



DESIGN-EM STATUS REPORT

JANUARY 2018 - OCTOBER 2021

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



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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 emergency departments, 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 is the second status report from DESIGN EM, and will present the activities and initiatives made within the DESIGN-EM network in 2018-2021, as well as bring an overview of the benefactors enabling the work of the DESIGN-EM researchers. The first status report presenting activities and initiatives made within the DESIGN-EM since its establishment in 2013 and until 2017 are available on DESIGN EM's homepage <https://mgmt.au.dk/research/organisation-strategy-and-accounting/icoa/research/design-em/>

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 Frederiksbjerg Hospital, Capital region Denmark.



Erik Jylling Health Policy Director, Danish Regions.
Birte Obel Danish Health Authority

MEMBERS OF THE DESIGN-EM NETWORK

Hans Kirkegaard Professor in Emergency Medicine, Research Center for Emergency Medicine, Aarhus University

Børge Obel Professor Emeritus, Interdisciplinary Center for Organizational Architecture, Department of Management, Aarhus University

Jacob Kjær Eskildsen Head of Department, Department of Management, Aarhus University

Iben Duvald Anthropologist, Assistant Professor, Interdisciplinary Center for Organizational Architecture, Department of Management, Aarhus University. Affiliated with the Emergency department at Viborg Regional Hospital, Regional Hospital Central Jutland

Henrike Konzag Assistant Professor, Interdisciplinary Center for Organizational Architecture, Department of Management, Aarhus University

Gitte Boier Tygesen Development manager and PhD, Department of Emergency Medicine, Aarhus University Hospital. Affiliated with the Research Center for Emergency Medicine, Aarhus University.

Anders B Møllekær MD, MBA, PhD, Physician at the Emergency department at Regional Hospital West Jutland.

Line Stjernholm Tipsmark PhD, DEFACTUM (Consultant and Research House within Central Denmark Region, associated with Department of Public Health at Aarhus University)

Dea Kehler MD, Master in leadership, learning processes and organizational Psychology, PhD, Chief Physician at the Emergency department at Regional Hospital West Jutland.

Marianne Lisby Associate Professor, Department of Clinical Medicine, Aarhus University and Department of Emergency Medicine, Aarhus University Hospital. Affiliated with the Research Center for Emergency Medicine, Aarhus University.



PHD DISSERTATIONS IN THE DESIGN-EM NETWORK

Iben Duvald	Exploring and explaining the weekend effect in a Danish emergency department. Main supervisor: Professor Børge Obel. Department of Business Development and Technology, Aarhus BSS, Aarhus University. Thesis defended June 2018.
Anders B Møllekær	The organization of Danish Emergency departments and patient outcome. Main supervisor: Professor Hans Kirkegaard. Department of Health, Aarhus University. Thesis defended October 2018.
Henrike Konzag	Use of Information Systems across Tasks and Shifts: An analysis of Two Hospital Emergency Units. Main supervisor: Professor Børge Obel. Department of Management, Aarhus BSS, Aarhus University. Thesis defended December 2018.
Gitte Boier Tygesen	Development and evaluation of a situation awareness model targeting clinical deterioration in the Emergency Department. Main supervisor: Professor Hans Kirkegaard. Thesis defended June 2020.
Line Stjernholm Tipsmark	Organizational Design of Emergency Departments: Policy evaluation. Supervisor: Professor Børge Obel. Thesis defended March 2021.

DESCRIPTIONS OF CURRENT PROJECTS WITHIN DESIGN-EM

CONSEQUENCES OF THE COVID-19 PANDEMIC FOR FUTURE ORGANIZATION OF EMERGENCY CARE (2021-)

Børge Obel, Hans Kirkegaard

Aim: The overall purpose of the project is to describe and analyze the organizational changes at the individual hospital in the Danish Central Jutland Region caused by the Covid-19 pandemic, as well as the impact on patient flow and treatment quality, to find out what have the hospitals done, what worked and how.

Methods: A qualitative approach with semi-structured interviews, especially focusing on the five emergency departments in Central Jutland Region will be used. Data will be collected from the department management in the emergency departments along with the hospital management teams in each hospital. Additionally, interviews will be conducted with the executive vice president in the Central Jutland Region and with



management of the prehospital. The aim is to describe, analyze and understand the rationale of the organizational changes made at each hospital and the subsequently experiences. Interviews will be supplemented with available instructions, guidelines, newsletters from management, minutes of meetings in the region's crisis staff and other available minutes and reports. The overall organizational perspective will focus on changes in the organization, decision-making processes, resource allocation and coordination. The analysis of the individual hospital will be based on the Multi-contingent theory.

Collaborators: Emergency Department Regional Hospital Horsens, Emergency Department Regional Hospital Viborg, Emergency Department Regional Hospital Randers, Emergency Department Regional Hospital Herning, the pre-hospital in the Central Jutland Region and the Executive Board Central Jutland Region.

CONSEQUENCES OF THE COVID-19 PANDEMIC FOR FUTURE EMERGENCY CARE: PATIENT FLOW, SAFETY AND QUALITY OF TREATMENT IN EMERGENCY DEPARTMENTS (2021-)

Gitte Boier Tygesen, Hans Kirkegaard, Marianne Lisby

Aim: The purpose of this project is to investigate the patient flow in the emergency departments before and during the COVID-19 pandemic. In addition, to determine the quality of the provided diagnostics and treatment. Finally, to determine the pandemics impact on safety issues e.g. readmissions, mortality and transfers to intensive care units.

Hypothesis: The patient intake is associated with the COVID-19 reproduction rate. It may result in a reduced number of diseases in the emergency departments; however, patients being more severely ill.

Method: It is a register study based on data documented in the period from 1. of January 2019 until 31th. of December 2020. Data is disclosed from the CPR register and from Central Denmark Regions 'Data warehouse', which contain data from the electronic patient journal e.g. blood tests, radiology, diagnostic procedures, medication, vital signs, ventilation, lengths of stay, transfers, admissions, readmission, and death. We expect around 600.000 contacts to the EDs during the study-period distributed on approximately 250.000 patients. The primary endpoints are comparison of patient flow and patient safety (readmissions, mortality) between the pre-COVID-19 period (January to December 2019) and during COVID-19 (January to December 2020). Both descriptive and analytic statistics will be applied including univariate and multivariate regression analysis.

Setting: Data from the five emergency departments in Central Denmark Region.

Collaborators: Emergency Department Regional Hospital Horsens, Emergency Department Regional Hospital Viborg, Emergency Department Regional Hospital Randers, Emergency Department Regional Hospital Herning, the pre-hospital in the Central Jutland Region and the Executive Board Central Jutland Region.

IN-HOME TREATMENT OF ELDERLY PATIENTS – A CROSS-SECTORIAL ALTERNATIVE TO EMERGENCY ADMISSION (2018-)

Iben Duvald, Børge Obel, Hans Kirkegaard

Aim: The purpose of this research project is to avoid cases with unnecessary emergency admissions of elderly, medical patients to reduce the risk of infections, delirium and physical and psychical loss of function



at a vulnerable patient group. Moreover, the design of a new cross-sectorial patient pathway in the patient's own home means fewer emergency admissions, and give the patients a possibility to play a more active role in their own treatment. Hospital treatment in own home is a smaller intervention in their daily life of the patient and is expected to result in increased quality of life.

Methods: By means of action research, practitioners from three municipalities and hospital as well as GPs will in collaboration in an iterative process, where it is possible to make adjustments in route, find an organizing that can support an optimum treatment in the immediate environment of the citizen. When testing the patient pathway, we develop the pathway further by using patients and relatives' first-hand experiences. The project strives towards a broad evaluation of the new hospital at home patient pathway, and therefore a series of methods such as literature reviews, qualitative interviews, focus groups, participant observations, dialogue meetings, questionnaires, analysis of administrative data, and health economics/statistical calculations are used.

Collaborators: It is a joint research project between three municipalities (Skive, Viborg, Silkeborg), GPs, the Emergency department at Viborg Regional Hospital, Regional Hospital Central Jutland, and the prehospital services. Researchers from ICOA, CfA, and DEFACTUM support the cross-sectorial collaboration as to knowledge, investigate the process by organizing the new patient pathway across professions, sectors, and organization forms, and investigate the effect of the new pathway, both as to quantity and quality. Internationally, Professor David Coghlan from Trinity Business School, Ireland, who is specialized in action research, is affiliated as consultant at the project.

DEVELOPMENT AND EVALUATION OF A PATIENT SAFETY MODEL TARGETING SEVERE CLINICAL DETERIORATION AND SAFETY AWARENESS IN THE EMERGENCY DEPARTMENT (2016-)

Gitte Boier Tygesen, Hans Kirkegaard

Aim: The overall aim of this study is to develop and evaluate the effect of a situation awareness model inspired by the Cincinnati Situation Awareness model. The model will be adjusted to the Danish healthcare system and to target adult patients in the Emergency Department.

Method: A systematic literature review will be conducted to identify risk factors that should be considered for inclusion in a situation awareness model targeting clinical deterioration in hospitalized adults. A patient model will be developed on the basis of the literature review, selection of the most important predictors informed by a Delphi process and the Cincinnati Situation Awareness model and tested in a pilot study. In a controlled intervention study, the effect of the model will be tested in relation to clinical deterioration, the staffs' perception of the patient safety culture and serious adverse events.

Settings: The intervention will be carried out at the emergency departments at Regional Hospital Horsens and Regional Hospital Viborg with Regional Hospital Randers and Regional Hospital Herning as control departments.

Collaborators: Emergency Department Regional Hospital Horsens, Emergency Department Regional Hospital Viborg, Emergency Department Regional Hospital Randers, Emergency Department Regional Hospital Herning, Research Center for Emergency Medicine, and The Cincinnati Children's Hospital, USA.



ORGANISATION OF EMERGENCY DEPARTMENTS: AN EVALUATION OF THE POLICY DESIGN (2016-)

Line Tipsmark, Børge Obel

Aim: The overall purpose of the project is to investigate the national policy recommendations of emergency department reorganization in terms of: implementation status and the effects on health, quality and costs. Furthermore, organizational determinants and effects of diagnostic quality is assessed.

Methods: A national, cross-sectional survey was performed to identify implementation status and organizational designs at Danish emergency departments. To analyze the effect of emergency department reorganization, the survey data was combined with register data and a multilevel analysis was performed. Hip fracture and erysipelas emergency episodes were chosen as study population. From organizational theory, the multi-contingency model and information processing theory is applied as an overall analytical framework.

Setting: All 21 emergency departments in Denmark.

Intervention: Evaluation of the Danish policy on emergency department reorganization from 2007.

INFORMATION SYSTEMS IN SHIFT WORK (2014-)

Henrike Konzag, Børge Obel

Aim: My projects aims at investigating how healthcare professionals use an information system (IS) to support patient treatment in a shift work context. Theoretically, use is motivated by a number of factors related to the individual user's domain such as usefulness to the individual user's work or ease of use. In a setting in which close collaboration not only within a single work shift, but also across is a prerequisite for the quality of patient care/outcome, but the use of IS may be motivated by other factors than usefulness and ease of use.

Methods: The project can be classified as qualitative study, more specifically a case study applying interviews and observations as primary means of data sources.

Setting: The Emergency Department at Viborg Regional Hospital, Regional Hospital Central Jutland

INTERNATIONAL COLLABORATION

COLLABORATION BETWEEN CLIO AND ICOA/CFA

In May 2019, collaboration between Center for Leadership, Innovation and Organization (CLIO), LUISS University Rome and Design-EM was established. The purpose of the collaboration is to create joint projects where the expertise from both groups can facilitate the development of emergency care.

Project Participants:

- Børge Obel (bo@icoa.au.dk)
- Valentina Iacopino (viacopino@luiss.it)



- Daniele Mascia (dmascia@luiss.it)
- Luigi Marengo (lmarengo@luiss.it)
- Luca Giustiniano (lgiusti@luiss.it)
- Iben Duvald (idp@mgmt.au.dk)
- Henrike Konzag (konzag@mgmt.au.dk)
- Hans Kirkegaard (hans.kirkegaard@clin.au.dk)

February 4, 2020, a joint seminar with the title New Organizational Forms in Healthcare with Focus on Micro Level Organization was held at LUISS University.

DESIGN-EM PRESENTATIONS

DESIGN-EM CONFERENCE 2018

The fourth DESIGN-EM conference took place on the 20th of March 2018, and had 122 paying participants. The focus of this conference was on the link between patient safety and the organization of the emergency departments.

Børge Obel	<u>Welcome and status for DESIGN-EM</u> Professor, Interdisciplinary Center for Organizational Architecture
Anne-Marie Vangsted	<u>Patient safety in the emergency departments</u> Director, Styrelsen for Patientsikkerhed
Gitte Boier Tygesen	<u>Safe patient flow within the emergency department (situation awareness)</u> PhD student and Nurse, Horsens Regional Hospital and Research Center for Emergency Medicine
Phillip Andersson	<u>Improving patient safety by using population health decision support</u> Director, International Collaborations, Division of International Emergency Medicine and Humanitarian Programs, Boston's Brigham and Women's Hospital – A teaching hospital of Harvard Medical School, Boston
Iben Duvald	<u>Is it safe to be admitted to the emergency department at weekends, and what can the reason be, if it is not safe to be admitted?</u> PhD student and Anthropologist, Interdisciplinary Center for Organizational Architecture
Andreas Eiset	<u>Crowding in emergency departments is dangerous, but (somehow) predictable</u> PhD student and MD, Department of Aarhus University



Patient-outcome and the organization of the emergency departments

Anders Møllekær

PhD student, Physician, and MBA, Research Center for Emergency Medicine

At the conference, the participants had the opportunity to visit the new emergency department at Aarhus University Hospital. Chief Physician, Ole Mølgaard, gave a short presentation of the organization of the emergency department before the visit.

PANEL PARTICIPANTS

Debate based on of the conference presentations

Christian Skjærbæk	Chief Physician, Randers Regional Hospital, Emergency Department and Chairman for Danish Society for Emergency Medicine
Phillip Andersson	Director, International Collaborations, Division of International Emergency Medicine and Humanitarian Programs, Boston's Brigham and Women's Hospital – A teaching hospital of Harvard Medical School, Boston
Anne-Marie Vangsted	Director, Styrelsen for Patientsikkerhed
Susanne Juul	Head Nurse, Herlev and Gentofte Hospital, Emergency Department

Moderated by Hans Kirkegaard, Professor, Research Center for Emergency Medicine

OTHER DESIGN-EM PRESENTATIONS – ORAL PRESENTATIONS

2021	Gitte Boier Tygesen (invited speaker): Alcohol treatment in the emergency department. 9th Danish Emergency Medicine Conference (DEMC9). (Copenhagen, Denmark).
2021	Gitte Boier Tygesen: Situation awareness and patient safety in Danish emergency departments. Emergency Medicine Research Symposium. (Sandbjerg Gods, Denmark).
2021	Henrike Konzag: Continuous Cyclic Organizations – Coordination across Time Cycles. Academy of Management (AOM). (Virtual conference).
2021	Iben Duvald (invited speaker): In-Home Hospital Treatment of Elderly Acute Sick Patients. 9th Danish Emergency Medicine Conference (DEMC9). (Copenhagen, Denmark).
2021	Iben Duvald: In-Home Hospital Treatment. Emergency Medicine Research Symposium. (Sandbjerg Gods, Denmark).



- 2021 Line Stjernholm Tipsmark (Invited speaker): Organization of emergency departments: evaluation of the policy design. Clinical Research Center. (Online).
- 2021 Line Stjernholm Tipsmark (Invited speaker): Organization of emergency departments: evaluation of the policy design. Danish health authority, Department of hospital planning. (Online).
- 2020 Gitte Boier Tygesen: Development and evaluation of a situation awareness model targeting clinical deterioration in the emergency departments – a quasi experimental study. The European Emergency Medicine Congress (EUSEM). (Copenhagen, Denmark).
- 2020 Henrike Konzag: Nurse Usage of HIS to Coordinate Work across Shifts. 53rd Hawaii International Conference on System Sciences (HICSS). (Hawaii).
- 2020 Iben Duvald: Combining action research and organization design in order to solve the problem with more elderly patients across and in collaboration with different type of organizations. European Academy of Management Annual Meeting (EURAM). (Virtual conference).
- 2019 Gitte Boier Tygesen (Invited speaker): Safe Emergency Admissions – the effect of a patient safety model. Akutfagligt råd (council for emergency medicine) (Viborg, Denmark).
- 2019 Gitte Boier Tygesen (Invited speaker): Safe Emergency Admissions – the effect of a patient safety model. The Prehospital Service. (Aarhus, Denmark).
- 2019 Henrike Konzag, Lars Mathiassen: Information Systems Use in Shift Work. Health Information Technology Symposium (HITS) Pre-ICIS (International Conference on Information Systems). (Munich, Germany).
- 2019 Iben Duvald (Invited speaker): Collaboration seen from an outside perspective. Temadag i forbindelse med Sundhedsvisitation Midt (A day with focus on the hospital visitation at HEM). (Viborg, Denmark).
- 2019 Iben Duvald: In-home treatment of elderly acute sick patients, but how? The organization of a new patient pathway by using action research. Symposium, Viborg Regional Hospital. (Viborg, Denmark).
- 2019 Iben Duvald (Invited speaker): In-home treatment of elderly. Fælles Temadag for alle uddannelseslæger inden for Almen Medicin i Region Midtjylland (A day for physicians specializing in general medicine in RM). (Silkeborg, Denmark).



- 2019 Iben Duvald (Invited speaker): Weekend effect in an emergency department – does it exist and what could the reason be? Center for Innovative Medical Technology (CIMT) seminar. (Odense, Denmark).
- 2018 Anders Møllekær (Invited speaker): How to get the collaboration with the other departments to work? 8th Danish Emergency Medicine Conference (DEMC8). (Aarhus, Denmark).
- 2018 Gitte Boier Tygesen (Invited speaker): Patient Safety. 8th Danish Emergency Medicine Conference (DEMC8). (Aarhus, Denmark).
- 2018 Gitte Boier Tygesen: Development of a Danish Emergency Department Patient Safety Model using systematic search and modified Delphi Process. PhD Day, Department of Health, Aarhus University. (Aarhus, Denmark).
- 2018 Gitte Boier Tygesen (Invited speaker): Risk factors in the Emergency Department (blood test/bio markers). Do we (måler) and observe the right things? Emergency Medicine Research Symposium. (Sandbjerg Gods, Denmark).
- 2018 Gitte Boier Tygesen: Safe emergency admissions. Research Day at the Regional Hospital Horsens. (Horsens, Denmark).
- 2018 Gitte Boier Tygesen: Safe emergency admissions. Summer School at SDU. (Odense, Denmark).
- 2018 Iben Duvald (Invited speaker): Weekend effect in an emergency department. 8th Danish Emergency Medicine Conference (DEMC8). (Aarhus, Denmark).
- 2018 Iben Duvald: In-home treatment of elderly medical patients - an alternative to acute admission. Acute functions 2018; Process, implementation and knowledge sharing. (Aarhus, Denmark).
- 2018 Line Stjernholm Tipsmark: Organization of Danish emergency departments, Intern conference, DEFACTUM. (Aarhus Denmark).

PUBLICATIONS

Original papers



- 2021 Duvald I. When methods play each other good. A reflection on how anthropology and action research can be combined. Jordens Folk. Accepted for publication. (In Danish)
- 2021 Duvald I. Using action research and organization design to plan in-home hospital treatment. Research in Organizational Change and Development vol. 29. Accepted for publication.
- 2021 Duvald I, Konzag H, Obel B. The importance of organizational design for the quality of patient care. Økonomi & Politik 94(3). Accepted for publication. (In Danish)
- 2021 Kobberup FB, Sode BS, Tygesen GB, Kalmriz M. Investigating the possibilities of using patient-generated health data in emergency care: an explorative study. Dansk Tidsskrift for Akutmedicin (Danish Journal of Emergency Medicine) 4(1).
- 2021 Tygesen GB, Lisby M, Raaber N, Rask MT, Kirkegaard H. A new situation awareness model decreases clinical deterioration in the emergency departments - A controlled intervention study. Acta Anaesthesiol Scand. Epub ahead of print.
- 2021 Van den Ende ES, Schouten B, Kremers MNT et al. (Tygesen GB.) Understanding what matters most to patients in acute care in seven countries, using the flash mob study design. BMC Health Serv Res. 21(1)
- 2020 Møllekær A, Kirkegaard H, Vest-Hansen B, Duvald I, Eskildsen J, Obel B, Madsen B. Risk of death within 7 days of discharge from emergency departments with different organizational models. European Journal of Emergency Medicine 27(1).
- 2020 Tygesen GB, Kirkegaard H, Raaber N, Rask MT, Lisby M. Consensus on predictors of clinical deterioration in emergency departments: A Delphi process study. Acta Anaesthesiol Scand. 65:266-275.
- 2019 Duvald I. Exploring reasons for the weekend effect in a hospital emergency department: An information processing perspective. Journal of Organization Design 8(1).



- 2019 Møllekær A, Duvald I, Obel B, Madsen B, Eskildsen JK, Kirkegaard H. The organisation of Danish emergency departments. *European Journal of Emergency Medicine* 26(4).
- 2019 Jensen S, Duvald I, Aagaard R, Primdahl SC, Petersen P, Kirkegaard H, Weile J. Remote Real-Time Ultrasound Supervision via Commercially Available and Low-cost Tele-Ultrasound: A Mixed-Methods Study of the Practical Feasibility and Users' Acceptability in an Emergency Department. *Journal of Digital Imaging* 32.
- 2019 Jensen S, Duvald I, Aagaard R, Primdahl SC, Petersen P, Kirkegaard H, Weile J. Feasibility and acceptability of remote real-time ultrasound supervision. DEMC8 abstract. *Dansk Tidsskrift for Akutmedicin (Danish Journal of Emergency Medicine)* (2).
- 2018 Duvald I, Møllekær A, Boysen MA, Vest-Hansen B. Linking the severity of illness and the weekend effect. A cohort study examining emergency department visits. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 26(72).
- Papers and abstracts
- 2020 Konzag H, Mathiassen L. Nurse Usage of HIS to Coordinate Work across Shifts. *Proceedings of the 53rd Hawaii International Conference on System Sciences (HICSS)*, pp. 3558-3566.

PUBLICATIONS IN THE PIPELINE

- 2021 Duvald I. Adverse events in an emergency department weekdays and weekends – a critical study of registration practices. (In review).
- 2021 Duvald I, Østergaard M, Thomsen JL, Andersen CA. Exploring why elderly patients are admitted to an emergency department: a structured classification of complaints, and health professionals' perspectives on referral practice. (working paper).
- 2021 Konzag H. Team-based vs. individual-based coordination patterns. (working paper).
- 2021 Tipsmark LS, Sønderdahl A, Møllekær A, Obel B, Søgaard R. Reorganisation of emergency departments: From policy to practice. (In review).



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| 2021 | Tipsmark LS, Obel B, Andersson T, Sjøgaard R. Reorganisation towards more autonomy in emergency departments: a mixed effects approach to evaluate the effects of a national policy on hospital performance. (In review). |
| 2021 | Tipsmark LS, Obel B, Andersson T, Sjøgaard R. Organisational determinants and consequences of diagnostic discrepancy in emergency departments: a national study of consecutive episodes between 2008-2016. (In review). |
| 2021 | Tygesen GB, Lisby M, Kirkegaard H, Raaber N, Rask MT. Generic predictors of clinical deterioration in adult Emergency Department patients: a systematic review. (In review). |
| 2021 | Tygesen GB, Lisby M, Kristensen S. Patient safety culture in Danish Emergency Departments. |

MEDIA

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| 2018 | Iben Duvald: Hospital admissions in weekends increase the mortality. TV Midt Vest. News 19.30. Together with Chief Physician at Viborg Regional Hospital the results of the PhD project about the weekend effect are discussed. |
| 2018 | Iben Duvald. Live radio interview at P4 Morgen. Dialogue about results of PhD project about the weekend effect. |

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

[Aarhus BSS, Aarhus University](#)

[Faculty of Health, Aarhus University](#)

[Central Denmark Region](#)



Viborg Regional Hospital, Regional Hospital Central Jutland

Novo Nordisk Foundation

KEU (Kvalitets og efteruddannelsesudvalget)

Helsefonden

Familien Hede Nielsens Fond

Horsens Regional Hospital