A semi-systematic review on the maturational physiology in exclusively breastfed infants: Growth – A contribution from the ConcePTION project

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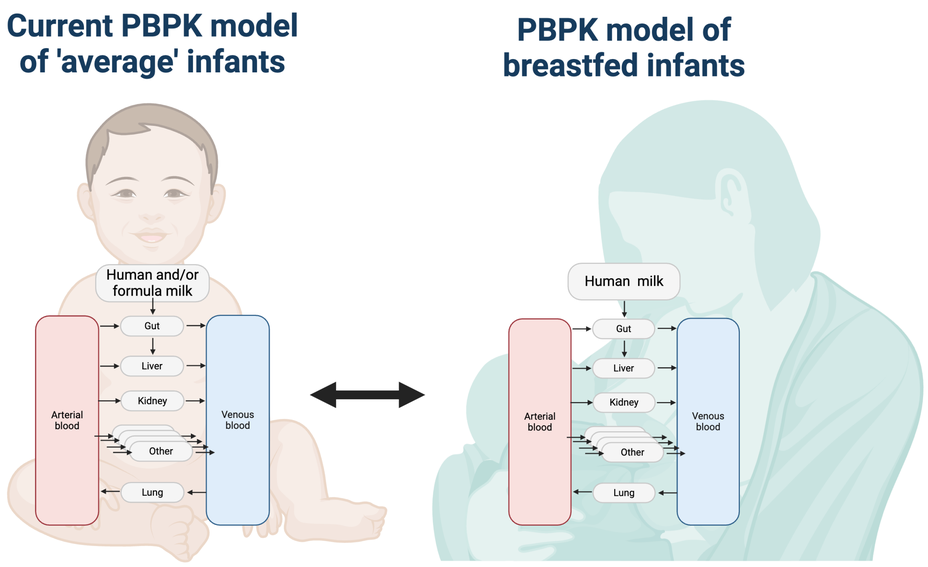
Introduction

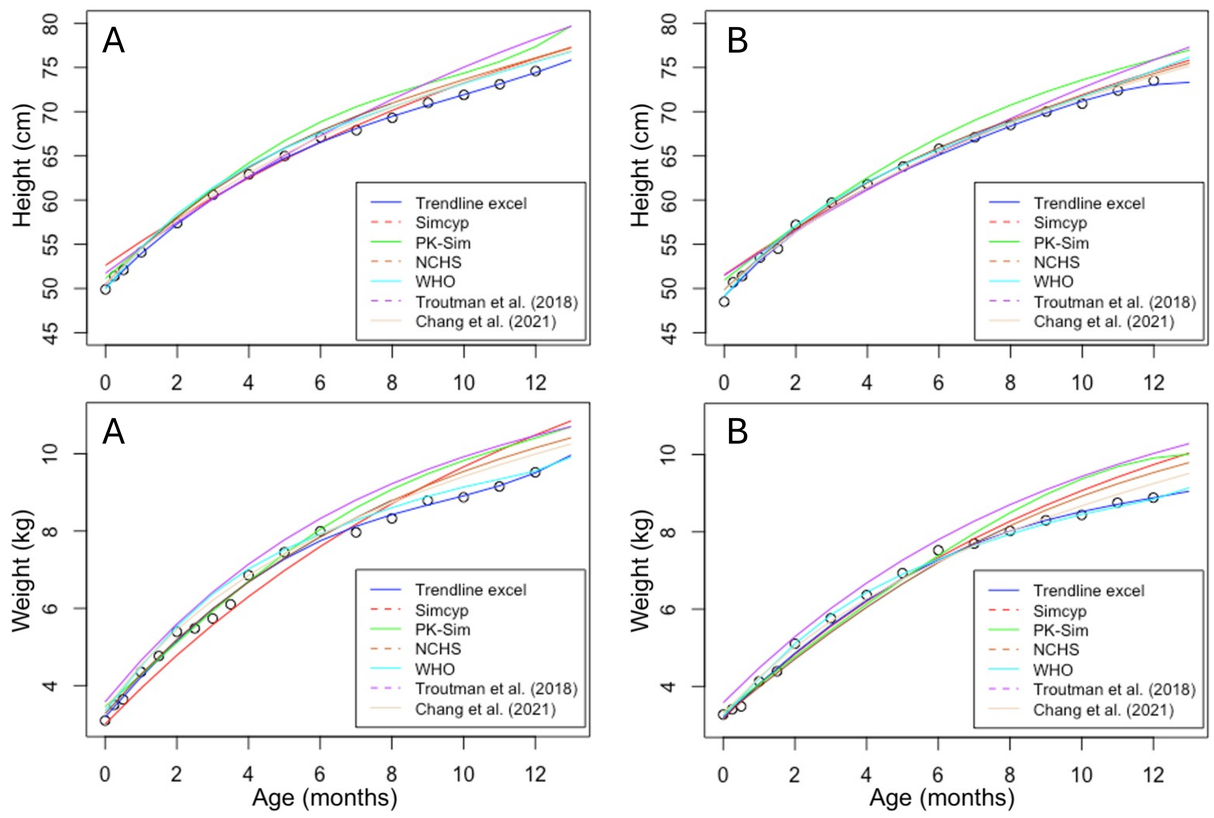
Physiology differs between formula- and breastfed infants and has not yet been adequately implemented in physiologically-based pharmacokinetic (PBPK) simulations.



We aim to compare infant growth-functions to a new dataset of breastfed infants and to **assess the impact on PBPK predictions.**

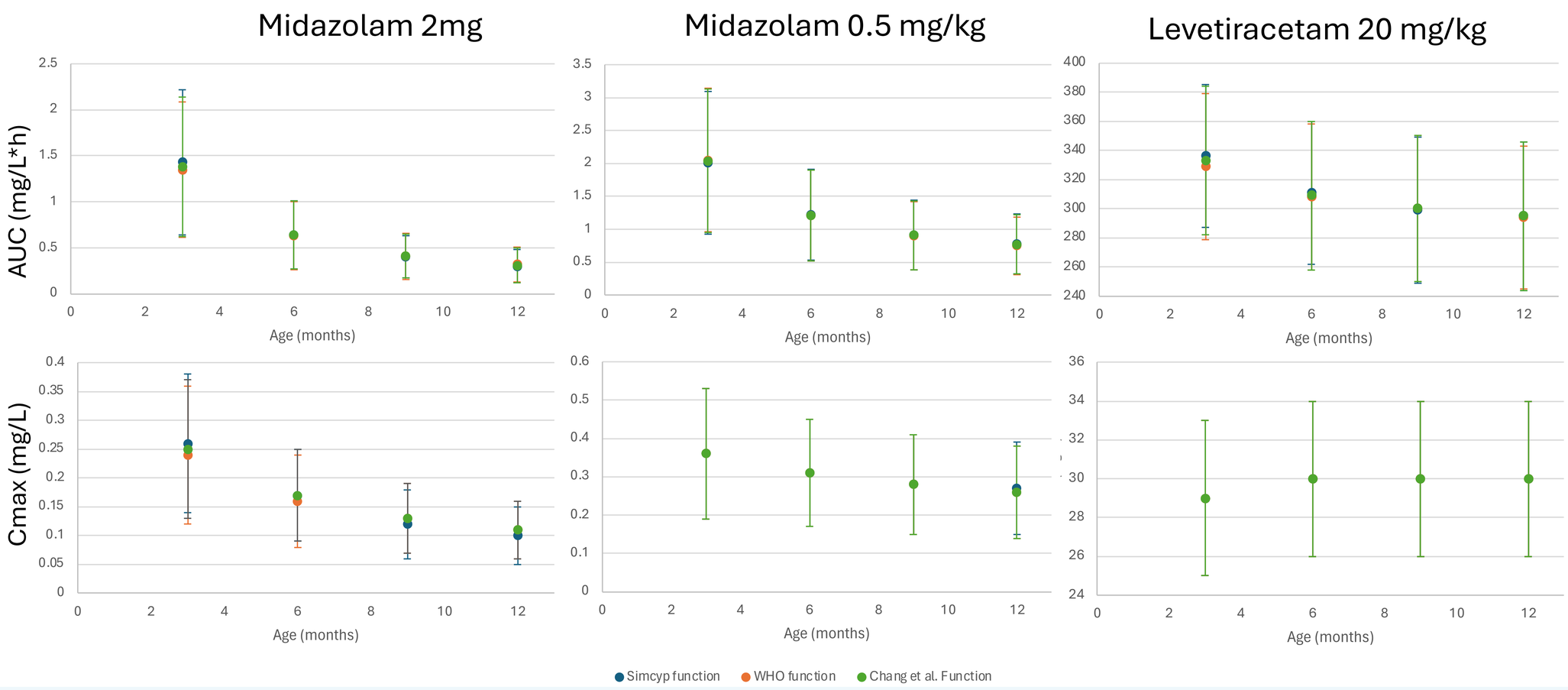
Methods

A **new dataset** (points) **on height and weight of (≥4 months exclusively) breastfed boys** (A) **and girls** (B) was generated during the first year of life and compared to height and weight functions (lines).[1]



Results

Comparing the area under the curve (AUC) and maximum concentration (Cmax) during the first year of life after oral intake using the default Simcyp function, Chang et al.[2] and WHO[3] function for height and weight in the Simcyp PBPK simulations.



Conclusions

- As expected, the **WHO function is the most similar to our dataset** as these are based on a breastfed population
- **Small differences were observed for the AUC and Cmax** between the different height and weight functions and **negligible differences when comparing weight-based dosing** predictions
- This **structured workflow with systematic search is valuable** to collect different aspects of infant physiology for lactation-related PBPK platforms and to assess the impact on PK simulations

References

[1] Van Neste M, et al. A structured review about the physiology of breastfed infants, with a special interest in the effects on drug absorption and transfer: https://osf.io/mhgf2/
[2] Chang HP, Kim SJ, Wu D, et al. Age-Related Changes in Pediatric Physiology: Quantitative Analysis of Organ Weights and Blood Flows: Age-Related Changes in Pediatric Physiology. AAPS Journal. 2021 May 1;23(3).
[3] Centers for Disease Control and Prevention (CDC). WHO Growth Charts: https://www.cdc.gov/growthcharts/who/boys_length_weight.htm

Acknowledgements

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