#whatsnewicu18

Reducing noise in the Intensive Care Unit: Why and how?

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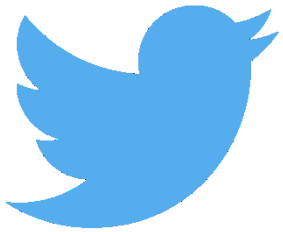

KadoorieCentre

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WHO Guidelines: What are we trying to achieve?

- Guidelines: 30 - 35dBA (max 40dBA)
- Reality: 42 – 69dBA (mean 53dBA)
- Max values: $120dBA_{(LC)}$ $128dBA_{(LAF)}$
- Night values: 51 – 64dBA

Solving the wrong problem?

Sleep Measures Study: Intervention

Each of these questions is answered by placing an "X" on the answer line. Place your "X" anywhere on the line that you feel best describes your patient's sleep during the Sleep Monitor recording period.

Office use only:

1. The patient's sleep last night was:

Deep Sleep _____ Light Sleep

2. Last night, the first time the patient got to sleep, they:

Fell asleep almost immediately _____ Just never could fall asleep

3. Last night, the patient was:

Awake very little _____ Awake all night long

4. Last night, when the patient woke up or was awakened, they:

Got back to sleep immediately _____ Couldn't get back to sleep

5. I would describe the patient's sleep last night as:

A good night's sleep _____ A bad night's sleep

6. I would describe the noise level last night as:

Very quiet _____ Very noisy

7. Last night, the light levels:

Didn't affect the patient at all _____ Kept the patient

Each question is scored using a 100mm visual analogue scale in which a higher sc

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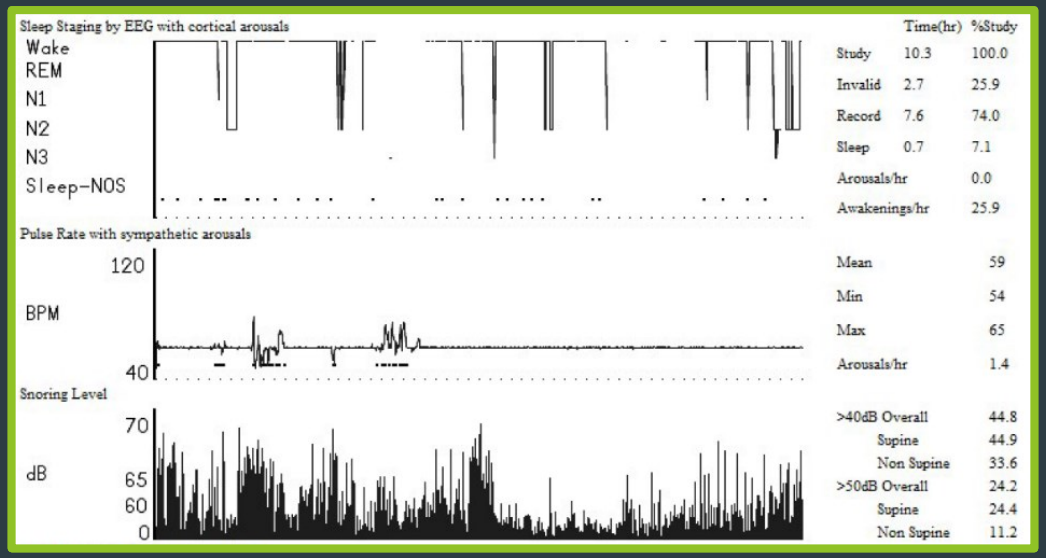
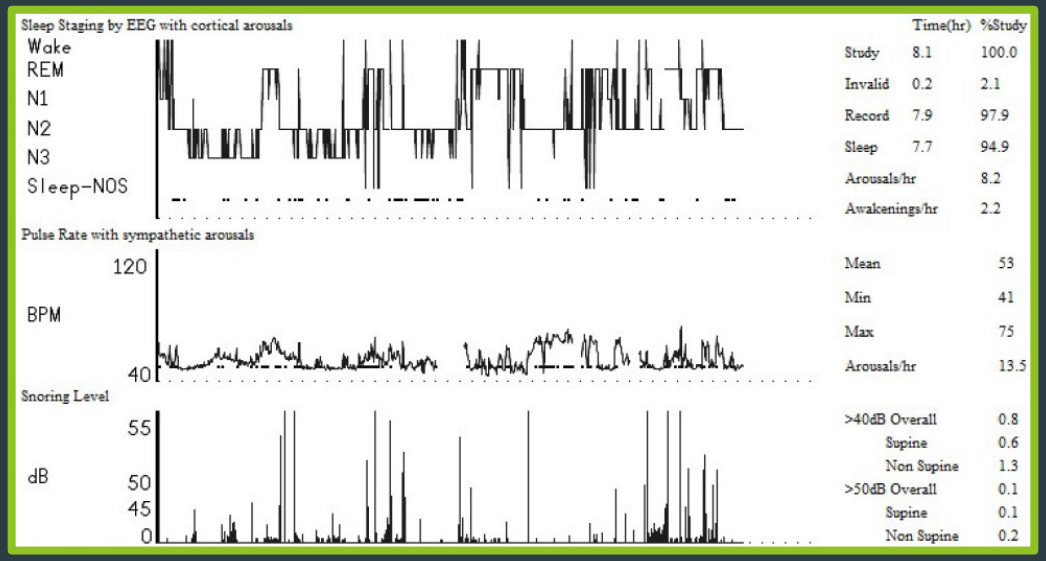
EEG measured sleep



ICU patient



Healthy volunteer

What goes bump in the night?

Patient rankings
Alarms
Interventions
Bleeps
Handover
Talking
Phones
Footsteps
Cleaners
Visitors
Entertainment

What goes bump in the night?

Teaching Reflections

- Alone (n=47)
- Uncomfortable (n=44)
- Frightening (n=44)
- Stressed (n=43)
- Confused (n=39)
- Scared (n=37)
- Worrying (n=36)
- Afraid (=34)

Self-identified practice change

More patient reassurance	36%
Noise reduction	34%
Limit unnecessary patient interaction	9%
Reduce verbal volume	9%
Lower alarm volume/equipment noise	8%
Sleep promotion	3%

Results: Sound Pressure Levels

	Baseline	Post-intervention
No of days	86	70
LAeq median (IQR)	57.0 (3.2)	53.2 (5.1)
LC peak	124.8	115.3

Is your patient at risk because you are not functioning at your best?

Beware of burnout!

Perceptual error

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Simulation and education

Failure to perceive clinical events: An under-recognised source of error☆

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ABSTRACT

Introduction: Attentional focus narrows as individuals concentrate on tasks. Missing an event that would otherwise appear obvious is termed a perceptual error. These forms of perceptual failure are well-recognised in psychological literature, but little attention has been paid to them in medicine. Cognitive workload and expertise modulate risk, although how these factors interplay in practice is unclear. This video-based experiment was designed to explore the hypothesis that perceptual errors affect clinicians.
Methods: 142 volunteers with varying levels of experience of adult resuscitation were shown a short video depicting a simulated cardiac arrest. This video included a series of change-events designed to elicit perceptual errors. The experiment was conducted on-line, with participants watching the video and then responding via combinations of open-ended free-text and directed questioning.
Results: 141 people experienced at least a single perceptual error. Even the most clinically significant event (disconnection of the patient's oxygen supply) was missed by three in four viewers. Although expertise was associated with increased likelihood of detecting an occurrence, even highly significant events were missed by up to two thirds of the most experienced observers.
Discussion: This study demonstrates, for the first time, that perceptual errors occur during healthcare-relevant scenarios at significant levels. Events such as an oxygen malfunction would meaningfully affect patient outcome and, although expertise conferred some advantages, events were still missed more often than not. Data acquisition is fundamental to good-quality situational awareness. These results suggest perceptual error may be a contributor to adverse events in practice.

1. Introduction

Situational awareness, a term that describes the ability of an individual to process information about the environment in which they are functioning, is considered to be a "safety-critical skill",[1] particularly in emergency-care type settings. The development of situational awareness can be modelled as a three-step process:[2] acquisition of relevant information, integration of that information into a coherent mental model, and then use of the mental model to make decisions. A failure in any one of these steps limits effective care delivery. Data from both healthcare and industry already demonstrate that loss of situational awareness contributes to a high proportion of critical incidents.[3–5]

Many factors can cause a loss of situational awareness. Poor training or judgement may limit the synthesis of mental models or the decisions made using them, and these may be the focus of investigations after serious untoward incidents (SUI). Comparatively little attention has been paid to human performance limitation, and specifically the role of perception, in loss of situational awareness.[6] Introspection, based on day-to-day experience, leads us erroneously to conclude that our ability to perceive objects in our environment is unlimited, richly detailed, and automatic.[7] There is a general assumption that educated, trained, experienced practitioners are skilled in noticing events in their environment.

This assumption is ill-founded, and it is surprisingly easy to demonstrate that perception is fallible. A number of studies in experimental psychology have demonstrated that individuals frequently miss conspicuous events when placed under relatively

☆ A Spanish translated version of the summary of this article appears as Appendix in the final online version at http://dx.doi.org/10.1016/j.resuscitation.2014.03.316.
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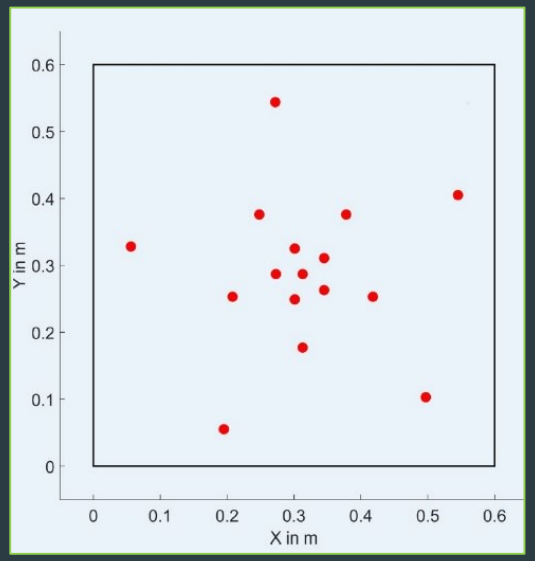
0300-9572/

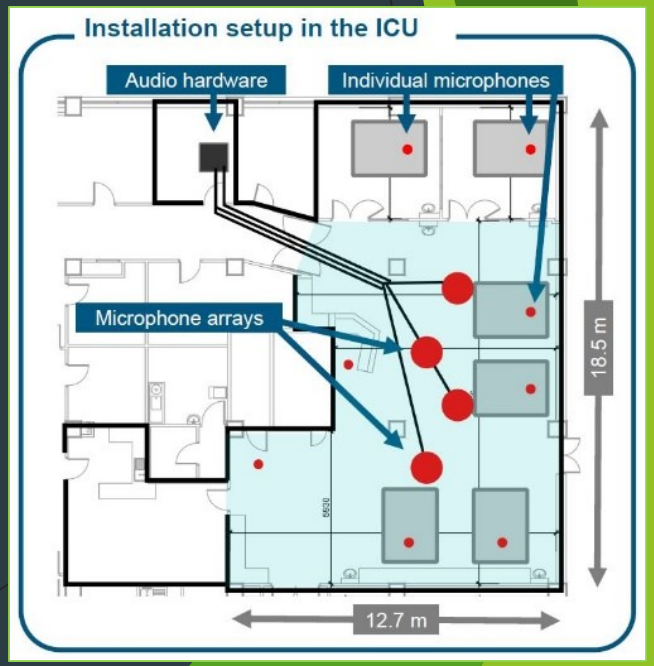
- People overestimate their ability to detect changes in the environment
- Distractions that you think you are ignoring still receive some cognitive processing
- Subconscious distractor processing has a measurable effect on task performance

Live noise management: Can we do better?

Collaboration: University of Southampton

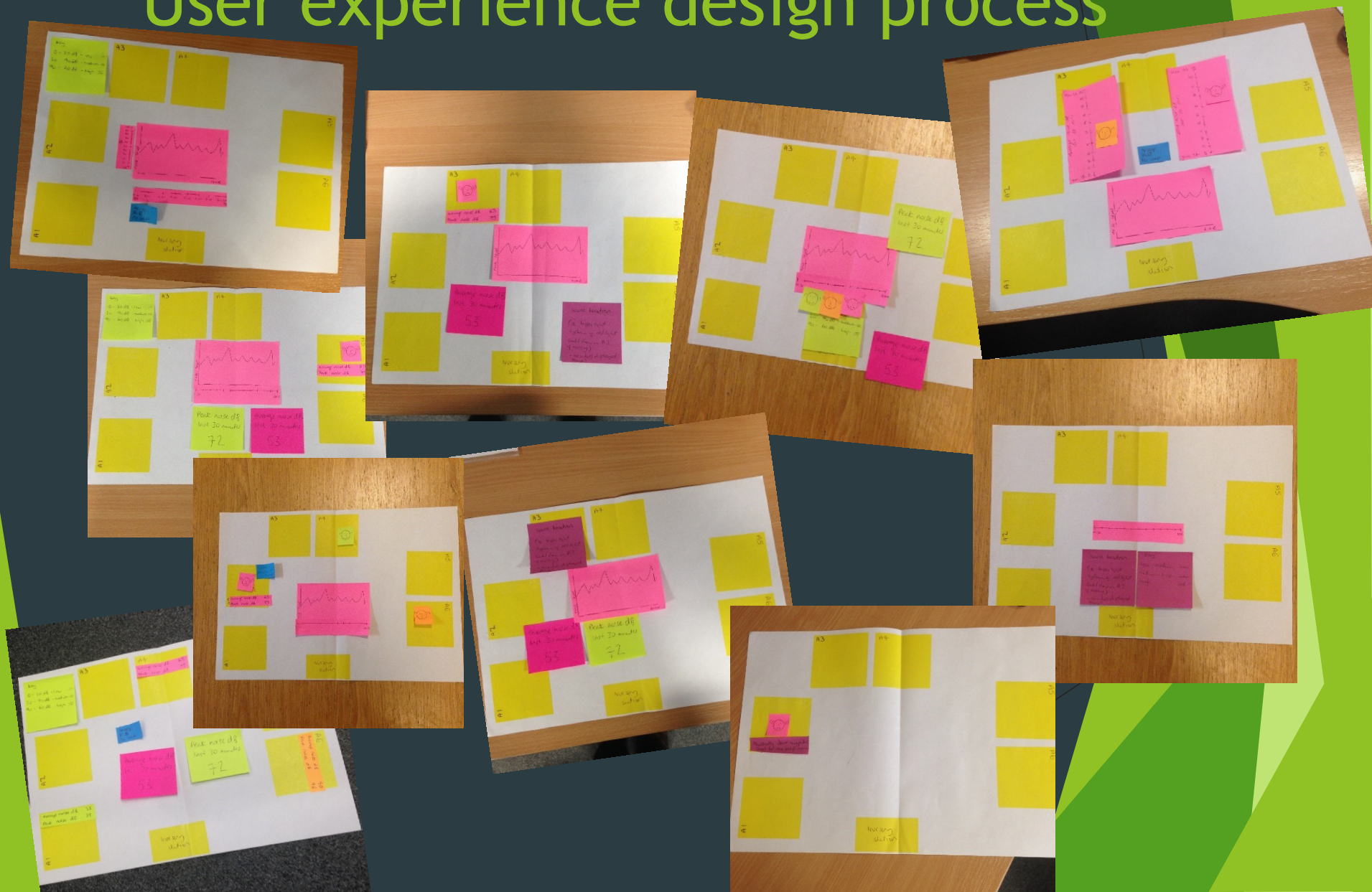


- Spiral array
- 16 microphones
- Power supplies hidden



- 4 tiles of 16 microphones
- 8 additional microphones
- ADC block in office space
- 100m fibre optic cabling

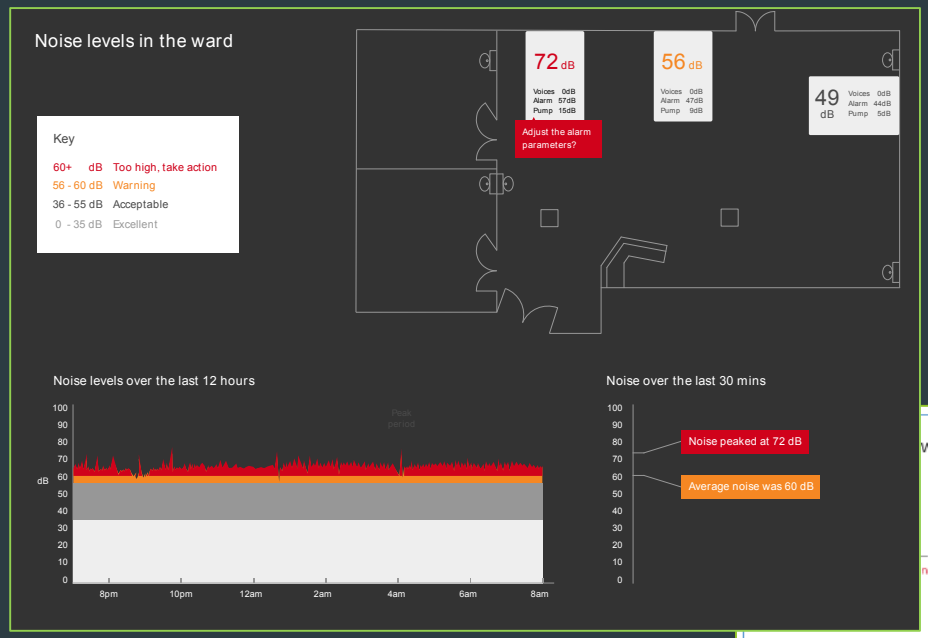
User experience design process



Key features

- Individual bed space values
- RAG ‘traffic light’ colour scheme
- Graphical view of SPL/shift
- Numerical average SPL/30mins
- Numerical ‘peak’ value from last 30mins
- Easy to reference key
- Ability to add noise source type & location
- Ability to request reports

Prototype draft designs



How to protect patients?

Summary

- Noise and disturbances are a 24hr problem
- Patients feel overwhelmed in the environment
- High noise levels are a distraction risk
- Monitor for delirium in patients
- Monitor for signs of stress in colleagues

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