

## A Computer-based Pharmacokinetic Implementation for Digoxin Therapeutic Monitoring in Pediatric Patients

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### ABSTRACT

*Because of the narrow therapeutic range and large inter-patient variability in digoxin's pharmacokinetics and pharmacodynamics, an appropriate dosage regimen for individuals is needed. However, monitoring and adjusting the optimal individualized dosage regimen requires a knowledge and familiarity of pharmacokinetic equations. The objective of this study was to develop a computer-based pharmacokinetic implementation for individualized digoxin pharmacokinetic parameters, dosage regimen, and predicted concentrations in pediatric patients. The program was developed using Microsoft Access 2000. Validated digoxin pharmacokinetic parameters for pediatrics from a previous study were used to test the computer-based pharmacokinetic program. After entering a patient's data, the program calculated the pharmacokinetic parameters and a dosage regimen for each patient to achieve the therapeutic goals; the predicted concentrations at non-steady state and steady state from selected doses were also calculated. For program testing, 30 pediatric patients from the validation group were used to calculate pharmacokinetic parameters. The mean prediction error (bias) was -0.111 ng/mL (95% CI: -0.218 to 0.004) and precision (RMSE) was 0.315 ng/mL (95% CI: 0.237 to 0.378). Compared to manual calculations, using the computer program required less than one fifth of the time. This simple computer program was developed to assist the pharmacist and healthcare team in terms of accuracy, timesaving, and convenience for digoxin pharmacokinetic calculation and therapeutic monitoring in pediatric patients.*

**Keywords:** Digoxin, Computer-based program, Pharmacokinetic, Pediatric