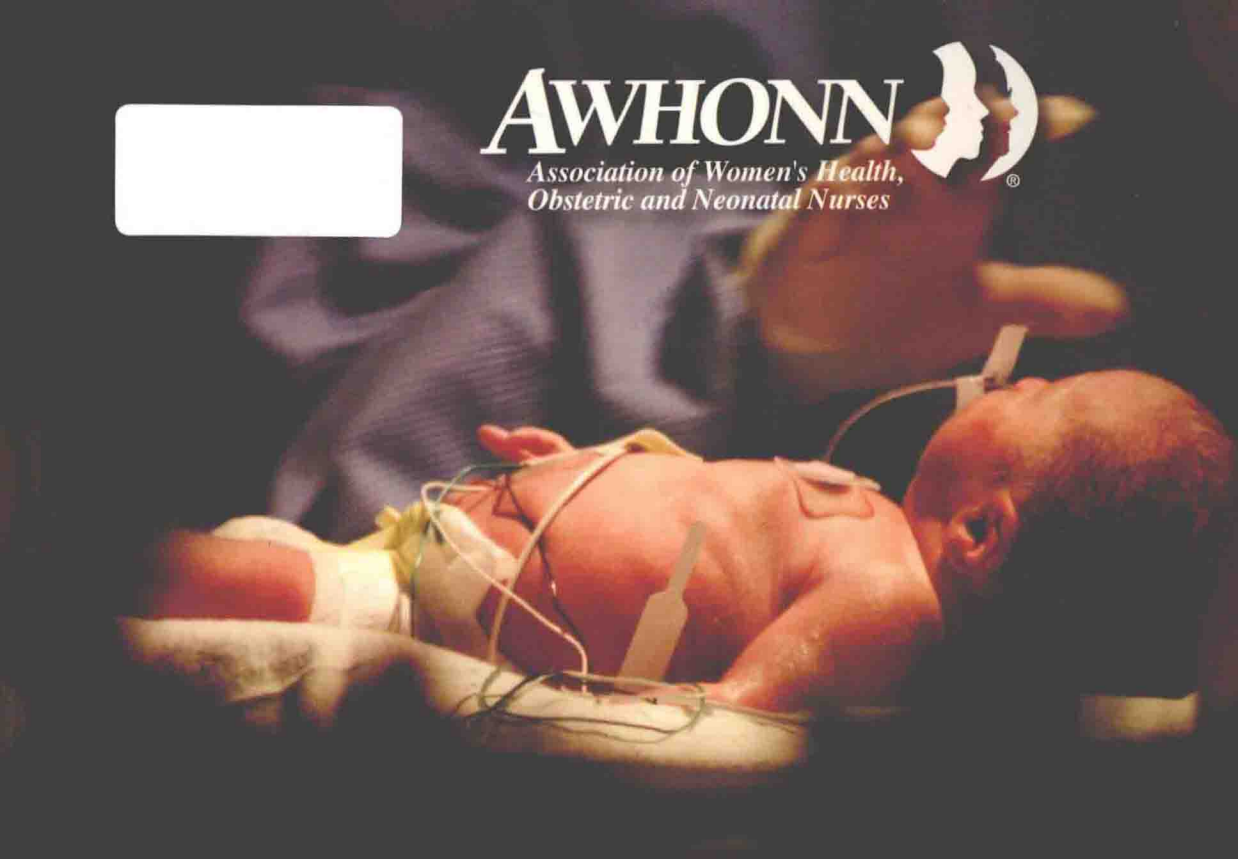
AWHONN
Association of Women's Health, Obstetric and Neonatal Nurses

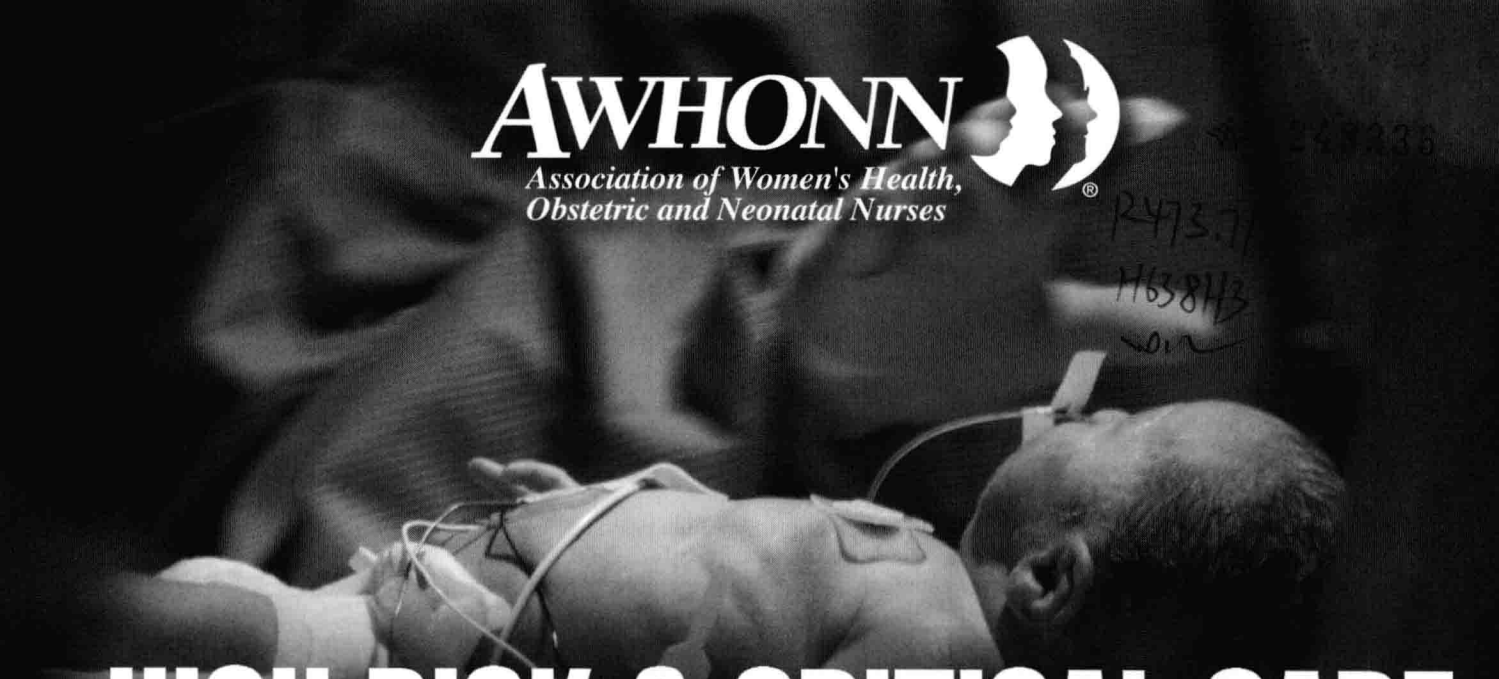


Nan H. Troiano Carol J. Harvey Bonnie Flood Chez

HIGH-RISK & CRITICAL CARE OBSTETRICS

Third Edition

Wolters Kluwer Health | Lippincott Williams & Wilkins



HIGH-RISK & CRITICAL CARE OBSTETRICS

Third Edition

Editors

Nan H. Troiano, RN, MSN
Director, Women's and Infants' Services
Sibley Memorial Hospital
Johns Hopkins Medicine
Washington, D.C.

Carol J. Harvey, RNC, C-EFM, MS
Clinical Specialist
High Risk Perinatal
Labor & Delivery
Northside Hospital
Atlanta, Georgia

Bonnie Flood Chez, RNC, MSN
President, Nursing Education Resources
Perinatal Clinical Nurse Specialist &
Consultant
Tampa, Florida

Wolters Kluwer Health | Lippincott Williams & Wilkins
Philadelphia • Baltimore • New York • London
Buenos Aires • Hong Kong • Sydney • Tokyo

Acquisitions Editor: Bill Lamsback
Product Director: David Moreau
Product Manager: Rosanne Hallowell
Development and Copy Editors: Catherine E. Harold and Erika Kors
Proofreader: Linda R. Garber
Editorial Assistants: Karen J. Kirk, Jeri O'Shea, and Linda K. Ruhf
Creative Director: Doug Smock
Cover Designer: Robert Dieters
Vendor Manager: Cynthia Rudy
Manufacturing Manager: Beth J. Welsh
Production and Indexing Services: Aptara, Inc.

Printed in China

10 9 8 7 6 5 4 3 2 1

Library of Congress Cataloging-in-Publication Data
High-risk & critical care obstetrics / editors, Nan H. Troiano, Carol J. Harvey, Bonnie Flood Chez. – 3rd ed.
p. ; cm.
High-risk and critical care obstetrics
Rev. ed. of: AWHONN's high-risk and critical care intrapartum nursing / [edited by] Lisa K. Mandeville, Nan H. Troiano. 2nd ed. c1999.
Includes bibliographical references and index.
ISBN 978-0-7817-8334-7 (pbk. : alk. paper)
I. Troiano, Nan H. II. Harvey, Carol J. III. Chez, Bonnie Flood. IV. AWHONN's high-risk and critical care intrapartum nursing. V. Title: High-risk and critical care obstetrics.
[DNLM: 1. Obstetrical Nursing–methods. 2. Critical Care. 3. Delivery, Obstetric–nursing. 4. Obstetric Labor Complications–nursing. 5. Pregnancy Complications–nursing. 6. Pregnancy, High-Risk. 7. Pregnancy. WY 157]

618.20231–dc23

2011040224

RRS1111

AWHONN
Association of Women's Health, Obstetric and Neonatal Nurses

HIGH-RISK & CRITICAL CARE OBSTETRICS

Third Edition

To my mother, Bonnie Lee Chappell Hamner; to my brother, Philip David Hamner; and in loving memory of my father, Harold Max Hamner. Finally, to Bogart, my companion throughout, and Bacall.

—Nan H. Troiano

In loving memory of my parents, Mildred and Richard Harvey; to my husband, Scott Sneed; and to my sisters by birth and by choice.

—Carol J. Harvey

To my dad, Dr. William A. Flood; and to my George and Semi.

—Bonnie Flood Chez

PREFACE

Since publication of the second edition of this text in 1999, we continue to appreciate the challenges and rewards associated with providing care to this unique patient population. Time has granted us the benefit of a rapidly expanding knowledge base derived from ongoing research and clinical experience related to the care of pregnant women who experience significant complications or become critically ill during pregnancy. Time has also gifted us with an appreciation for the value of advanced practice collaboration among clinicians who care for these women and their families. Therefore, this edition includes extensive revisions that reflect evidence-based changes in clinical practice for specific complications, and new chapters have been added that address foundations for practice, adjuncts for clinical practice, and selected clinical guidelines.

One of the most challenging aspects of perinatal care continues to be meeting the clinical and psychosocial health care needs of an increasingly diverse obstetric patient population. A general overview of today's obstetric population depicts women who, in general, are older, larger in body habitus, more likely to have existing comorbid disease, more prone to high-order multiple gestations, known to have an increased incidence of operative intervention, less likely to attempt vaginal birth after a previous Cesarean birth, apt to have high expectations for care in terms of outcomes, and predisposed to complex clinical situations that may generate ethical issues related to their care.

It remains true that most pregnant women are without identified complications and proceed through pregnancy, labor, delivery, and the postpartum period without problems. Accordingly, obstetric care remains based on a wellness-oriented foundation. However, maternal mortality remains unacceptably high and there has been a renewed commitment to addressing this problem. Significant complications may develop at any time during pregnancy without regard for a woman's *identified* risk status. Unfortunately, this very phrase has evolved into being synonymous with labels such as *high risk* or *at risk*. However, we believe that use of such terms to designate levels of risk should be appreciated as being reasonably imprecise and nonspecific. We should avoid any suggestion that categorical boundaries exist for patients or for the clinicians who care for them. For example, there are women who manifest medical conditions during pregnancy who, absent appropriate recognition and management, may be more prone to adverse obstetric outcomes. However, it is also recognized that this same population of pregnant women may, with appropriate management, experience no adverse perinatal outcomes above those of the general population.

Further, providing care to this unique population and their families within our evolving health care delivery system presents additional challenges to us as a society. Efforts to reform health care continue to attempt to address the concepts of accessibility, affordability, quality, responsibility, safety, and cost-effectiveness. Debate will no doubt continue regarding what is the best way to achieve reform measures.

This edition is reflective of these and other associated challenges. However, the most significant intent of the format of this text is to promote appreciation for the importance of a collaborative approach to the care of this specific obstetric population. Therefore, for the first time, most chapters are co-authored by nurse and physician experts in their respective areas of practice.

The first section is devoted to discussion of foundations for practice. It includes an overview of the state of our specialty, the importance of collaboration in clinical practice, and the complexities of practice that often include ethical dilemmas that must be considered in the overall care of the patient and her family.

The second section presents information on adjuncts often used in the clinical care of this patient population. We hope that this information proves useful for clinicians caring for obstetric patients with significant complications or who are critically ill during the intrapartum setting, as well as for those who provide consultation for such patients on other services. The third section presents comprehensive critical concepts and current evidence-based information regarding specific clinical entities in obstetric practice. The fourth section includes practice resources in the form of clinical guidelines, in an attempt to provide clinicians with references and tools to optimize clinical care of this special obstetric population.

On a personal note, we the editors feel that it is important to acknowledge that the evolution of this text over the past several years reflects the reality of accommodating to changes and challenges in our paths, much like the population of women for whom we provide care and our colleagues who care for them. We all have our personal stories. The interval between publication of the second and third editions bears witness to personal and professional stories for us all. During this period of time, we have: celebrated years of remission from breast cancer; finished 60-mile Komen Foundation walks in Washington, DC, and

Boston; lost beloved members of our family; grieved the loss of 10 precious pets; supported co-authors with professional and family tragedies and triumphs; changed jobs; endured the economy; found new love; gained energy and renewal because of the support of family and friends, and navigated significant challenges in order to bring this project to completion.

We are grateful for the overwhelmingly positive feedback from those who have read previous editions and provided us with direction to take this third edition to the next level. We are in debt to the wonderful group of contributing authors for sharing their special expertise and time. It has been an honor to work with these colleagues, AWHONN, and Lippincott Williams & Wilkins on this project.

Nan H. Troiano
Carol J. Harvey
Bonnie Flood Chez

CONTRIBUTORS

Julie M.R. Arafeh, RN, MSN
Obstetric Simulation Specialist
Center for Advanced Pediatric and Perinatal Education
Lucile Packard Children's Hospital
Stanford, California

Suzanne McMurtry Baird, RN, MSN
Assistant Director, Clinical Practice
Women's Services
Texas Children's Hospital
Houston, Texas

Michael A. Belfort, MD, PhD
Professor and Chair, Obstetrics and Gynecology
Baylor College of Medicine
Houston, Texas
Obstetrician/Gynecologist-in-Chief
Texas Children's Hospital
Houston, Texas

Frank A. Chervenak, MD
Given Foundation Professor and Chairman
Department of Obstetrics and Gynecology
New York Weill Cornell Medical Center
New York, New York

Bonnie Flood Chez, RNC, MSN
President, Nursing Education Resources
Perinatal Clinical Nurse Specialist and Consultant
Tampa, Florida

Steven L. Clark, MD
Medical Director, Women's and Children's Clinical Services
Clinical Services Group
Hospital Corporation of America
Nashville, Tennessee

Patricia Marie Constanty, RN, MSN, CRNP
Clinical Nurse Specialist and Perinatal Nurse Practitioner
Labor and Delivery and High Risk Obstetrics
Thomas Jefferson University Hospital
Philadelphia, Pennsylvania

Deborah Anne Cruz, RN, MSN, CRNP
Clinical Nurse Specialist and Perinatal Nurse Practitioner
Labor and Delivery and High Risk Obstetrics
Thomas Jefferson University Hospital
Philadelphia, Pennsylvania

Gary A. Dildy III, MD
Director of Maternal-Fetal Medicine
MountainStar Division
Hospital Corporation of America
Nashville, Tennessee;
Clinical Professor
Department of Obstetrics and Gynecology
Louisiana State University School of Medicine
New Orleans, Louisiana;
Attending Perinatologist
Maternal Fetal Medicine Center at St. Mark's Hospital
Salt Lake City, Utah

Karen Dorman, RN, MS
Research Instructor
Maternal–Fetal Medicine
University of North Carolina School of Medicine
Chapel Hill, North Carolina

Patrick Duff, MD
Professor and Residency Program Director
Department of Obstetrics and Gynecology
University of Florida
Gainesville, Florida

Bonnie K. Dwyer, MD
Assistant Clinical Professor, Affiliated, Stanford University
Division of Maternal–Fetal Medicine
Department of Obstetrics and Gynecology
California Pacific Medical Center
San Francisco, California

Sreedhar Gaddipati, MD
Assistant Clinical Professor of Obstetrics and Gynecology
Columbia University
College of Physicians and Surgeons
Medical Director, Critical Care Obstetrics
Division of Maternal–Fetal Medicine
New York, New York

Lewis Hamner, III, MD
Division of Maternal Fetal Medicine
Kaiser Permanente
Georgia Region
Atlanta, Georgia

Carol J. Harvey, RNC-OB, C-EFM, MS
Clinical Specialist
High Risk Perinatal
Labor and Delivery
Northside Hospital
Atlanta, Georgia

Nan Hess-Eggleston, RN, BSN
Clinical Nurse Specialist—Women's and Infants' Services
Sibley Memorial Hospital
Johns Hopkins Medicine
Washington, DC

Washington C. Hill, MD, FACOG
First Physician Group of Sarasota
Medical Director, Labor and Delivery
Director, Maternal–Fetal Medicine
Sarasota Memorial Hospital;
Department of Clinical Sciences
OB-GYN Clerkship Director—Sarasota Campus
Florida State University, College of Medicine;
Clinical Professor
Department of Obstetrics and Gynecology
University of South Florida, College of Medicine
Tampa, Florida

Maribeth Inturrisi, RN, MS, CNS, CDE
Coordinator and Nurse Consultant, Regions 1 and 3
California Diabetes and Pregnancy Program
Assistant Clinical Professor, Family Health Care Nursing
University of California
San Francisco, California;
Sweet Success Nurse Educator
Physician Foundation Sweet Success Program
California Pacific Medical Center
San Francisco, California

Thomas M. Jenkins, MD
Director of Prenatal Diagnosis
Legacy Center for Maternal–Fetal Medicine
Portland, Oregon

Renee' Jones, RNC-OB, MSN, WHCNP-BC
Nurse Practitioner
The Medical Center of Plano
Women's Link–Specialty Obstetrical Referral Clinic
Plano, Texas

Betsy B. Kennedy, RN, MSN
Assistant Professor of Nursing
Vanderbilt University School of Nursing
Nashville, Tennessee

Ellen Kopel, RNC-OB, MS, C-EFM
Perinatal Nurse Consultant
Tampa, Florida

Stephen D. Krau, RN, PhD, CNE, CT
Associate Professor of Nursing
Vanderbilt University School of Nursing
Nashville, Tennessee

Nancy C. Lintner, RNC, MS, CPT
Clinical Nurse Specialist and Nurse Consultant/Educator
Diabetes and Pregnancy Program
University of Cincinnati Physicians/Greater Cincinnati Obstetrics & Gynecologists
University of Cincinnati Medical School/Division of Maternal–Fetal Medicine
Cincinnati, Ohio

Marcy M. Mann, MD
Maternal Fetal Medicine Specialist
Atlanta Perinatal Consultants
Center for Perinatal Medicine
Northside Hospital
Atlanta, Georgia

Brian A. Mason, MD, MS
Associate Professor
Wayne State University
St. John's Hospital / Medical Center
Detroit, Michigan

Laurence B. McCullough, PhD
Center for Medical Ethics and Health Policy
Baylor College of Medicine
Houston, Texas

Keith McLendon, MD
Staff Anesthesiologist
Northside Anesthesiology Consultants
Northside Hospital
Atlanta, Georgia

Richard S. Miller, MD, FACS
Professor of Surgery
Medical Director, Trauma Intensive Care Unit
Vanderbilt University School of Medicine
Nashville, Tennessee

Jeffrey P. Phelan, MD, JD
Director of Quality Assurance
Department of Obstetrics and Gynecology
Citrus Valley Medical Center
West Covina, California;
President and Director of Clinical Research
Childbirth Injury Prevention Foundation
City of Industry, California

Amy H. Picklesimer, MD, MSPH
Division of Maternal–Fetal Medicine
Greenville Hospital System University Medical Center
Greenville, South Carolina

Donna Ruth RN, MSN
Nursing Professional Development Specialist
Nursing Education and Professional Development
Vanderbilt University Medical Center
Nashville, Tennessee

George R. Saade, MD
Professor, Department of Obstetrics and Gynecology
Divisions of Maternal–Fetal Medicine and Reproductive Sciences
Director, Maternal–Fetal Medicine Fellowship Program
The University of Texas Medical Branch
Galveston, Texas

Shailen S. Shah, MD
Director of Operations, Antenatal Testing Unit
Virtua Health System
Assistant Professor, Department of Obstetrics and Gynecology
Thomas Jefferson University
Philadelphia, Pennsylvania

Baha M. Sibai, MD
Professor of Clinical Obstetrics and Gynecology
Maternal–Fetal Medicine
Department of Obstetrics and Gynecology
University of Cincinnati
Cincinnati, Ohio

Melissa C. Sisson, RN, MN
Director of Women's Services
Northside Hospital
Atlanta, Georgia

Kimberlee Sorem, MD
Maternal–Fetal Medicine Specialist
Medical Director
Physician Foundation Sweet Success Program
California Pacific Medical Center
San Francisco, California

Mary Ellen Burke Sosa, RNC, MS
President, Perinatal Resources, Rumford, Rhode Island
Per Diem Staff Nurse, LDR, Kent Hospital, Warwick, Rhode Island
Diabetes Nurse Educator, Division of Maternal–Fetal Medicine
Women & Infants' Hospital
Providence, Rhode Island

Nan H. Troiano, RN, MSN
Director, Women's and Infants' Services
Sibley Memorial Hospital
Johns Hopkins Medicine
Washington, DC

Patricia M. Witcher, RNC-OB, MSN
Clinical Nurse Specialist
Labor and Delivery, High Risk Obstetrics
Northside Hospital
Atlanta, Georgia

ACKNOWLEDGMENTS

The editors gratefully acknowledge the unparalleled support of colleagues who have played an instrumental role in making this third edition possible. In the years between the second and third editions, we have had the privilege of working collaboratively with valued colleagues, mentors, fellows, residents, and students in our respective practice environments. We thank them all for their untiring dedication to the health and safety of all pregnant women and their unborn children, and specifically to this unique subset of pregnant women.

We have also been privileged to participate in perinatal education programs and consulting opportunities throughout the United States and other countries. We appreciate that this demonstration of commitment to education, clinical practice, and research represents our best hope for collectively advocating for safe and effective perinatal care. Ultimately, it represents the foundation for true "collaboration" in practice. It also reminds us that we have made friends with, listened to, and benefitted from the wisdom of those who are on the "front lines" every day. These networking opportunities have resulted in deep and lasting relationships that are part of the very fabric of this book.

Further, there have also been individuals who have contributed their special expertise to this third edition. Among these:

- Susan Drummond, RN, MSN, for helping us to identify and appreciate content related to patient safety that continued as a theme throughout this text and to Frank H. Boehm, MD for lending his expertise and wisdom to her efforts.
- A. Scott Johnson, Esq., for providing guidance related to understanding legal implications for practice.
- Patricia Witcher, RNC-OB, MSN, for authoring some of the most challenging chapters and for ghost-writing additional ones with her amazing talent.
- Fay Rycyna, our AWHONN rock of support throughout this entire project, who never lost faith that the finish line was in sight.

On a personal note, the editors and a core group of contributing authors thank the wonderful people of Arley, Alabama, particularly those who comprise the communities of Rock Creek and Smith Lake, for providing the perfect place from which this project was launched. Memories remain rich and vivid of time spent enjoying the tranquil beauty and warm hospitality that surrounded us there as we continued to nurture this endeavor over time.

Finally, we acknowledge the patients and families for whom we have provided care and from whom we learned valuable lessons. Your "stories" are reflected in the content and spirit of this book and will continue to affect the care provided to others.

Nan H. Troiano
Carol J. Harvey
Bonnie Flood Chez

CONTENTS