The Patient State Index as an Indicator of the Level of Hypnosis under General Anaesthesia.
Prichep L.S., Gugino L.D., John E.R., Chabot R.J., Howard B., Merkin H., Tom M.L., Wolter S., Rausch L., Kox W.J. *Br J Anaesth.* 2004 Mar;92(3):393-9.

Background
This retrospective study describes the performance of the Patient State Index (PSI), under standard clinical practice conditions. The PSI is comprised of quantitative features of the EEG (QEEG) that display clear differences between hypnotic states, but consistency across anaesthetic agents within the state.

Methods
The PSI was constructed from a systematic investigation of a database containing QEEG extracted from the analyses of continuous 19 channel EEG recordings obtained in 176 surgical patients. Induction was accomplished with etomidate, propofol, or thiopental. Anaesthesia was maintained by isoflurane, desflurane, or sevoflurane, total i.v. anaesthesia using propofol, or nitrous oxide/narcotics. It was hypothesized that a multivariate algorithm based on such measures of brain state, would vary significantly with changes in hypnotic state.

Results
Highly significant differences were found between mean PSI values obtained during the different anaesthetic states selected for study. The relationship between level of awareness and PSI value at different stages of anaesthetic delivery was also evaluated. Regression analysis for prediction of arousal level using PSI was found to be highly significant for the combination of all anaesthetics, and for the individual anaesthetics.

Conclusions
The PSI, based upon derived features of brain electrical activity in the anterior/posterior dimension, significantly co-varies with changes in state under general anaesthesia and can significantly predict the level of arousal in varying stages of anaesthetic delivery.