



How Often Should You Take DayQuil™?



Cold medication like VICKS® DayQuil™ often includes the chemical Dextromethorphan, which is a cough suppressant. Although these medications are available over-the-counter and are generally low-risk, taking too large of quantities can cause serious side effects.

1. Dextromethorphan has a half-life of 3 hours. This means that every 3 hours, your body will eliminate $\frac{1}{2}$ of the current amount. In a 30 mL dosage of liquid DayQuil™, there are 20 milligrams of Dextromethorphan, and after 3 hours, 10 mg would still be in your system.
 - a. How many mg of the drug will be in your system after 6 hours? After 9 hours?
 - b. How many mg of the drug will be in your system after 10 hours? How do you know?

2. Write a formula for $D(t)$, that gives the amount of Dextromethorphan in your system after t hours.

3. What percent of the drug remains in your body after 1 hour? What percent is eliminated?

4. Write an alternate formula for $D(t)$ of the form $D(t) = ab^t$ that can also be used to model the amount of Dextromethorphan in your system after t hours. Clearly explain what your a and b values represent in this context.

5. Customers are instructed to use the medicine “as directed”. For adults and children 12 years and over, this means taking 30 mL every 4 hours. Suppose you take your first 30 mL at 8 AM. Using the recommended dose, calculate how many mg of Dextromethorphan will be in your system at various times throughout the day.

8 AM	10 AM	12 PM	2 PM	4 PM	6 PM	8 PM
20 mg						

