

## Labs and Metabolism

Children are not small adults. They often respond to drugs and other therapeutics differently than adults do. There are complex changes in growth and development that take place during childhood. These changes affect the absorption, distribution, metabolism, and excretion of various medications. Additionally, children suffer from different types of diseases and symptom development of those diseases compared to adults.

**Even within a group of children of similar age and weight, drug dosing may differ** because of maturational differences in absorption, metabolism, and elimination. Whether a child is male, or female also plays a role in drug absorption. Over periods of time, because of these continued changes throughout childhood, drug doses will also need to be adjusted. Due to the complexity and fluctuation in absorption, all dose adjustments should be based on blood serum levels.

**Adolescence is a time for growth spurts and puberty changes.** A teen may grow several inches in a short period of several months followed by a period of very slow growth, followed by yet another growth spurt. These growth spurts require energy. Food intake or sleeping more are signs the body is likely experiencing a growth spurt. Medications can also be affected by these changes.

**Metabolism can affect how your body processes medications and can impact both the drug's efficacy and toxicity.** It's one of the main reasons why you can experience success with drug therapy or get into trouble. For instance, if your body metabolizes a drug too quickly, you may not get any benefit from the prescribed dose.

**Lab work is a critical tool for children on medications. It is a way to monitor how the individual's body is processing the drug.** As children mature, liver enzymes can effectively metabolize most drugs because the Basal Metabolic rate in children is higher than in adults, and drugs are metabolized more quickly. **Thus, drug dosages relative to body weight may need to be higher for children than adults.** The basal metabolic rate decreases almost linearly with age. Using dosing guidelines, therapeutic drug levels can be done at half the target dose to assess anticipated final dose, if your doctor is willing and your child is able. **Children do not always need to be at the maximum target dose to reach stability.**

## Labs

**Lab work is best completed in the morning, 12 hours after the previous evening dose. You'll also want to skip that morning dose until after testing to get a trough level.** This is important because the body is subject to variations depending on the time of day, which can be reflected in some laboratory values. The vitamins, minerals, fats, carbohydrates, and proteins that make up all food and beverages can impact blood-level readings, clouding the results of your test.

**Should your child have a difficult time with blood draws,** you can request that your doctor provide a prescription for an EMLA cream or lidocaine, which numbs the skin before blood is drawn. Also, some labs have a vibrating device (usually a little animal or gadget) that can be placed in a child's hand to distract them while blood is taken.

## References:

**Factors and Mechanisms for Pharmacokinetic Differences between Pediatric Population and Adults** [Eva Fernandez,1,\\*](#) [Raul Perez,1](#) [Alfredo Hernandez,1](#) [Pilar Tejada,1](#) [Marta Arteta,1](#) and [Jose T. Ramos2,\\*](#) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3857037/>

## **Drug metabolism and disposition in children**

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