An investigation into the antibacterial efficacy of three makes of epidural filters

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Objective
The objective of this study is to prove acceptable outcomes in ICUs affiliated to the Pretoria Academic Hospital (PAH) complex by calculating standardised mortality ratios (SMR) based on the APACHEII probability model.

Design
The study entailed prospective data collection and retrospective analyses over an 18-month period.

Settings
The study was undertaken in one surgical and one general ICU ward in an academic hospital complex.

Patients
A total of 261 patients remained in the study after the exclusion of 133 patients with unverifiable data.

Measurements and main results
The data that were captured included the APACHEII score parameters, APACHE II diagnostic category and outcome. The overall mortality was 21.0%. The general ICU had a mortality of 22.5% (14 deaths from 62 admissions) and the surgical ICU had a mortality of 20.6% (41 deaths from 199 admissions). Sufficient patient numbers for validation of the APACHEII mortality prediction model in the surgical ICU were present in three diagnostic categories, i.e. "multiple trauma", where the surgical ICU had an SMR of 0.969 from 49 patients, "peripheral vascular surgery", where the surgical ICU had an SMR of 0.811 from 23 patients, and "gastrointestinal perforation/obstruction", where the surgery ICU had an SMR of 0.875 from 32 patients. The general ICU had an SMR of 0.344 from 14 patients in the latter diagnostic category. Significant difference in this diagnostic outcome was arguably proven (Chi square 13, p <0.001).

Conclusions
In the trauma category, the surgical ICU obtained the same mortality ratio in 2006 as was achieved by 13 participating USA hospitals in 1985 (when the APACHEII probability model was developed). The surgical ICU obtained a slightly improved outcome in the "peripheral vascular surgery" and "gastrointestinal perforation/obstruction" categories.

In the "gastrointestinal perforation/obstruction" category, the general ICU obtained particularly impressive patient outcomes, with a third of the mortalities that occurred in the 13 USA ICUs (during 1985) and less than half of the mortalities in the surgical ICU (during 2006). Reasons for this significant difference cannot be arrived at easily – in part because no optimisation or treatment protocols are available for this diagnostic category in any of the ICUs. A dedicated prospective project is recommended to examine and perhaps reduce this significant difference in SMR. However, the author's perception is that the general ICU is run in a smarter way.

Effect of nitrous oxide on spectral entropy during sevoflurane anaesthesia at an altitude of 1 400 metres

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Introduction
Spectral entropy is a monitor of the level of anaesthesia. No change in entropy was recorded with N_2O alone, despite a loss of consciousness,[1] but entropy decreased when N_2O was added to sevoflurane.[2,3]

Objective
The objective of this study was to determine the effect of nitrous oxide on spectral entropy at 1 400 metres above sea level.

Methods
Seventy adults were randomly divided into seven groups, receiving N_2O of end-tidal 0%, 10%, 20%, 30%, 40%, 50% or 60%. After induction, the patients received 2% sevoflurane in O_2/air. Response and state entropy were recorded (Datex-Ohmeda). After the addition of N_2O, entropy was recorded again.

Results
Between the groups, entropy differed during N_2O administration (p < 0.0001). In the groups, entropy differed before and during N_2O administration (p < 0.0001) (ANCOVA). The trend line for the relationship between change in entropy and N_2O fitted a linear function (p < 0.0001) (see Figure 1).
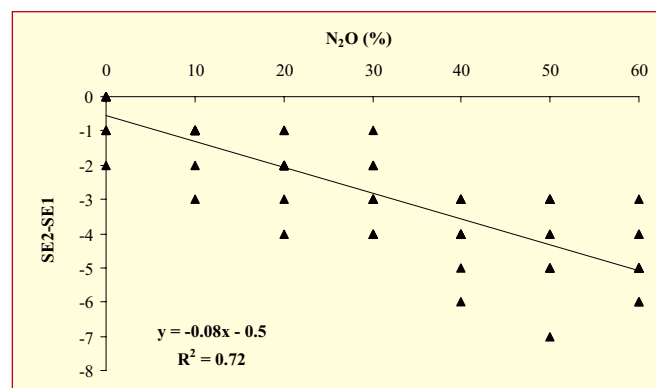
Conclusion
We demonstrated that entropy is not blind to N_2O during 1 MAC of sevoflurane at an altitude of 1440 m in the absence of surgical stimulation. There is a linear relationship between the change in entropy and end-tidal concentrations of N_2O.

Recommendations
N_2O concentrations (equi-MAC) should be taken into account when recording entropy during sevoflurane anaesthesia.

Figure 1: Relationship between changes in state entropy (SE2-SE1) and N_2O concentration

$$y = -0.08x - 0.5$$
$$R^2 = 0.72$$

References
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3. Soto RG, Smith RA, Miguel RV. ASA Abstracts 2004;Oct:A–327.