

# Dose Rounding, Maximum Single Dose, Maximum Cumulative Dose

## iKnowMed Dose Rounding

### Background

For many anti-cancer agents, doses are ordered by a formula dose (e.g., mg/m<sup>2</sup>, mg/kg, gm/m<sup>2</sup>). iKnowMed will calculate the dose to be given to a patient based on the most recently charted patient measurement on which the dose depends. For example, if a drug dose is ordered as mg/kg or mg/m<sup>2</sup>, the system will use the most recently entered weight or BSA, respectively, to calculate the dose of the drug. When iKnowMed calculates the dose of a drug based on a formula, the final dose that is calculated can (depending on the BSA, weight, and dose in a given circumstance) contain decimal places. In most clinical settings, it is undesirable to have decimals present for anti-cancer agent doses and therefore the dose will then be rounded to the nearest whole number. In addition, vial concentration or tablet sizes can also be a factor in determining what dose will actually be administered to a patient versus what dose was calculated.

In order to minimize the number of manual modifications that a user must make once formula doses are calculated, iKnowMed has dose rounding values set up for many of the commonly used anti-cancer agents (and some other medications). When these values are set, typical doses are taken into consideration as well as available vial concentrations or tablet/capsule sizes. If an oral drug is available in various sizes, dose rounding will not typically be set to allow for provider preference. Dose rounding will also not be set if the therapy is given as a flat dose.

### Basics

Since dose rounding only comes into play when doses are calculated from formula units to absolute units, it is important to note iKnowMed calculates and records BSA using the Dubois and Dubois formula or Mosteller formula. iKnowMed defaults to the Dubois and Dubois formula unless specified otherwise by practice preference.

For clarity, the BSA is displayed to the nearest hundredth. If no dose rounding has been defined in iKnowMed for a drug, the system will use what is known as the default-rounding rule, which is to round the calculated dose to the nearest whole number when the dose is greater than 10, or to two significant digits if the dose is less than 10. Note that this is how most medications in iKnowMed handle dose rounding.

There is only one dose rounding value set for each medication if a value is set at all. The dose rounding values are set at the drug level and are not set for the various drug forms, which may be present for one drug (ex. 250 mg, 500 mg, and 1000 mg vial sizes). The calculated dose is rounded up or down depending on what dose rounding value is set and what dose is calculated. Although having an electronic medical record will minimize the potential misinterpretation of dose amounts, iKnowMed recommends a policy of rounding all anti-cancer agent doses over 10 mg to a whole number to avoid a potential dose error where, for example, a dose of 20.5 mg is misread as 205 mg.

### Examples

The examples below illustrate how dose rounding works in the context of iKnowMed.

1. Dacarbazine 10 mg/mL. Dose rounding set to 10 mg.
  - A patient with a BSA of 1.7 has an ordered dose of 225 mg/m<sup>2</sup> that calculates to 382.5 mg. This dose will be rounded down to 380 mg.

2. Cyclophosphamide 20 mg/mL. Dose rounding set to 10 mg.
  - A patient with a BSA of 1.8 has an ordered dose of 450 mg/m<sup>2</sup> that calculates to 810 mg. No dose rounding takes place. However, a dose of 475 mg/m<sup>2</sup> calculates to 855 mg and will be rounded up to 860 mg.
3. Cyclophosphamide 25 mg tablets.\* Dose rounding set to 25 mg.
  - The patient has a BSA of 1.7 and the drug is dosed at 100 mg/m<sup>2</sup>. The dose calculates 170 mg, but dose will round to 175 mg.

**\*NOTE:** For many of the anti-cancer oral agents, the smallest tablet/capsule size is used for the dose rounding value, based on the assumption that half of a tablet/capsule would not be used. In the case where a practice believes that half tablet sizes will be used (i.e., the tablets are scored), then dose rounding can be removed (or modified) to accommodate for this.

### Alternatives

It is possible to remove dose rounding or modify dose rounding so that it only rounds the dose values to the nearest whole number (by entering a dose rounding value of 1), or to the 10th decimal place (by entering a dose rounding value of 0.1). However, it is important to note that such a configuration has major implications for system usability in that it increases workload for iKnowMed users who may need to manually modify the doses of many of the anti-cancer agents to doses which are more likely to be given based on compounding issues.

For example, if the system calculates a dose of 1046 mg of injectable Cyclophosphamide with dose rounding in place, the dose will round to 1050 mg. If no dose rounding is in place, the user will likely manually modify the dose. Again, dose rounding is applied only when doses are calculated from formula units to absolute units. Entering a flat dose will always override dose rounding.

### Special Cases

For most practice settings, dose rounding is a helpful tool that allows for ease of dose preparation by the pharmacy or nursing staff. However, there is a situation where dose rounding may have limitations:

**Pediatrics:** Rounding set for adults may have a larger than intended effect on pediatric patients. If pediatric patients are treated in a pediatric clinic, then unique dose rounding values can be set for that clinic or not used at all. In the case where pediatric patients are treated outside of a pediatric clinic and within an adult practice setting, the doses for these patients need to be calculated manually and then entered to override the dose-rounded doses.

### Maximum Single Dose

#### Drugs with Maximum Single Dose Values Set

When a maximum single dose exceeds the value set for a given drug an alert appears indicating the maximum single dose for the drug ordered as well as the dose ordered. For drugs with flat doses, the maximum single dose is determined using the established upper limit from the drug prescribing information or other drug information references. For drugs dosed using body weight or BSA, the maximum single doses are calculated using the established upper limit multiplied by a maximum body weight of 150 kg or BSA 2.5 m<sup>2</sup>.

### Maximum Cumulative Lifetime Dose

#### Cumulative Doses

Below are drugs with lifetime cumulative doses. The system calculates the cumulative doses when the below are ordered in the chart. The calculation includes the historical doses, total doses given off-site, scheduled doses and those doses administered in iKnowMed.

When a maximum cumulative dose exceeds the value set for a given drug, an alert appears indicating the maximum cumulative dose for the drug ordered as well as the combined cumulative dose of administered, scheduled, and historical doses.

Please note the doses of certain related drugs below are added together to determine the maximum cumulative dose. An example would be Doxorubicin and Doxorubicin liposomal if both in the chart would be taken into account when calculating the maximum cumulative lifetime dose for the drug.

### Drugs with a Max Cumulative Lifetime Dose

Medication Name	Historical Dose
Bleomycin sulfate	Historical dosage in units
Carmustine	Historical dosage in mg/m <sup>2</sup>
Daunorubicin	Historical dosage in mg/m <sup>2</sup>
Daunorubicin liposomal	Historical dosage in mg/m <sup>2</sup>
Doxorubicin	Historical dosage in mg/m <sup>2</sup>
Doxorubicin liposomal	Historical dosage in mg/m <sup>2</sup>
Epirubicin	Historical dosage in mg/m <sup>2</sup>
Idarubicin	Historical dosage in mg/m <sup>2</sup>
Mitoxantrone	Historical dosage in mg/m <sup>2</sup>

### Statement of Understanding

In witness whereof, the parties hereto have reviewed and agreed upon the dose rounding parameters referenced above and utilized by iKnowMed software as described herein as of the date set forth below.

<b>Customer:</b>	
<b>Signature:</b>	
<b>Name:</b>	
<b>Date:</b>	
<b>Title:</b>	