Abstract

Pharmacokinetic variability signifcantly impacts drug e f cacy and safety, particularly in special populations such as the elderly, children, pregnant women, and individuals with comorbidities. This review explores the factors inf uencing pharmacokinetics within these groups, including changes in absorption, distribution, metabolism, and excretion. Understanding these variations is critical for optimizing dosing regimens and achieving therapeutic success. Individualized dosing strategies, pharmacogenetic testing, inclusive clinical trials, and continuous medical education are emphasized as essential tools for healthcare p

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Renal Disease: Reduced renal function impacts drug excretion, necessitating dose modi cations for renally-excreted drugs to prevent adverse e ects [4].

Cardiovascular Disease: Altered hemodynamics in cardiovascular disease can in uence drug distribution and clearance, particularly for drugs with a narrow therapeutic index

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Utilizing pharmacokinetic modeling and simulations allows healthcare providers to predict drug behavior in special populations and adjust dosing accordingly. erapeutic drug monitoring (TDM) is essential for drugs with narrow therapeutic windows to ensure e cacy and safety.

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