



Danish Centre for Health Informatics

Annual Report 2012



Preface

The Virtual Centre for Health Informatics (V-CHI) was established in 1995 to coordinate research activities within the field of health informatics at Aalborg University. Three departments were involved: Department of Health Science and Technology, Department of Communication and Psychology, and Department of Development and Planning. The objective of the centre was to strengthen the research to support the teaching at the Master Programme in Health Informatics, also established by the three departments.

Later on the activities of the centre expanded to support activities of networking between the IT industry and the regions' clinical sections, and in general between health informatics researchers at a national level. This led to a renewal of our centre name from being "Virtual" to "Danish"; [The Danish Centre for Health Informatics \(DaCHI\)](#), April 2012. Furthermore, the centre organises a range of activities and meetings within health informatics and is also secretariat for the Danish Society of Medical Informatics.

This report represents the accomplishments of 2012. The research activities of the departments participating in the centre are introduced by a description of the projects and by the publications that communicate their research.

Furthermore, the open meetings and conferences held in 2012 are mentioned in the report.

Christian Nøhr

Professor and head of Danish Centre for Health Informatics

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1. Danish Centre for Health Informatics – “a network centre”

DaCHI operates within research and development and offers counselling and teaching of health informatics to the health care sector. DaCHI is a formal network between Danish universities, public and private companies, organisations, hospitals and regions. The interested parties are represented in a “Reference Group” and the daily activities are managed by an executive committee and the director of the centre. The affiliated researchers represent three faculties at Aalborg University. The DaCHI secretariat is located at Aalborg University.

Mission

DaCHI’s mission is to expand develop the mutual understanding and interaction between health informatics and the health care institutions, health professionals and the citizens.

Network of researchers at Aalborg University

DaCHI is embeded in the research environment at Aalborg University where several departments collaborate in a number of health informatics research projects, i.e. Department of Health Science and Technology, Department of Communication and Psychology, Department of Development and Planning, and Department of Business and Management. The DaCHI research network is associated with a wide range of network partners, i.e. North Denmark Region, Central Denmark Region, The Danish Institute for Health Services Research, Centre for Health Telematics, Danish Society for Medical Informatics, CHI – Vendor Forum (CHI-Leverandørforum), Aarhus University and Aalborg University Hospital. Through the anchoring of the DaCHI at Aalborg University and the wide range of competences of our network-partners, we provide an interdisciplinary understanding of health informatics research.

The following researches at Aalborg University associated to DaCHI:

- Andre Kushniruk, Department of Development and Planning
- Ann Bygholm, Department of Communication and Psychology
- Anna Marie Høstgaard, Department of Development and Planning
- Anne Randorff Rasmussen, Department of Health Science and Technology
- Charlotte Bjørnes, Department of Development and Planning
- Christian Nøhr, Department of Development and Planning
- Gert Galster, Department of Health Science and Technology
- Janne Seemann, Department of Sociology and Social Work
- Jytte Brender, Department of Health Science and Technology
- Karsten Niss, Department of Health Science and Technology
- Kirstine Rosenbeck Gøeg, Department of Health Science and Technology
- Lars Botin, Department of Development and Planning
- Lars H. Ehlers, Department of Business and Management
- Lasse Riis Østergaard, Department of Health Science and Technology
- Lone Stub Pedersen, Department of Development and Planning
- Louise Pape-Haugaard, Department of Health Science and Technology
- Marion Berg Christiansen, Department of Development and Planning
- Mette Holst, Department of Development and Planning
- Ole K. Hejlesen, Department of Health Science and Technology
- Pernille Bertelsen, Department of Development and Planning
- Pia Elberg, Department of Health Science and Technology
- Sanne Jensen, Department of Development and Planning
- Stig Kjær Andersen, Department of Health Science and Technology
- Søren Vingtoft, Department of Development and Planning

Research Work

DaCHI primarily work within the following health informatics research areas:

- user interface and usability
- technology assessment and implementation
- organisation and management
- clinical decision support systems
- clinical information systems, and EHR
- quality development and assurance
- user driven innovation
- clinical work practice
- ambient assisted living
- patient safety

other competences are:

- network creation and management
- research and knowledge sharing between university, industry and clinic
- education and training
- project fund raising and management

In addition, The Master Programme in Health Informatics is a DaCHI activity. The two-year programme primarily employs teachers from Aalborg University, but also external lecturers from clinic, industry and public sector are connected to the programme. This variety of teachers ensures that the programme is aligned with the requirements from the industry and public sector.

Organisation

DaCHI is managed by an executive committee supported by a Reference Group.

The DaCHI secretariat is hosted by the Department of Development and Planning and is managed by the director of the centre, Professor Christian Nørh.

The executive committee

The executive committee consists of a representative from each participating department. The representatives are together with the director responsible for the management of the centre.

The executive committee appoints a chairman and determines the rules of procedure.

The following research fields are represented in the executive committee:

- Research Group for Medical Informatics, Department for Health Science and Technology represented by Stig Kjær Andersen

- Research Group for Participation and Technology, Department of Development and Planning represented by Pernille Bertelsen
- Research Group for Information Practice Studies, Department of Communication and Psychology represented by Ann Bygholm

Referencegroup

DaCHI has established a Reference Group to ensure and actively support DaCHI's missions and fundings to match the ideas, requests and demands of a professional approach to health informatics in accordance to expectations from the public as well as private sector.

The Reference Group members shall contribute with mutual inspiration to each other and to DaCHI.

The Reference Group meet 1-2 times a year. At these meetings DaCHI presents results achieved and current projects and important subjects within health informatics are discussed.

The Reference Group is represented by:

- The Central Denmark Region by Mogens Engsig-Karup
- The North Denmark Region by Lise Wormstrup
- Aalborg University, Department of Communication and Psychology represented by Ann Bygholm
- Aalborg University, Department of Development and Planning represented by Christian Nørh
- Aalborg University, Department for Health Science and Technology represented by Stig Kjær Andersen
- Aalborg University, Department of Business and Management by Lars Ehlers
- Aarhus University by Michael Hasenkam
- Aalborg University Hospital by Karin Hedegaard
- Centre for Health Telematics by Ib Johansen
- CHI – Vendor Forum (CHI-Leverandørforum) by Jakob Boye Hansen, Carecom
- The Danish Institute for Health Services Research by Helle Wentzer
- Danish Society for Medical Informatics by Christina Silseth Bartholdy

Secretariat

The secretariat's staff:

- Christian Nøhr, Director of Centre
- Anni Møller Brændstrup, Senior Clerk
- Lene Sømmod Flou, Academic Secretary
- Marianne Sørensen, Academic Officer

2. Master in Health Informatics

The master programme of Health Informatics has existed for almost 20 years and has over time been revised several times according to new research results and the following implementations within health informatics. In 2012 the programme has experienced a decline of students with the consequence that a selected committee is working on making the programme up-to-date, to ensure the programme in the future.

The organizers of the programme in the period of this annual report: Professor Ann Bygholm, Aalborg University, Department of Communication Psychology and Teaching; Associate Professor Karsten Niss, Aalborg University, Department of Health Science and Technology. Several of the researchers within the network of DaCHI are teaching in the programme. Finally, the DaCHI Secretariat runs the administration of the Master Programme in Health Informatics.

The seminar activities of the programme in 2012 consisted of course work, plenary lectures and problem based project work. The following guest lectures have been invited to address the students.

January 2012

Guest lecturer Ivan Lund Pedersen, Key Account Manager, National eHealth Technology, (NSI), Strategy of Digitalisation (<http://www.nsi.dk>)

April 2012

Guest lecturers from the research group Participation and Technology (Partec), Department of Development and Planning; Professor Christian Nøhr, Associate Professor Anna Marie Høstgaard, and Assistant Professor Lone Stub Petersen with the theme "Research Projects within the field of Health Informatics.

June 2012

The graduation of students with 22 new masters with the title "Master in Information Technology in Health Informatics" took place right after the final exams. Egon Toft, dean of the Faculty of Medicine addressed the graduates and handed over the diplomas.

September 2012

Number of students signed in:

Class 2012 16 students and Class 2011 12 students. A total of 28 students at the programme September 2012. Guest lecturer Steen Andreasen, Professor, Department of Health Science and Technology with the theme "From Research to Reality".

November 2012

Guest lecturer Kirsten Skovrup, Office Manager of the IT Department, section of Administration of Elderly and Handicap Care, Aalborg Municipality with the theme "IT in the primary sector – what is going on right now".

3. Conferences and seminars

3.1 In 2012 the following conferences and seminars were organised by researchers in the network and the practical administration was organised by the DaCHI secretariat

E-Health Observation Conference 2012

This conference is an annual event in the autumn. 10 – 11 October 2012 the conference was held at Hotel Nyborg Strand with 670 participants. The theme of this conference was: "eHealth as the basis securing continuity and coherence of citizens' health service system".

Keynotespeakers of the conference; [Flemming Christiansen](#), CEO, National Board of eHealth, theme; eHealth – success and difficulties. [Anders Olauson](#), President for EPF (European Patients Forum) Member of The EU eHealth Task Force, theme "Redesigning health in Europe for 2020". [Stanton Newman](#), Professor, Dean of the School of Health Sciences, City University, London. Theme "The Whole Systems Demonstrator RCT Evaluation of Telehealth". [Richard Osborne](#), Professor, Chair in Public Health, School of Health & Social Development, Deakin University, Melbourne, Australia. Theme: "Health Literacy: a fundamental element for generating equitable patient health outcomes". [Marie-Catherine Beuscart-Zéphir](#), Dr., University of Lille, Faculty of Medicine, France, "Human Factors and Usability for complex Health Information Technologies: Why is it so important?". [Jens Andersen](#), Head of Steering Committee and CEO of RSI (The Regions' eHealth) and Region Zealand. Theme "What will future bring for RSI?"

Finally, a political panel debate was carried out by the popular Danish journalist [Mette Vibe Utzon](#). The theme of the debate was "eHealth as the foundation of the future healthcare system – what are the demands to innovation and planning?"

The panel members were: [Astrid Krag](#), Minister for the Ministry of Health (no show!). [Camilla Hersom](#), "Det Radikale Venstre", political spokesman for health. [Sophie Løhde](#), "Venstre" political spokesman for health.

[Flemming Møller Mortensen](#) "Socialdemokratiet", president of "Folketingets Sundheds- og Forebyggelsesudvalg". [Poul Müller](#), Danish Regions, president of "Danske Regioners sundhedsinnovationsudvalg, regionsråds- medlem fra Region Midtjylland".

[Thomas Kastrup Larsen](#), KL, acting mayor of Aalborg Municipality. [Klaus Phanareth](#), chief physician, PhD, "Epitalet".

Snap Shot – AAU-DaCHI (internal seminar)

April 27 2012 DaCHI had a seminar at the island Egholm surrounded by the Limfjord. This event targeted researchers at Aalborg University and the teaching associate professors at the Master Programme of Health Informatics. Snap Shot had 13 participants – all presenting a "Snap Shot" of their current research. The aim of this seminar was to share new ideas and experiences to stimulate to new projects and network. The programme also encouraged discussion of which scientific journals and publications to address and in general how to communicate research results through teaching at the study programmes and PhD courses at the university.

3.2 In 2012 the following conferences and seminars researches within DaCHI were involved in either Scientific Programme Committee (SPC), Editorial Committee (EC) or Local Organizer Committee (LOC)

eHealth Week and WoHIT 2012 7 – May 7-9

DaCHI and Department of Medical Science and Technology arranged a joint booth for Aalborg University at the international eHealth Week. This event was organized by HIMMS and held at the Bella Centre in Copenhagen May 7-9. The booth was well-attended and many network opportunities arose. The combination of the four areas represented at the booth – Danish Centre for Health Informatics, School of Medicine and Health, Eir – Empowering Industry and Research, and AAU's newly established e-Health Tech center – turned out very successful. The theme at the conference was individualized welfare technology and the conference hosted a large exhibition: WoHIT 2012. WoHIT is a parallel event to E-Health Week which is the largest annual gathering of the European health communities. E-Health Week is jointly organized by HIMMS Europe, the European Commission and the country which holds the presidency of the Council of the European Union. More than 2500 delegates attended E-Health Week 2012. The focal points of the conference were patient empowerment and chronic diseases management – both topics involving business and investment opportunities in the various health care research areas. A total of 98 exhibitors were represented at the 3-day exhibition. (reference: Health Tech Wire)

At the exhibition Daniel Johansen, Ph.D. student of Faculty of Medicine, demonstrated an exceptional example of welfare technology research performed at

Aalborg University in connection with a Ph.D. study; a robotic hand which is controlled by a tongue control system. Another concept presented was the “online patient book” which has already been implemented and tested at Aalborg Hospital. This is also a part of a Ph.D. study by Charlotte Bjørnes, Assistant Professor at Aalborg University, Department of Development and Planning.

MIE 2012, Italy – August 26-29

DaCHI attended with a booth at this European Medical Informatics Conference. The theme of the conference was “Quality of Life through Quality of Information”. Stig Kjær Andersen served in the SPC and the EC.

EFMI Special Topic Conference STC2012

18 -21 April 2012 in Moscow EFMI European Federation for Medical Information in co-operation with Russian Association for Medical Informatics. Stig Kjær Andersen served in the SPC.

Scandinavian Conference on Health Informatics 2012 (SHI2012)

2 -3 October, Linköping in Sweden.

Members of the SPC; Ole Hejlesen, Pia Elberg, Gert Galster, Department of Health Science and Technology, and Ann Bygholm, Department of Communication.

SIGCIS Workshop 2012

October 7, 2012, Copenhagen, Denmark. Historical Perspectives on Technological and Social Change. Stig Kjær Andersen gave a presentation at a Workshop: Shot, 55th Meeting of the Society for the History of Technology in Copenhagen.

Medinfo 2013

Danish Society for Medical Informatics, DSMI, hosts the World Congress on Medical and Health Informatics (MedInfo) in 2013. This global conference is expected to attract more than a thousand researchers, clinicians, executives, and suppliers – all with the common interest in health care to share knowledge and experiences within health-, medical- and bio-informatics.

DaCHI is involved in this world congress together with Pia Elberg and Stig Kjær Andersen, Department of Health Science and Technology, and Marianne Sørensen, Secretariat of DaCHI, in the LOC, and Christian Nøhr, Department of Development and Planning, in the EC and André

Kushniruk, Adjunct Professor at Department of Development and Planning is member of SPC.

Context Sensitive Health Informatics, Copenhagen Denmark 2013

Christian Nøhr, director of DaCHI, Sanne Jensen, Department of Development and Planning, and Marianne Sørensen, Secretariat of DaCHI serve in the SPC.

ITC in Health Care

Victoria, BC, Canada, 2013, Christian Nøhr and Andre Kushniruk are members of the Scientific Review Committee.

4. Visiting researchers, guest lectures

Inaugural lecture of Adjunct Professor Andre Kushniruk

Adjunct Professor Andre Kushniruk from the School of Health Information Science, University of Victoria, British Columbia in Canada, appointed as Assistant Professor at Aalborg University, Department of Development and Planning, May 2012.

5. PhD Courses

PhD course “Theoretical approaches and methods to evaluate health informatics systems and eHealth applications”, May 2012. Organized by Christian Nøhr, Andre Kushniruk and Pernille Bertelsen.

6. DaCHI Secretariat for other networks and associations

DaCHI is secretariat for various networks and associations. Below is a short description.

DSMI

The Danish Society of Medical Informatics is a cross-disciplinary association for all stakeholders within the field of eHealth. Among our researches you find a member of the steering committee of DSMI; Anna Marie Høstgaard and Lene Sømod Flou is secretary for the society. Stig Kjær Andersen represents the DSMI's membership of the European Federation for Medical Informatics (EFMI).

DaCHI administrates the secretariat for the Danish Society of Medical Informatics (DSMI) i.e. bookkeeping, mailings, administration of memberships of DSMI (database, sign and resign of members, account of membership fee), and organizing conferences, seminars and workshops.

CHI Vendor Forum (Leverandørforum)

The CHI Vendor Forum consists of a group of seven companies delivering IT systems to the health care sector. They have had three meetings in the period of reporting. The activities have been in various taskforce groups and special topic meetings with Henrik Bjerregaard, Medcom; Flemming Christiansen, NSI; Esben Dalsgaard, NSI.

Responsible for this forum are: Stig Kjær Andersen and Marianne Sørensen.

Researcher Forum for eHealth (Forskerforum for sundheds-it)

eHealth Researcher Forum was established in the autumn 2011 at a meeting at Copenhagen University. The participants of the meeting represented all institutions active in research in health informatics i.e.:

Copenhagen University, Technical University of Denmark, Roskilde University, Aarhus University, IT University of Copenhagen, Aalborg University and the public sector research institution KORA (former Dansk Sundheds Institut (DSI)). The activities in this forum are primarily organizing and running PhD courses, exchange of experiences of planning and running research projects. The forum has had two events in 2012. In spring 2012 Liz Cummings from University of Tasmania, Australia and André Kushniruk from University of Victoria, Canada had an open presentation about “Moving from the Human Factors Laboratory to the Real World: Experiences in Developing Usable and Safe Health Information Technology”.

In autumn they arranged a meeting hosted by KORA, presenting the research of this institution. This meeting was for the participants of the forum exclusively. DaCHI is the secretariat for the forum.

More information: sundheds-it-forskerforum.dk

The Steering Group for a Conference Network at Aalborg University

At Aalborg University a conference network was established by the Network Centre (Netværkscenteret). This network group shares experiences and gives advice on how to organize conferences. The network group has appointed a steering group, who works on improvements of systems and infrastructure of organizing conferences at Aalborg University. Twice a year the steering group arranges a network meeting for their members. Marianne Sørensen is a member of the steering group.

7. Other network cooperations

- **EFMI** the European Federation for Medical Informatics, EFMI, Stig Kjær Andersen is a council-member of this cooperation.
- **IMIA** the International Medical Informatics Association, IMIA. Aalborg University is represented by Christian Nøhr, Stig Kjær Andersen, being an Institutional Member.
- **AMIA** the American Medical Informatics Association has Stig Kjær Andersen, Christian Nøhr, and Andre Kushniruk as members and they are both active in various working groups; People and Organisational Issues (POI), Education and Evaluation

Working Groups

- IMIA Working group on human factors engineering and usability in health informatics. Chairman of the group is Christian Nøhr and Andre Kushniruk is co-chairman
- EFMI working group 6: Working Group Education in Health Informatics represented by Christian Nøhr
- AMIA Education Working Group represented by Christian Nøhr
- AMIA Working group people and organizational issues represented by Christian Nøhr
- eHealth in Africa, Platform for Human Health under Building Stronger Universities represented by Pernille Bertelsen
- Dansk Standard, Udvalg S-273, Health Informatics, participant Gert Galster
- SIG-CHI, "Interaktionsdesign" in Denmark, participant Gert Galster
- InFinIT "interessegruppen for processer og it", participant Gert Galster
- IDA's "fagtekniske netværk" IDA-IT, participant Gert Galster

8. Projects within Health Informatics

An extract of some of the projects in health informatics by some of the researchers – a list of the all the projects of each researcher can be found at VBN – Videnbase Nord (Knowledge Base North) www.vbn.aau.dk having the status of projects in progress 2012.

E-Health Observation

This project aims to identify and analyze the Danish development of eHealth in both hospitals and primary care. Emphasized is uncovering the dissemination rate of the Electronic Health Records (EHR), detecting EHR stakeholder experience, identifying and evaluating key factors that promote the extension and use of EHR, as well as identifying and evaluating general barriers to the EHR. Furthermore, the project aims at communicating the experiences achieved among the primary actors. This is accomplished by an annual conference that brings together the most active partners within health informatics throughout the country.

Project homepage: e-sundhedsobservatoriet.dk

Mobile Information Competences

The project aims to develop a system of how the libraries can improve the citizens' knowledge of using the mobile telephone as an advanced information search tool and as a media platform. The method is to make a proactive effort to point out the possibilities and insufficiencies of the mobile telephones in information search and media communication. This will primarily include the project libraries, which will be followed up on a national scale to libraries countrywide. The project is built on experiences of the massive success of spreading knowledge on using the internet.

Support and guidance of internet based information search are to spread from the computer to the mobile telephone. The project will develop teaching methods and material to ensure that the libraries in the future are competent actors concerning mobile web. The Department of Communication takes part in the further research of the projects, being the evaluation. The evaluation will be based on interviews of users and library staff.

Participants: Ulla Konnerup, Lykke Haals Vardinghus, Ann Bygholm.

The Programme for the International Assessment of Adult Competencies (PIAAC)

OECD has made an agreement with an international consortium managed by Educational Testing Service about international development, coordination, and implementation of OECD's international survey of adults' competencies "Programme for International Assessment of Adult Competencies" (PIAAC) during the period of 2008- 2013. The international survey is based on contributions from countries participating in the survey, including Denmark where the assignment belongs to the Ministry of Education. The target of the survey is internationally to compare adults' competencies required to be able to participate as an active citizen in the knowledge society. The survey collects knowledge of the adults' competencies in understanding and using text and mathematics, finding and decoding information, using information technology and finally, using It to solve complex problems. Further, the survey is to bring knowledge of adults' use of key competences in their working life, e.g. in reading, IT, communication, cooperation and leadership. Further, the purpose is to enlighten possible connections between the adults' level of competencies to the level of their education, financial, employment, social and cultural situation. This will be derived by a collection of a range of background information of the participants of the survey. The pilot survey was accomplished and evaluated upon in 2010. In 2011 the main survey was accomplished and in 2012 the results are evaluated and reported to the OECD.

The IV-project belonging to the Department of Communication is only a small part when compared to the entire project. The department is cooperating with SFI and thereby only subcontractors to the project. As subcontractor we focus on the part of the survey being problem solving using It.

The subcontractors' parts of the project are:

- to estimate and comment on the total material of the survey supplied by the international consortium and to proofread and correct the material from English to Danish language.
- to contribute to the analysis and interpretation of the results from the pilot survey, accomplished in spring 2010 – assessing how the Danish part of the survey has functioned.
- to make translations and corrections of the test material from English to Danish language (after the pilot survey)

- to provide representatives of the adult citizens aged between 16-65 years for both the pilot and the main survey based on data from the Civil Registration System (main survey of 2011).
- to make a national PIAAC-report

Department of Communication and Psychology, Danish Centre for Health Informatics (Health), E-learning labIPS (Information Practice Studies)

Participants: Lykke Haals Vardinghus, Ann Bygholm, Joan Vuust

Asian University for Women

Development of curriculum for post-graduate level training in Environmental Engineering and Human Centred Informatics focused on meeting the needs and aspirations of women from poor and rural Asian communities. AUW is going to be situated in Bangladesh.

Partners Imperial College London, Harvard University, Massachusetts Institute of Technology (MIT), Aalborg University, E-learning Lab, Aalborg University, Development and Planning, Aalborg University, Computer Science.

Participants: Ann Bygholm, Lone Dirckinck-Holmfeld, Anne Marie Kanstrup, Peter Axel Nielsen, Gitte Tjørnehøj, Lykke Haals Vardinghus, Marianne Georgsen

Smart Health

A working group for a loosely associated set of researchers at AAU in Humanities and Social Sciences who are interested in healthcare, ageing, wellness, dis/ability, informatics and technology, especially the relations between primary and secondary care.

A collaboration of the Department of Architecture & Design Department of Communication and Psychology Department of Language and Culture Department of Sociology and Social Work Centre for Mobility and Urban Studies Centre for Dialogue and Organization Centre for Discourse Studies Doctoral programme Discourse and Contemporary Culture E-learning labIPS (Information Practice Studies), Sociologisk Laboratorium.

Participants: McIlvenny, Paul (Contact person), Morelli, Nicola (Contact person) Wentzer, Helle (Contact person) Raudaskoski, Pirkko Liisa (Project participant) Horsbøl, Anders (Project participant) Bygholm, Ann (Project participant) Frimann, Søren (Project participant) Gimmler, Antje (Project participant) Ridder, Hanne Mette Ochsner

(Project participant) Knudstrup, Mary-Ann (Project participant) Dahl, Poul Nørgård (Project participant)

Clinical Handover

This project aims to conduct an exploratory research on the work practices of shift-to-shift medical and nursing handover in five countries – Australia, Denmark,

Norway, United States and Brazil, utilizing video observation methods, with a view to eventually developing a system to support clinical handover practices.

The project aims to define shift-to-shift clinical handover practices across different countries and healthcare services. It further aims to develop a common understanding of the clinical handover process and explore the work practices in clinical handover in these countries. This project then aims to develop systems to improve clinical handover practices utilizing a user-centered approach.

This project will be the first of its kind to explore and define clinical handover practices across different countries from the views of clinicians. This will help better define the process and develop an improved understanding of potential initiatives that could improve clinical handover.

Participants: Paul Turner and Ming Chao Wong, University of Tasmania, Christian Nøhr, Aalborg University

Consensus on eHealth definitions

There is a significant degree of attention and focus on ehealth initiatives globally; ehealth frequently forms a component of healthcare strategy and policy, and is represented in projects, financial outlays, cost benefit, outcomes, clinical process improvement, safety and quality, and addressing the challenges facing healthcare. Activities, which are described as implementing ehealth solutions, attract significant funding, and consume many resources and much time.

However, despite the frequency with which the term is used, there does not appear to be a general consensus about the meaning of 'eHealth'. While there appears to be near-unanimous support for eHealth and its benefits, there is much less agreement about what eHealth actually represents. Many definitions have been proposed, but there has so far not been any universal agreement about what things might be excluded or included within the scope of the term.

This project explores the possibilities of reaching an international consensus on the use of the term eHealth in order to avoid misunderstandings in the professional dis-

course, and to clarify the potential and scope of eHealth applications.

Participants: Chris Showell, University of Tasmania, Christian Nøhr, Aalborg University

GIS in Health

Exploring the possibilities for developing new research areas for the interdisciplinary competencies at Aalborg University.

Participants: Anders Knørr Lyseen, Esben Munk Sørensen, Egon Toft, Christian Nøhr

ICT for Health (Baltic Region)

ICT for Health - Strengthening social capacities for the utilisation of ehealth technologies in the framework of ageing population.

As an effect of the ageing of the population in general, the number of citizens with chronic diseases is increasing, especially among elderly people throughout the Baltic Sea Region. This is a great challenge for both the wellbeing of the citizens and the public health care systems. Health care solutions provided by information and communication technology (ICT), also known as eHealth, offer one solution to this problem.

The ICT for Health project is aiming to improve the social capacities of citizens and medical professionals to utilise eHealth technologies in prevention and treatment of chronic diseases.

Project period: 4.2.2010 – 31.12.2013

Participants from DaCHI: Pernille Bertelsen, Ann Bygholm and Christian Nøhr

Patient safety

There is evidence that health information technology (HIT) is central to improving safety and quality of health service. But research has also documented the ability of health information systems to introduce new types of errors (i.e. technology-induced errors) that arise from the design and development, the implementation and customization, or the interactions between the operation of a technology and the new work processes that arise from a technology's use.

Within this theme we are engaged in a number of project activities:

- Co-chairing the launch of a new working group on patient safety informatics within the International Medical Informatics Association (IMIA)
- Critically review of initiatives that address safe HIT system design, build, implementation and use in a non-exhaustive set of exemplar countries identified by searching the websites of regional and national agencies and programs in England, Denmark, the Netherlands, the USA, Canada and Australia.
- Analysis of reports on adverse drug events in the Oncology Department at Aalborg Hospital in relation to a newly implemented medication administration system (ONCMED).

Participants: Farah Magrabi, University of New South Wales, Sydney, Australia; Elizabeth Borycki, André Kushniruk, University of Victoria, BC, Canada; Christian Nøhr, Charlotte Bjørnes Aalborg University

Use of Video observations to study work practice in health informatics

Studying work practice can be very complicated in complex organizations such as health care institutions. The clinical staff has special assignments where the work is centered on people with multiple diseases, which constantly change in a non-predictable pattern. In addition to rational and formal work processes, that to a certain extent can be planned and controlled, there is a great number of informal and derived processes that are necessary to keep the organization functioning. These types of work are difficult to study by means of traditional rational analytical framework, but video based observations can be instrumental in this task. Our experience from 12 different video observation project will inspire the development of a methodological framework for video based analysis related to the different phases of a systems development cycle.

Participants: Lars Botin, Andre Kushniruk, Christian Nøhr

Usability test of five medication management systems

In Denmark the five regions have implemented different electronic health record (EHR) solutions developed by different vendors consequently resulting in different working procedures in each region. The systems have been tested according to functionalities, but have not been usability tested to the same depth and using the same methods to allow comparison. Ten physicians were therefore recruited to perform a usability test in a

cross-over design, both testing their own system and an unknown system. This study focuses on the methodology to conduct a usability test in the five different systems focusing on the medication module.

Participants: Marion Berg Christiansen, Christian Nøhr, Anna Marie Kanstrup, Inge Madsen, Aalborg University. André Kushniruk, University of Victoria, BC, Canada

National monitoring of development and use of e-health in Denmark

Earlier we have experienced several research projects making status of penetration of eHealth systems. They have primarily been focused on EHR systems and mostly on whether they have been implemented or not.

However, the penetration has now reached a level making it more interesting to survey whether the systems are used and if so – to what extension and where in the daily clinical work practice.

This is a continual project making a survey every year questioning around 8000 clinicians about their use of e-health systems. The aim of the survey is to clarify the use of and the attitudes to e-health. This survey is the third in a row, addressing randomly selected physicians, nurses and medical secretaries. The survey is made in cooperation with "Lægeforeningen", "Dansk Sygeplejeråd" and "Dansk Lægeseekretærforening". In the long term the objective is to compare the results over several years, making tendencies of use and attitudes to e-health systems visible. Further, the results will make a comparison to other countries possible.

The survey is a part of the Nordic e-Health Research Network (NeRN) making equivalent surveys in the Nordic countries. Further, the project is a part of the OECD task force on model survey on the availability and use of information and communication technologies in the health sector.

Participant: Christian Nøhr, Søren Vingtoft, Marion Berg Christiansen

ANUBIS-WP7 - Ambulant user interface for chronic disease management

This project is initiated as sub-project to the FP6 special targeted research project Ambient Networked User-centric Biomedical Information Structure [ANUBIS]. The sub-project aims at developing a scalable user interface for

people suffering from chronic diseases. This interface will be able to communicate with (scalable) terminals (e.g. mobile phones, PDA's, PC's, and Virtual reality facilities) and will in the project be tested specific on the ANUBIS data-platform that is used to retrieve and store relevant information. Emphasis will be put on scalability and "fall-back procedures" with information under- and overflow, so the user can be confident in the information displayed. The interface has a technical and a conceptual element. The technical element is "pure ICT development", the conceptual element is aiming at injecting new possibilities into the user interface of ICT-terminals especially for "telling health related stories and knowledge" to the end-user. The computer are in it's present form, appearances, and interfaces very much suited for office and finance work, but less suited for supporting human behavioural related activities included decisions in a social and well-being of human's framework.

Department of Architecture & Design, Department of Development and Planning, Department of Media Technology, The division of Technology, Environment and Society, PBL – Artes

Participants: Veirum, Niels Einar (Project participant), Botin, Lars (Project participant), Tosti, Mikael (Project participant), Kofoed, Lise B. (Project participant)

Ambulance Project

In 2011, the Pre-hospital unit in The North Denmark Region initiated a project to establish video facilities in 10 ambulances in the region. These facilities launch video-communication between the paramedics at the scene, and the doctor at the hospital and add new possibilities to an already established and normally used mobile telephone contact between the paramedics and the doctor on call in the required speciality area. The video makes it possible for the doctor at the hospital to see and communicate with the patient from the time when the paramedics are on the scene, e.g. in the patient's own home as well as while driving in the ambulance to the hospital.

The video communication is based on several complementing mobile networks to achieve sufficient band with (broad-band). In the ambulances the video-monitors are mobile to be used both in-side and out-side the ambulances within a demarked area. At the hospital, the video-monitors are stationary with a limited number of fixed "video-stations".

The video facilities are expected to be in use from the beginning of 2011. This evaluation project aims to analyse

possible qualitative and/or quantitative effects, e.g. optimize visitations of patients, reductions in admission.

Primarily, the evaluation seeks to explore the effects from the users' perspective. Doctors, specialist in relevant areas, will be interviewed both before and after. The paramedics' experiences as users will be investigated during the first year.

Participants: Høstgaard, Anna Marie Balling, Nøhr, Christian, Bertelsen, Pernille, Petersen, Lone Stub

Patientdi@logue

Patientdi@logue is a user involving project including intervention and research. The target is to support the patients' needs and possibility of patients with fatal cancer to stay at his / her home during the course of disease. Applying a user involving design process, an IT dialog platform is designed. Patientdi@logue provides patients and relatives access to individualized information and correspondance with health professionals. Furthermore, the possibility of communication between all implicated health professionals performing treatment and nursing is established.

Department of Development and Planning, The division of Technology, Environment and Society, Danish Centre for Health Informatics (Health), Participation and Technology Research Group

Participants: Charlotte D. Bjørnes, Høstgaard, Anna Marie Balling Høstgaard, Pernille Bertelsen

Evaluation of the data validity in a new Danish national database for early detection of infants at risk

Since 2009 health data for all Danish children have been registered in a new national Danish database (Børneda-tabasen) with an aim to enable the early detection of infants at risk. However, data are neither complete nor valid. Thus, the objective of the study is to identify where in the data-generating process errors occur in order to validate data in the database.

The project is supported by Aalborg University, the National Board of Health, Denmark and the municipality of Aalborg.

Participant: Anna Marie Balling Høstgaard, Louise Pape Hougaard

PhD Projects

Modeling of SFI in EHR-systems – a survey of the potential of standardization

Health Professional Level (Sundhedsfagligt Indhold, SFI) is a description of the interface between the electronic health records system (EHR-systems) and clinical domain knowledge. Earlier the clinical domain knowledge were hard coded in the systems, but the last few years both contractor and organizations of standardization have developed models and systems to separate the EHR-systems' information models from the clinical models and the clinical terminology. By doing this, a chance of dynamic improvement of adapting the EHR-systems to a clinical every day emerge. However, it is problematic that lack of practical experiences, well-established methods and governance strategies within the field make modeling of SFI diverse as well as time and resource demanding.

Homogenization and standardization could make SFI used by other than the organization which developed it and thereby improve the interoperability between the systems. However, standardization is a lengthy process - probably because it demands national and international consensus and a thorough re-design of the established It-systems. Therefore, an incremental standardization process relating to the established heterogeneous landscape of systems probably would make standardization possible to implement. To prove this strategy the purpose of the PhD project is to examine the challenge of incremental standardization of SFI related to clinical models and clinical terminology.

PhD project of Kirstine Rosenbeck Gøeg

Use of clinical simulation in development and implementation of clinical information system

Since 2007 the Capital Region of Denmark has conducted simulations on a regular basis in order to qualify IT systems to the clinic. These simulations range from simple setups during the development phase, to full scale simulations. The simulations are performed at IT Experimentarium (ITX) and the lab uses the simulation facilities at DIMS (Danish Institute for Medical Simulation).

The aim of this PhD study is to develop and operationalize methods to design and evaluate information systems that are to be used in the clinical work practice at the hospitals.

The PhD study will investigate the significance of using simulation in the development and evaluation of clinical

information systems. This will be done by literature study and several case studies. The scientific results are aimed to be put into practice. The PhD study encompasses four case studies covering full scale simulation test of clinical information systems from various phases in the development life cycle, and will hereby investigate the usefulness of using simulation in combination with the design and evaluation of information systems in healthcare.

Up till now three case studies have been conducted

1. assessment of potential benefits of a Planning and Coordination Module
2. evaluation of work practice and the usefulness of electronic signing results of different tests; i.e. blood tests and microbiological tests
3. validation of user requirements and use cases in connection with procurement of an it-platform for healthcare in The Capital Region of Denmark and Region Zealand

The fourth case study is being planned

4. assessment of three solutions in connection with procurement an it-platform for healthcare in The Capital Region of Denmark and Region Zealand

PhD project of Sanne Jensen, period: October 2011 to September 2014

Use of SNOMED CT in Denmark

Multiple challenges arise when vendors and system owners strive towards a harmonization of the content within the Electronic health records by the use of standardized clinical terminology. Yet, the motivation for such harmonization exist because it induce a great potential for sharing, comparing and reusing clinical information across systems and borders (departments, hospitals, sectors). Potentially, it will increase the beneficial usage of clinical data for both primary and secondary purposes.

The clinical terminology SNOMED CT is developed to represent all clinically relevant information, and therefore it has a size and complexity that demands for knowledge when applied to clinical information systems. Hence, one challenge is to understand the content and model of the terminology to be able to navigate and select sufficient concepts to represent the concerned clinical information. Another challenge is to ensure that related clinical information that is registered in different clinical templates in the EHR-system is represented by concepts in

the terminology that support the information to be compared.

This topic has been matter of attention in the present PhD study, where an in depth analysis of SNOMED CT combined with an actual SNOMED CT implementation project has been the underlying basis for developing applicable SNOMED CT implementation-guidelines and a software tool for supporting consistent and coherent terminology implementation.

PhD project of Anne R. Højen

Contextual Clinical Information - an Elusive Part of Health Informatics

Access to comprehensive patient information is crucial for the quality of clinical work. Through several years, considerable resources have been spent on developing models, terminologies and other kinds of infrastructure to ensure that key clinical information - e.g. diagnoses, actions, results, etc. - can be digitally processed, shared and presented to the clinical staff.

Some authors have, however, pointed out that key clinical information does not necessarily constitute a sufficient basis for clinical decisions. The information must be seen in context to be understood and interpreted correctly.

It is an open question to what extent contextual information has an impact on daily clinical practice, and how electronic health records can support the clinicians' need for contextual clinical information. The aim of this PhD study is to describe and operationalize contextual clinical information.

Clinical documentation can be understood from a simple communication model consisting of a sender, a message, and a receiver. Hence, contextual clinical information can be seen in two different perspectives:

- The sender-perspective: Any clinical information is provided under some circumstances - in a context - which subsequently may be significant to the information's usefulness.
- The receiver-perspective: A central part of clinical work is to arrange the clinical information in a context - in a given situation some information is perceived as relevant, some is not.

This PhD project deals with both of these perspectives which are illustrated by means of four studies:

- Two literature studies to examine the extent to which contextual factors influence the occurrence of double

documentation and (re)use of clinical information.

- Two observational studies to investigate the nature and significance of sender- and receiver-contextual clinical information in everyday clinical work of physicians.

PhD project of Gert Galster

“Support of IT systems in Hospitals”

The subject of this project is to understand and develop the IT support in hospitals.

Specific requirements and certain circumstances in hospitals make both development and implementation of new systems problematic.

Massive literature on the system development process exists - but after the process of implementation often unforeseen changes in practice occurs.

This PhD project considers and tests by using participatory design, if it is possible to change the way of providing feedback about the systems used in hospitals and to make an ongoing redesign of the work processes and thereby support organizational learning. Project finalised February 2012.

PhD project of Lone Stub Petersen

9. Publications within Health Informatics

Below is a list of the most important health IT related publications from the DaCHI researchers. A full list each researchers publications can be found at VBN: Videnbase Nord (Knowledge Base North) www.vbn.aau.dk having the status of publications 2012.

[eHealth Education of Professionals in the Baltic Sea Area.](#)

/ [Bygholm, Ann](#); Günther, Julia; [Bertelsen, Pernille](#); [Nøhr, Christian](#). Quality of Life through Quality of Information: Studies in Health Technology and Informatics. ed. / J Mantas; S.K. Andersen; M.C. Mazzoleni; B. Blobel; S. Quaglino; A. Moen. Vol. 180 IOS Press, 2012. p. 934-938 (Studies in Health Technology and Informatics, Vol. 180).

Publication: Research - peer-review › Article in proceeding

[Issues in Internationalization of education : The case of a Danish Business School exporting a blended learning MBA program to developing countries.](#)

/ [Youssef, Sandra Safwat](#); [Bygholm, Ann](#); [Jæger, Kirsten](#). Proceedings of the 8th International Conference on Networked Learning 2012. red. / V. Hodgson; C. Jones; M de Laat; D. McConnell; T. Ryberg; P. Sloep. 2012. s. 276-283.

Publikation: Forskning - peer review › Konferenceartikel i proceeding

[Scandinavian Conference on Health Informatics 2012, 2-3 October 2012, Linköping, Sweden.](#)

/ Karlsson, Daniel (Editor); Bellika, Johan Gustav (Editor); [Elberg, Pia Britt](#) (Editor); Fossum, Mariann (Editor); [Galster, Gert](#) (Editor); Hartvigsen, Gunnar (Editor); Koch, Sabine (Editor); Nilsson, Gunilla (Editor). Linköping University Electronic Press, 2012. 73 p. (Linköping Electronic Conference Proceedings; No. 70).

Publication: Research - peer-review › Anthology

[Why is clinical information not reused?.](#)

/ [Galster, Gert](#). Quality of Life through Quality of Information: Proceedings of MIE2012, 26-29 August 2012, Pisa, Italy. ed. / John Mantas; Stig Kjær Andersen; Maria Christina Mazzoleni; Bernd Blobel; Silvana Quaglino; Anne Moen. IOS Press, 2012. p. 624-628 (Studies in Health Technology and Informatics; No. 180).

Publication: Research - peer-review › Article in proceeding

[Using Video Observation to gain insight into complex clinical work practices.](#) / [Høstgaard, Anna Marie Balling](#); [Bertelsen, Pernille](#). MIE 2012: Proceedings of the 24th European Medical Informatics Conference: Quality of Life Through Quality of Information. IOS Press, 2012. p. 378. Publication: Research - peer-review › Article in proceeding

[Video Observation in HIT Development : Lessons learned on Benefits and Challenges.](#) / [Høstgaard, Anna Marie Balling](#); [Bertelsen, Pernille](#). In: [B M C Medical Informatics and Decision Making](#), Vol. 12, No. 91, 22.08.2012, p. 1-33.

Publication: Research - peer-review › Journal article

[A system for determining flow properties of a blood vessel.](#) / [Schmidt, Samuel \(Opfinder\)](#); [Østergaard, Lasse Riis \(Opfinder\)](#); Staalsen, Niels-Henrik (Opfinder); Lundhus, Kasper (Opfinder); Svorkmo, Michael (Opfinder). IPC nr.: G06T 7/00. aug 16, 2012.

Publication: Research › Patent

[Automatic vessel tracking and segmentation using epicardial ultrasound in bypass surgery.](#) / [Jørgensen, Alex Skovsbo](#); [Schmidt, Samuel](#); Staalsen, Niels-Henrik; [Østergaard, Lasse Riis](#). Annual Computing in Cardiology Conference, CinC, 9-12 September 2012, Krakow, Poland. Krakow : AGH University of Science and Technology, 2012. s. 3.

Publication: Research - peer review › Conference abstract in proceeding

[Automatic vessel tracking and segmentation using epicardial ultrasound in bypass surgery.](#) / [Jørgensen, Alex Skovsbo](#); [Schmidt, Samuel](#); Staalsen, Niels-Henrik; [Østergaard, Lasse Riis](#). I: [Computing in Cardiology](#), Vol. 39, 2012, s. 9-12.

Publication: Research - peer review › Conference article in Journal

[BEaST : brain extraction based on nonlocal segmentation technique.](#) / [Eskildsen, Simon Fristed](#); Coupé, Pierrick; Fonov, Vladimir; Manjón, José V.; Leung, Kelvin K.; Guizard, Nicolas; Wassef, Shafik N.; [Østergaard, Lasse Riis](#); Collins, D. Louis. I: [NeuroImage](#), Vol. 59, Nr. 3, 2012, s.

2362-2373.

Publication: Research - peer review › Journal article

[MR-CT registration in image-guided radiotherapy of prostate cancer using a Ni-Ti prostate stent.](#) / [Korsager, Anne Sofie](#); Carl, J.; [Østergaard, Lasse Riis](#). I: [Radiotherapy & Oncology](#), Vol. 103, Nr. Suppl. 1, 2012, s. S535-S536, No. EP-1408.

Publication: Research - peer review › Conference abstract in journal

[MR-CT registration in image-guided radiotherapy of prostate cancer using a Ni-Ti prostatestent.](#) / [Korsager, Anne Sofie](#); Carl, J.; [Østergaard, Lasse Riis](#). 2012. Poster session presented at Summer School on Registration in Image Analysis and Computer Graphics, Falsterbo, Sverige.

Publication: Research › Poster

[Quantitative quality assessment of coronary artery bypass graft surgery using ultra-sound images.](#) / [Jørgensen, Alex Skovsbo](#); [Schmidt, Samuel](#); Staalsen, Niels-Henrik; [Østergaard, Lasse Riis](#). 2012. Poster session presented at Summer School on Registration in Image Analysis and Computer Graphics, Falsterbo, Sverige.

Publication: Research › Poster

[Semi-automatic vessel tracking and segmentation using epicardial ultrasound in bypass surgery.](#) / [Jørgensen, Alex Skovsbo](#); [Schmidt, Samuel](#); Staalsen, Niels-Henrik; [Østergaard, Lasse Riis](#). 34th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, IEEE EMBS, EMBC, 28 August-1 September 2012, San Diego, CA, USA. IEEE Press, 2012. s. 2331-2334 (IEEE Engineering in Medicine and Biology Society. Conference Proceedings).

Publication: Research - peer review › Article in proceeding

[End-user participation in Health IT development : the EUPHIT method.](#) / [Høstgaard, Anna Marie Balling](#). Measuring Organizational Information Systems Success: New Technologies and Practices. ed. / Zakariya Belkhamza; Syed Azizi Wafa. Hershey, USA : IGI global, 2012. p. 318- 340.

Publication: Research - peer-review › Book chapter

[Using Video Observation to gain insight into complex clinical work practices.](#) / [Høstgaard, Anna Marie Balling](#); [Bertelsen, Pernille](#). MIE 2012: Proceedings of the 24th European Medical Informatics Conference: Quality of Life

Through Quality of Information. IOS Press, 2012. p. 378. Publication: Research - peer-review › Article in proceeding
[Reusable data in public health databases : problems encountered in Danish children's database.](#) / [Høstgaard, Anna Marie Balling](#); [Pape-Haugaard, Louise](#). Quality of Life through Quality of Information: Proceedings of MIE2012, 26-29 August 2012, Pisa, Italy. ed. / John Mantas; Stig Kjær Andersen; Maria Christina Mazzoleni; Bernd Blobel; Silvana Quaglini; Anne Moen. IOS Press, 2012. p. 609-613 (Studies in Health Technology and Informatics; No. 180).

Publication: Research - peer-review › Article in proceeding

[Preface.](#) / Mantas, John; [Andersen, Stig Kjær](#); Mazzoleni, Maria Cristina; Blobel, Bernd; Quaglini, Silvana; Moen, Anne. Quality of Life through Quality of Information: Proceedings of MIE2012, 26-29 August 2012, Pisa, Italy. ed. / John Mantas; Stig Kjær Andersen; Maria Christina Mazzoleni; Bernd Blobel; Silvana Quaglini; Anne Moen. IOS Press, 2012. p. v-vii (Studies in Health Technology and Informatics; No. 180).

Publication: Research - peer-review › Preface/ Introduction/postscript

[Quality of Life through Quality of Information : Proceedings of MIE2012.](#) / Mantas, John (Editor); [Andersen, Stig Kjær](#) (Editor); Mazzoleni, Maria Cristina (Editor); Blobel, Bernd (Editor); Quaglini, Silvana (Editor); Moen, Anne (Editor). IOS Press, 2012. (Studies in Health Technology and Informatics, Vol. 180).

Publication: Research - peer-review › Anthology

[Telerehabilitation programme : Lessons learned from the TELEKAT project.](#) / Dinesen, Birthe; Nielsen, C.; Grann, O.; [Andersen, Stig Kjær](#); Hejlesen, Ole; Toft, Egon. The International eHealth, Telemedicine and Health ICT Forum for Education, Networking and Business, 18-20 April 2012, Luxembourg: Exhibition and Conference Guide. International Society for Telemedicine & eHealth, 2012. p. 145.

Publication: Research - peer-review › Conference abstract in proceeding

[Applying visualization to support coherent terminology implementation.](#) / Højen, Anne Randorff; Gøeg, Kirstine Rosenbeck; Elberg, Pia Britt. Scandinavian Conference on Health Informatics, SHI2012, 2-3 October 2012, Linköping, Sweden. Linköping University Electronic Press, 2012. p. 49 (Linköping Electronic Conference Proceedings; No. 70).

Publication: Research - peer-review › Article in proceeding

[SNOMED CT implementation : mapping guidelines facilitating reuse of data.](#) / [Højen, Anne Randorff](#); [Gøeg, Kirstine Rosenbeck](#). In: [Methods of Information in Medicine](#), Vol. 51, No. 6, 2012, p. 529-538.

Publication: Research - peer-review › Journal article

[eHealth indicators : results of an expert workshop.](#) / HYPPOENEN, Hannele ; AMMENWERTH, Elske; [Nøhr, Christian](#); FAXVAAG, Arild ; WALLDIUS, Åke. Quality of Life Through Quality of Information: Proceedings of MIE2012 (Studies in Health Technology and Informatics). ed. / John Mantas; Stig Kjaer Andersen; Maria Cristina Mazzoleni; Bernd Blobel; Silvana Quaglini; Anne Moen. IOS Press, 2012. p. 328-332 (Studies in Health Technology and Informatics, Vol. 180).

Publication: Research - peer-review › Article in proceeding

[Empower the patients with a dialogue-based web application.](#) / [Bjørnes, Charlotte D.](#); Cummings, Elizabeth; [Nøhr, Christian](#). Quality of Life Through Quality of Information: Proceedings of MIE2012 (Studies in Health Technology and Informatics). ed. / John Mantas; Stig Kjaer Andersen; Maria Cristina Mazzoleni; Bernd Blobel; Silvana Quaglini. IOS Press, 2012. p. 452-456 (Studies in Health Technology and Informatics, Vol. 180). Publication: Research - peer-review › Article in proceeding

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Publication: Research - peer-review › Book chapter

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Publication: Research - peer-review › Article in proceeding

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Publication: Research - peer-review › Article in proceeding

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Publication: Research - peer-review › Report

[Contemporary Hospital Architecture : Post-phenomenological readings.](#) / [Botin, Lars](#). The Philosophy of Post-phenomenology and the Future of Philosophy of Technology. New York, 2012.

Publication: Research - peer-review › Conference abstract in proceeding

[Hybrid Imagination in Hospital Architecture.](#) / [Botin, Lars.](#)

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Publication: Research - peer-review › Article in proceeding

[Patientoplysninger : balance mellem fortrolighed og tilgængelighed.](#) / [Gøeg, Kirstine Rosenbeck.](#) In: [Medicinsk Teknologi & Informatik](#), Vol. 9, No. 2, 2012, p. 30-34.

Publication: Communication › Journal article

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Publication: Communication › Journal article

[Preliminary trial for development of an online information service for day surgery patients.](#) / Wacker, K. Ken; Olsen, L.; [Pape-Haugaard, Louise.](#) In: [European Journal of Cardiovascular Nursing](#), Vol. 11, No. Suppl. 1, 2012, p. S43-S44, No. P118.

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[Transversal interoperability for interdisciplinarity in e-Health.](#) / [Pape-Haugaard, Louise.](#) River Publisher, 2012.

Publication: Research - peer-review › Book

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Publication: Research - peer-review › Conference abstract for conference

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