PEDeus

Pediatric Decision Support

PEDeus is a 100% subsidiary of the University Children's Hospital Zurich.
Our vision is to perfect drug therapy and drug safety in children through «clinical decision support» (CDS).

Impact of a pediatric clinical decision support system on drug dose prescribing - a randomized within-subject simulation trial

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Background

Drug dosing errors are among the most frequent causes of preventable harm in pediatrics. Due to the complexity of pediatric pharmacotherapy and the working conditions in healthcare, it is not surprising that human factor is a well-described source of error. We hypothesized that the use of a clinical decision support system (CDSS) with a built-in dose calculator leads to a reduction of dose calculation errors and makes the dose prescribing step more efficient when compared to manual calculation using a pocket calculator. Thus, we conducted a randomized within-subject simulation asking health care professionals (HCP) to calculate dosages for hypothetical but clinically relevant patient cases.

Conclusion

Our results provide robust evidence that the use of the CDSS is safer and more efficient than manual dose derivation in pediatrics. Interestingly, only consulting a dosing database was not sufficient to substantially reduce errors. We are confident the CDSS PEDeDose ensures a higher safety and speeds up the prescribing process in practice.

Methods

Study setup

18 pediatric prescription examples

3 interventions

52 healthcare professionals

Interventions

Full	CDSS PEDeDose
Basic	PEDeDose database + pocket calculator
Control	SmPC + pocket calculator

Multivariable modelling

Error (binary)	**Generalized Linear Mixed Model (logistic)**
Time (continuous)	**Linear Mixed Model**

Adjustment for

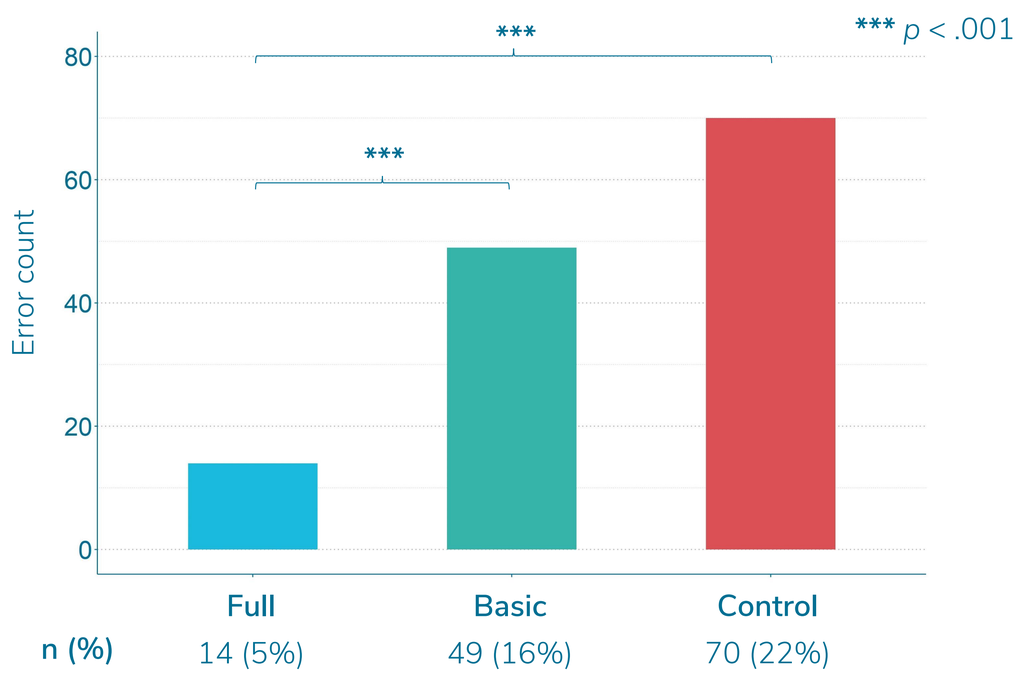
Type of institution, working experience, and PEDeDose usage.

Random slopes and intercepts by subject and by intervention

Errors – Primary outcome

Error counts

Number of errors stratified by intervention



n (%)	Full	Basic	Control
	14 (5%)	49 (16%)	70 (22%)

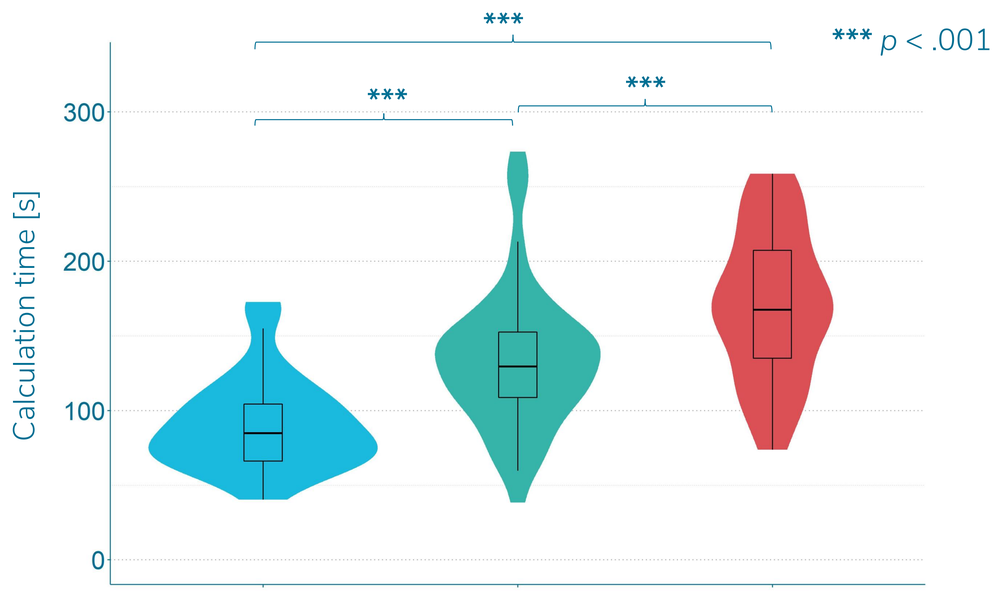
Odds ratio (error / correct)

Full vs Control	**0.08 (95% CI 0.02 to 0.36, p <.001)**
Full vs Basic	0.67 (95% CI 0.44 to 1.03, p <.001)
Basic vs Control	0.22 (95% CI 0.12 to 0.42, p = .68)

Time – Secondary outcome

Calculation time

Distribution of the median calculation time per participant stratified by intervention



Median [Q1,Q3]	Full	Basic	Control
	86 s [67, 116]	132 s [96, 173]	161 s [118, 225]

Time change (%)

Full vs Control	**–45% (95% CI –51 to –39, p <.001)**
Full vs Basic	–31% (95% CI –38 to –23, p <.001)
Basic vs Control	–20% (95% CI –27 to –12, p <.001)