

# Concepts in Sterile Preparations and Aseptic Technique

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# Dedication

*To our children, Anthony, Daniel, and Natalie—you inspire me to be the best that I can be for you. I love you all forever. And yes, my dear children, I am finally finished writing my book and now we can go play. To my husband, who has been my continuous pillar of support. You are my best friend and the love of my life. To my parents, Tina and Al, who both instilled in me the desire to never stop learning, to expand my horizons, and to always persevere. Thank you for teaching me that anything is possible. To my mentors and colleagues, who have helped me learn, understand, and shape me into the professional that I am today. Especially for those who have dedicated themselves to paving the road for our profession. To my students and residents, for the hope you bring me for the bright future of our treasured profession.*

*For all the sacrifices endured by my family, and for the unwavering support and encouragement of my friends, colleagues, and relatives. Thank you.*

*“The book” is done.*

*And—most importantly—for Your Glory, Lord. Without You, none of this would have been possible.*

*Pamella S. Ochoa*

*I dedicate this book to my brilliant and beautiful wife who has been my inspiration, and without whom this book would have not been completed. I also dedicate this book to my parents who overcame great hardships and sacrifices to provide me the opportunity to pursue my dreams.*

*José A. Vega*



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# Preface

This is an interesting time in the evolution of sterile compounding. The recent past has revealed many changes and standards in regard to compounding sterile preparations. While much progress has been made, there is still more that needs to be accomplished as we continue to recognize the need for further changes for the safety of our patients. Our generation has been unfortunate in witnessing landmark events related to adverse patient outcomes—from contamination of medications to compatibility misadventures and errors in dosing related to compounded sterile preparations. This has fueled the need to immediately address specifics of sterile compounding such as the training of persons compounding sterile preparations, current verification processes, environmental controls, and much more.

The content of this book is derived from current practice, current standards and regulations, literature, and best practice. Information from USP Chapter <797> is included throughout the book. To emphasize the application of these USP standards, specific content from the standards has been strategically placed based on the content of the chapter.

It is the goal of the authors to bring attention to the patient. Concern for the patient must be at the forefront of our thoughts and actions as we consider the terminal purpose of our preparations. In addition to descriptions and alerts for patient safety issues, historical examples are included in an effort to connect sterile compounding to real life situations.

It is important that pharmacists understand fundamentals of aseptic technique, as well as current standards and best practices as they relate to sterile compounding. The intent of this book is to provide a source of information for these topics. Our hope is that this book will prove useful in the education of pharmacy students as part of their coursework and in the training of pharmacists and pharmacy technicians who will be involved in sterile compounding. For those who are already compounding sterile preparations, we hope that this book will serve as a valuable resource to enhance current practice.

## How to Use this Book

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This book provides a comprehensive overview of the fundamentals of aseptic technique and sterile compounding. The book includes the following pedagogical features:

- **Videos:** Instructional videos are included on the Navigate Companion Website to demonstrate important techniques that are common with sterile compounding. These videos provide verbal step-by-step instructions with a visual depiction of various techniques. To facilitate a comprehensive review of techniques and processes, the video content correlates with the content of each chapter.
- **Tips:** Techniques and practices that are helpful for compounding sterile preparations are included throughout the book. These tips are intended to provide guidance based on current practice, literature, and the experiences of those who have compounded sterile preparations.
- **Alerts:** Important information that may relate to patient safety, operator safety, or current regulations and standards is highlighted throughout the book. Not only are

these alerts intended to draw the attention of the reader to the importance of the information, but they also serve as a helpful tool for remembering important information.

- **Case Studies:** While the information presented in the book is useful, its application is of utmost importance. For this reason, the authors have included case studies for each chapter. The case studies provide realistic scenarios that provide an opportunity to apply the content from the chapter. The case studies enhance learning by requiring the reader to synthesize answers.
- **Review Questions:** Each chapter includes a series of review questions that provide an opportunity for the reader to assess knowledge of important information. The review questions also serve as useful tools for the application of content presented in the chapter.
- **Additional Features:** A glossary of terms appears at the end of the book. Each chapter begins with an overview of its content and its relevance to current practice, while end-of-chapter summaries are also included. References are included for each chapter.

With the use of videos, tips, alerts, case studies, and review questions, the reader is provided with numerous methods to enhance their learning and assess their understanding.

## Student Resources

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The Navigate Companion Website features useful study activities, including Videos, Chapter Quizzes, Crossword Puzzles, Interactive Flashcards, an Interactive Glossary, Matching Exercises, and Web Links. To redeem the Access Code Card available with your new copy of the text, or to purchase access to the website separately, call 800-832-0034 and request ISBN-13: 9781449693381, or visit [go.jblearning.com/OchoaCWS](http://go.jblearning.com/OchoaCWS).

### Navigate Companion Website features:

#### Videos

These exclusive videos demonstrate important techniques.

### **Chapter Quizzes**

Complete a quiz at the end of each chapter to assess your knowledge of key concepts. Results can be emailed to your course instructor.

### **Crossword Puzzles**

Enjoy an interactive overview of terms from each chapter with real crossword puzzles made up of terms from the text.

### **Interactive Flashcards**

Enhance retention as these helpful tools guide you through the key terms vital to understanding important topics.

### **Interactive Glossary**

Search for key words and terms and their definitions alphabetically or by chapter.

### **Matching Exercises**

Engage in an enjoyable online activity to connect concepts and terms with their meanings.

### **Web Links**

Explore external sites that provide additional information about topics covered in the textbook.

## **Instructor Resources**

Qualified instructors can also receive the full suite of Instructor Resources, including PowerPoint Presentations, a Test Bank, an Instructor's Manual, and an Answer Key. To gain access to these valuable teaching materials, contact your Health Professions Account Specialist at [go.jblearning.com/findarep](http://go.jblearning.com/findarep).

**PowerPoint Presentations** featuring more than 375 slides

**Test Bank** containing more than 175 questions

**Instructor's Manual** including lab exercises and supplies list

**Answer Key** containing answers for the end-of-chapter Review Questions

# Acknowledgements

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# About the Authors

**Dr. Pamela S. Ochoa** is originally from Portland, Texas. The idea of becoming a pharmacist originated during a conversation with her father about potential careers. After graduating from high school, Dr. Ochoa attended Texas A&M University in College Station, Texas, where she obtained a Bachelor of Science degree in Biochemistry with a minor in Genetics. She then attended Texas Tech University Health Sciences Center School of Pharmacy, where she earned a Doctor of Pharmacy degree. Following graduation, Dr. Ochoa completed a PGY1 Pharmacy Practice residency at the University of Texas Health Center in Tyler, Texas. Dr. Ochoa's professional experience includes working as a clinical pharmacist, hospital pharmacist, pharmacy technician, and pharmacy intern in various hospital settings. She underwent training as a pharmacy technician for compounding of sterile preparations, including chemotherapy, and performed aseptic parenteral compounding thereafter. Dr. Ochoa has assisted in training pharmacy technicians, pharmacy students, and pharmacists as it relates to sterile compounding. She is a team member of the Sterile Compounding course, teaching both in laboratory and didactic portions of the course. She continues to provide education

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**Dr. José A. Vega** is originally from Friona, Texas. He established an interest in the field of Pharmacy early in his studies. To pursue this goal, he first attended West Texas A&M where he earned a degree in Biochemistry. His education extended to include a Doctor of Pharmacy degree from Texas Tech Health Sciences Center School of Pharmacy. He completed a PGY1 Pharmacy Practice residency at the University of Texas Health Center at Tyler. Dr. Vega worked in the community setting as a pharmacy technician, followed by professional experience as both a clinical and hospital pharmacist. He is involved in the training of pharmacy students, pharmacy technicians, and pharmacists in the area of sterile compounding. His involvement in providing education also includes the development and delivery of continuing education for sterile compounding, as well a Sterile Preparations Certification course for pharmacists. Dr. Vega serves as the course team leader for the Sterile Compounding course in which didactic and laboratory experiences provide education to pharmacy students. He currently practices as a clinical pharmacist in a hospital setting.

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