1. Title

**Does the use of Intensive Care Information System (ICIS) compared to paper-based charting improve time in target range (TTR) for post-resuscitation care in the intensive care units?**

1. Rationale for study with a clear statement of the Hypothesis(es)

ICIS are changing intensive care by replacing paper-based systems and are reported to enable a more efficient, structured, and accessible patient data management. They are also reported to improve diagnostic and therapeutic accuracy (Ehteshami 2013), although there is scant high-quality evidence for this.

This study will test the hypothesis that the use of ICIS will improve reaching TTR for cardiac arrest survivors in the intensive care units. Specifically, this study will assess the TTR of the following European Resuscitation Council (ERC) (Nolan 2021) recommended treatment targets between the subgroups of patients treated in ICU-s that use ICIS compared to paper-based charting:

a) PaO₂ 75-100mmHg / 10–13 kPa  
b) SaO₂ 94–98%  
c) PaCO₂ 35-45mmHg / 4.5–6 kPa  
d) Use TV of 6–8 ml/kg  
e) MAP > 65 mmHg or > 85 mmHg (depending on the STEP CARE study group)  
f) Decreasing or normal lactate  
g) Urinary output > 0.5 ml/kg/h (surrogated with decreasing creatinine levels)  
h) interventions of early mobilisation   
i) interventions of prevention of delirium

3. PICO   
Population:   
All patients included in the STEP CARE trial  
  
Intervention:   
Retrospective review of TTR for the included patients, comparing site-reported use of ICIS vs paper-based charting in the first 24 hours after randomization of intensive care

4. Data requirements from study CRF   
At all available timepoints:   
a) pO2  
b) SaO2  
c) pCO2  
d) Tidal volume  
e) Respiratory rate  
f) MAP  
g) MAP target assigned to during randomization  
h) Lactate  
j) Creatinine  
g) ICU Mobility Score  
h) Delirium present  
i) 6 month survival   
j) 6 month mRS score

5. Additional data required:   
A simple 5-minute survey sent to the PI of each centre, only to be filled out once per centre.  
Survey questions:   
*a) The centre   
1) Uses ICIS for all ICU documentation, ordering and target setting  
2) Uses partial ICIS and partial paper-based ICU documentation, ordering and target setting  
3) Uses fully paper-based ICU documentation, ordering and target setting*

*b) Name of ICIS used at our centre*

*c) System Usability Scale (SUS) of the used ICIS at our centre*

*d) checkbox of treatment targets that are regularly set for the staff*

a. Logistics regarding additional data collection   
Questionnaires to be sent out with email

6. Sample size/ power estimations   
Power estimation is not currently available due to no background information on the proportion of ICIS use.

7. Statistical analysis plan   
a) Percentage of time spent within the target range  
b) Mean, median, standard deviation, and interquartile range of TTR  
c) Logistic regression for binary outcomes on survival and good neurological outcome (mRS 0-3)

8. Lead Investigators   
Dr Eno-Martin Lotman  
a. Co-Investigators   
Open call  
b. Participating sites   
All sites of the STEP CARE trial

9. Funding   
No additional funding

10. References

Ehteshami A, Sadoughi F, Ahmadi M, Kashefi P. Intensive care information system impacts. Acta Inform Med. 2013;21(3):185-91.

Nolan JP, Sandroni C, Böttiger BW, Cariou A, Cronberg T, Friberg H, Genbrugge C, Haywood K, Lilja G, Moulaert VRM, Nikolaou N, Olasveengen TM, Skrifvars MB, Taccone F, Soar J. European Resuscitation Council and European Society of Intensive Care Medicine guidelines 2021: post-resuscitation care. Intensive Care Med. 2021 Apr;47(4):369-421