5.12: Safe Dosage Range

When administering calculated liquid medication, it is important to double-check that the dosage administered is within a safe range. Safe ranges of dosages are provided in drug reference materials. Medication errors often occur in children, who have smaller ranges of safe dosage than adults due to their smaller weight.

When verifying that a dosage is within a safe range based on a patient’s weight, begin by completing the dosage calculation. Then, calculate the low and high ends of the safe dosage range. Finally, verify that the calculated dose is within this range.

Practice Problem: Safe Dosage Range

Declan is an 8-month-old infant who weighs 7 kg. He has been prescribed acetaminophen 100 mg every 4-6 hours PO for a fever. The recommended dosage range for infants is 10-15 mg/kg/dose. Calculate the acceptable dosage range for Declan and determine if the prescribed dose is safe.

1. Calculate the low end of the safe dosage. Start by identifying the goal unit. For this problem we want to know the dose in milligrams:

\[ mg = ? \]

2. To set up the problem, match the numerator in the first fraction to the desired unit to be solved, which in this case is mg. Based on information known from the problem, we know that the recommended low dose is 10 mg per kg, so add 1 kg to the denominator:

\[ mg = \frac{10 - mg}{1 - kg} \]
3. Create the second fraction with the intent to cross out units. Place kg in the numerator. Look to the problem for information related to kg. We know that Declan weighs 7 kg, so place 7 in the numerator and 1 in the denominator with the intent to cross off units:

\[ mg = \frac{10 \text{ mg}}{1 \text{ kg}} \times \frac{7 \text{ kg}}{1} \]

4. Cross off units. Multiply across the numerators and then the denominators, and then divide the final fraction for the final low dose answer in mg:

\[ mg = \frac{10 \text{ mg}}{1 \text{ kg}} \times \frac{7 \text{ kg}}{1} = \frac{70}{1} = 70 \text{ mg} \text{ (low dose)} \]

5. Calculate the high dose. Set up a similar equation, but this time using the high dose information of 15 mg per kg:

\[ mg = \frac{15 \text{ mg}}{1 \text{ kg}} \times \frac{7 \text{ kg}}{1} = \frac{105}{1} = 105 \text{ mg} \text{ (high dose)} \]

6. Based on the calculations, the safe dosage range for Declan is 70 mg – 105 mg. Compare the prescribed dose to the low- and high-dose range calculations to determine if it is safe. Declan was prescribed 100 mg. It falls within the calculated safe dosage range of 70 – 105 mg, so, yes, this is a safe dose for Declan.

**Video Review of Safe Pediatric Dosage Calculations**: [1]
Please practice dosage range calculations with the interactive activity below.

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1. RegisteredNurseRN. (2016, September 13). *Safe dose dosage range pediatric calculations nursing drug math (Video 7).* [Video]. YouTube. All rights reserved. Video used with permission. [https://youtu.be/QRdlVGaQf7Q](https://youtu.be/QRdlVGaQf7Q)