

2019

ANNUAL REPORT

Research Center for Emergency Medicine



AARHUS
UNIVERSITY

Data sheet

Annual Report 2019 – Research Center for Emergency Medicine

The annual report is composed and published in cooperation with researchers and colleagues affiliated to Research Center for Emergency Medicine.

June 2020

Editor

Research Center for Emergency Medicine
Department of Clinical Medicine, Aarhus University
Emergency department, Aarhus University Hospital
Palle Juul-Jensens Boulevard 161, building J, level 1
DK-8200 Aarhus N

cfa@clin.au.dk

www.recem.au.dk

www.facebook.com/Akutforskning

Editorial and cover: Ida Katrine Thomsen

Preface

Dear reader

With this annual report, we want to expose you for the spirit and the activities in Research Center for Emergency Medicine. On the first two pages, we give a short background information about who we are, what we strive for, how we work and how we see Emergency Medicine.

On the following pages, we list our academic program and activities.

We hope you will find the reading interesting and inspiring, and if you do, do not hesitate to contact us, we are always looking for new researchers and collaborators.

Best regard

Professor

Hans Kirkegaard

A handwritten signature in dark ink, reading "Hans Kirkegaard". The signature is written in a cursive style with a light blue shadow effect behind the text.

Contents

1. About us - Research Center for Emergency Medicine	1
2. Mission and vision	1
3. Research philosophy.....	2
4. Organizational changes in the field of Emergency Medicine.....	2
5. Academic programme and current research projects	3
Hans Kirkegaard, professor	3
Bo Løfgren, professor.....	4
Marianne Lisby, associate professor.....	5
Lars Wiuff Andersen, associate professor.....	6
6. Publications	6
Peer review articles	6
7. Editorial	12
8. Other publications	13
Educational book and e-learning	13
Letters, comments, contribution to a debate or article.....	13
Abstracts	13
9. Invited lectures and presentations	14
International	14
National	14
10. International cooperation.....	15
11. Review committee assessments	16
12. Grants and funding	17
13. Awards	18

1. About us - Research Center for Emergency Medicine

We are the center for research in emergency medicine in Central Denmark Region and at Aarhus University, established to initiate and stimulate research in this newly implemented medical specialty in Denmark.

In house, at Aarhus University Hospital, the center is affiliated with the emergency department and the research environment is occupied by all levels of researchers, from master students and Ph.D. students to clinicians and established researchers.

By embracing various healthcare professions and research methods, we strive to reflect the interdisciplinary nature of emergency medicine in our research activities. Many of our research activities are structured in networks that also welcome researchers based in other specialties or locations.

We provide an excellent research environment and aim to establish new collaborators and projects continuously within the research field of emergency medicine.

2. Mission and vision

Mission

Our mission is to create and convey new knowledge about prevention, diagnostics, treatment, and rehabilitation of all patients with immediate need of medical attention (caused by disease or injury).

To optimize transition across sectors within the healthcare system we strive to cooperate across fields and disciplines by creating knowledge about continuity of care, potential working relationships and forms of organisations.

The center plays an active role in the development of the research field of emergency medicine as an independent and autonomous academic discipline.

Vision

- 1. Research- and/or development projects are incorporated in all individual acute patient trajectories*
 - 2. The center is leading within the research field of emergency medicine in Denmark and known and recognised internationally*
 - 3. The center sustains and expands its international co-operation*
 - 4. Training in emergency medicine pre- as well as postgraduate is taken to an international level*
-

3. Research philosophy

Our research philosophy is based on the establishment of research networks. A research network is a group of researchers with similar interests. The head of research at The Research Center for Emergency Medicine presides over the respective networks; however the networks are autonomic and driven forward by key researchers. As previously mentioned researchers from other research environments are also linked to the networks, which is why we represent a unique interdisciplinary field within the individual research fields.

4. Organizational changes in the field of Emergency Medicine

The field of emergency medicine research is concerned with the care of illness or injuries requiring acute medical attention. It embraces all aspects of the acute patient's treatment from the first contact to the emergency service to hospitalisation and rehabilitation after discharge. Our research cuts across existing professional and organizational boundaries and has a wide interface of different clinical and epidemiological research fields.

In Denmark the emergency departments have existed for several years now, and in 2017 emergency medicine was finally approved as a medical speciality.

Pre-graduate education

Aarhus University has now approved and incorporated emergency medicine in the Master's Degree programmes in medicine.

The training features symposiums and seminars, and takes place during last semester at the Master's Degree Programme. Increasingly, the training becomes more modern and includes streaming of lectures on video, case-based training and simulation training.

The specialty of emergency medicine

A new era of the speciality of emergency medicine is beginning to take shape. In 2018 the first positions of introduction to emergency medicine were filled and in 2019 the Specialist Training Programme in emergency medicine initiated. Educational training programmes and courses, instructions and qualification guidelines are described in the links below:

<https://www.videreuddannelsen-nord.dk/hoveduddannelse/>

<https://www.videreuddannelsen-nord.dk/hoveduddannelse/specialer/akutmedicin/>

Positions in the Specialist Training Programme in Emergency Medicine:

<https://www.sundhedsjobs.dk/jobopslag/390802>

Read more about statement of aims:

<http://www.dasem.dk/uddannelse/#Hoveduddannelsen>

5. Academic programme and current research projects

Hans Kirkegaard, professor

Ph.D. Students, supervisor

Louise Møldrup Nielsen

Risk of readmission and the elderly patient's perspective of return to everyday life after discharge from a short-stay unit at the Emergency Department.

Defenced January 2019

Christophe Henri Valdemar Duez

Neurological prognostication after cardiac arrest using EEG and biomarkers, with a focus on prolonged targeted temperature management

Defenced March 2019

Jesper Weile

Point-of-care ultrasound in the emergency department

Defenced June 2019

Gitte Boier Tygesen

Development and evaluation of a patient safety model targeting Severe Clinical Deterioration and Safety Awareness in the Emergency Department

Mathias Holmberg

Coenzyme Q10 in post-cardiac arrest patients: a randomized, double-blind, placebo-controlled phase II

Trial

Marie Kristine Jessen

Fluid administration in adult emergency department patients with sepsis

The prehospital EMS program

Martin Gude

Improvement and evaluation of prehospital stroke management

Ph.D. Students, co-supervisor

Kasper Glerup Lauridsen

In Hospital Cardiac Arrest

Mathilde Stærk

Optimising the In-hospital Use of Automated External Defibrillators

The prehospital EMS program

Sophie Seidenfaden

The potential of novel biomarkers in prehospital management of traumatic brain injury

Research Year Students, supervisor

David Kocemba

Differences in fluid resuscitation and mortality in patients suspected of septic shock with congestive heart failure: A pilot study

Rae Rebekka Marie Fonnesbæk

Patient outcomes associated with discordance between Real Time Physician Impression and Final Hospital Diagnosis in patients presenting to the Emergency Department with shock

Defenced October 2019

Master Thesis, supervisor

Søren Flink

Predicting mortality and readmission based on chief complaint in emergency department patients - A retrospective cohort study from a Danish university hospital using Danish Emergency Process Triage (DEPT)

Passed November 2019

David Kocemba

Differences in fluid resuscitation and mortality in patients suspected of septic shock with congestive heart failure: A pilot study

Passed December 2019

Maria Jensen

Resuscitative fluids to patients with chronic kidney disease presenting with septic shock in the emergency department

Passed June 2019

Administrative officer and professor secretary

Ida Katrine Thomsen

Bo Løfgren, professor

Ph.D. students, supervisor

Kasper Glerup Lauridsen

Improving outcomes from in-hospital cardiac arrest: studies on cardiac arrest teams

Mathilde Stærk

Optimising the In-Hospital Use of Automated External Defibrillators

Anders Sjørølev Schmidt

Improving the Efficiency and Safety of Direct Current Cardioversion

Research Year Students, supervisor

Dung Thuy Nguyen

Dual operator CPR compared to Single operator CPR: A Randomised Trial in Basic Life Support for laypersons

Cecilie Budolfson

NT-proBNP Measurements to Rule-out Heart Failure among Patients with Atrial Fibrillation: A Prospective Clinical Study

Marianne Lisby, associate professor

Ph.D. students, co-supervisor

Gitte Boier Tygesen

Development and Evaluation of a Patient Safety Model Targeting Severe Clinical Deterioration and Safety Awareness in the Emergency Department

Hanne Mørkenborg Bové

Bridging acute nursing care to patients suffering from alcohol use disorders. A lifeworld perspective

Master Thesis (cand.scient.san), supervisor

Trine Worm Thøgersen

The association between homecare dependency and potentially medication-related readmissions – a population-based cohort study.

Mia Mandau

Timing of antibiotic therapy and outcomes in adult emergency department patients with community acquired pneumonia – A cohort study

Anna Melgaard

The association between ambulatory care-sensitive conditions and destination of discharge among patients admitted at “Akuttilbud”, Aalborg

Sidsel Seier Jørgensen

Characteristics and analysis of patients who do not meet the visitation criteria at an intermediate care unit in Aarhus Municipality

Master Thesis, co-supervisor

Søren Flink, medical student

Predicting mortality and readmission based on chief complaint in emergency department patients - A retrospective cohort study from a Danish university hospital using Danish Emergency Process Triage (DEPT)

Research Honors Programme 2017-2019 AU, supervisor

Mia Mandau

Practices of health professions in the making of coordination

Trine Worm Thøgersen

Preventable acute hospital readmissions - terminology, characteristics, and development of an assessment tool for community-based nurses

Lars Wiuff Andersen, associate professor

Ph.D. students, supervisor

Nikola Stankovic

The Relationship Between Socioeconomic Factors and Incidence, Treatments, and Outcomes for Patients with In-Hospital Cardiac Arrest in Denmark

Mikael Vallentin

Calcium for Out-of-Hospital Cardiac Arrest – A Randomized, Double-Blind, Placebo-Controlled Trial

Ph.D. students, co-supervisor

Mathias Holmberg

Coenzyme Q10 in post-cardiac arrest patients: a randomized, double-blind, placebo-controlled phase II trial

Marie Kristine Jessen

Fluid administration in adult emergency department patients with sepsis

Lauge Vammen

Clinically relevant cardiac arrest survival model and intervention with thiamine

Projects nurse, research project VAM-IHCA

Birthe Sindberg

6. Publications

Peer review articles

1. Andersen LW, Carøe Lind P, Vammen L, Høybye M, Holmberg MJ, Granfeldt A. Adult post-cardiac arrest interventions: An overview of randomized clinical trials. Resuscitation. Accepted Dec 2019, published Feb 2020.
<https://doi.org/10.1016/j.resuscitation.2019.12.003>
2. Andersen LW, Holmberg MJ, Granfeldt A, James LP, Caulley L. Cost-Effectiveness of Public Automated External Defibrillators. Resuscitation. 2019;138 (May):250-258.
<https://doi.org/10.1016/j.resuscitation.2019.03.029>
3. Andersen LW, Holmberg MJ, Berg KM, Donnino MW, Granfeldt A. In-Hospital Cardiac Arrest: A Review. JAMA - Journal of the American Medical Association. 2019 mar;321(12):1200-1210. <https://doi.org/10.1001/jama.2019.1696>
4. Andersen LW, Holmberg MJ, Løfgren B, Kirkegaard H, Granfeldt A. Adult in-hospital cardiac arrest in Denmark. Resuscitation. 2019;140:31-36.
<https://doi.org/10.1016/j.resuscitation.2019.04.046>

5. Andersen LW, Ostergaard JN, Antonsen S, Weis A, Rosenberg J, Henriksen FL et al. The Danish in-hospital cardiac arrest registry (DANARREST). *Clinical epidemiology*. 2019;11:397-402. <https://doi.org/10.2147/CLEP.S201074>
6. Bang C, Hansen C, Lauridsen KG, Frederiksen CA, Schmidt M, Jensen T et al. Rapid use of high-sensitive cardiac troponin i for ruling-in and ruling-out of acute myocardial infarction (RACING-MI): Study protocol. *Open Heart*. 2019;6(1). e000995. <https://doi.org/10.1136/openhrt-2018-000995>
7. Bang C, Mortensen MB, Lauridsen KG, Bruun JM. Trends in antidiabetic drug utilization and expenditure in Denmark: A 22-Year Nationwide Study. *Diabetes, Obesity and Metabolism*. 2020 feb;22(2):167-172. <https://doi.org/10.1111/dom.13877>
8. Bartlett E, Valenzuela T, Idris A, Deye N, Glover G, Gillies M, Taccone F, Sunde K, Flint A, Holger Thiele H, Arrich J, Hemphill C, Holzer M, Skrifvars MB, Pittl U, Polderman K, Ong M, Kim KH, Oh SH, Shin SD, Kirkegaard H, Nichol G. Systematic Review and Meta-Analysis of Intravascular Temperature Management Versus Surface Cooling in Comatose Patients Resuscitated From Cardiac Arrest. *Resuscitation* 2019, in press, <https://doi.org/10.1016/j.resuscitation.2019.10.035>
9. Berg KM, Donnino MW, Andersen LW, Moskowitz A, Grossestreuer AV, American Heart Association's Get With the Guidelines-Resuscitation® Investigators. Acute respiratory compromise on hospital wards: association between recent ICU discharge and outcome. *Resuscitation*. 2019 nov;144:40-45. <https://doi.org/10.1016/j.resuscitation.2019.09.002>
10. Blauenfeldt, Rolf; Hjort, Niels; Gude, Martin; Behrndtz, Anne ; Fisher, Marc; Valentin, Jan; Kirkegaard, Hans; Johnsen, Søren ; Hess, David; Andersen, Grethe. A multicenter, randomised, sham controlled trial on chemic conditioning In patients with acute (RESIST) - rationale and study design. *European Stroke Journal*, in press. <https://doi.org/10.1177%2F2396987319884408>
11. Bové HM, Lisby M, Norlyk A. Scheduled care-As a way of caring: A phenomenological study of being cared for when suffering from alcohol use disorders. *Journal of Clinical Nursing*. 2019;28(7-8):1174-1182. <https://doi.org/10.1111/jocn.14715>
12. Bové, HM, Lisby M, Norlyk A., Do the carers care? A phenomenological study of providing care for patients suffering from alcohol use disorders. May 2020 (accepted Aug 2019), *Nursing Inquiry*. 27, 1, 9 s., e12322. <https://doi.org/10.1111/nin.12322>
13. Bro-Jeppesen J, Jeppesen AN, Haugaard S, Trolborg A, Hassager C, Kjaergaard J, Kirkegaard H, Wanscher M, Hvas AM, Thiel S. The complement lectin pathway protein MAp19 and out-of-hospital cardiac arrest: Insights from two randomized clinical trials. *European Heart Journal: Acute Cardiovascular Care*, in press. <https://doi.org/10.1177/2048872619870031>
14. Calabró L, Bougouin W, Cariou A, De Fazio C, Skrifvars M, Soreide E et al. Effect of different methods of cooling for targeted temperature management on outcome after cardiac arrest:

- A systematic review and meta-analysis. *Critical Care*. 2019;23(1). 285.
<https://doi.org/10.1186/s13054-019-2567-6>
15. Chase M, Cocchi MN, Liu X, Andersen LW, Holmberg M, Donnino MW. Coenzyme Q10 in Acute Influenza. *Influenza and Other Respiratory Viruses*. 2019 jan;13(1):64-70.
<https://doi.org/10.1111/irv.12608>
16. Dankiewicz J, Cronberg T, Lilja G, Jakobsen JC, Bøhlhávek J, Callaway C et al. Targeted hypothermia versus targeted Normothermia after out-of-hospital cardiac arrest (TTM2): A randomized clinical trial—Rationale and design. *American Heart Journal*. 2019;217:23-31.
<https://doi.org/10.1016/j.ahj.2019.06.012>
17. De Fazio C, Skrifvars M, Søreide E, Creteur J, Grejs AM, Kjærgaard J, Laitio T, Nee J, Kirkegaard H and Taccone FS. Intravascular versus surface cooling for targeted temperature management after out-of-hospital cardiac arrest: an analysis of the TTH48 trial. *Critical Care* 2019; 23:61 <https://doi.org/10.1186/s13054-019-2335-7>
18. Dideriksen TL, Lisby M, Brünés N, Dreyer P. Social Nurses' Descriptions of Nursing: A Qualitative Study of What Social Nursing is and Does? *The Open Nursing Journal*. 2019 dec;13:228-236. <https://doi.org/10.2174/1874434601913010228>
19. Dynesen JJØ, Skov MJ, Mackenhauer J, Jessen MK, Nissen JY, Ebdrup L et al. The 7-day mortality associated with an early warning score varies between age groups in a cohort of adult Danish emergency department patients. *European Journal of Emergency Medicine*. 2019 dec;26(6):453-457. <https://doi.org/10.1097/MEJ.0000000000000623>
20. Eiset AH, Kirkegaard H, Erlandsen M. Crowding in the emergency department in the absence of boarding - a transition regression model to predict departures and waiting time. *BMC Medical Research Methodology* 2019; 19:68. <https://doi.org/10.1186/s12874-019-0710-3>
21. Evald L, Brønnick K, Duez CHV, Grejs AM, Jeppesen AN, Søreide E et al. Prolonged targeted temperature management reduces memory retrieval deficits six months post-cardiac arrest: A randomised controlled trial. *Resuscitation*. 2019;134:1-9.
<https://doi.org/10.1016/j.resuscitation.2018.12.002>
22. Friesgaard KD, Kirkegaard H, Rasmussen C-H, Giebner M, Christensen EF & Nikolajsen L. Prehospital intravenous fentanyl administered by ambulance personnel: a cluster-randomised comparison of two treatment protocols. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2019; 27:11. <https://doi.org/10.1186/s13049-019-0588-4>
23. Granfeldt A, Avis SR, Nicholson TC, Holmberg MJ, Moskowitz A, Coker A et al. Advanced airway management during adult cardiac arrest: A systematic review. *Resuscitation*. 2019 jun;139:133-143. <https://doi.org/10.1016/j.resuscitation.2019.04.003>
24. Hansen C, Bang C, Rasmussen SE, Nebsbjerg MA, Lauridsen KG, Bjørnshave Bomholt K et al. Basic life support training: Demonstration versus lecture – A randomised controlled trial.

American Journal of Emergency Medicine. 2019 jan 1.

<https://doi.org/10.1016/j.ajem.2019.06.008>

25. Hansen C, Bang C, Stærk M, Krogh K, Løfgren B. Certified Basic Life Support Instructors Identify Improper Cardiopulmonary Resuscitation Skills Poorly: Instructor Assessments Versus Resuscitation Manikin Data. *Simulation in healthcare : journal of the Society for Simulation in Healthcare*. 2019;14(5):281-286. <https://doi.org/10.1097/SIH.0000000000000386>
26. Harpsø M, Granfeldt A, Løfgren B, Deakin CD. No effect of hyperoxia on outcome following major trauma. *Open access emergency medicine : OAEM*. 2019 apr;11:57-63. <https://doi.org/10.2147/OAEM.S181629>
27. Holmberg MJ, Moskowitz A, Wiberg S, Grossestreuer AV, Yankama T, Witten L et al. Guideline removal of atropine and survival after adult in-hospital cardiac arrest with a non-shockable rhythm. *Resuscitation*. 2019;137:69-77. <https://doi.org/10.1016/j.resuscitation.2019.02.002>
28. Holmberg MJ, Issa MS, Moskowitz A, Morley P, Welsford M, Neumar R et al. Vasopressors During Adult Cardiac Arrest: A Systematic Review and Meta-Analysis. *Resuscitation*. 2019 jun;139(June). <https://doi.org/10.1016/j.resuscitation.2019.04.008>
29. Holmberg MJ, Wiberg S, Ross CE, Kleinman M, Hoeyer-Nielsen AK, Donnino MW et al. Trends in Survival after Pediatric In-Hospital Cardiac Arrest in the United States. *Circulation*. 2019 okt;140(17):1398-1408. <https://doi.org/10.1161/CIRCULATIONAHA.119.041667>
30. Holmberg MJ, Ross CE, Fitzmaurice GM, Chan PS, Duval-Arnould J, Grossestreuer AV et al. Annual Incidence of Adult and Pediatric In-Hospital Cardiac Arrest in the United States. *Circulation: Cardiovascular Quality and Outcomes*. 2019 jul;12(7):1-8. e005580. <https://doi.org/10.1161/CIRCOUTCOMES.119.005580>
31. Jensen SH, Weile J, Aagaard R, Hansen KM, Jensen TB, Petersen MC et al. Remote real-time supervision via tele-ultrasound in focused cardiac ultrasound: A single-blinded cluster randomized controlled trial. *Acta Anaesthesiologica Scandinavica*. 2019 mar;63(3):403-409. <https://doi.org/10.1111/aas.13276>
32. Jensen SH, Duvald I, Aagaard R, Primdahl SC, Petersen P, Kirkegaard H et al. 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*. 2019 okt;32(5):841-848. <https://doi.org/10.1007/s10278-018-0157-9>
33. Kirkegaard H, Taccone FS, Skrifvars M, Soreide E. Postresuscitation Care after Out-of-hospital Cardiac Arrest: Clinical Update and Focus on Targeted Temperature Management. *Anesthesiology*. 2019 jul;131(1):186-208. <https://doi.org/10.1097/ALN.0000000000002700>

34. Langsted S, Dynesen J, Nissen J, Jessen M, Mackenhauer J, Ahrensberg J, Kirkegaard H. How Comorbidities Impact Early Warning Score as a Predictor of 7-day Mortality. *European Journal of Emergency Medicine* 2019, September 5, 142-146. <https://doi.org/10.1097/MEJ.0000000000000633>
35. Lauridsen KG, Watanabe I, Nishisaki A, Berg RA, Niles D, Hunt EA, Douval-Arnould J, Good G, Cheng A, Løfgren B, Nadkarni V: Standardizing Communication to Improve In-hospital Cardiopulmonary Resuscitation. 2020 Feb 1;147:73-80. <https://doi.org/10.1016/j.resuscitation.2019.12.013>
36. Lindskou TA, Mikkelsen S, Christensen EF, Hansen PA, Jørgensen G, Hendriksen OM, Kirkegaard H, Berlac PA & Søvsø MB. The Danish prehospital emergency healthcare system and research possibilities. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2019; 27: Article number: 100. <https://doi.org/10.1186/s13049-019-0676-5>
37. Lisby M, Klingenberg M, Ahrensberg JM, Hoeyem PH, Kirkegaard H. Clinical impact of a comprehensive nurse-led discharge intervention on patients being discharged home from an acute medical unit: Randomised controlled trial. *International Journal of Nursing Studies*. 2019 dec;100. 103411. <https://doi.org/10.1016/j.ijnurstu.2019.103411>
38. Morgan RW, Landis WP, Marquez A, Graham K, Roberts AL, Lauridsen KG et al. Hemodynamic effects of chest compression interruptions during pediatric in-hospital cardiopulmonary resuscitation. *Resuscitation*. 2019 jun 1;139:1-8. <https://doi.org/10.1016/j.resuscitation.2019.03.032>
39. Moskowitz A, Ross CE; Andersen LW; Grossestreuer AV; Berg KM; Donnino MW; for the American Heart Association's Get With The Guidelines – Resuscitation Investigators. Trends Over Time in Drug Administration During Adult In-Hospital Cardiac Arrest. *Critical Care Medicine*. 2019 feb 1;47(2):194-200. <https://doi.org/10.1097/CCM.0000000000003506>
40. Moskowitz A, Yankama T, Andersen LW, Huang DT, Donnino MW, Grossestreuer AV et al. Ascorbic Acid, Corticosteroids and Thiamine in Sepsis (ACTS) protocol and statistical analysis plan: a prospective, multicentre, double-blind, randomised, placebo-controlled clinical trial. *BMJ Open*. 2019 nov;9(12). e034406. <https://doi.org/10.1136/bmjopen-2019-034406>
41. Nielsen LM, Østergaard LG, Maribo T, Kirkegaard H, Petersen KS. Returning to everyday life after discharge from a short-stay unit at the Emergency Department- a qualitative study of elderly patients' experiences. *International Journal of Qualitative Studies on Health and Well-Being*. 2019 jan 29;14(1). 1563428. <https://doi.org/10.1080/17482631.2018.1563428>
42. Nolan JP, Berg RA, Andersen LW, Bhanji F, Chan PS, Donnino MW et al. Cardiac Arrest and Cardiopulmonary Resuscitation Outcome Reports: Update of the Utstein Resuscitation Registry Template for In-Hospital Cardiac Arrest: A Consensus Report From a Task Force of the International Liaison Committee on Resuscitation (American Heart Association, European Resuscitation Council, Australian and New Zealand Council on Resuscitation, Heart and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Council of

- Southern Africa, Resuscitation Council of Asia]. *Resuscitation*. 2019 nov;144:166-177. <https://doi.org/10.1016/j.resuscitation.2019.08.021>
43. Olsen SW, Draborg E, Lisby M. Physicians' and Nurses' Attitudes and Actions Regarding Perioperative Medication Management. *Journal of PeriAnesthesia Nursing*. 2019 jun;34(3):614-621. <https://doi.org/10.1016/j.jopan.2018.08.005>
44. Pfeiffer S, Lauridsen KG, Wenger J, Hunt EA, Haskell S, Atkins DL et al. Code Team Structure and Training in the Pediatric Resuscitation Quality International Collaborative. *Pediatric Emergency Care*. 2019 apr. <https://doi.org/10.1097/PEC.0000000000001748>
45. Rauff-Mortensen A, Berggren-Olsen MM, Houliind KC, Kirkegaard H, Birke-Sørensen H. Faster Detection of Ischemia in Free Muscle Transfer When Using Microdialysis. *Journal of Reconstructive Microsurgery* 2019, <https://doi.org/10.1055/s-0039-3401036>
46. Simonsen BY, Lisby M, Traube C, Skovby P. The Cornell Assessment of Pediatric Delirium: Translation and inter-rater reliability in a Danish pediatric intensive care unit. *Acta Anaesthesiologica Scandinavica*. 2019;63(7):900-904. <https://doi.org/10.1111/aas.13369>
47. Simonsen BY, Skovby P, Lisby M, An evaluation of the Danish version of the Pediatric Anesthesia Emergence Delirium scale, April 2020 (accepted Dec. 2019), 1 : *Acta Anaesthesiologica Scandinavica*. 64, 5, s. 613-619. <https://doi.org/10.1111/aas.13543>
48. Skibsted S, Bhasin MK, Henning DJ, Jaminet SC, Lewandowski J, Kirkegaard H et al. Leukocyte Transcriptional Response in Sepsis. *Shock (Augusta, Ga.)*. 2019 aug;52(2):166-173. <https://doi.org/10.1097/SHK.0000000000001258>
49. Skjøt-Arkil H, Mogensen CB, Lassen AT, Johansen IS, Chen M, Petersen P et al. Carrier prevalence and risk factors for colonisation of multiresistant bacteria in Danish emergency departments: A cross-sectional survey. *BMJ Open*. 2019 jun 1;9(6). e029000. <https://doi.org/10.1136/bmjopen-2019-029000>
50. Skifvars M, Soreide E, Sawyer K, Taccone F, Toome V, Storm C, Jeppesen A, Grejs A, Duez C, Tiainen M, Rasmussen BS, Laitio T, Hassager C, Kirkegaard H. Hypothermic to ischaemic ratio after cardiac arrest. *Acta Anaesthesiol Scand*, in press. <https://doi.org/10.1111/aas.13528>
51. Soar J, Maconochie I, Wyckoff MH, Olasveengen TM, Singletary EM, Greif R et al. 2019 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Resuscitation*. 2019 dec;145:95-150. <https://doi.org/10.1016/j.resuscitation.2019.10.016>
52. Soar J, Maconochie I, Wyckoff MH, Olasveengen TM, Singletary EM, Greif R et al. 2019 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations: Summary From the Basic Life Support;

Advanced Life Support; Pediatric Life Support; Neonatal Life Support; Education, Implementation, and Teams; and First Aid Task Forces. *Circulation*. 2019 dec 10;140(24):e826-e880. <https://doi.org/10.1161/CIR.0000000000000734>

53. Schmidt AS, Kasper Glerup Lauridsen, Bo Løfgren: Maximizing cardioversion efficacy: Maximum-fixed energy shocks and what else?, *European Heart Journal*, 2019 <https://doi.org/10.1093/eurheartj/ehz797>
54. Schmidt AS, Kasper Glerup Lauridsen, Peter Torp, Leif Frausing Bach, Hans Rickers, Bo Løfgren: Maximum-fixed energy shocks for cardioverting atrial fibrillation, *European Heart Journal*, 2019 Aug. <https://doi.org/10.1093/eurheartj/ehz585>
55. Valdemar Duez CH, Johnsen B, Ebbesen MQ, Kvaløy MB, Grejs AM, Jeppesen AN o.a. Post resuscitation prognostication by EEG in 24 vs 48 h of targeted temperature management. *Resuscitation*. 2019 feb;135:145-152. <https://doi.org/10.1016/j.resuscitation.2018.10.035>
56. Vistisen ST, Moody B, Celi L, Chen C. Post-extrasystolic characteristics in the arterial blood pressure waveform are associated with right ventricular dysfunction in intensive care patients. *Journal of Clinical Monitoring and Computing*. 2019;33(4):565-571. <https://doi.org/10.1007/s10877-018-0216-2>
57. Vistisen ST, Berg JM, Boekel M, Modestini M, Bergman R, Jainandunsing J et al. Using extra systoles and the micro-fluid challenge to predict fluid responsiveness during cardiac surgery. *Journal of Clinical Monitoring and Computing*. 2019 okt;33(5):777-786. <https://doi.org/10.1007/s10877-018-0218-0>
58. Wiberg S, Stride N, Bro-Jeppesen J, Holmberg MJ, Kjærgaard J, Larsen S et al. Mitochondrial dysfunction in adults after out-of-hospital cardiac arrest. *European Heart Journal: Acute Cardiovascular Care*. 2019 mar 11. <https://doi.org/10.1177/2048872618814700>
59. Witten L, Gardner R, Holmberg MJ, Wiberg S, Moskowitz A, Mehta S et al. Reasons for death in patients successfully resuscitated from out-of-hospital and in-hospital cardiac arrest. *Resuscitation*. 2019 mar;136:93-99. <https://doi.org/10.1016/j.resuscitation.2019.01.031>
60. Würtz MFG, Jensen CS, Egerod I. International perspectives on the pediatric nurse practitioner role. *Journal of the American Association of Nurse Practitioners*. 2019 dec;31(12):773-781. <https://doi.org/10.1097/JXX.0000000000000252>

7. Editorial

1. Nielsen N, Kirkegaard H. Rewarming. The neglected phase of targeted temperature management. *Resuscitation*. Accepted 23 Oct 2019;146:249-250. <https://doi.org/10.1016/j.resuscitation.2019.10.012>

8. Other publications

Educational book and e-learning

1. Jensen CS, Loft MI. Sygepleje og børn. I Hundborg S, red., Sygepleje & patientinvolvering . 1 udg. Bind 1. København: FADL's forlag. 2019. s. 348-370

Letters, comments, contribution to a debate or article

2. Kirkegaard H, Lund Henriksen F, Rosenberg J, Sandgaard NCF, Skjærbæk C, Damkjær M, Nielsen MS, Møller D, Neland K, Andersen LW, Grijota M, Weis A and Hansen CP. DANARREST – registrering af hjertestop på hospital. Abstract from annual report 2018. Danish Medical Journal. November 2019
3. Lauridsen KG, Nadkarni V, Løfgren B. In-hospital resuscitation team composition: Are three heads really better than six? Journal of Critical Care. 2019 feb 7;51:221-222.
<https://doi.org/10.1016/j.jcrc.2019.01.017>
4. Lauridsen KG, Nadkarni V, Berg RA. Man and machine: can apps resuscitate medical performance? The Lancet Child & Adolescent Health. 2019 maj;3(5):282-283.
[https://doi.org/10.1016/S2352-4642\(19\)30032-X](https://doi.org/10.1016/S2352-4642(19)30032-X)
5. Purup T, Ahrensberg JM, Nikolajsen L. Demografi og triage af børn med akutte mavesmerter. Dansk Tidsskrift for Akutmedicin. 2019 jul;2(4):56-61. <https://doi.org/10.7146/akut.v2i4.110483>
6. Schmidt AS, Lauridsen KG, Løfgren B: Maximizing cardioversion efficacy: Maximum-fixed energy shocks and what else?, European Heart Journal, 2019,
<https://doi.org/10.1093/eurheartj/ehz797>

Abstracts

1. Brogård Andersen H, Andersen M, Andelius TCK, Pedersen MV, Løfgren B, Pedersen M et al. Effect of adrenaline on survival and neurological outcome in a newborn piglet model of hypoxic cardiac arrest. 2019. Poster session presentation, 3rd Congress of joint European Neonatal Societies.
2. Evald L, Brønnick K, Duez CHV, Jeppesen A, Grejs AM, Søreide E et al. Prolonged Targeted Temperature Management Reduces Memory Retrieval Deficits Six Months Post Cardiac Arrest: A Randomized Controlled Trial. 2019. Poster session presentation, Annual Meeting, Danish Neuropsychologist Association, Aalborg, Denmark
3. Lauridsen KG, Watanabe I, Nishisaki A, Berg RA, Niles DE, Hunt EA et al. Development and Evaluation of Standardized Communication For In-hospital Resuscitation. Circulation. 2019;140. 247.
https://www.ahajournals.org/doi/abs/10.1161/circ.140.suppl_2.247
4. Lauridsen KG, Schmidt AS, Nadkarni V, Berg R, Højbjerg R, Ørbæk Sørensen B et al. When Does Team Leadership Fail during In-hospital Resuscitation? A Qualitative Study. Resuscitation. 2019;142(Supplement 1):e34.
<https://doi.org/10.1016/j.resuscitation.2019.06.085>

5. Nguyen DT, Glerup Lauridsen K, Johnsen J, Krogh K, Løfgren B. Does Simplification of Guidelines Improve Retention of BLS Skills 3 Months After Training? *Circulation*. 2019;140(Suppl_2):A139. https://www.ahajournals.org/doi/10.1161/circ.140.suppl_2.139
6. Stærk M, Glerup Lauridsen K, Krogh K, Kirkegaard H, Løfgren B. Automated External Defibrillators Are Rarely Used for In-Hospital Cardiac Arrest in Denmark. *Circulation*. 2019;140 (Suppl_2). A109. https://www.ahajournals.org/doi/10.1161/circ.140.suppl_2.109
7. Stærk M, Are Basic Life Support Instructors Competent? 2019. Poster session presentation. Randers Research Symposium 2019, Randers, Denmark.

9. Invited lectures and presentations

International

Hans Kirkegaard

Therapeutic temperature management. European Society of Cardiologist Congress, Paris, September 1, 2019

Lars Wiuff Andersen

Airway management in cardiac arrest. SMART conference, Milan, Italy. May 8, 2019

Advanced life support. European Resuscitation Council congress 2019. Sept. 19, 2019

Outcomes for pediatric cardiac arrest. European Resuscitation Council congress 2019. Sept. 21, 2019

Research using registries. European Resuscitation Council congress 2019. Sept. 21, 2019

Targeted temperature management. ESICM annual congress 2019. Sept. 30, 2019

Circulation during hypothermia. ESICM annual congress 2019. Sept. 30, 2019

Non-inferiority trials. ESICM annual congress 2019. Oct. 2, 2019

Airway management in cardiac arrest. EUSEM 2019. Oct. 14, 2019

Advanced life support. Resuscitation Council UK. Dec. 6, 2019

Kasper Glerup Lauridsen

Johns Hopkins University Hospital, February 2019

National

Gitte Boier

Oral presentation: *Sikre Akutte indlæggelser- effekt af en patientsikkerhedsmodel*, Akutfagligtråd, Viborg. August 8, 2019

Oral presentation: *Sikre Akutte indlæggelser- effekt af en patientsikkerhedsmodel*, Prehospital, Aarhus. September 29, 2019

Kasper Glerup Lauridsen

Resuscitation Users Network Symposium, November 2019, Odense Universitetshospital;
Genoplivningskonferencen, December 2019, Rigshospitalet Simulation Research Conference,
Assessment Committee

Mathilde Stærk

FUN, Laerdal Denmark, Odense, Denmark, November 28, 2019

10. International cooperation

Hans Kirkegaard

Eldar Søreide, Professor, MD, PhD, FERC, Department of Anaesthesiology and Intensive Care and
Alf Inge Larsen, Professor, MD, PhD, FESC; Department of Cardiology, Stavanger University
Hospital, Stavanger, Norway and Department of Clinical Medicine, University of Bergen, Bergen,
Norway

Fabio Silvio Taccone, Professor, MD, PhD; Department of Intensive Care, Erasme Hospital,
Université Libre de Bruxelles (ULB), Brussels, Belgium

Valdo Toome, MD; Department of Intensive Cardiac Care, North Estonia Medical Centre, Tallinn,
Estonia

Christian Storm, MD, PhD; Department of Internal Medicine, Nephrology and Intensive Care,
Charité-Universitätsmedizin Berlin, Berlin, Germany

Timo Laitio, MD, PhD; Department of Anaesthesiology and Intensive Care, Turku University Hospital
and University of Turku, Finland

Markus B Skrifvars, Associated professor, MD, PhD, EDIC, FCICM; Division of Intensive Care,
Department of Anaesthesiology and Intensive Care Medicine, Helsinki University Hospital and
University of Helsinki, Finland, and Australian and New Zealand Intensive Care Research Centre,
School of Public Health and Preventive Medicine, Monash University Melbourne, Australia

Nathan Shapiro Ass. Professor, MD Emergency Department, Beth Israel Deaconess Medical
Center, Longwood, Boston, USA

Michael Donnino, Ass. Professor MD, Emergency Department, Beth Israel Deaconess Medical
Center, Longwood, Boston, USA

Bo Madsen, Associated professor, MD, Emergency Department, Mayo Clinic, Rochester,
Minnesota, USA

Jeff Keep, MD, FRCER Consultant & Honorary Senior Lecturer in Emergency Medicine & Major
Trauma Lead for Research & Clinical Governance King's College Hospital, London, United
Kingdom

Philip Andersson, Adjunct professor, MD, Emergency Department, Brigham & Womens Hospital,
Boston, MA, USA.

Dr. Ben Bloom Consultant Emergency Medicine, Barts Health NHS Trust Royal London Hospital,
United Kingdom

Kasper Glerup Lauridsen

Professor Vinay Nadkarni, MD, MS, Children's Hospital of Philadelphia & University of Pennsylvania, Perelman School of Medicine, USA

Professor Robert A. Berg, MD, Children's Hospital of Philadelphia & University of Pennsylvania, Perelman School of Medicine, USA

Ass. Professor Akira Nishisaki, MD, MSCE, Children's Hospital of Philadelphia & University of Pennsylvania, Perelman School of Medicine, USA

Professor Robert Greif, MD, Bern University Hospital, Switzerland Dr. Enrico Baldi, MD, University of Pavia, Italy

Ass. Professor Elizabeth A. Hunt, MD, PhD, MPH, Johns Hopkins University Hospital & Johns Hopkins School of Medicine, USA

Ass. Professor Jordan Duval-Arnould, MPH, DrPH, Johns Hopkins University Hospital, USA

Professor Marc Berg, MD, Stanford University & Lucile Packard Children's Hospital, Stanford, USA

Professor Adam Cheng, MD, University of Calgary & Alberta Children's Hospital, Canada

Assistant professor Javier Laszlo, MD, FAAP, Texas Children's Hospital

Dr. Tia Raymond, MD, Medical City Children's Hospital, Dallas, Texas

Lars Wiuff Andersen

Michael Donnino, BIDMC, Harvard Medical School, Boston

Claus Sixtus Jensen

Professor Ian Maconochie FRCPCH FRCPI FRCER PhD Consultant in Paediatric Accident and Emergency Medicine St Mary's Hospital London, UK Faculty of Medicine, Imperial College, London, UK

Professor Colin Powell MB ChB, DCH, MRCP(UK), FRACP, FRCPCH, MD Emergency Department Sidra Medical and Research Center, Doha Qatar Emergency Department, Weill Cornell University, Doha Qatar School of Medicine Cardiff University, Cardiff, UK

Dr. Sue Chapman RN, PhD Gulf Regional Clinical Manager Dubai Office

11. Review committee assessments

Hans Kirkegaard

Professor assessment, Aarhus University 2019 (chairman)

Opponent at three Ph.D. dissertations

Marianne Lisby

Ph.D. protocol, AU, Health

Assessor, Associate Professor Assessment, Faculty of Health Sciences, University of Southern Denmark

Conferences

Assessor: abstracts, posters and presentations. The National Trauma Conference, Aarhus University Hospital

Funding

Assessor, Prioriteringsudvalget Region Midtjyllands

Assessor, Sundhedsvidenskabelige Professioners Pulje, Aarhus University Hospital

12. Grants and funding

Awarded researchers listed by rewarding funds

Aarhus University Research Foundation

Marie Kristine Jessen (full Ph.D. scholarship)

Cecilie Budolfson (research year scholarship)

A.P. Møller Foundation

Cecilie Budolfson DKK 20.000

Augustinus Foundation

Dung Thuy Nguyen DKK 50.000

Danish Regions (Development- and Research fund)

Tine Louise Dideriksen DKK 1.500.000

Trine Worm Thøgersen DKK 1.300.000

Elite Research

Kasper Glerup Lauridsen DKK 200.000

Familien Hede Nielsens Fond

Gitte Boier Thygesen DKK 12.500

Frimodt-Heineke Foundation

Dung Thuy Nguyen DKK 25.000

Health Research Foundation of Central Denmark Region

Lars Wiuff Andersen DKK. 415,831

Henry and Astrid Møller's Foundation

Dung Thuy Nguyen DKK 25.000

Holger and Ruth Hesses fund

Marie Kristine Jessen DKK 60.000

Independent Research Fund Denmark

Lars Wiuff Andersen DKK 2.343.000

Karen Elise Jensen Foundation

Lars Wiuff Andersen DKK 1.500.000

Laerdal Foundation

Kasper Glerup Lauridsen NOK 180.211

Odd Fellow Broderloge num. 73

Dung Thuy Nguyen DKK 15.000

Cecilie Budolfson DKK 15.000

Overlæge Johan Boserup og Lise Boserups Legat

Cecilie Budolfson DKK 64.680

Region Midt Sundhedsvidenskabelige Forskningsfond

Kasper Glerup Lauridsen DKK 445.133

Master Cabinetmaker (Snedkermester) Sophus Jacobsen and Astrid Jacobsen Foundation

Dung Thuy Nguyen DKK 25.000

Puljen for Sundhedsvidenskabelige professioner, Aarhus Universitetshospital

Mia Blaabjerg DKK 261.027

The Toyota Foundation

Cecilie Budolfson DKK 100.000

13. Awards

Elite Research Travel Grant 2019

Kasper Glerup Lauridsen

Erhoff Foundation's Talent Prize

Lars Wiuff Andersen DKK 50.000