# Article information:

Renal clearance parameters for PBPK model analysis of early lifestage differences in the disposition of environmental toxicants - ScienceDirect
<https://www.sciencedirect.com/science/article/pii/S027323000800038X?via%3Dihub=>

# Article summary:

1. Physiologically-based pharmacokinetic (PBPK) models are being developed to assess the susceptibility of early life stages to environmental toxicants based on differences in renal clearance.

2. Glomerular filtration rate (GFR), tubular secretion, and tubular reabsorption are all deficient in newborns, with varying maturation rates during the first months and years of life.

3. Limited data on renal plasma flow indicate that neonatal rates are only 10-20% of adult values, but rapidly increase to 50% by 6 months and approach adult levels by 1-2 years of age.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article titled "Renal clearance parameters for PBPK model analysis of early lifestage differences in the disposition of environmental toxicants" provides a summary of data on renal clearance in neonates and infants to support the development of physiologically-based pharmacokinetic (PBPK) models. The aim is to evaluate whether early life stages are more or less susceptible to adverse effects from exposure to chemicals due to reduced renal clearance.

One potential bias in this article is the focus on supporting the development of PBPK models without considering alternative approaches or methodologies. While PBPK models can be useful tools, they have limitations and assumptions that may not accurately represent real-world scenarios. It would be beneficial to discuss other modeling approaches or experimental studies that could provide complementary information.

The article also relies heavily on data compiled from various sources, including PubMed searches and reference sections of review articles. This approach may introduce selection bias, as it is unclear how these sources were chosen and if all relevant studies were included. Additionally, the limited availability of data on renal blood flow and secretion rates in neonates and infants is acknowledged but not adequately addressed. This lack of data limits the accuracy and reliability of the conclusions drawn from this study.

Furthermore, there is a lack of discussion on potential confounding factors that may influence renal clearance in early life stages. Factors such as developmental changes in enzyme activity, protein binding, or metabolism could impact the disposition of chemicals and should be considered when evaluating susceptibility to adverse effects.

The article also fails to explore counterarguments or alternative explanations for observed differences in renal clearance between adults and early life stages. It would be valuable to discuss potential mechanisms underlying these differences and consider whether they are solely due to reduced renal function or if other factors play a role.

Additionally, while the article mentions risk assessment briefly, it does not provide a comprehensive analysis of the potential risks associated with altered renal clearance in early life stages. Considering that this is an important aspect of the study, it would be beneficial to discuss the implications of reduced renal clearance on the toxicokinetics and toxicity of environmental toxicants.

Overall, this article presents a limited perspective on the topic of early life stage differences in renal clearance. It relies heavily on compiled data without thoroughly addressing potential biases or limitations. The lack of discussion on alternative approaches, confounding factors, and comprehensive risk assessment limits the usefulness and applicability of the findings presented.

# Topics for further research:

* Alternative modeling approaches for evaluating early life stage differences in renal clearance
* Developmental changes in enzyme activity and their impact on renal clearance in neonates and infants
* Factors influencing renal clearance in early life stages beyond reduced renal function
* Mechanisms underlying differences in renal clearance between adults and early life stages
* Implications of reduced renal clearance on the toxicokinetics and toxicity of environmental toxicants in neonates and infants
* Comprehensive risk assessment of altered renal clearance in early life stages

# Report location:

<https://www.fullpicture.app/item/6d9e4d408301c3499b3a76531e974805>