.   a self-contained EHR maintained and controlled by a third party- such as, for example, a web service provider
 3.   a component of an integrated EHR maintained by a health provider- such as, for example, a general practitioner, and controlled at least partially, that is, at least the PHR component as a minimum, by the patient or consumer
 4.   a component of an integrated EHR that is maintained and controlled by the patient or consumer.

Source: Health Informatics–Electronic Health Record–Definition, Scope And Context. Standard ISO/TR 20514:2005; International Organization for Standardization; Geneva, Switzerland: 2005.

Many PHRs are standalone products, which may be web based or delivered on USB sticks. Other PHRs are tethered to clinical EHRs. Features that are mostly appreciated by patients are access to vaccination data, laboratory results, and pharmacy-related data such as prescriptions. Patients also expect to get legible information. So they must be able to understand the clinical content of the EHRs.

In general, there seems to be a high interest in PHRs from citizens. And there's a lot of knowledge describing patient expectations. But despite this knowledge, current PHRs do not always fulfill these expectations. Thus the uptake of PHRs is still low. Main reasons for that are the lack of interoperability standards. Tethered PHRs have proven to be preferred by citizens, but that requires interoperability with clinical EHRs from different care providers. Interoperability of Health Information Systems is one of the major research areas in health or medical informatics research. Important work has been done e.g. within HL7 (http://www.hl7.org/) and OpenEHR (http://www.openehr.org/) to create standards for sharing health information between e.g. different EHR systems (see also chapter 6). However, actually implementing these standards has proven more difficult than first expected, and getting all vendors and healthcare organisations to agree on the details is a challenge.

Potential benefits of having an EMR or e-health portal:
-        build actionable business rules (example: informing staff when a certain level of severity for a patient is reached or inform researchers when a patient is admitted who is potentially eligible for a clinic trial)
-        e-health portal to be a source of information and learning to know more about uniqueness of the challenges of every patient, their experiences and thoughts, as well as a channel of communication (via PM), with information and questions patients shared that can customize the content for their education program. Some issues can then be presented during face to face consultations. Easier contact for some patients who feel more comfortable communicating online than face to face especially with as time constraints, shame, and fear of stigma that could influence the oral dialog
-        Transparency on patients' information (life, challenges, needs) but more time for professionals in reading and preparing comprehensive answer compared to oral context, with the fear of publishing information that can be perceived as incorrect
-        Responsibility to follow up and provide high quality health care to the patients, and thus it makes them responsible to act and implement measures accordingly, e.g prevention (can have great impact on both the patients' health status and quality of life, and to society as a whole considering the health care expenses of treatment costs and hospitalizations)
https://www.jmir.org/2015/11/e267

e)   Patient innovation
Oliveira and colleagues did an interesting study, where they demonstrated that in rare diseases 8% of patients and their families create something for themselves to meet needs they have in connection with their disease. http://ojrd.biomedcentral.com/articles/10.1186/s13023-015-0257-2

"patients are one possible group of user innovators since they expect to benefit from using the solutions they self-develop. We draw upon and complement previous work of Shcherbatiuk and Oliveira (2012), Oliveira, von Hippel and DeMonaco (2011) and Oliveira (2012) that found that patients and family members display innovative capabilities and have developed a significant number of TT&MD for themselves (e.g. about 50% of TT&MD for Cystic Fibrosis were developed by the patients). The knowledge of affected people about the disease holds important potential for the health care sector, but the main players have – for several reasons – been hesitant to

integrate them into their development processes. Given these circumstances, patients themselves have a strong incentive to innovate." → patient innovators

Habicht, H., Oliveira, P., & Shcherbatiuk, V. (2012, August 27). User Innovators: When Patients Set Out to Help Themselves and End Up Helping Many. Retrieved January 02, 2017, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2144325

f)   Patient data & ethics

4.   Health systems in an international context
a)   e-Health in the context of health care, social care & self care

 Since the aim of eHealth is to improve people's health, we also need to consider what goes beyond the boundaries of health care. Health care is a complex field that encompasses primary care, hospitals, vaccinations, checkups, emergencies, long term monitoring and palliative homecare, to only mention a few. But for many patients other services are needed to complement health care. Depending on where you are in the world, social care is frequently concerned with helping elderly with their daily activities or supporting the disabled as well as patients with mental health issues. Whether the responsibilities lie on volunteers or tux-funded solutions, social care is an important part of providing good care. Collaboration and communication between these sectors is key to providing good care for patients, but the tools for doing so are still rare. Additionally, self care is an increasingly acknowledged component in health and the prevention of diseases. Bridging health care, social care and self care is therefore crucial when talking about successful eHealth tools, innovations and solutions.

For The Health System
   •   Delivers information to the right people at the right time, enhancing the patient / provider experience

   •   Reduces costs associated with managing paper records and duplicate tests and allows a more efficient transfer of accurate information

   •   Enhances health system planning, decision support and performance management

   •   Improves workflows and system efficiencies by reducing wait times and administrative paper-chasing

https://www.ehealthontario.on.ca/en/for-healthcare-professionals/connectingontario

5.   Design approaches

The difficulty of designing eHealth doesn't lie in the novelty or complexity of the technology, but in the complex way that healthcare is practiced and organized. There's a mass of information and health care organizations are very large. Moreover, health care is highly politicized and powerful professional groups dominate health care. So health care faces a massive coordination problem, which makes it hard to design eHealth tools and strategies that actually work. But there are many methods and techniques we can use to improve the design and usability of eHealth.

a)   User involvement in e-Health: Socio-technical design

A socio-technical systems consist of both technical and social parts and was first established to stress the interrelationship between humans and machines. Technical and social conditions of work should be shaped in a way that efficiency and humanity do not contradict each other. But when increasing the efficiency in health care, problems occur, where IT systems do not match the organisation. This is often one reason why implementation of eHealth strategies fail. The approach

of socio-technical design has been introduced to address these issues. Socio-technical design is many design approaches that considers human, social, and organizational factors in the design of organizational systems. Examples for socio-technical design approaches are: soft systems methodology, cognitive work analysis, the socio-technical method for designing work systems, ethnographic workplace analysis, contextual design, cognitive systems engineering, and human-centered or user-centered design.

Professor Coiera from Sydney described socio-technical design in four basic rules. The first rule states that technical systems have social consequences, which means that a technical system that doesn't affect the organization in the social context can not really be designed or implemented. The second rule states that social systems have technical consequences, so when designing technology, always take into account how the organization and the social context will impact on the design, and how the technology will be used. This is summed up in the third rule, that states that we don't design technology, we design socio-technical systems, so we need to consider both parts of this complex. The fourth rule states there has to be an understanding on how people and technologies interact in order to design sociotechnical systems. In order to find out how humans and technologies interact, one can use techniques like field studies, ethnographic methods or observation.

<u>b) User involvement in eHealth: User-centered design</u>

User-centered design is a design approach that stresses the importance of understanding the users, as well as their context, and involving them in the design process. But actually gaining access to users can be a challenge when designing eHealth, since health care professionals are notoriously busy. Being part of a design team might not be their top priority. And there can also be a limited understanding of the need for continuous user involvement, because when resources are scarce, this is often what you cut down on first in a development process. Because there is still a lot of hierarchy in health care, those who are often included in the design process are not the ones who use it in the end. Including the end user of a system, who represents the user and is active in the field, increases the likelihood that you actually meet the needs of the people who will use the eHealth tools or system in the end. When talking about representative, it needs to be considered who the person actually is. It is very difficult when one user group speaks for others, which can often happen in a healthcare setting. For example, when health care professionals speak on the behalf of patients or family carers, or when a physician tells you about the work processes of the nurses. Always take into consideration that this might not capture the right information that is needed for the design process.

User-centred design needs to be tempered with caution, because it is very easy when collaborating with the end-user and focusing on their problems and needs to get caught up in their reality and forgetting the big picture. Other stakeholder with knowledge about, for example, IT architecture, terminologies used in health care, the standards for interoperability, legal aspects, or reimbursement issues have to be included in the design process too. Requirements and constraints from these stakeholders are also crucial to the design of successful eHealth.

c)   <u>Tools for design</u>

In order to provide the right tool, the environment where it is going to be used needs to be understood. There are several techniques and methods to understand the context of use. Generally, such techniques can be divided in two categories: design strategy methods and concepting methods. The design strategy method is used to answer what and why questions when designing a tool. One method that can be used is user stories, which are descriptions of, for example, what a physician or a nurse does or needs to do as part of his or her job function. It's about motivation that drives the target audience to use each feature, as well as the path that they will take to do the task. The format for user stories are an actor, a role, or a persona to complete a goal so that can achieve a value. Another method to explore the multiple, steps taken by consumers as they engage with the service is the consumer journey map or experience map. This allows designers to frame the user's motivations and needs in each step of the healthcare journey to create appropriate design solutions. An experience map is a holistic visual representation of the user's interaction with the tool. Another method is ecosystem map, which is a visualisation of

the health care environment's digital properties, the connection between them, and their purpose. The ecosystem map gives insights on how to leverage new and existing assets to achieve the goals. One of the most common methods to understand the context of use is interviewing and observing the stakeholders in a project.

Important decisions affecting user experiences are done in early phases of the product development when concepts of ideas are discussed. Concepting methods like brainstorming are used to answer how, where, and when questions when designing a tool. Storyboards, user flow diagrams or flowcharts also can be used to illustrate a series of actions that users need to take while using the tool. Using these methods will help understand the actual condition under which a given tool or software product will be used in a healthcare environment.

6. Technical demands on e-Health systems

In order to be able to use eHealth technologies a number of technical and informatics prerequisites need to be in place.

·   Secure infrastructure
·   wireless communication infrastructure
·   standards for electronic communication
·   clinical knowledge (in some cases)
·   images needs to be stored and transferred, and a standard for description of image information is needed
·   electricity needs to be available at all times
·   communication networks have to be reliable at all times, also in emergency situations
·   a unique patient identifier

Having updated information about a patient's medication is often a problem in health care, because care providers and pharmacies document in different IT systems. This problem could be solved using a classification system for drugs that integrates information on medication from different IT systems into an electronic health record system.

If such information should be reusable in by other electronic health systems, a standard for the structure of electronic health records should be used.

Standards for electronic health record communication can be used to transfer EHRs or parts of it, such as a discharge summary for communication between hospital and primary care. Different care professionals do not only use different IT systems for documentation and communication but also different words to express the same concept.

For making the different IT systems interoperable, there needs to be an agreement on terminologies.

a) Health informatics

The purpose of health information standards is to allow different systems that apply them to exchange information and also understand the meaning of the information exchanged automatically. Imagine two hospitals that are not able to exchange information, that are not interoperable. Both hospitals use an electronic health record, but cannot exchange the information, because of different standards. Hospital A reports Surname, Name, Weight and Age of the patient. Hospital B reports Name, Surname, Age and Weight. It's a different order of information, a different standard that makes it impossible to exchange information. This exchange of meaningful information between health IT systems is called semantic interoperability. This is not easy to achieve between most health information systems, since most of them tend to be very heterogeneously structured. Each organization has its own applications, platforms and culture of handling data, information and knowledge. Standard development organizations such as the IHE (Integrating Health Care Enterprise), HL7 (Health Level 7 International), DICOM (Digital Imaging and Communications in Medicine) and openEHR set health information standards.

Let's have a closer look at one of the prominent standardization efforts in eHealth: HL7. HL7 is a messaging standard that defines structures for all kinds of messages to be exchanged between different health-care information systems. To give you an idea of how such messages can look, check out the message below (you don't have to look at the message in detail):

```
MSH|^~\&|GHH  LAB|ELAB-3|GHH  OE|BLDG4|200202150930||ORU^R01|CNTRL-3456|P|2.4<cr>
  PID|||555-44-4444||EVERYWOMAN^EVE^E^^^^L|JONES|19620320|F|||153  FERNWOOD  DR.^
  ^STATESVILLE^OH^35292||(206)3345232|(206)752-121||||AC555444444||67-
A4335^OH^20030520<cr>    OBR|1|845439^GHH  OE|1045813^GHH  LAB|15545^GLUCOSE|||
200202150730|||||||||    555-55-5555^PRIMARY^PATRICIA  P^^^^MD^^||||||||||F||||||
444-44-4444^HIPPOCRATES^HOWARD  H^^^^MD<cr>    OBX|1|SN|1554-5^GLUCOSE^POST
12H CFST:MCNC:PT:SER/PLAS:QN||^182|mg/dl|70_105|H|||F<cr>
```

The horizontal parts of the message are called segments (PID, LAB, MSH). These segments are divided into fields, which can be further divided into components and sub-components. You can find a lot of information, like a patient's demographic details such as name or date of birth and clinical details such as laboratory specific data. With such message, for example an electronic discharge summary from a hospital can be transferred to a primary care physician effectively. But only if both sides have implemented the HL7 standard.

Another standard is the DICOM standard that is used for handling, storing, printing, and transmitting information in medical imaging. It includes a file format definition and a network communications protocol.

The openEHR describes the management and storage, retrieval and exchange of health data in electronic health records. In openEHR, all health data for a person is stored in a "one lifetime", vendor-independent, person-centred EHR. The openEHR specifications include an EHR Extract specification but are otherwise not primarily concerned with the exchange of data between EHR-systems as this is the focus of other standards such as HL7.

IHE integration profiles describe a clinical information need or workflow scenario and document how to use established standards to accomplish it. A group of systems that implement the same integration profile address the need/scenario in a mutually compatible way. For example, the DICOM standards specify many different formats for image data. A given set of images that might comply with some optional parts of the standards might still not be accepted by an application in use by a particular radiologist. Profiles reduce the chances of these incompatibilities.

7. Common denominators of e-Health strategies
a) Adoption and implementation of e-Health strategies
To successfully implement eHealth nationwide, most countries around the world have set up national eHealth strategies.

EHealth is on the political agenda worldwide and many countries in the world have created national eHealth strategies. In Europe, the European Commission issued an action plan for eHealth in 2004, demanding that all European countries should provide a national strategy by the end of 2005. And that was the starting point for the development of eHealth strategies in Europe. 2005 was another major landmark, when the World Health Assembly defined the WHO eHealth strategy which started the development of eHealth strategies worldwide. Recently, in 2012, ITU and WHO released the eHealth Strategy Toolkit, which is a guide for setting up and monitoring eHealth strategies and action plans. In the following, some examples of eHealth strategies will be presented to you.

1. Denmark
With its 5 million inhabitants, the small country Denmark is one of the top performers when it comes to eHealth. The Danish health care sector is handled by the public sector and financed by local and state taxes. It is governed by a combination of national state institutions, regions and municipalities and has democratically elected assemblies (HealthcareDENMARK, 2016).

But why is Denmark so good in E-Health? The health care system is decentralized and its focus has been on building an IT infrastructure since the early 1990's (Olejaz M et al., 2012). In 1994, MedCom, a non-profit was created by the Danish Government that dealt with the development, implementation and dissemination of electronic communication in the health sector. Since then, MedCom strongly contributed to the development and the exchange of communication in Denmark. Since 2011, MedCom is mainly responsible for the communication between and within different sectors. One central aspect of MedCom is, that from the beginning on, all the important stakeholders were involved in initiating E-Health solutions that were practical and operative.

How does it work?
One essential component of the patient health record in Denmark is the connection between inpatient and outpatient care sector and the linkages of the diverse solutions to the coherent national patient portal. In 2003, the patient portal sundhed.dk went online. Patients, hospitals and doctors have access to this platform and its relevant information, for example the Shared Medical Record. Since 2010, a vaccination registry is accessible for patients. The possibility to make the different systems available for patients, is due to the fact that since the late 1960's, every patient has an identification number (CPR number) and the public is used to data collection. Most importantly, the systems is so successful because of the unifying, national standards for the patient health record solutions that had been set, so that data can be reflected on sundhed.dk equally. So even though Denmark has a decentralised health care system, the coherent strategies enable the implementation of E-Health solutions. Through the online platform sundhed.dk, which operates as a cloud solution, patients have access to; e-journals (inpatient setting), p-journals (outpatient setting), SMR (Shared Medication Record), e-prescription, e-advance-decision, e-organ-donor-card. Altogether, these databases build the portal sundhed.dk. That means that next to this portal, local platforms still exist and are compatible with the portal; clinics do not have to access sundhed.dk to get patient information, they can use their hospital information system (HIS). At the same time, some information from sundhed.dk might be relevant to physicians that do not have specific information about a patient in their own practice management solution.

Technology & Data security
Sundhed.dk is web-based, ad-free and for free for everyone. The data is not pooled in a central database. As described earlier, the inpatient setting and the outpatient setting use different electronic health record solutions. In the outpatient setting, vendors are different depending on the region, so there is a local variation. There are fewer solutions in the inpatient setting, but the information can still have regional differences; laboratory results for example have different scopes, so each resident doctor has a different amount of patient information. The standard that is used throughout Denmark is the XML standard and the HL7 standard.
For data security for e-health solutions or electronic health records, there are no extra rules; the same laws as for analogous applications (e.g. paper work) apply. It is understood, that the patient's consent to the treatment, is also the consent that the information that develops, will be visible for other health care providers. But patients have an "Opt-Out" option, if they do not want every care provider to see their information.
Every Dane has an electronic health insurance card with his/her individual CPR Number, which, together with an access code similar to online banking, can be used to log on to sundhed.dk. In

the portal they can then see their information and also, when which care provider accessed what information about the patient.

At this point it is to mention, that Danes have an overall open mentality when it comes to data security, meaning they are more concerned that essential data could be missing, than they have fear of data misuse. One explanation might be that there are clearly defined penalties (e.g. withdrawal of accreditation) for those who want to access data without being authorised. However, a flaw of the data security systems could be, that patients don't really know where their data is being stored.

Globally, ethical questions need to be kept in mind regarding, privacy, confidentiality, security breaches, system implementation, data inaccuracies. Assistance with computerized health data is needed, as well as leadership, teamwork, flexibility, and adaptability.
Source: Ethical issues in electronic health records: A general overview, Fouzia F. Ozair, Nayer Jamshed, Amit Sharma,and Praveen Aggarwal, 2015, US National Library of Medicine - National Institutes of Health
retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4394583/

Evaluation
From the very start, people in Denmark were convinced of the success and the benefits of an electronic health record. The question, if an EHR had positive effects weren't an issue, everyone was confident that the implementation of an e-health strategy was necessary. Besides the complexity of the project, this might be one explanation why there was not a large-scale evaluation study of the implementation of the digitalisation in the health care sector. However, individual areas like the telemedicine have been evaluated extensively. The results of several of these projects have led to the provision of a telemedicine infrastructure, which will be available to every single COPD patient by 2019 Regarding the use of the EHR, Kroigaard (2013) states, that in the 2013, all general practitioners, 98% of the specialists, 85% of the chiropractic's and 50% of the dentists use the EHR. Similarly, almost 100% of pharmacies use electronic ways to exchange information. The portal sunhed.dk show constant usability growth; very Dane uses the portal 6 to 7 times a year on average.
Even though several e-health solutions have found their way into the day to day live in Denmark, there is still a lot to do. The example of the premature electronic medication plan shows, that in the near future, a consistent medication systems needs to be further developed to make all medication data available for all regions. So far, patients can only see their medication plan but in the next years, they should also be able to autonomously upload information on their non-prescription drugs. Also, the development of the telehealth infrastructure is especially important, since many people live on small islands and have problems traveling back and forth to practices or clinics.

Conclusion
Denmark's approach to E-Health and EHR's is marked by a strong sense of pragmatism, and the linkage from top-down and bottom-up components. National IT-strategies that brought all stakeholders to the table, as well as firm resolutions to sustainably digitalise health care were strived for. Where it was possible, existing solutions were used, integrated, and further developed. The freedom that was given to regional stakeholders, to further use their well-functioning solutions under the guise of national IT standards, allowed to unite divergent interests. Successful solutions will prevail, not a "one-size fits all" approach.
At the same time, Denmark partly missed its opportunity to implement clear governance structures that would have helped establishing an electronic medication plan or implementing the HER in the inpatient setting more easily.
However, the overall positive experiences from Denmark show the importance of drafting vivid national and strategic goals and establishing governance structures that facilitate the implementation process.

HealthcareDENMARK. (2016). The Case of Denmark- Homecare.

Kierkegaard, P. (2015) Interoperability after deployment: persistent challenges and regional strategies in Denmark. International Journal for Quality in Health Care.

Kroigaard, S. (2013), Denmark: Health IT and telemedicine - Industry Overview. Retrieved from: http://2016.export.gov/california/build/groups/public/@eg_us_ca/documents/webcontent/eg_us_ca_064082.pdf

Olejaz M, Juul Nielsen A, Rudkjøbing A, Okkels Birk H, Krasnik A, Hernández-Quevedo C. Denmark: Health system review. Health Systems in Transition, 2012, 14(2):1–192.

Example:
eHealth Strategy for the public health sector in South Africa
http://www.hst.org.za/publications/e-health-strategy-south-africa-2012-2016
http://www.hst.org.za/sites/default/files/eHealth_Strategy_South_Africa_2012-2016.pdf

European Commision eHealth Action Plan 2012-2020: http://europa.eu/rapid/press-release_MEMO-12-959_en.htm

Understanding contrasting approaches to nationwide implementations of electronic health record systems: England, the USA and Australia: http://www.research.ed.ac.uk/portal/files/11135240/Understanding_contrasting_approaches_to_nationwide_implementations_of_electronic_health_record_systems.pdf

b)   WHO/ITU national e-Health strategy
In 2012, the World Health Organization and the International Telecommunication Union released the eHealth strategy toolkit, which is a guide for setting up and monitoring national eHealth strategies and action plans. The toolkit is very comprehensive, but built up in different parts and sub-parts so that governments can pick parts they are interested in and apply the framework to their needs, also depending on the country's eHealth maturity. The three main parts of the toolkit consist of part one, a national eHealth vision that responds to health and development goals; part two, a national eHealth action plan that reflects country priorities and the eHealth context; and part three, a plan to monitor implementation and evaluate outcomes achieved.

http://www.itu.int/pub/D-STR-E_HEALTH.05-2012

c)   Prerequisites for local e-Health adoption
How can an organization make the best choice when implementing a new eHealth service? As eHealth services usually should support specific activities or processes in an organization, the first step to prepare decision making is to identify the main objective of the service, the goals to achieve, and to determine expected effects. Depending on whether your main objective is, for example, to improve care processes between different organizations, to improve patient safety or quality of care, or to improve care coordination within one care unit, you will identify different goals. Next, the technical, operational, economic requirements, needs and preconditions need to be determined. These need to be fulfilled either by the technology provider or by the organization that will implement the eHealth service. Decision makers need to identify whether the investment

pays off and help to achieve the expected effects or not. So estimation of expected profit and the evaluation of costs for acquiring and maintaining the eHealth service is an important third step. Introducing new eHealth services goes along with a relatively big organisational and behavioural change, and implementation takes time. Take success factors and barriers you read about throughout the content guide into account when implementing a eHealth system. Another important part of the implementation work to reach sustainable use is to identify rewards and incentives. These steps can help visualise the process of adoption and implementation of eHealth systems.

Social entrepreneurship

Definitions

"What distinguishes the social entrepreneurship from it's for-profit cousin?" asked Roger L Martina and Sally Osberg in an article published in the Stanford Social Innovation review in Spring 20017. The difference seems to lie in the value proposition itself. For the entrepreneur, the aim is to serve a new market that can afford a new product or service and this, create a potential financial profit. Profit is sine qua non, essential to venture's sustainability and the means to the ultimate goal of reaching a large-scale market and a new equilibrium. The social entrepreneur instead aims for value in form of large-scale, transformational benefit for a segment of society or society at large. There is no assumption there is a market that can pay for the innovation and potentially benefit investors. Instead, the targue are undeserved, neglected or highly disadvantaged population. However they can either not-for and for-profits. Roger and Osberg define social entrepreneurship as having the following three components:

"(1) identifying a stable but inherently unjust equilibrium that causes the exclusion, marginalization, or suffering of a segment of humanity that lacks the financial means or political clout to achieve any transformative benefit on its own;
(2) identifying an opportunity in this unjust equilibrium, developing a social value proposition, and bringing to bear inspiration, creativity, direct action, courage, and fortitude, thereby challenging the stable state's hegemony; and
(3) forging a new, stable equilibrium that releases trapped potential or alleviates the suffering of the targeted group, and through imitation and the creation of a stable ecosystem around the new equilibrium ensuring a better future for the targeted group and even society at large."

Social Entrepreneurship refers to the practice of combining innovation, resourcefulness and opportunity to address critical social and environmental challenges. Social entrepreneurs focus on transforming systems and practices that are the root causes of poverty, marginalization, environmental deterioration and accompanying loss of human dignity. In so doing, they may set up for-profit or not-for-profit organizations, and in either case, their primary objective is to create sustainable systems change.

Social Entrepreneurship is also defined as "The key concepts of social entrepreneurship are innovation, market orientation and systems change".

Sources: Social Entrepreneurship: The Case for Definition,Roger L Martin & Sally Osberg, 2007, Stanford Social Innovation Review, retrieved from
https://ssir.org/articles/entry/social_entrepreneurship_the_case_for_definition
What is social entrepreneurship, definition by SAÏD (Skoll for Social Entrepreneurship), retrieved from http://www.sbs.ox.ac.uk/faculty-research/skoll/what-social-entrepreneurship

Who are Social Entrepreneurs

Changer drivers. This is who social entrepreneurs are. They work with institutions, networks and communities to create efficient, sustainable and transparent solutions, with measurable impact. Microfinance, the globally spread "slow food movement", students from top universities working in America's worth performing public schools are exemple of social entrepreneurship initiatives. Greg Dees propose abilities by which social entrepreneurs are united:

- Adopt a mission to create and sustain social value (not just commercial value)

- Recognise and relentlessly pursue new opportunities to serve that mission

- Engage in a process of continuous innovation, adaptation, and learning

- Act boldly without being limited by resources currently in hand, and

- Exhibit a heightened sense of accountability to the constituencies served and for the outcomes created

Interesting is also to know what does not constitute social entrepreneurship:

- Philanthropists - who after a successful business life decide to help less privileged people in the society by creating a foundation to support cause/setting up a charity. Although they are important ins the society and often supportive of social entrepreneurship, they are not to be confused with social entrepreneurs.

- Activists - are passionate people, involved in NGOs to lobby the governments and put pressure on policymakers in order to stop a specific practice, with often no alternative options proposed.

- Companies with a Foundation - companies encouraging and engaging its staff in community activities and providing them with time to do so, by instance or supporting a cause. It also refers to companies incorporating corporate citizenship and social responsibility in its core business practice. Their priority is however to make money to content their stakeholders and not mainly to benefit the communities wellness.

Muhammad Yunus, founder of the Grameen Bank and father of microcredit, Robert Redford, creator of the Sundance Institute, providing young filmmakers with space and support for developing their ideas or Victoria Hale, creator of the Institute for OneWorld Health, the first nonprofit pharmaceutical company whose mission is to ensure that drugs targeting infectious diseases in the developing world get to the people who need them, regardless of their ability to pay for the drugs, are social entrepreneurs.

Source: What is social entrepreneurship, definition by the Skoll for Social Entrepreneurship, retrieved from http://www.sbs.ox.ac.uk/faculty-research/skoll/what-social-entrepreneurship

2. Speakers

Prof. Dr. Peeter Ross

Prof. Dr. Peeter Ross serves as e-health professor and senior research scientist in eMedicine Lab of Tallinn University of Technology (TUT). Peeter also holds radiologists position in East Tallinn Central Hospital, Estonia. He is a founder and member of the board of e-health and radiology consulting company SMIS International OÜ. Dr. Ross has previously worked as a Director of R&D and a Head of Diagnostic Clinic in East Tallinn Central Hospital. He has been a member of the supervisory board of the Estonian eHealth Foundation and Estonian Health Insurance Fund.

Peeter Ross studied medicine in Tartu University, Estonia, and in Helsinki University, Finland 1985-91. He has graduated from Tartu University (1991) as a medical doctor. Dr. Ross completed residency in radiology in Tartu University in 1996. He studied radiology in Oulu University, Finland, and in Armed Forces Institute of Pathology, Washington DC, USA, as well as health care management in INSEAD, France. Peeter completed his doctoral studies in Tallinn University of Technology in 2011. The topic of the thesis work was data sharing and shared workflows in medical imaging.

Peeter Ross has participated actively in designing and implementation of Estonian nation-wide Health Information System. He has also been involved in EU funded eHealth projects InterregPacs, Baltic eHealth, R-Bay, Dreaming, Regional Telemedicine Forum, epSOS, eMedic, SUSTAINS, Momentum and Mastermind. Peeter Ross is a past president of Estonian Society of Radiology (2005-2011).

As the professor and senior research scientist in TUT, Peeter Ross is responsible for research of healthcare innovation and use of digital applications in health domain. He has been one of the main designers of masters´ and doctoral program in healthcare technology and healthcare engineering.

Jürgen Brandstätter

Jürgen Brandstätter is a standards expert and passionate proponent of „standards-based interoperability" in the field of Health IT and active in several standardization organizations at national and international level, in particular in the Integrating the Healthcare Enterprise (IHE) initiative.

During our Social Entrepreneurship Challenge on Interoperability in e-Health, his talk will be about "Integrating the Healthcare Enterprise – An open framework and methodology for achieving interoperable Health Information Exchange".

Jürgen serves as board member of IHE International, co-chair of the IHE Global Deployment Coordination Committee, co-chair of the IHE Pharmacy domain and founding board member of IHE-Austria.

During his professional life he contributed to the European epSOS project and currently consult the Austrian Health Record project in the area of the nation-wide harmonization of Clinical Summary information as well as the Austrian e-Medication Interoperability Specification. Internationally he is involved in other interoperability projects such as the Saudi eHealth Exchange project in the Kingdom of Saudi Arabia.

In his academic and research activities, Jürgen is together with Univ.-Prof. Dr. Peter Pokieser the creator of the "Unified Patient" project at the Medical University of Vienna: The web based linking of problem orientated medical knowledge and patient data to enhance the quality of patient's treatment at each stage of the healing process.

Jürgen owns an MSc in Computer Science from the Technical University of Vienna, Austria.

Dr. Ramesh Krishnamurthy

Dr. Ramesh Krishnamurthy serves as a senior technical officer and the focal point for eHealth standardization and interoperability efforts at the World Health Organization in Geneva, Switzerland. He has extensive experience in designing, implementing, coordinating, and managing national and sub-national eHealth systems and services, including health information systems, emergency operations centers, and public health surveillance information systems.

Dr. Krishnamurthy has also assisted numerous countries in all of the six WHO Regions in their development and implementation of national and sub-national eHealth strategies, standardization and interoperability of eHealth systems and services, and utilization of strategic information for evidence- based public health decision-making.

Previously Dr. Krishnamurthy served as Senior Informatics Advisor at the United States Centers for Disease Control and Prevention (CDC) in Atlanta. He holds many prestigious honors and awards. He owns a PhD in Physical Anthropology from the University of Oregon, US and a Master of Public Health with a major in Health Services Management from University of California, Los Angeles School of Public Health.

Dr. John O'Donoghue

Dr. John O'Donoghue is a Senior Lecturer in eHealth at Imperial College London and Deputy Director of its Global Health Unit. He is also the eHealth Principal Investigator within the Global Health Research Group at University College Dublin.

He received his B.Sc. in Computer Science and a research M.Sc. in Real-Time Systems and Simulation from the Department of Mathematics and Computing, Cork Institute of Technology, Ireland and a PhD from the Department of Computer Science at University College Cork, Ireland. He has published in a number of national\international journals and conference proceedings in the area of eHealth and mHealth for both developed and developing countries.

His main research areas include: Pervasive Data Management, Quality of Data, Health Informatics and Medical based Information Systems. For his doctoral research, he received the Massachusetts Institute of Technology (MIT) Ballou/Pazer DQ/IQ Research Award, which recognises a PhD dissertation that demonstrates a significant contribution to the field of Information Quality (IQ).

The Global eHealth Unit is an international research hub for innovation and entrepreneurship in health care. It is a multidisciplinary team, collaborating on a number of local, national and international activities. It rigorous approach to research and development work provides a strong evidence base for influencing policy and improving health education and practice.

Examples of projects which John is currently involved with include, detection and management of acutely ill patients on hospital wards, data management modelling for clinical trials, use of mHealth technology to identify illness in children in developing countries, and development of systems for integrated chronic disease management.

3. Mentors

Dr. Nana Bit-Avragim

Dr. Nana Bit-Avragim is a life sciences professional and health care expert. Her story is one of knowledge, transformation and translation in health sciences and medicine. Being a clinician-scientist with a focus on molecular cardiology and genetics and a forward thinker, Dr. Bit-Avragim is passionate about new life sciences technologies and believes that innovation means adapting to the future.

Currently, she is running the Digital Health & Life Sciences programme at SingularityU Germany to help align the latest technological developments in the healthcare and life sciences industries into society. Singularity University (SU) is an executive education organisation based on NASA Research Park in Silicon Valley.

Before joining Singularity University Germany, Nana was the Programme Director of Innovation and Entrepreneurship at Stiftung Charité (Charité Foundation); an independent foundation supporting Charité - Universitätsmedizin Berlin and its partners, such as the Berlin Institute of Health (BIH). Their collective goal was the strategic navigation and promotion of medical entrepreneurship in Berlin and beyond. Nana coordinated and executed the 2016 Charité Entrepreneurship Summit; one of the major think tank events in medical innovation and entrepreneurship in Europe, achieving an event of the highest quality and delivering compelling results.

Nana enjoys communicating across borders and cultures. Besides being a social media nerd who loves tweeting about digital health, medical innovations and open science.

Prof. Dr. Jörg.-Uwe Meyer

Prof. Dr. Jörg-Uwe Meyer's educational background is in Biomedical Engineering Sciences. He has received his Ph.D. at the University of California, San Diego.   After his post-doctoral year at the Life-Science Department of NASA Ames Research Center, Moffett-Field, CA, he returned to Germany, heading the Sensor and Microsystems Department at the Fraunhofer Institute for Biomedical Engineering. He has been Head of Research at "Dräger" in Lübeck, Germany, for 6 years. He has been Managing Director of the endoscopy company "Richard Wolf" for three years before he founded his own company "MT2IT – your safe medical network" in 2011.

MT2IT is offering consultancy and "Software-as-a-Service (Saa")" developments for connected health and care systems. Uwe is involved in international standards committees addressing connected medical device and "smart health applications", based on IoT and cloud architectures.

Prof. Dr. Jörg-Uwe Meyer is also associated with the University of Luebeck, Germany, through the UniTransferKlinik Luebeck (UTK-HL). He is advising founders and entrepreneurs on innovation and business opportunities in the area of e-health.

Piret Hirv, MA

Piret Hirv, MA is currently Advisor for E-services and Innovation at the Ministry of Social Affairs in Estonia supporting the digital transformation and innovation of social security area in Estonia, including health, labour and social matters. She is also a student at Tallinn University of Technology specializing on healthcare technology.

Ms Hirv has earlier work experience in pharmaceutical industry, marketing entrepreneur, and long term experience as CEO of lobby and advocacy organization specialized in development cooperation.

4. Jury

Jared Sebhatu
Programme Director German
Accelerator Life Sciences, Germany

Jared Sebhatu is the Program Director, Germany for the German Accelerator Life Sciences. He is responsible for engaging life science startups and young companies and liaising with strategic partners. Having worked for numerous international companies, Jared is an expert in the German healthcare market and has extensive experience in the digital health and medical technology innovation process. He is currently mentoring various startups in strategy, technology, and innovation management.

Simon Unterschütz
Manager Private Sector Cooperation
Deutsche Gesellschaft für Internationale Zusammenarbeit
(GIZ)

5. Partners

CIEE - Council on International Educational Exchange
We are very thankful for the CIEE's by letting us use their amazing facilities in the centre of Kreuzberg. The CIEE operates over 175 study abroad programs in over 40 countries. Their location, the CIEE Global Institute in Berlin is a very vibrant and modern institute and is located in the heart of Berlin. The campus consists of a newly renovated former factory and state-of-the-art classrooms. We are looking forward to building a long-lasting partnership with the CIEE and hosting many more Challenges in their facilities.
A nonprofit, nongovernmental organization, CIEE is the country's oldest and largest nonprofit study abroad and intercultural exchange organization. Since 1947, CIEE has helped thousands of people gain the knowledge and skills necessary to live and work in a globally interdependent and culturally diverse world by offering the most comprehensive, relevant, and valuable exchange programs available.
It's an undertaking they've been proud to pursue for seven decades.
Today, the CIEE serve more than 340 U.S. colleges and universities, 1,000 U.S. high schools, and 35,000-plus international exchange students each year.
The CIEE change lives; their alumni change the world.

eHealth.Business

eHealth.Business is a young and dynamic project management and consulting business. The business guides and presents projects concerned with health and especially eHealth. At the moment for example, eHealth.Business supervises two projects supported by the Innovation fund of the General Joint Committee. The team of eHealth.Business also guides workshops on eHealth and interoperability and hosts discussions and forums with stakeholders from IT, health care, economy, science and service providers such as insurance companies. Working together with companies such as Techniker Krankenkasse, Cisco, xevIT, AOK Nordost, DRK Kliniken, IGES, Tiani, LMU München and many more, new challenges and highly innovative, new, fun projects always await. That makes working at the company very diverse- no day is like any other, and thus the learning curve is very high.

The vision of eHealth.Business is making medical information available for anyone, anywhere, as soon as possible. eHealth.Business believes that through open communication and the right tools, this vision can become reality. Working with tools such as GANTT charts, protocols, Excel, GoToMeeting, Prezi, project plans and mind mapping programs like Mindejet is inevitable when making eHealth projects a success. The business culture is very communicative and honest, and the emphasis is on qualities like trust and productivity rather than being at the office on time from nine to five. Whilst traveling to clients is very common, so is working from home. Until now, the team consists of almost 10 people with diverse backgrounds. New projects already await and eHealth.Business is looking for new employess in every area: project managers, project assistants, trainees, management assistance and students.

German Accelerator Life Sciences

The German Accelerator Life Sciences' vision is to help build successful companies that bring innovative medical products and technologies to patients worldwide. They are confident that such success stories will ignite optimism, encourage entrepreneurship, and have a positive effect on the German economy.

European Youth Award

The European Youth Award (EYA) is a pan-European contest to motivate young people, social entrepreneurs and start-ups to produce digital projects with impact on society. It demonstrates their potential to create innovative solutions with Internet and Mobile technology addressing the goals defined by the Council of Europe and Europe 2020 as well as the UN Sustainable Development Goals (SDGs).

Sigel

For many years, consumers have placed their trust in the Sigel brand label. It represents everything that makes Sigel special: innovation, style and the intrinsic value of high-quality products, which have been developed with a high level of creativity and an instinct for the different needs of the users. Sigel has created two different brand labels - one in green, one in silver - to address these diverse needs, all under the umbrella of the white Sigel logo.

Schneider
Quality is not an end in itself. The point is to launch writing insturments with characteristics that allow the users to intergrate them naturally in their everyday life - to make it subtly more comfortable and better.
Therefore, we are consistently working on technical innovations, which improve the writing characteristics of our instruments. These include the Viscoglide Technology for smooth and gliding writing, the LiquidInk Technology for an extremly even ink flow or hybrid tips made of stainless steel or elastic plastic for a particular soft and pleasant writing.

6. Prices

7. The Organising Committee

Martin Blohmer

MD Candidate

Even though I just started my medical studies, I am aware that medicine cannot be approached from one single area of expertise. Instead, members of many disciplines have to work together in order to make health care as good as possible. To facilitate this teamwork, I joined the organising committee of the 24 hrs Social Entrepreneurship Challenge on E-Health. E-Health is a rapidly evolving field that has the power to transform the lives of everyone involved in the health sector, from patients over doctors to engineers. This is why I will support all participants in their quest to make their project reach this goal.

m.blohmer@youngleadersforhealth.org

Stella Duwendag

Public Health Student

During several international experiences I got to understand the strong influence that health has on people's lives and therefore chose to study Public Health. Within my studies, I learned about the variety of influences on health, from the biological to social, cultural, political and economic factors. Due to these various determinants, Global Health can only be improved through the cooperation of people from all kinds of disciplines. I am convinced that there are numerous fantastic ideas around the world that have the potential to improve the world population's health, but have not been made reality yet. Therefore, I am grateful to be a part of the organising committee of the YLH 24 hrs Social Entrepreneurship Challenge on E-Health that gives young people the opportunity to share their ideas with peers, receive support from experts and to actually realise them.

s.duwendag@youngleadersforhealth.org

Anna Maria Georgeson
Global Health with Conflict & Security
Gained an MSc in Global Health with Conflict & Security at King's College London and recently joined Cochrane Response as an Assistant Editor. The current climate presents humanity with many challenges, which often affects the poorest and marginalised populations, the most. Thus, we must contend with the structures that create and maintain poverty, structural inequalities that cause people to experience ill health. I therefore consider it crucial for people from all disciplines to work together, thinking locally and globally, for solutions towards a more tolerant, and less harmful environment. Moreover, I truly believe that everyone has a right to health and we each have a responsibility to protect that right.

a.georgeson@youngleadersforhealth.org

Marine Guézennec
International Healthcare Management
I come from Brittany, the beautiful West Coast of France. After several international experiences in the healthcare sector (Belgium, Netherlands, Denmark, Spain), including a recent collaboration with the World Health Organisation, I'm currently living in Toronto, Canada and enjoy working in the changing Ontario health system. I own an38 MSc in Healthcare Policy, Innovation and Management from Maastricht University (NL), a MPH and a master in Management Sciences from diverse universities in France. I find YLH very appealing due to their interdisciplinary vision and the fact that they provide young people with a place to think and act. I'm very excited about working on the 24 hrs Social Entrepreneurship Challenge and look forward to seeing your brains – and ours – burning and enjoying our experts.

m.guezennec@youngleadersforhealth.org

Tanya Herfurth
Political Science Student
Being a founding board member of Young Leaders for Health I wanted to expand our non-profit's undertakings by starting the YLH 24 hrs Social Entrepreneurship Challenge. I believe that the biggest flaw in the current functioning of public and global health is the lack of interdisciplinary workings. Hence, this is how the concept of this endeavour came about. However, without my excellent team, it simply would have remained a concept. Together, we have created the YLH 24 hrs Social Entrepreneurship Challenge on E-Health, focussing on Interoperability.
We want to empower students and young professionals by giving them the platform and the means to launch a sustainable project in the realm of e-Health systems.
I myself am a former medical student currently studying political science, specialising on international political economy.

t.herfurth@youngleadersforhealth.org
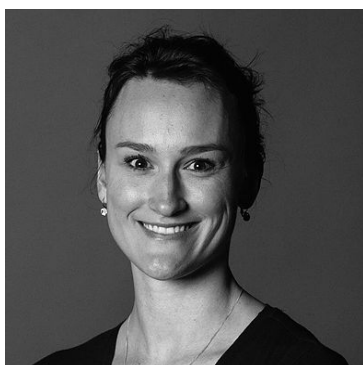
Anjuli Krause
Health Education & Promotion
Within the course of my studies and my employment at eHealth.Business I had the chance to gain important knowledge as well as professional experience in the health care sector in Germany and worldwide. I believe that communication and openness towards new ideas is the key when making innovative projects a success, not only in global health. Seeing that patient's care is not as high of quality as it could be due to the lack of patient information, makes me want to make a difference by help making important information available for the patient anytime and anywhere. I believe that a more patient-centred approach is vital when talking about improving health care. That is why I am especially passionate about interoperability in e-health; because only within the frame of cross-sectoral cooperation will it be possible to give patients access to their health information.

a.krause@youngleadersforhealth.org

Valentina Neumair
Ethnology Student

I am an ethnology and political science student, and my current residence of choice is Berlin. Through my studies I have come to learn how important it is for everybody to have access to medical institutions of all kind in order to support their individual wellbeing. Living in Berlin, a truly vibrant and multicultural city, I want to take the opportunity and use my knowledge and efforts to support valuable projects and ideas. I see Young Leaders for Health as a highly dedicated and passionate organisation and I am more than happy to be a part of it.

v.neumair@youngleadersforhealth.org

Daniel Nomah
MD Candidate

Growing up in Koforidua, Ghana and volunteering with 'DoctorsAct' since 2012 made me passionate about Global Health. Through these experiences coupled with my medical studies in Russia, I came to understand that good health policies coordinated with a strong public health system could produce optimal results in healthcare delivery. I became interested in Young Leaders for Health because of their objective of encouraging and fostering potential leaders in Global Health on an interdisciplinary, intercultural and innovative basis. It has been great preparation ground for me as I look forward to doing more in these areas upon completion of medical school in few months. I'm particularly excited about the 24 hrs Social Entrepreneurship Challenge on E-Health because I believe that e-Health can address the major demands of the fast developing health industry.

d.nomah@youngleadersforhealth.org