Basic & Applied PHARMACOKINETICS *Self Assessment*

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Dedication

To patient care providers whose quest for knowledge remains an important part of life throughout their career.

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Preface

Welcome to *Basic & Applied Pharmacokinetics Self Assessment*. The content for this work was developed over 10 years of practicing the application of pharmacokinetic principles to the care of patients ranging from fragile premature newborns to the oldest of the elderly. It is also informed by over 30 years of teaching both basic and applied pharmacokinetics to thousands of pharmacy students. I hope it will be of value to review content learned in the past and practiced in patient care settings as well as, perhaps, learning new areas that might not have been covered in your training.

To view a video of the welcome and instructions for this self-assessment textbook, go to https://www.youtube.com/user/murphyassessment.

Or

Most of the pharmacokinetic parameters and dosing approaches used here are taken directly from specific chapters in the book *Clinical Pharmacokinetics, Fifth Edition* (American Society of Health-System Pharmacists, 2011). I wish to thank the authors of those chapters for their excellent work in reviewing the literature and compiling these data for use in predicting drug dosing schedules and resulting drug concentrations. However, it is important to note that this textbook is designed to test skills in using equations and application of pharmacokinetic parameters. It is not meant to be the final word on how patients should be dosed and monitored.

A few caveats will be of benefit to consider while using this material:

1. It is quite likely that other professors teaching pharmacokinetics used variations of some of the equations provided here. That is to be expected. My approach has always been to try and find the simplest approach to solving pharmacokinetic problems, although it is surely possible that others have found better ways to solve some problems. As an example of my approach, 2.3 × log = ln, so I always use ln (natural log) rather than log (to the base 10) because it saves the step of multiplying times 2.3. Other teachers like C_1 and C_2 to represent two different concentrations on a concentration-time curve. I prefer C_i, which would generally represent the first (higher concentration) measured, and C for any concentration that is down the curve and smaller.

2. The chapters are designed to pose questions, some of which will be calculations and other general knowledge, with the answers given at the end of the chapter. If you

get an answer right, keep moving on. If not, detailed problem solutions are shown in the second part of the book with corresponding numbers (e.g., Chapter 1.3 self assessment corresponds with Chapter 2.3 problem solutions).

3. Most self-assessment chapters will have population pharmacokinetic values and dosing approaches provided at the beginning of the chapter. These approaches and values provided are not meant to suggest that better approaches or different parameters might not be found in the literature. Although other approaches and population predictors may be used in various settings, the ones provided here must be used to end up with the same answer that will be provided.

4. Calculations have generally been done by storing multiple decimals of a portion of a formula answer to be used for the rest of the formula, while final answers may be rounded off to just a couple of decimal places. If answers are rounded off early in calculations when a complex formula is used, the final answer may be somewhat different than the one listed as correct. If your answer is slightly off, examine the problem solution, and if the problem has been set up correctly, the difference may be due to early rounding.

5. Although most of the problems are based on actual patients treated over the years, some are purely hypothetical. Some of the approaches taken may not be in common use and are provided primarily as examples to illustrate points.

6. As mentioned above, I like simple approaches. Whenever a problem can be solved using ratio (e.g., a 50% increase in dose can be expected to increase a steady state concentration by 50%), that approach will be shown. Using the correct equations that represent the dosing approach can solve any problem and will also be shown, but I don't think you should have to work harder than necessary to solve a problem.

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