Ke0 Differences and Impact

ke_0 Differences and Impact

with the Eleveld Pharmacokinetic Model

Don Macalister Consultancy | TCI Education Series

For TCI practitioners, one of the biggest advances of the Eleveld pharmacokinetic model is that it re-examines how ke_0 is estimated and uses a unified model across a much wider range of patients than older models such as Marsh and Schnider.

The key point is not simply that Eleveld uses a different ke_0 value. Instead, Eleveld re-estimated the entire pharmacokinetic/pharmacodynamic system from a very large and diverse dataset. Consequently, the ke_0 parameter functions together with revised compartment volumes and clearances. The ke_0 values from different models should therefore not be compared in isolation, as each is only valid within its own pharmacokinetic framework.

Model Comparison

Feature	Marsh	Schnider	Eleveld
Population	Healthy adults	Adults	Neonates → elderly (unified dataset)
Era	Older model	Established	Contemporary
ke_0	Fixed	Fixed (integral)	Estimated within unified PK/PD model
Weight basis	Total body weight	Lean body mass	Body size + age + physiological covariates
Effect-site targeting	Not integral	Integral	Integral

Clinical Impact

With Schnider, the predicted effect-site concentration generally rises rapidly and induction characteristics are familiar to many clinicians.

With Eleveld, the predicted plasma concentration required to achieve a given effect-site concentration may differ, the loading profile is often smoother, and predictions tend to be more consistent across extremes of age and body size.

Although the displayed effect-site concentration may be identical (for example, Ce 2.0 µg/mL), the predicted plasma concentration and infusion profile may differ because the underlying pharmacokinetic model is different.

Educational Perspective

- Marsh is valuable for understanding classical pharmacokinetics.
- Schnider remains widely used for procedural sedation and introduced refined effect-site targeting.
- Eleveld represents an evolution toward a unified model intended to improve predictive performance across a broad range of patients.

Importantly, a Ce target of 2.5 µg/mL on Schnider should not automatically be considered clinically equivalent to a Ce target of 2.5 µg/mL on Eleveld. Although the units are the same, the underlying models differ, and the predicted concentrations and clinical effects are therefore not necessarily interchangeable.
