

# Aligning with NCCN: A Comparative Analysis of Digital Tools for Adult Carboplatin Dosing



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## Background

Carboplatin is a platinum compound commonly used in combination chemotherapy regimens for the treatment of various malignancies and primarily eliminated through kidney. The most widely used formula to calculate the carboplatin dose in adults is the Calvert Equation.

### Calvert Equation<sup>1</sup>

- Carboplatin Dose (mg) = Target area under the curve (AUC mg/mL/min) x (GFR\* + 25)

GFR is commonly estimated by calculating the creatinine clearance (CrCl) using Cockcroft-Gault or Jelliffe equation. The National Comprehensive Cancer Network (NCCN) recently published an adult carboplatin dosing recommendation in February 24, 2023 to consider using adjusted body weight for overweight or obese patients (BMI ≥ 25 kg/m<sup>2</sup>) and using a minimum serum creatinine (Cr) of 0.7 mg/dL<sup>2</sup>. Actual body weight for overweight or obese patients may lead to overestimation of CrCl and result in carboplatin overdose<sup>3,4</sup>. Various carboplatin dosing calculators are available online. However, whether these online calculators have been updated based on the NCCN recommendation is unknown.

## Objective

The objective of this study is to evaluate which online calculators are updated based on the NCCN recommendation and be able to support healthcare professionals in selecting the appropriate carboplatin dosing calculator to obtain the optimal carboplatin dose, thereby maximizing therapeutic efficacy while minimizing the risk of toxicity for carboplatin containing chemotherapy regimens.

## Methods

**Selection of Online Calculators:** Carboplatin dosing calculators were identified by online search using Google with the term “carboplatin dosing calculator”.

**Data Collection:** Hypothetical overweight patient datasets (age = 70, sex = female, actual body weight = 100kg, height = 178cm, serum creatinine = 1 mg/dL, and AUC goal = 5) were inputted into online calculators to obtain the recommended carboplatin dose. For each online calculator, the use of adjusted body or actual body weight as well as additional parameters used to calculate carboplatin dose were recorded.

## Discussion

Multiple online calculators are available for carboplatin dosing, yet not all adhere to the most recent NCCN recommendation. Among the calculators tested, AiGenRX/OncPharm, GlobalRPh, and CancerCalc align with the NCCN recommendation. Additionally, some calculators offer options for different methods of estimating GFR. For instance, GlobalRPh generates multiple results based on various body weights and GFR estimation equations, including Cockcroft-Gault and Jelliffe. The eviQ.org calculator highlights the Anticancer Drug Dosing in Kidney Dysfunction (ADDIKD) guideline, which endorses the use of body surface area-adjusted eGFR calculated by CKD Epidemiology Collaboration (CKD-EPI). Similarly, LexiDrug prompts users to choose between Cockcroft-Gault or Jelliffe for eGFR calculation. While most calculators cap GFR at 125 mL/min, Medscape and GuidelineCentral do not implement this GFR cap, potentially leading to dosing inconsistencies. It is worth noting that when provided with only the patient's information, ChatGPT-4o initially uses the Cockcroft-Gault formula with actual body weight to calculate CrCl. However, when instructed to calculate the dose based on the newly updated NCCN recommendations, which include using a minimum creatinine level and selecting the appropriate body weight, ChatGPT-4o aligns the carboplatin dosing with the NCCN guidelines after detailed instructions.

## Results

Table 1. Parameters Used to Calculate Carboplatin Dose

	Sex	Age	Weight	Height	Target AUC	Serum Creatinine
AiGenRX/OncPharm	✓	✓	✓	✓	✓	✓
Medscape	✓	✓	✓	✓	✓	✓
GuidelineCentral	✓	✓	✓	-	✓	✓
GlobalRPh	✓	✓	✓	✓	✓	✓
eviQ	✓	✓	✓	-	✓	✓
Omni Calculator	✓	✓	✓	-	✓	✓
CancerCalc	✓	✓	✓	✓	✓	✓
LexiDrug	✓	✓	✓	-	✓	✓
ChatGPT 4o	✓	✓	✓	✓	✓	✓

Table 2. Comparison of Body Weight Used By Calculators

	Adjusted Body Weight	Actual Body Weight	GFR Cap (mL/min)	Calculated Dose (mg)
AiGenRX/OncPharm	✓		125	460.8
Medscape		✓	-	538.2
GuidelineCentral		✓	-	538.2
GlobalRPh	✓	✓	100, 125, 150	460 & 538
eviQ		✓	125	538
Omni Calculator		✓	125	538.2
CancerCalc	✓		125	463
LexiDrug		✓	100, 125, 150	538
ChatGPT 4o		✓	-	538

## Conclusion

AiGenRX/OncPharm, GlobalRPh, and CancerCalc are online calculators that align with NCCN guidelines by utilizing adjusted body weight for overweight or obese patients. ChatGPT-4o could be utilized to calculate carboplatin dosing per NCCN recommendation with detailed instructions.

## Reference

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