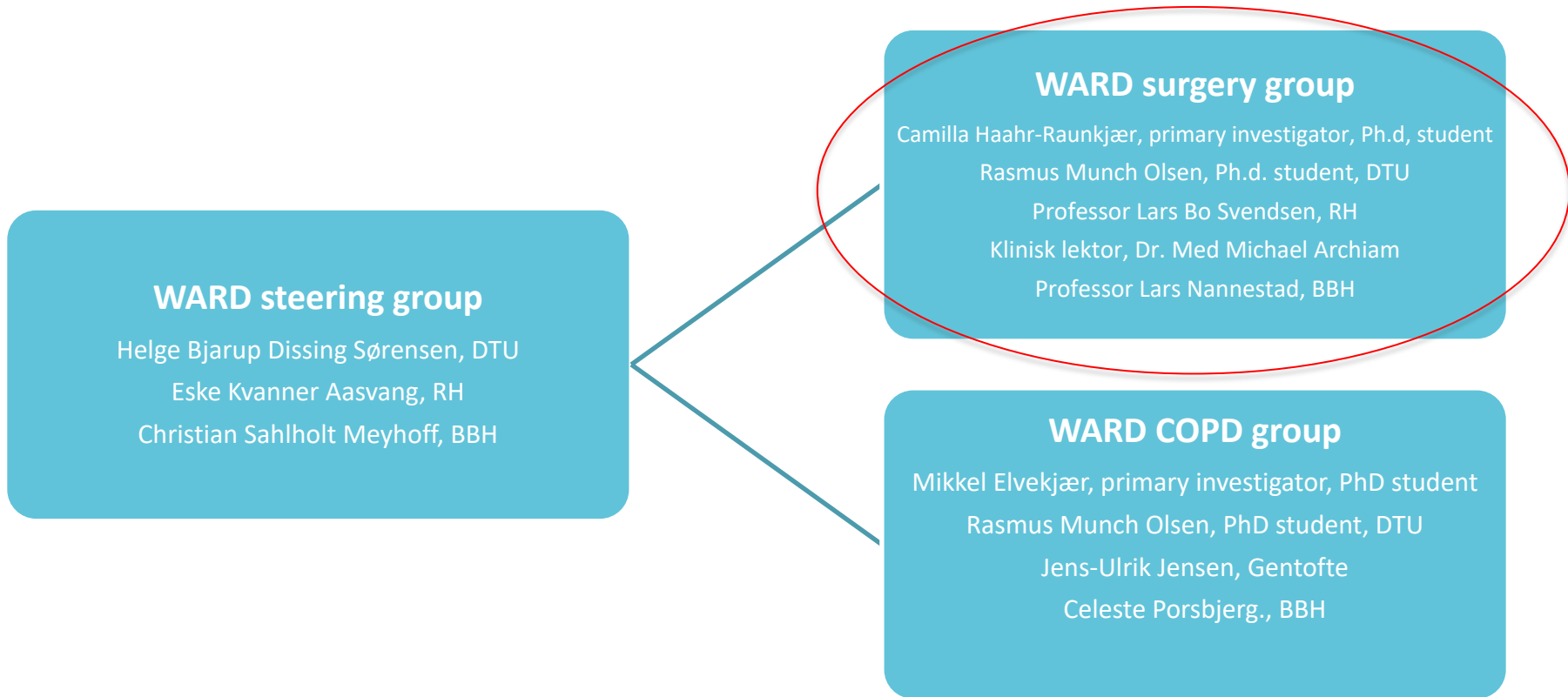




WARD organization

Wireless Assessment of Respiratory and circulatory Distress



Continuous vital sign monitoring in postoperative patients – protocol for an observational study

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Background

- > 200 million major non-cardiac surgery annually
- 30% postoperative moderate/severe complications
- Early detection attempted by routine assessments every 8-12 hours. Early Warning Score (EWS)
 - Inconsistent, without proven effect on survival or complications
 - Micro events occur in between assessments

National Early Warning Score (NEWS)

PHYSIOLOGICAL PARAMETERS	3	2	1	0	1	2	3
Respiration Rate	≥3		8-11	12-20		21-24	≥25
Oxygen Saturation	≤91	92-92	94-95	≥96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤35.0		35.1-36.0	36.1-38.0	38.1-39.0	≥39.1	
Systolic BP	≤90	91-100	101-110	111-210			≥220
Heart Rate	≤40		41-50	51-90	91-110	111-130	≥131
Consciousness Level				A			V, P, or U

* a weighting score of 2 should be added for any patient requiring supplemental oxygen

Study aim

- To analyze associations between deviating vital parameters and serious adverse outcomes
- Develop a clinical support system by utilizing machine learning and pattern recognition

Methods

500 patients
-major abdominal cancer surgery

PREOPERATIVE

Demographic data
Baseline vital parameters

POSTOPERATIVE

Continuous vital sign monitoring – 96 hours



Daily standardized evaluation of micro events and serious adverse outcomes



30 DAYS

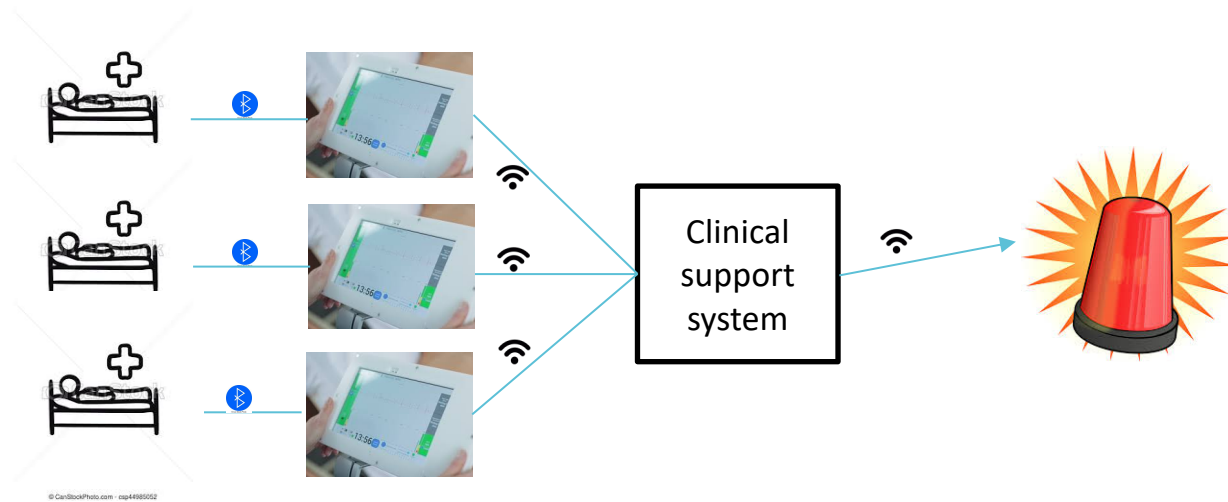
Serious adverse outcomes

- Pneumoni
- Stroke
- AMI
- MINS (myocardial injury after non-cardiac surgery)
- Pulmonary oedema
- Pulmonary embolism
- Respiratory failure
- Surgical site infection
- Sepsis
- Acute renal failure
- Postoperative bleeding
- Arrhythmias etc.

6 MONTHS

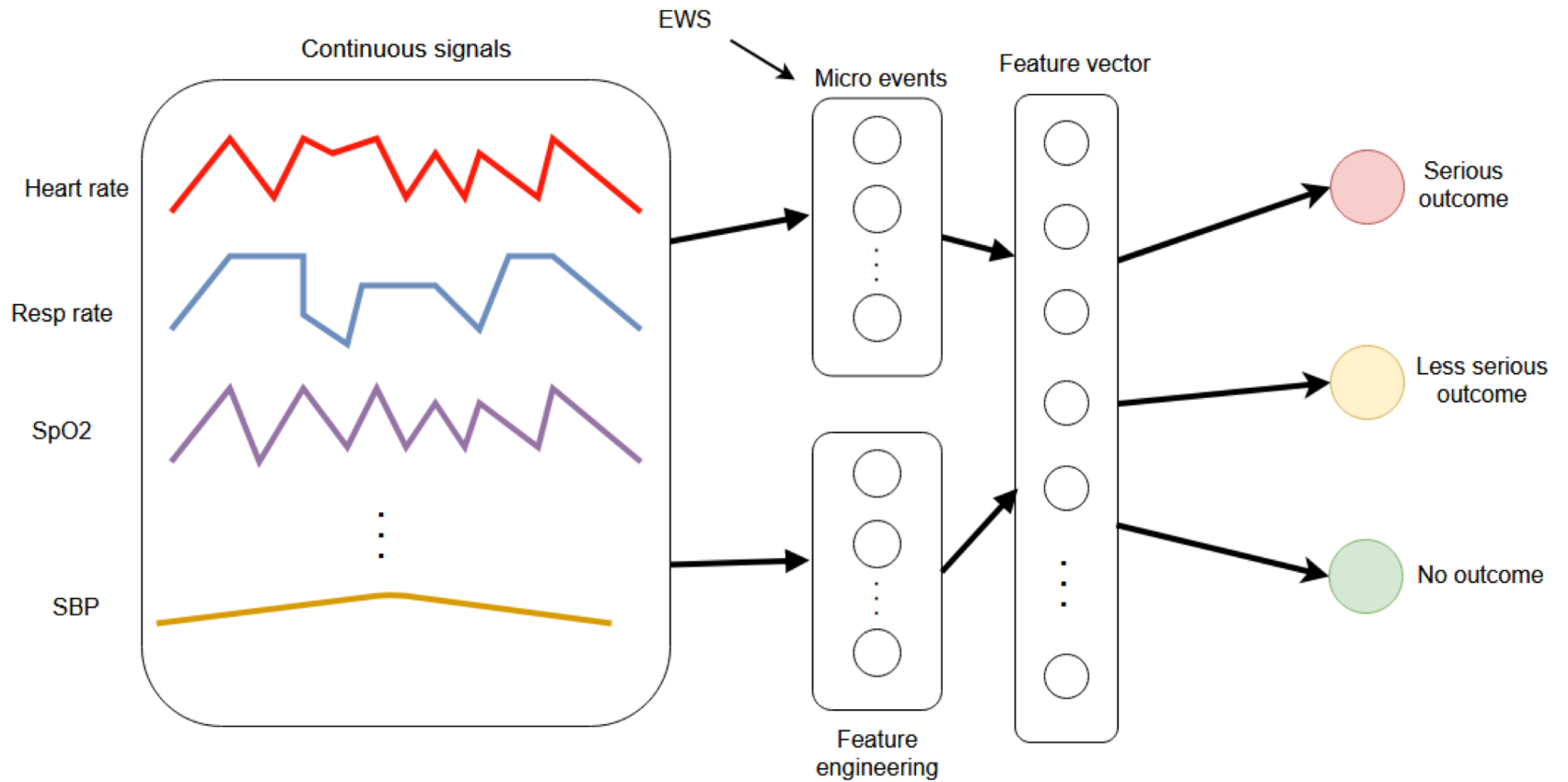
Re-admission to hospital
Mortality

Perspectives



Early detection of deterioration in patients to allow early intervention, to reduce complications and ultimately to reduce mortality

THANK YOU



PILOT STUDY

OUTCOMES

SpO2	< 92
Heart Rate	< 41 eller > 130 /min
Respiratory Rate	< 9 or > 24

TABLE 2: Cardiopulmonary events after major abdominal cancer surgery

	Continuous monitoring	Conventional EWS monitoring	p-value
A: SpO₂ <92%			
Number of patients			
- Any SpO ₂ <92%	49 (98%)	8 (16%)	<0.0001
- SpO ₂ <92% more than 25% of time	10 (20%)	0 (0.0%)	0.0012
Duration, min.	435.5 (16-1801)	0 (0-340)	





TABLE 2: Cardiopulmonary events after major abdominal cancer surgery			
	Continuous monitoring	Conventional EWS monitoring	p-value
D: Heart rate >130			
Number of patients	29 (58%)	3 (6.0%)	<0.0001
Duration, min.	3.5 (0-136)	0 (0-158)	
E: Heart rate <41			
Number of patients	11 (22%)	0 (0.0%)	0.0005
Duration, min.	0 (0-27)	0 (0-0)	
F: Respiratory rate >24			
Number of patients	36 (72%)	4 (8%)	<0.0001
Duration, min.	8.0 (0-189)	0 (0-864)	
G: Respiratory rate <9			
Number of patients	32 (64%)	1 (2.0%)	<0.0001
Duration, min.	2.0 (0-313)	0 (0-0)	