



DESIGN-EM STATUS REPORT

DECEMBER 2017

AARHUS UNIVERSITY: **DESIGN-EM**
RESEARCH NETWORK FOR ORGANIZATION DESIGN AND EMERGENCY
MEDICINE



TABLE OF CONTENT

Introduction	2
Mission of DESIGN-EM	2
Contributions of DESIGN-EM	3
DESIGN-EM Advisory Board Per May 2016	3
Ph.d. Students in the DESIGN-EM network	4
DESIGN-EM Conferences	5
DESIGN-EM Conference 2013	5
Speakers at the 2013 DESIGN-EM Conference	5
Panel Participants	6
DESIGN-EM Conference 2015	6
Speakers at the 2015 DESIGN-EM Conference	6
Panel Participants	7
DESIGN-EM Conference 2016	7
Speakers at the 2016 DESIGN-EM Conference	8
Panel Participants	8
DESIGN-EM Conference 2018	8
Other DESIGN-EM Presentations	9
Publications	11
Publications in the Pipeline	12
Regional Reports on Organizational Design Challenges of Emergency Departments in Denmark	13
DESIGN-EM Sponsors	14
Main Sponsors	14
Additional Sponsors	14



INTRODUCTION

Research Network for Organization Design and Emergency Medicine, DESIGN-EM is a cross-disciplinary research network that combines research-based knowledge about optimizing organization design within the emergency medicine field in order to give evidence-based guidelines for designing effective and efficient emergency departments.

The founding partners are Research Center for Emergency Medicine (CfA), Aarhus University Hospital and Aarhus University and Interdisciplinary Center for Organizational Architecture (ICOA), Aarhus University.

The Design-EM research network is particularly relevant in a time where Danish emergency medical care is undergoing the largest reorganization in decades. The number of acute hospitals have been reduced from 40+ to 21 and the new emergency departments which differ in organization design are being established. The emergency departments play an important role in the planning of future hospitals, including controlling hospital crowding. The vast majority of patients referred to the hospital are seen in the ED, and many of these patients are discharged again without further admission. Further, a new specialty in emergency medicine has just been decided. This calls for knowledge on how the differences in organization impact efficiency, effectiveness, quality of patient care, and resource utilization.

WHAT IS ORGANIZATION DESIGN?

Organizational efficiency and effectiveness is largely determined by the choice of an organization design. Organization design is the design of structures and processes, including, but not exclusively, workflow, use of data and information, incentives structure, and staffing.

WHAT IS EMERGENCY MEDICINE (EM)?

Emergency Medicine is concerned with the initial stabilization, diagnosis, treatment and management of individuals with acute illness and injury. Emergency Medicine encompasses a large amount of general medicine and involves the technical and cognitive aspects of virtually all fields of medicine and surgery. Emergency Medicine is a medical specialty in many countries around the world including Sweden and Finland and now also Denmark.

MISSION OF DESIGN-EM

The mission of the DESIGN-EM research network is to offer new knowledge and innovative solutions to the challenges of organizing emergency medical care in the face of demographic changes and a demand for reducing healthcare costs. The results contribute to insuring future equal access to high quality patient-centered health care when it is needed the most in the emergency situation.



This can be obtained by bringing together expertise in emergency medicine and quality of patient care with state-of-the-art expertise on how to design effective and efficient organizations on the basis of data analytics combined with innovative developments

Similar trends and challenges for the emergency departments as seen in Denmark are occurring internationally, and DESIGN-EM therefore includes international and corporate partners with recognized experience in innovative and research-based solutions for healthcare.

CONTRIBUTIONS OF DESIGN-EM

The cross-disciplinary DESIGN-EM research has produced results that contributes to optimizing Danish healthcare by developing new organizational, technological, and financial solutions making better use of existing resources. Thus, DESIGN-EM contributes to ensure coordination of procedures and services and, for the benefit of patients, employees, as well as collaborative partners and society as a whole. The research has been communicated through publications, conferences (including the conferences hosted by DESIGN-EM), and additional presentations for stakeholders.

This status report will present the activities and initiatives made within the DESIGN-EM network since its establishment, as well as bring an overview of the benefactors enabling the work of the DESIGN-EM researchers.

DESIGN-EM ADVISORY BOARD PER MAY 2016

Jens Friis Bak	Hospital Medical Doctor, Western Jutland Hospital unit, Central Denmark Region
Peter Bogetoft	Professor, CBS and Yale University
Hans Peder Graversen	Medical Director, Health Planning, Central Denmark Region
Michael Hasenkam	Professor, Department of Clinical Medicine
Bo E. Madsen	Emergency Medicine Physician, Mayo Clinic
Torben Mogensen	Deputy Director, Hvidovre and Amager Hospitals, Capital Region Denmark
Jens Peter Steensen	Danish Health Authority
Per Sabro Nielsen	Hospital Medical Director, Prehospital, Central Denmark Region
Kristjar Skajaa	Head of Department, Department of Clinical Medicine



Kristian Antonsen	Deputy Director, Bispebjerg and Frederiksberg Hospital, Capital region Denmark.
Erik Jylling	Health Policy Director, Danish Regions.
Birte Obel	Danish Health Authority
Vibeke Krøll	Chief Nursing Officer Aarhus University Hospital

June 11, 2016 Vibeke Krøll passed away far too early. DESIGN-EM is forever grateful for the strong support and activity Vibeke provided for us.

PH.D. STUDENTS IN THE DESIGN-EM NETWORK

Anders B Møllekær	The reorganization of emergency care in Central Denmark Region 2008-2014: Emergency department performance and quality of care. Main supervisor: Professor Hans Kirkegaard.
Iben Duvald	The organization of and social practices in a Danish emergency department – possible explanations of the ‘weekend effect’. Main supervisor: Professor Børge Obel.
Gitte Boier Tygesen	Development and evaluation of a patient safety model targeting severe clinical deterioration and safety awareness in the Emergency Department. Main supervisor: Hans Kirkegaard.
Henrike Konzag	IS Usage Across Tasks and Shifts – An Analysis of two Hospital Emergency Units. Main supervisor: Professor Børge Obel.
Line Stjernholm Tipsmark	Organizational design of emergency care: Policy evaluation. Main supervisor: Professor Rikke Søgaard, co-supervisor: Professor Børge Obel.



DESIGN-EM CONFERENCES

DESIGN-EM CONFERENCE 2013

Monday the 2nd of December 2013, DESIGN-EM hosted its first conference on organizing emergency departments in Denmark. 150 people from hospitals, regions, boards and ministries participated in the conference to learn about the first research results from the pilot project DESIGN-EM initially conducted in the fall 2012 in 5 emergency departments in the region of Central Jutland.

SPEAKERS AT THE 2013 DESIGN-EM CONFERENCE

	<u>Welcome and introductory remarks</u>
Hans Kirkegaard	Professor, Research Center for Emergency Medicine
Børge Obel	Director, Interdisciplinary Center for Organizational Architecture
	<u>Mapping the organization of shared emergency departments in Region Central Jutland</u>
Anders B Møllekær	Ph.D. student and Physician, Research Center for Emergency Medicine
	<u>Experiences and visions for organizing the shared emergency departments in Region Central Jutland</u>
Ole Mølgaard	Chief Physician, Aarhus University Hospital, Emergency Department
Tommy Midtgaard Jensen	Chief Physician, Randers Regional Hospital, Emergency Department
Larry Højgaard	Chief Physician, Viborg Regional Hospital, Emergency Department
Bente Dam	Head Nurse, Viborg Regional Hospital, Emergency Department
Tommy Andersson	Chief Physician, Herning Region Hospital, Emergency Department
Ove Gardboe	Chief Physician, Horsens Region Hospital, Emergency Department
	<u>International developments in emergency departments: Experiences from the Netherlands</u>
Bert R. Meijboom	Associate Professor, van Rooij MSc, TRANZO, Tilburg University, Holland
Mrs. Liesbeth van Gils	Junior Researcher, van Rooij MSc, TRANZO, Tilburg University, Holland
	<u>Perspectives and experiences from the Danish regions</u>
Christian Boel	Vice President, Central Jutland Region
Jørn Munkhof Møller	Chief Physician, Northern Jutland Region
Jakob Lundager Forberg	Chief Physician, Capital Region
Jens Peter Steensen	Medical Director at OUH, Southern Denmark Region



Knut Borch-Johnsen Vice President at Holbæk Hospital, Zealand Region

PANEL PARTICIPANTS

Debate on the organization, quality and resource expenditure in shared emergency departments in Denmark

Anne Brøcker	Senior Consultant, Central Jutland Region
Jørn Munkhof Møller	Chief Physician, Northern Jutland Region
Jakob Lundager Forberg	Chief Physician, Capital Region
Jens Peter Steensen	Medical Director at OUH, Southern Region Denmark
Knut Borch-Johnsen	Vice President at Holbæk Hospital, Zealand Region Denmark
Dan Brun Petersen	Chairman, Danish Society for Emergency Medicine
Anette Jacobsen	Chairman, Danish Nurses Organization
Niels Qvist	Deputy Chairman Professor, Organization of Danish Medical Societies
Camilla Noelle Ratcke	Chairman for Younger Physicians, Danish Medical Association

DESIGN-EM CONFERENCE 2015

In 2015 on the 12th of March, DESIGN-EM hosted its second conference. 180 persons registered for the conference to learn about the most recent research results from the interdisciplinary research network of DESIGN-EM. All regions, the Danish Health Authority and several leaders from emergency hospitals were represented at the conference.

SPEAKERS AT THE 2015 DESIGN-EM CONFERENCE

Hans Kirkegaard	<u>Challenges in the emergency department</u> Professor, Research Center for Emergency Medicine
Børge Obel	<u>An organizational perspective on the challenges in the emergency department</u> Director, Interdisciplinary Center for Organizational Architecture
Anders B Møllekær Hanne Jørsboe	<u>The results of the nationwide research on the organization of emergency departments in Denmark</u> Ph.D. Student and Physician, Research Center for Emergency Medicine Specialty Responsible Chief Physician, Zealand Region Denmark
Jens Peter Steensen	<u>Incentive challenges related to the care of emergency patients</u> Director, Odense University Hospital



Elena Shulzenko	<u>Incentive systems and motivation – A case study of the orthopaedical surgical patient care at Odense University Hospital</u> Postdoc, Interdisciplinary Center for Organizational Architecture
Søren Aggestrup	<u>The organization of the first of the new emergency hospitals</u> Medical Director, Southern Jutland Region Denmark
Bente Dam	<u>The use of the development tool trial actions in organizing emergency departments</u> Head Nurse, Emergency Department, Central Jutland Region Denmark
Iben Duvald	<u>Trial actions; how are they being used in organizational development of departments and which challenges can occur in the process</u> Ph.D. Student and Anthropologist, Interdisciplinary Center for Organizational Architecture
Hans Kirkegaard Børge Obel	<u>Preliminary recommendations for organizing emergency departments</u> Professor, Research Center for Emergency Medicine Director, Interdisciplinary Center for Organizational Architecture

PANEL PARTICIPANTS

Debate on the presented recommendations

Bo Madsen	Regional Medical Director for Emergency Medicine, Assistant Professor, Mayo Clinic
Torben Mogensen	Vice President, Zealand Region Denmark
Jørn Munkhof Møller	Chief Physician, Emergency Department, Northern Jutland Region
Vibeke Krøll	Chief Nursing Officer Aarhus University Hospital
Birte Obel	Chief Physician, Office manager, Danish Health Authority

DESIGN-EM CONFERENCE 2016

The third DESIGN-EM conference was hosted on the 12th of May 2016 with 84 paying participants. The focus of this conference was on the link between organization and patient outcome – including mortality.



SPEAKERS AT THE 2016 DESIGN-EM CONFERENCE

	<u>Welcome and status for DESIGN-EM</u>
Hans Kirkegaard	Professor, Research Center for Emergency Medicine
Børge Obel	Director, Interdisciplinary Center for Organizational Architecture
	<u>Stitching Ties: Physician networks and hospital's surgical care performance</u>
Russel Funk	Assistant Professor, Strategic Management & Entrepreneurship, University of Minnesota
	<u>The weekend effect – Organization, cooperation and behavior as well as the potential impact to patient outcome</u>
Iben Duvald	Ph.D. Student and Anthropologist, Interdisciplinary Center for Organizational Architecture
Betina Vest-Hansen	Physician, Research Center for Emergency Medicine
	<u>The organization of emergency departments and mortality risk – The results from a study of 5 emergency departments</u>
Anders Møllekær	Ph.D. Student and Physician, Research Center for Emergency Medicine
Jacob Kjær Eskildsen	Head of Department, Department of Management, Aarhus University

PANEL PARTICIPANTS

Debate based on of the conference presentations

Nicolai Döllner (Moderator)	Chief Editor, Dagens Medicin/Today's Medicine
Vibeke Krøll	Chief Nursing Officer Aarhus University Hospital
Birgitte Nybo Jensen	Chief Physician, Capital Region Denmark
Bo Madsen	Regional Medical Director for Emergency Medicine, Assistant Professor, Mayo Clinic
Mads Skipper	Board Member and Chairman, The Danish Medical Association, Committee of Education and Research

DESIGN-EM CONFERENCE 2018

The fourth DESIGN-EM conference will take place on the 20th of March 2018.



OTHER DESIGN-EM PRESENTATIONS

- 2014 Anders B Møllekær: Performance Measurement System design: Developing a new system for Danish emergency departments. PMA (Performance Management Association) conference . June 20th .
- 2014 Anders B Møllekær: (Mangler titel). 6th Danish Emergency Medicine Conference (DEMC6). (Odense, Denmark).
- 2014 Børge Obel: The organization of shared emergency departments. The future hospital (Fremtidens hospital). University of Southern Denmark. December 4th.
- 2015 Anders B Møllekær: Organisering af akutafdelingerne: anbefalinger fra DESIGN-EM projektet. Danish Society for Emergency Medicin. 7th of May. (Aarhus, Denmark)
- 2016 Børge Obel: Presentation of DESIGN-EM results in Ministry of Health. March 31st.
- 2016 Børge Obel: Organizing shared emergency departments in Denmark. Results and recommendations from a research project. Jydsk Medicinsk Selskab. 3rd of March.
- 2016 Gitte Boier Tygesen: Poster/short oral presentation: Safe Emergency Hospitalizations. Research day at Viborg Region Hospital (Viborg, Denmark).
- 2016 Gitte Boier Tygesen: Poster presentation: Safe Emergency Hospitalizations. Research day at Horsens Region Hospital (Horsens, Denmark).
- 2016 Gitte Boier Tygesen: Safe Emergency Hospitalizations, Research Center for Emergency Medicine, Aarhus University hospital.
- 2016 Iben Duvald: Poster/short oral presentation: Adverse events in an emergency department – weekdays and weekends. 7th Danish Emergency Medicine Conference (DEMC7). (Copenhagen, Denmark).
- 2016 Iben Duvald: Poster/short oral presentation: The collaboration between the emergency department and the other departments at the hospital – possible explanations of the weekend effect in an emergency department. 7th Danish Emergency Medicine Conference (DEMC7). (Copenhagen, Denmark).



- 2016 Iben Duvald: Poster presentation: The organization of and behavior as possible explanations of the weekend effect in emergency departments Research day at Viborg Region hospital (Viborg, Denmark).
- 2016 Iben Duvald: Weekend effect: organization, cooperation and behavior. Staff meeting at Viborg Region hospital.
- 2016 Iben Duvald: The organization of and behavior as possible explanations of the weekend effect in emergency departments. The International Conference in Emergency Medicine (ICEM). (Cape Town, South Afrika).
- 2016 Hans Kirkegaard: Projekter i DESIGN-EM: Et interdisciplinært forskningsnetværk. DEMC7, København
- 2017 Gitte Boier Tygesen: Nursing research in an emergency department. DAENA Nursing specialist day (Sygeplejefaglig dag), (Aarhus, Denmark).
- 2017 Gitte Boier Tygesen: Safe Emergency Hospitalizations, DASEM Annual Meeting.
- 2017 Iben Duvald: The organization of and social practices in a Danish emergency department – possible explanations of the ‘weekend effect’. Departmental Seminar, Primary Care Health Sciences. (Oxford, Great Britain).
- 2017 Iben Duvald: The organization of and social practices in a Danish emergency department – possible explanations of the ‘weekend effect’. Health Experience Research Group (HERG), Primary Care Health Sciences. (Oxford, Great Britain)
- 2017 Iben Duvald: Poster presentation: Solving shortage with a temporary ‘emergency’ physician – challenges and advantages. 11th European Congress on Emergency Medicine (EuSEM). (Athens, Greece).
- 2017 Iben Duvald: Poster presentation: Challenges in the collaboration with other departments, weekdays and weekends. 11th European Congress on Emergency Medicine (EuSEM). (Athens, Greece).
- 2017 Iben Duvald: Poster presentation: Adverse events and registration practice in an emergency department. 11th European Congress on Emergency Medicine (EuSEM). (Athens, Greece).



PUBLICATIONS

Original papers

2016 Raaber N, Duvald I, Riddervold IS, Christensen EF, Kirkegaard H. Geographic information system data from ambulances applied in the emergency department: effects on patient reception. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 24: 39, 9

2016 Eiset AH, Erlandsen M, Møllekær AB, Mackenhauer J, Kirkegaard H. A generic method for evaluating crowding in the emergency department. *BMC Emergency Medicine* 1:21

Papers and abstracts

2014 Duvald I, Kirkegaard H. Prøvehandling som metode i organisationsudvikling. *Tidsskrift for Dansk Sundhedsvæsen* 90(7)

2014 Møllekær AB. Fordele og ulemper ved akutmodtagelsernes forskellige organiseringer (Advantages and disadvantages in emergency department organization). *Tidsskrift for Dansk Sundhedsvæsen*. 90(7)

2015 Møllekær AB, Duvald I, Obel B, Eskildsen JK, Kirkegaard H. The organization of Danish emergency departments may not have allowed for a full realization of their performance potential. *Scand J Trauma Resusc Emerg Med*. 23(Suppl 1): A52.

2016 Tygesen GB, Haakonsen SJ, Uhrenfeldt L. Effectiveness of decision tools used to identify adult patients suitable for early discharge from the Emergency Departments (ED): a systematic review protocol. *JBI Database System Rev Implement Rep*. 14 (1).

2017 Duvald I. Adverse events in an emergency department weekdays and weekends. Meeting abstracts from the 7th Danish Emergency Medicine Conference. In: *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 25, Nr. 29

2017 Duvald I. The collaboration between the emergency department and the other departments at the hospital as a possible explanation of the weekend effect in



an emergency department. Meeting abstracts from the 7th Danish Emergency Medicine Conference. In: Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 25, Nr. 29.

Book chapters

- 2014 Møllekær AB, Duvald I, Kirkegaard H, Sørensen PD, Eskildsen JK, Obel. Organisationsdesign af fælles akutmodtagelserne. Chapt. 17 in K.M. Pedersen & N.C. Petersen (red.): Fremtidens hospitaler. Munksgaard
- 2015 Duvald I, Jensen KE, Astrup P. Prøvehandling – En let innovationsmetode. Gyldendal Business

PUBLICATIONS IN THE PIPELINE

- 2018 Duvald I. Adverse events in an emergency department weekdays and weekends – a critical study of registration practices.
- 2018 Duvald I. Fits and misfits between the information processing requirements and capacities: the weekend effect in a hospital emergency department
- 2018 Duvald I, Vest-Hansen B, Boysen MA, Møllekær AB: The weekend effect in a Danish emergency department.
- 2018 Jensen SH, Duvald I, Aagaard R, Primdahl S, Petersen P, Kirkegaard H, Weile J. Supervision via Tele-ultasound in Point-of-care Lung and Cardiac Ultrasound.
- 2018 Møllekær AB., Duvald I, Obel B, Eskildsen JK, Kirkegaard H. The organization of Danish Emergency departments.
- 2018 Møllekær AB, Duvald I, Obel B, Eskildsen JK, Kirkegaard H. Goal directed emergency department organization.
- 2018 Møllekær AB, Kirkegaard H, Vest-Hansen B, Duvald I, Eskildsen JK, Obel B, Madsen B. 7-days mortality after discharge from a Danish emergency departments: demographic and organizational predictors
- 2018 Tipsmark L, Sønderdahl A, Møllekær AB, Obel B, Sjøgaard R. Evidence for the effects of organizational design strategies on emergency medicine: A systematic review of the literature. Scandinavian Journal of trauma resuscitation and emergency medicine.



2018 Eiset E, Kirkegaard H, Erlandsen M. Crowding in the emergency department-
analysis of predictors for departures

REGIONAL REPORTS ON ORGANIZATIONAL DESIGN CHALLENGES OF EMERGENCY DEPARTMENTS IN DENMARK

Based on research exploring comparative case studies across several emergency departments in all five regions of Denmark throughout 2014/2015, an extensive report for each region has been developed with remarks on organizational challenges observed in this particular region.

2015 Duvald I, Møllekær AB, Kirkegaard H, Obel B. Organiseringen af akutmodtagelserne i Region Nordjylland – en rapport fra DESIGN-EM
- A comparative case study of 3 emergency departments in Region Northern Denmark.

2016 Duvald I, Møllekær AB, Kirkegaard H, Obel B. Organiseringen af akutmodtagelserne i Region Hovedstaden – en rapport fra DESIGN-EM
- A comparative case study of 5 emergency departments in Region Capital Denmark.

2016 Duvald I, Møllekær AB, Kirkegaard H, & B. Obel: Organiseringen af akutmodtagelserne i Region Syddanmark – en rapport fra DESIGN-EM
- A comparative case study of 5 emergency departments in Region Southern Denmark.

2016 Duvald I, Møllekær AB, H. Kirkegaard, Obel B. Organiseringen af akutmodtagelserne i Region Sjælland – en rapport fra DESIGN-EM
- A comparative case study of 4 emergency departments in Region Zealand Denmark.

2016 Møllekær AB, Duvald I, Kirkegaard H, Obel B: Organiseringen af akutmodtagelserne i Region Midtjylland – en rapport fra DESIGN-EM
- A comparative case study of 5 emergency departments in Region Central Jutland.



DESIGN-EM SPONSORS

A number of sponsors/benefactors have enabled the work of the DESIGN-EM research network. These are listed below.

MAIN SPONSORS

The Interdisciplinary Center for Organizational Architecture, Aarhus University

Research Center for Emergency Medicine

ADDITIONAL SPONSORS

School of Business and Social Science, Aarhus University

Faculty of Health, Aarhus University

Department of Management, Aarhus University

Region Central Denmark

IT-Vest

Helsefonden