

# Phlebotomy Simplified

THIRD EDITION

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**Cover Art:** Hand holding test tube with blood plasma ready for testing by Alexander Rath/Shutterstock  
**Printer/Binder:** LSC Communications, Inc.  
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#### **Library of Congress Cataloging-in-Publication Data**

Names: Garza, Diana, author. | Becan-McBride, Kathleen, 1949- author.  
Title: Phlebotomy simplified / Diana Garza, Kathleen Becan-McBride.  
Description: Third edition. | Boston : Pearson, 2018. | Includes bibliographical references and index.  
Identifiers: LCCN 2018023207 | ISBN 9780134718347 | ISBN 0134718348  
Subjects: | MESH: Phlebotomy—methods  
Classification: LCC RB45.15 | NLM WB 381 | DDC 616.07/561—dc23 LC record available at <https://lccn.loc.gov/2018023207>

Printed in the United States of America

1-18



ISBN-13: 978-0-13-471834-7  
ISBN-10: 0-13-471834-8

To my husband, Peter McLaughlin; my son, Kevin; my daughters and their husbands, Lauren and Bryant Black and Kaitlin and Kevin Necas; and my parents for their affection and continuous support.

—*Diana Garza*

To my husband, Mark; my sons, Patrick and Jonathan, and my daughter-in-law, Danielle; my grandsons, Finnaveir, Mitchell, and Luke; my granddaughter, Madeleine; my parents whom I miss so much; my sister; and my parents-in-law for their support and devotion.

—*Kathleen Becan-McBride*

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# About the Authors

**Drs. Diana Garza and Kathleen Becan-McBride** have a passion for phlebotomy practice and the people who work in this field. They have been collaborators for over 33 years on numerous educational programs, textbooks, and curricular materials; they have participated as presenters at national and international meetings and as advisors for educational programs in phlebotomy and clinical laboratory sciences. Their vast work experience has covered all areas in the clinical laboratory, beginning with their experience in the microbiology (Garza) and clinical chemistry (Becan-McBride) laboratories, moving into management and education as their careers evolved. Drs. Garza and Becan-McBride were involved in numerous courses for laboratory technologists/scientists, nurses, and physicians to teach phlebotomy techniques. As young faculty members, they began to develop curriculum materials for their own use, and in 1984 collaborated in publishing one of the first comprehensive textbooks focused entirely on phlebotomy practices. Their successful coauthoring partnership has endured for over three decades and has resulted in numerous editions of Phlebotomy textbooks. Both became tenured professors at their respective institutions, and over the years they received numerous grants for phlebotomy education as well as other health care initiatives. Their experience spans from academic medical centers to smaller clinical laboratories, industry, and international collaborations and consultations. They have also served on certification and accreditation committees—both for clinical/medical laboratory scientists and for phlebotomists—and they have had editorial responsibilities for several journals and continuing education publications, in both print and electronic versions. Aside from this current edition, they also recently completed the *Phlebotomy Handbook: Blood Specimen Collection from Basic to Advanced, 10<sup>th</sup> edition*, often referred to as the “Gold Standard” of phlebotomy practice.



**Diana Garza** received her Bachelor of Science degree in Biology from Vanderbilt University in Nashville, TN, followed by an additional year to complete her Medical Technology requirements at Vanderbilt University Medical Center. Her interest in laboratory sciences and in teaching led her to earn a Masters in Science Education at the Peabody School of Vanderbilt University. She worked at Vanderbilt Medical Center in the Microbiology department while she was a graduate student. A move back to her home state of Texas led her to a collaborative graduate program with Baylor College of Medicine and the University of Houston, and resulted in her Doctorate of Education in Allied Health Education and Administration, all while she worked in the Microbiology Section at the University of Texas M.D. Anderson Cancer Center (MDACC). Her laboratory and teaching experience continued at the University of Texas Health Science Center at Houston and for many years at MDACC, where she later became the Administrative/Technical Director of the Division of Laboratory Medicine. In 1990, she joined the faculty of Texas Woman’s University-Houston Center, where she taught quality improvement online courses, interdisciplinary management courses, and became editor of several journals and continuing education publications. She was extensively involved in curriculum review processes, and program and university accreditation. She has taught extensively both nationally and internationally; has been a

reviewer/inspector in many regulatory processes; has participated in accreditation procedures; and has authored, edited, and published numerous manuscripts in the field of phlebotomy, health care, and quality management. She currently sits on numerous advisory boards, selectively consults with health care organizations and companies, and continues her medical writing/editing career.

**Kathleen Becan-McBride** recently retired from the Directorship of Community and Educational Outreach at The University of Texas Health Science Center at Houston (UTHealth) and tenured Medical School Professor in the Department of Family and Community Medicine at UTHealth. She received her Bachelor of Science degree in Biology from the University of Houston with completion of her medical laboratory science education at St. Luke's Episcopal Hospital in Houston, Texas, and national board certification as a Medical Laboratory Scientist. While working at St. Luke's Episcopal Hospital Clinical Laboratory, she received a full scholarship to the University of Houston/Baylor College of Medicine collaborative Masters in Allied Health Education and Administration Program. This inspired Dr. Becan-McBride to continue her studies, and she completed her Doctorate in Higher Education and Administration while teaching in the Medical Laboratory Science program and Physician Assistant program at University of Texas Medical Branch Galveston and Medical Laboratory Technician program at Houston Community College. She then became a faculty member and Chair of the Clinical Laboratory Science Department at UTHealth. And in more recent years, she has become the Director of Community and Educational Outreach, Director of Workforce and Resource Development, and Professor in the Medical School Department of Family and Community Medicine.

Dr. Becan-McBride has published 24 books and more than 55 articles and has been on numerous national and international health care advisory boards and several editorial boards for health care journals. She has had research projects related to the medical laboratory sciences and also the community (i.e., UV/TB Prevention Research Project in Homeless Shelters in Houston). Most recently, she has received a National Institute of Health (NIH) grant in research on new point-of-care (POC) technology as defined through blood collection techniques. Dr. Becan-McBride is on educational advisory boards for medical laboratory science educational programs and community outreach programs. She has had invitational medical laboratory science presentations nationally and internationally to Singapore, China, Russia, France, South America, New Zealand, and, more recently, Croatia. She was the elected Chair of the ASCP Board of Certification Board of Governors from 2008 to 2010 and received the ASCP Mastership Award in 2012, ASCP Board of Certification Distinguished Service Award in 2012, and ASCP Mentorship Award in 2016. Dr. Becan-McBride continues her Texas Higher Education Consultants' activities in writing, presenting and editing, mainly in the expanding area of blood collection.



# Preface

*Phlebotomy Simplified, 3rd edition*, is designed for beginning or entry-level health care students and practitioners who are responsible for blood and specimen collections (medical assistants, nurses, phlebotomists, medical laboratory technicians, medical laboratory assistants, clinical assistants, technologists, and scientists), respiratory therapists, and others). The primary goals of the book are:

- to link novice health care workers to the most updated, basic standards of phlebotomy practice
- to promote essentials for safe practices for patients and health care workers and for high quality, effective blood specimen collection
- to provide step-wise basic specimen collection procedures for entry-level phlebotomists
- to enhance patient satisfaction and health outcomes

It is tailored to entry-level phlebotomists; for example, the medical terminology section provides terms that entry-level phlebotomists need to know to begin their first job. *Phlebotomy Simplified, 3rd edition*, has been reconfigured so that Student Learning Objectives are a more detailed and specific extension of the National Accrediting Committee for Clinical Laboratory Sciences' (NAACLS) "entry-level" competencies. Both NAACLS and Student Learning Objectives are now listed at the beginning of each chapter. The chapter-specific Student Learning Objectives cover a range of basic to intermediate techniques and concepts for phlebotomists. The key features include the following:

- Communication, clinical, technical, and safety skills that any health care worker will use in the practice of phlebotomy and other specimen collection procedures
- Chapter 6 featuring new equipment and emphasizing the most updated and comprehensive safety features of phlebotomy supplies and equipment, with new images from key manufacturers in the industry
- The latest information about current industry standards from the Clinical and Laboratory Standards Institute (CLSI), World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), risk and error reduction, patient and worker safety, needlestick prevention, and The Joint Commission
- Provides basic information about quality issues to improve technical skills and patient outcomes
- Provides technical procedures and illustrations that are indispensable for phlebotomists

We view this textbook as a fundamental and essential guide to basic standards of practice in the field.

The style, format, and length of the third edition are similar to the popular earlier editions. It is an easy, step-by-step, practice-oriented approach to blood collection procedures that can be implemented in a variety of settings, including hospitals, ambulatory clinics, home health care, and pediatric clinics. This edition has many new images, figures, and charts, including detailed anatomical figures of the arm and hand and photos of new technology, equipment, and supplies.

The *Table of Contents*, organized in 11 chapters, follows the order in which a phlebotomist is educated and how he or she approaches the patient.

- Chapter 1 Phlebotomy Practice and Quality Assessment Basics
- Chapter 2 Ethical, Legal, and Regulatory Issues
- Chapter 3 Basic Medical Terminology, the Human Body, and the Cardiovascular System
- Chapter 4 Safety and Infection Control
- Chapter 5 Documentation, Specimen Handling, and Transportation
- Chapter 6 Blood Collection Equipment
- Chapter 7 Preexamination/Preanalytical Complications
- Chapter 8 Venipuncture Procedures
- Chapter 9 Capillary or Dermal Blood Specimens
- Chapter 10 Pediatric and Geriatric Procedures
- Chapter 11 Special Collections
- Appendices
- Glossary

At the end of each chapter are study questions, problem-solving cases, competency assessments, and a section entitled *Advocating Patient Safety*. This section in each chapter focuses on preventable errors and risk reduction, a major focus for health care professionals. This section covers a short commentary or case analysis with discussion questions that specifically relate to the patient's safety. Competency Assessment checklists assure that objectives are covered through self-assessment.

The Appendices provide practical procedures (e.g., *Finding a Job*, *Using Military Time*, etc.) and important updated terms, phrases, and symbols for beginning workers. For example, phrases in English/Spanish are included for a more comprehensive and safe approach to patient and specimen identification. In addition, the Glossary provides definitions that relate to phlebotomy practice and includes all key terms from the text.

All in all, we have made this textbook as practical, educational, and useful as possible for those who are striving to begin a career in phlebotomy.

## Key Features of the Third Edition

- Detailed anatomical artwork depicting relationship of blood vessels to nerves in the arm and hand
- Expanded section about vein selection and preparation
- Incorporation of new CLSI standards
- Updates and new images of the latest phlebotomy equipment and supplies
- Expanded sections on venipuncture complications (preanalytical errors) and methods to avoid them
- Expanded section on “Finding a Job”
- New and updated appendix about acceptable blood volumes that can be withdrawn from pediatric and neonatal patients
- Updated sections on equipment, supplies, and patient identification technology
- Colorful photographs that show procedural steps and equipment
- Flowcharts that provide additional easy-to-follow procedures
- Case studies to encourage real-life problem solving

- Competency Assessments that provide a “Check Yourself” feature or can be used by instructors for evaluation
- Updated medical terminology section and glossary terms that are pertinent to phlebotomists
- Sections on age-related competencies and communication
- Clinical alert symbols indicating that *extra* caution is needed to prevent preanalytical errors, or highlight circumstances that may harm patients and/or health care workers
- Step-by-step procedural information presented using an on-the-job perspective
- Key terms, objectives, cases, and study questions provided for each chapter
- A color chart of types of blood collection tubes relating appropriate color coding with additives
- Appendices containing essential elements for Spanish phrases, symbols and units of measurement, military time, and NAACLS Competencies
- Vital to instructors and students, NAACLS Competencies linked to the chapter where the information is covered with the level of coverage (basic or intermediate) indicated.

More advanced content is available in our new textbook entitled *Phlebotomy Handbook, 10th edition*.

## Video Program

A video library is available for viewing on The Phlebotomy Handbook’s Student Resources Page ([www.pearsonhighered.com/healthprofessionsresources](http://www.pearsonhighered.com/healthprofessionsresources)). The videos emphasize safety, infection control, effective communication, quality assessment, and avoiding errors. The footage correlates with some of the procedures shown in Phlebotomy Handbook, 10th edition, and was filmed in collaboration with the authors. The video series is ideal for independent self-study or review for those aiming to enhance their understanding and performance. It is also an excellent classroom teaching tool for instructors. The series provides an additional teaching tool to support National Association for Accreditation of Clinical Laboratory Sciences competencies for accredited programs in Phlebotomy

## Additional Resources for Educators

This third edition has online/electronic companion resources that are cross-referenced to the text. The Instructor’s Resource Manual contains a wealth of material to help faculty plan and manage their course. It includes a detailed lecture outline, a complete test bank, teaching tips, and more for each chapter. For instructors, log on to <https://www.pearson.com/us/higher-education.html> to access the complete test bank and PowerPoint lectures that contain discussion points with embedded color images from the book.



## An Accompanying Guide for Examination Review

Available for separate purchase is Pearson's *SUCCESS! in Phlebotomy* 8th edition. This is an aid to students and health care workers preparing for a certification examination. It has over 850 exam-type questions and an accompanying website with a simulated board examination and referenced explanatory answers. Students can practice taking the simulated examination in print or via computer.

# Acknowledgments

We are grateful to many generous people, product suppliers, manufacturing companies, professional organizations, and health care organizations for assistance in preparing this and previous editions. We are particularly grateful to BD Vacutainer Systems, Greiner Bio-One, Marketlab, the American Society for Clinical Pathology, The University of Texas M. D. Anderson Cancer Center (MDACC), Memorial Hermann Health Care System, and The University of Texas Houston Health Science Center for their support throughout many stages of our previous and current editions.

We greatly appreciate our working relationships with our editors and copy editors who have encouraged us and improved this third edition. Special thanks go to Sandra Brauer.

We are eternally thankful to our families who have encouraged and supported our work throughout the years. They hold a special place in our hearts.

*Diana Garza*

*Kathleen Becan-McBride*