

# Age-specific effect-site TCI in children; modelling using TivaTrainer

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## Introduction

Effect-site propofol TCI offers the appeal of rapid equilibration of effect-site concentration ( $C_e$ ), reduced requirement for titration in practice, and a more logical target for propofol dosing than plasma TCI. Jeleazcov *et al*<sup>1</sup> have derived age-specific values for  $k_{e0}$  in children, which are available in TivaTrainer. We used TivaTrainer to simulate anaesthesia in children using the Jeleazcov and Paedfusor datasets in effect-site target mode.

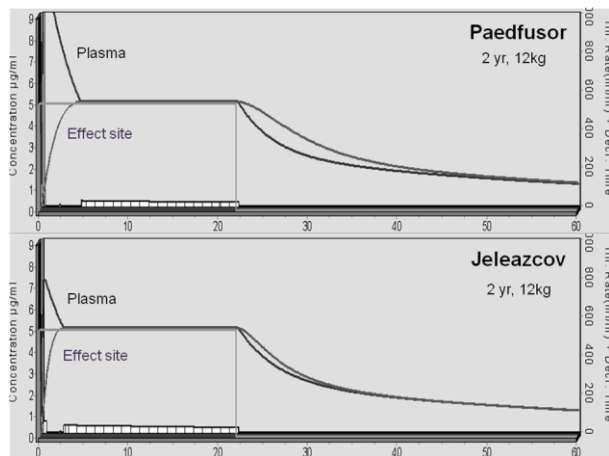
## Methods

TivaTrainer was used to simulate a 20 minute period of anaesthesia in children from 1 to 10 years, according to body weight calculated by  $\text{weight}=2(\text{Age}+4)$ . The propofol doses for induction and after 20 minutes at  $C_e$  of  $5\mu\text{g/ml}$  were compared.

## Results

Paedfusor delivers higher induction propofol boluses than Jeleazcov for all simulations between 2 and 10 years. Under 4 years, for  $C_e$  of  $5\mu\text{g/ml}$ , this bolus exceeds  $5\text{mg/kg}$  with Paedfusor. For the same  $C_e$ , Jeleazcov delivers less than  $5\text{mg/kg}$  induction dose above the age of 2. The total dose after 20 minutes is higher with Jeleazcov under 5 years, and with Paedfusor above this age.

Despite the lower induction doses with Jeleazcov compared to Paedfusor, the pharmacokinetic modelling shows more rapid effect-site equilibration with Jeleazcov, and an equally favourable recovery profile after 20 minutes of anaesthesia.



## Discussion

Paedfusor was derived to work in plasma TCI mode; whilst offering an interesting comparator here, the  $k_{e0}$  used is the adult  $k_{e0}$  from Diprifusor, resulting in clinically large doses in young children. Jeleazcov offers the potential of an age-specific effect-site TCI propofol infusion. The clinical efficacy and safety of this model, particularly with respect to haemodynamic stability, must now be proven in clinical practice.

## Reference

- 1 Jeleazcov C *et al*. Pharmacodynamic modelling of the bispectral index response to propofol-based anaesthesia during general surgery in children. *Br J Anaesth* 2008; 100: 509-16