

CORE CURRICULUM FOR

Interdisciplinary Lactation Care

SECOND EDITION



Edited by

Becky Spencer, PhD, APRN, PMHNP-BC, IBCLC, FILCA

Associate Clinical Professor

Texas Woman's University College of Nursing

Denton, Texas, USA

Suzanne Hetzel Campbell, PhD, RN, FCNEI, IBCLC, CCSNE

Professor

The University of British Columbia School of Nursing

Vancouver, British Columbia, Canada

Kristina Chamberlain, CNM, ARNP, IBCLC

Lactation Program, Division of Extended Studies

University of California, San Diego

La Jolla, California, USA



JONES & BARTLETT
LEARNING



World Headquarters
Jones & Bartlett Learning
25 Mall Road
Burlington, MA 01803
978-443-5000
info@jblearning.com
www.jblearning.com

Jones & Bartlett Learning books and products are available through most bookstores and online booksellers. To contact Jones & Bartlett Learning directly, call 800-832-0034, fax 978-443-8000, or visit our website, www.jblearning.com.

Substantial discounts on bulk quantities of Jones & Bartlett Learning publications are available to corporations, professional associations, and other qualified organizations. For details and specific discount information, contact the special sales department at Jones & Bartlett Learning via the above contact information or send an email to specialsales@jblearning.com.

Copyright © 2023 by Jones & Bartlett Learning, LLC, an Ascend Learning Company

All rights reserved. No part of the material protected by this copyright may be reproduced or utilized in any form, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without written permission from the copyright owner.

The content, statements, views, and opinions herein are the sole expression of the respective authors and not that of Jones & Bartlett Learning, LLC. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not constitute or imply its endorsement or recommendation by Jones & Bartlett Learning, LLC and such reference shall not be used for advertising or product endorsement purposes. All trademarks displayed are the trademarks of the parties noted herein. *Core Curriculum for Interdisciplinary Lactation Care, Second Edition* is an independent publication and has not been authorized, sponsored, or otherwise approved by the owners of the trademarks or service marks referenced in this product.

There may be images in this book that feature models; these models do not necessarily endorse, represent, or participate in the activities represented in the images. Any screenshots in this product are for educational and instructive purposes only. Any individuals and scenarios featured in the case studies throughout this product may be real or fictitious but are used for instructional purposes only.

The authors, editor, and publisher have made every effort to provide accurate information. However, they are not responsible for errors, omissions, or for any outcomes related to the use of the contents of this book and take no responsibility for the use of the products and procedures described. Treatments and side effects described in this book may not be applicable to all people; likewise, some people may require a dose or experience a side effect that is not described herein. Drugs and medical devices are discussed that may have limited availability controlled by the Food and Drug Administration (FDA) for use only in a research study or clinical trial. Research, clinical practice, and government regulations often change the accepted standard in this field. When consideration is being given to use of any drug in the clinical setting, the healthcare provider or reader is responsible for determining FDA status of the drug, reading the package insert, and reviewing prescribing information for the most up-to-date recommendations on dose, precautions, and contraindications, and determining the appropriate usage for the product. This is especially important in the case of drugs that are new or seldom used.

25556-0

Production Credits

Vice President, Product Management: Marisa R. Urbano
Vice President, Content Strategy and Implementation: Christine Emerton
Director, Product Management: Matthew Kane
Product Manager: Tina Chen
Director, Content Management: Donna Gridley
Manager, Content Strategy: Carolyn Pershouse
Content Strategist: Paula-Yuan Gregory
Content Coordinator: Samantha Gillespie
Director, Project Management and Content Services: Karen Scott
Manager, Project Management: Jackie Reynen
Project Manager: Jennifer Riden
Senior Digital Project Specialist: Angela Dooley

Sr. Product Marketing Manager: Lindsay White
Content Services Manager: Colleen Lamy
Vice President Manufacturing and Inventory Control: Therese Connell
Product Fulfillment Manager: Wendy Kilborn
Composition: S4Carlisle Publishing Services
Project Management: S4Carlisle Publishing Services
Cover Design: Briana Yates
Senior Media Development Editor: Troy Liston
Rights & Permissions Manager: John Rusk
Rights Specialist: Robin Landry
Printing and Binding: P.A. Hutchison Company

Library of Congress Cataloging-in-Publication Data

Names: Lactation Education Accreditation and Approval Review Committee, author. | Campbell, Suzanne Hetzel, editor. | Spencer, Becky, editor. | Chamberlain, Kristina, editor.
Title: Core curriculum for interdisciplinary lactation care / Lactation Education Accreditation and Approval Review Committee (LEAARC) ; edited by Suzanne Campbell, Becky Spencer, Kristina Chamberlain.
Description: Second edition. | Burlington, Massachusetts : Jones & Bartlett Learning, [2023] | Includes bibliographical references and index.
Identifiers: LCCN 2022007801 | ISBN 9781284255515 (paperback)
Subjects: MESH: Lactation--physiology | Curriculum | Breast Feeding | Infant Nutritional Physiological Phenomena | Milk, Human--metabolism | BISAC: HEALTH & FITNESS / Breastfeeding
Classification: LCC QP246 | NLM WP 18 | DDC 612.6/64--dc23/eng/20220608
LC record available at <https://lccn.loc.gov/2022007801>

6048

Printed in the United States of America
26 25 24 23 22 10 9 8 7 6 5 4 3 2 1

Contents



Foreword	xv
Introduction	xvi
Acknowledgments	xix
Contributors	xx

SECTION I **Science**.....**1**

CHAPTER 1 Scientific Evidence Supporting Lactation.....**3**

Becky Spencer and Kristina Chamberlain

Overview	4
I. Health Benefits of Breastfeeding for Infants and Children	4
II. Health Benefits of Breastfeeding for Lactating Parents	10
III. Global Economic Impact of Breastfeeding	12
Key Points from This Chapter	13
References	14

CHAPTER 2 Clinical Decision-making in Lactation Care and Support.....**19**

Becky Spencer and Amanda Watkins

Overview	20
I. Facilitating Implementation of Research into Practice	20
II. Evaluating Scientific Evidence: Asking the Clinical Question. . .	23
III. Steps to Finding Evidence.....	24
IV. Steps to Evaluate Research: Quantitative Methods	25
V. Steps to Evaluate Research: Qualitative Methods.....	35
VI. Critique of Qualitative and Quantitative Research	42
Key Points from This Chapter	49
References	49

CHAPTER 3 Infant Anatomy and Physiology for Feeding.....**53**

Nina Isaac and Elizabeth Choi

Overview	54
I. Oral Assessment of the Infant	54
II. Anatomy of the Infant's Oral Cavity	54

III. Oral Reflexes	67
IV. Suckling Cycle	69
V. Coordination of the Suck–Swallow–Breathe Triad	70
Key Points from This Chapter	72
References	73

CHAPTER 4 Normal Infant Behavior 77

M. Jane Heinig and Jennifer Bañuelos

Overview	78
I. The Six Infant Behavioral States	78
II. Infant Communication	79
III. Infant Crying	80
IV. Infant Sleep	81
Key Points from This Chapter	85
References	86

CHAPTER 5 Lactation Pharmacology 91

Thomas W. Hale, Kaytlin Krutsch, and Teresa M. Baker

Overview	92
I. Kinetics of Drug Entry into Human Milk	92
II. Maternal Factors That Affect Drug Transfer	96
III. Predicting Risks of Medications to the Infant	97
IV. Clinical Implications of Drug Excretion During Lactation	99
V. Galactagogues That Stimulate Milk Production	107
Key Points from This Chapter	109
Additional Resources	109
References	109

CHAPTER 6 Breast Anatomy and Milk Production 115

Claudia Krebs

Overview	116
I. Breast Development	116
II. General Anatomy of a Mature Breast	117
III. Variations in Breast Anatomy	122
IV. Mammatogenesis: Prenatal Breast Development	125
V. Secretory Differentiation or Lactogenesis I	126
VI. Secretory Activation or Lactogenesis II	126
VII. Galactopoiesis or Lactogenesis III	127
VIII. Involution: Apoptosis of Secretory Cells	129
IX. Milk Production and Synthesis	129
Key Points from This Chapter	131
References	132

CHAPTER 7 Biochemistry of Human Milk.....135

April Fogleman, Nicola Singletary, Rebecca Costello, and Jonathan C. Allen

Overview	136
I. Macronutrients	136
II. Water	137
III. Lipids	137
IV. Proteins	140
V. Carbohydrates	144
VI. Micronutrients	146
VII. Bioactive Factors in Human Milk	147
VIII. Mechanisms of Milk Secretion	148
IX. Colostrum	150
X. Pasteurized Donor Milk	150
XI. Infant Formula	151
Key Points from This Chapter	153
Additional Resources	153
References	154

CHAPTER 8 Nutrition during Lactation 161

Alicia C. Simpson and Virginia H. Carney

Overview	162
I. Initial Assessment	162
II. General Nutrition Recommendations for Lactation	163
III. Lactating Parent BMI	170
IV. Energy Needs during Lactation	171
V. Importance of Exercise during Pregnancy and Lactation	171
VI. Tandem Breastfeeding/Chestfeeding	172
VII. Special Populations	172
VIII. Prolonged Breastfeeding/Chestfeeding	176
Key Points from This Chapter	177
References	177

CHAPTER 9 Complementary Child Nutrition 181

Alicia C. Simpson and Virginia H. Carney

Overview	182
I. Guidelines and Recommendations for Infant Feeding	182
II. Introduction of Complementary (Solid) Foods	183
III. Breastfeeding/Chestfeeding the Toddler (1–3 Years of Age)	185
IV. Prevention of Malnutrition	186
V. Macronutrient and Micronutrient Needs of Infants and Toddlers	187
VI. Food Allergies and Intolerances	196
VII. Feeding in Special Populations	198
Key Points from This Chapter	200
References	200

SECTION II Management.....203**CHAPTER 10 Transition to Parenthood 205***Jane Grassley and Becky Spencer*

Overview	205
I. Transition to Parenthood.....	206
II. Parent–Infant Attachment	208
III. A Nurturing and Supportive Environment.....	209
IV. Factors that Influence the Transition to Parenthood	212
Key Points from This Chapter.....	218
Suggested Reading	218
References	219

CHAPTER 11 Breastfeeding and Employment 223*Cathy Carothers*

Overview	224
I. Competing Demands.....	225
II. Impact of Employment on Breastfeeding Initiation, Exclusivity, and Duration.....	226
III. Occupational Hazards and Lactating Employees	229
IV. Supporting Lactation Is a Win–Win–Win for Employers, Employees, and Babies	230
V. Barriers to Sustaining Lactation after Returning to Work	231
VI. Components of a Successful Lactation Support Program.....	231
VII. Safe Worksite Lactation Spaces for Employees	233
VIII. Counseling Breastfeeding/Chestfeeding Employees	234
IX. Assisting Employers with Providing Lactation Support	240
X. Childcare Providers.....	241
XI. The Lactation Consultant as Advocate for Working Parents.....	242
Key Points from This Chapter.....	243
Suggested Reading	244
References	244

**CHAPTER 12 Pregnancy, Labor,
and Birth Complications..... 249***Cheryl Benn*

Overview	250
I. Hypertensive Disorders of Pregnancy	250
II. Venous Thromboembolic Conditions in Pregnancy	252
III. Postpartum Hemorrhage	253
Key Points from This Chapter.....	255
Suggested Reading	255
References	255

CHAPTER 13 Facilitating Initiation of Lactation 257

Elaine Webber and Jean Benedict

Overview	258
I. Strategies for the Initiation of Breastfeeding/ Chestfeeding	258
II. Exclusive Breastfeeding/Chestfeeding in the Postpartum Period	260
III. Management of Breastfeeding/Chestfeeding during the Early Postpartum Period	261
IV. Managing Challenges in Initiating Breastfeeding/ Chestfeeding	270
Key Points from This Chapter	273
Additional Resources	273
References	274

CHAPTER 14 The Preterm Infant 279

Suzanne Hetzel Campbell, Laura N. Haiek, and Sarah Coutts

Overview	280
I. Scientific Basis for Breastfeeding the Preterm Infant	281
II. Management of the Environment to Support the Preterm Family for Breastfeeding/Chestfeeding Success	284
III. Initiatives to Support Breastfeeding/Chestfeeding the Premature Infant	287
IV. Kangaroo Mother Care	288
V. Professional Support for Parents of Preterm Infants	290
VI. Establishing Lactation with a Preterm Infant	292
VII. Maintaining Lactation with a Preterm Infant	294
VIII. Discharge Planning	295
IX. Human Milk Fortification	296
X. The Late Preterm Infant	298
Key Points from This Chapter	301
Website Resources	301
Acknowledgment	301
References	301

CHAPTER 15 Breastfeeding and Multiples 309

M. Karen Kerkhoff Gromada and Kathryn Stagg

Overview	311
I. Multiple-Birth Rate	311
II. Barriers to Nursing Multiple Neonates	311
III. The Right to a Nursing Relationship For and with Each Multiple-birth Infant	314
IV. Anticipatory Guidance: Prenatal Preparation for Nursing Multiples	315
V. Initiating Nursing and Lactation	319

VI. Biopsychosocial Issues Affecting the Duration of Nursing and Lactation with Multiples	324
VII. Maintaining Exclusive Nursing When All Multiples Nurse Effectively	325
VIII. Ongoing Issues with Nursing/Lactation.	332
IX. Exclusive versus Partial (or Combination) Nursing or Human Milk Feeding Options for Multiples	333
X. Nursing Older Infant and Toddler Multiples	334
Key Points from This Chapter	336
Additional Resources.	336
References	337

CHAPTER 16 Growth from Birth through Weaning 347

Debi Ferrarello and Rachelle Lessen

Overview	348
I. Breastfeeding/Chestfeeding Patterns during Infancy.	348
II. Physical Conditions that May Affect an Infant's Ability to Breastfeed	351
III. Later Stages of Breastfeeding/Chestfeeding	354
IV. Weaning	355
Key Points from This Chapter	358
Suggested Reading	358
Additional Resources.	358
References	360

CHAPTER 17 Maternal Physical Health and Lactation 363

Karen A. Wambach and Karman Romero

Overview	364
I. Acute Illnesses	364
II. Chronic Illnesses.	367
III. Assistance during Illnesses	380
Key Points from This Chapter	381
Additional Resources.	381
References	382

CHAPTER 18 Lactation and Mental Health 389

Kathleen Kendall-Tackett

Overview	390
I. Introduction: Key Findings Regarding Breastfeeding and Postpartum Mental Health	390
II. International Incidence of Postpartum Depression and Anxiety.	394
III. Inflammation: The Underlying Physiology of Depression, Anxiety, and PTSD	395

IV. Risk Factors for Depression	396
V. Treatment Options	408
Key Points from This Chapter	412
Suggested Reading	412
Information for Mothers on Postpartum Depression, Trauma, and Treatment Options	412
Resources for Those Who May Be Experiencing Prenatal or Postnatal Mood or Anxiety Disorders	412
References	413

CHAPTER 19 Induced Lactation and Relactation 421

Virginia Thorley and Gemma Cazorla-Ortiz

Overview	422
I. Research in Relactation and Induced Lactation	423
II. Physiological Mechanisms	424
III. Inducing Lactation or Relactating	424
IV. Parent Expectations and Support	426
V. History and Assessment	427
VI. Initiating Milk Production	428
VII. When Milk Production Begins	432
VIII. Milk Composition Following Induced Lactation and Relactation	432
IX. Feeding the Baby	433
Key Points from This Chapter	434
References	435

CHAPTER 20 Breast Pathology 439

Katrina B. Mitchell

Overview	440
I. Breast Evaluation and Variations in Exam	440
II. Palpation	443
III. Breastfeeding/Chestfeeding Complications and Breast Pathology	443
Key Points from This Chapter	454
References	454

CHAPTER 21 Newborn Challenges: Hyperbilirubinemia and Hypoglycemia 457

Sahira Long, Jessica Nash, and Michal A. Young

Overview	458
I. Normal Glucose Regulation in the Newborn	459
II. Risk Factors and Clinical Signs for Hypoglycemia	459
III. Testing Methods	460
IV. General Glucose Management Recommendations for All Term Newborns	460

V. Management of Documented Hypoglycemia in the Breastfed/Chestfed Infant	462
VI. Hyperbilirubinemia	462
VII. Common Types of Jaundice	463
VIII. Tests to Evaluate Jaundice	465
IX. Differential Diagnosis	466
X. Medical Management	466
XI. Breastfeeding/Chestfeeding Management of the Jaundiced Infant During Phototherapy	467
XII. Evaluation of Successful Resolution of Hyperbilirubinemia	467
Key Points from This Chapter	468
Additional Resources	468
References	468

CHAPTER 22 Low Milk Production and Infant Weight. 469

Kathleen L. Hoover, Lisa A. Marasco, and Kelli R. Fornow

Overview	469
I. Identifying the Causes for Weight Gain Issues	470
II. Poor Growth in Breastfed Babies	472
III. Unsubstantiated Low Milk Production	475
IV. Secondary Causes for Insufficient Milk Production	475
V. Primary Lactation Insufficiency: A Systems View	478
VI. Delayed Lactation: A Risk Factor for Insufficient Milk Production	479
VII. Primary Physical Causes of Insufficient Milk Production	480
VIII. Primary Physiological Causes of Insufficient Milk Production	482
IX. Oxytocin and Milk Ejection Problems as an Overlooked Contributor to Insufficient Milk Production	484
X. Management of Low Milk Production and Poor Weight Gain	486
XI. Additional Therapies to Increase Milk Production	494
Key Points from This Chapter	496
Recommended Key Articles and Resources	497
References	497

CHAPTER 23 Breastfeeding and Infant Birth Injury, Congenital Anomalies, and Illness. 509

Catherine Watson Genna

Overview	509
I. Postmature Infants	510
II. Birth Trauma	510

III. Fetal Distress and Hypoxia–Ischemia (Decreased Blood Flow and Oxygen)	512
IV. Neurologic Disorders	513
V. Inborn Errors of Metabolism	514
VI. Other Genetic and Congenital Disorders	516
VII. Acute and Systemic Illness	523
Key Points from This Chapter	526
References	526

CHAPTER 24 Alternative Feeding Devices and Topical Treatments 533

Sekeita L. Lewis-Johnson and Kirra Brandon

Overview	534
I. Prevention with Education	534
II. Nipple Devices	535
III. Alternative Feeding Devices	541
IV. Pacifiers (Dummies)	554
V. Infant Scale	555
VI. Topical Treatments	556
Key Points from This Chapter	560
Additional Resources	560
References	560

SECTION III Professional 565

CHAPTER 25 Professional Standards for Lactation Care Providers 567

Elizabeth C. Brooks and Elizabeth K. Stehel

Overview	568
I. The Need for Layers of Support to Breastfeed/Chestfeed	569
II. IBCLC Practice Documents	570
III. Certification Authority of IBLCE	571
IV. The IBLCE Code of Professional Conduct for IBCLCs	572
V. The IBLCE Scope of Practice for IBCLC Certificants	579
VI. IBLCE Clinical Competencies for IBCLC Practice	582
VII. ILCA Standards of Practice for IBCLCs	582
VIII. Practice Guidance for Lactation Care from Other Professional Organizations	584
Key Points from This Chapter	585
References	585

CHAPTER 26 Counseling and Communication 589

Laurie K. Scherer and Angela Love-Zaranka

Overview	590
I. Counseling Basics	590
II. Group Education and Facilitation	593
III. Effective Individual Counseling Sessions	594
IV. Counseling Skills for Challenging Situations	597
V. Communicating with Professionals	600
Key Points from This Chapter	601
References	601

CHAPTER 27 Problem Solving and Documentation 603

Angela Love-Zaranka and Laurie K. Scherer

Overview	604
I. Stages of Skill Acquisition and Critical Thinking	604
II. Key Elements in a Lactation Health Record	606
III. Documentation	608
IV. Problem-Solving Steps	610
V. Essential Characteristics of a Plan of Care	612
Key Points from This Chapter	613
References	614

CHAPTER 28 Cultural Humility.....617

Nekisha L. Killings

Overview	617
I. Cultural Humility and Its Relationship to Cultural Competency	618
II. Cultural Humility and Power	619
III. Bias	620
IV. Cultural Humility and Race, Gender Identity, and Sexuality ..	622
V. Interdisciplinary Applications of Cultural Humility	622
VII. Researched and Nonresearched Evidence	624
Key Points from This Chapter	624
Additional Resources	624
References	625

CHAPTER 29 Lactation Protection, Promotion, and Support..... 627

Suzanne Hetzel Campbell, Joan Younger Meek, and Tina Revai

Overview	628
I. Lactation Consultant as Change Agent at the Individual Level	629
II. Determinants of Breastfeeding/Chestfeeding and Opportunities for Change	629

III. Using a Social-ecological Approach to Identify Opportunities for Change	632
IV. Lactation Consultant as Change Agent at the Family Level. . .	633
V. Lactation Consultant as Change Agent at the Community Level	633
VI. Lactation Consultant as Change Agent at the Organizational Level.	634
VII. Lactation Consultant as Change Agent at the Workplace Level and in the Sociocultural Context. . . .	638
VIII. Lactation Consultant as Change Agent at the National and Global Levels	639
Key Points from This Chapter	642
Additional Resources.	643
References	643

CHAPTER 30 Lactation Education for Health Professionals 651

Kristina Chamberlain, Susan Fuchs, and Suzanne Hetzel Campbell

Overview	652
I. General Principles of Adult Education.	652
II. Types of Learning Styles and Theories	652
III. Education for Aspiring Lactation Professionals	653
IV. IBCLC Role in Interdisciplinary Lactation Education	655
V. Lactation Education for Healthcare Professionals	655
Key Points from This Chapter	660
Additional Resources.	660
References	660

CHAPTER 31 Expression and Use of Human Milk . . . 663

Frances Jones and Gillian Weaver

Overview	664
I. Reasons for Milk Expression	664
II. Validity of Information about Establishing and Maintaining Milk Production	665
III. Strategies to Help Establish and Maintain Milk Production . . .	665
IV. Storage and Handling of Milk	668
V. Transporting Human Milk.	670
VI. Sharing of Human Milk	671
VII. History of Sharing Human Milk	672
VIII. Milk Banking Today	673
IX. Use of Raw versus Pasteurized Donor Milk	677
X. Nonprofit Milk Banks—A Global Snapshot	678
XI. For-Profit Milk Processing Companies	680
Key Points from This Chapter.	681
Additional Resources.	682
References	682

CHAPTER 32 Interdisciplinary Lactation Services	687
<i>Rebecca Mannel, Suzanne Hetzel Campbell, and Elizabeth K. Stehel</i>	
Overview	688
I. Interdisciplinary Health Care	689
II. Interdisciplinary Education	690
III. Institute of Medicine: Measuring the Impact.	691
IV. Examples of Interdisciplinary Collaboration	692
V. Interdisciplinary Teams	693
VI. Interdisciplinary Care for Lactation	694
VII. Patient-Centered Care	695
VIII. Interprofessional Education and Patient-Centered Care	696
IX. Policy Development Resources for Interdisciplinary Lactation Care	700
X. The Clinical Lactation Professional as a Key Partner.	701
Key Points from This Chapter	702
Additional Resources	702
Organizations for Interprofessional Education	703
References	703
 Case Studies	 707
Glossary (available online in the ebook)	819
Index	I-1

Foreword



Throughout the world, the lactation consultant profession is recognized as essential for promoting, protecting, and supporting breastfeeding. Since its first edition, this text has become a vital tool in the curriculum design of my lactation educator courses and many other Lactation Education Accreditation and Approval Review Committee (LEAARC) accredited and endorsed programs. It has also become the primary study guide for thousands of English-speaking people who wish to become certified lactation consultants by the International Board of Lactation Consultant Examiners (IBLCE). This is precisely due to its unique format and competency-based learning orientation, which allows for the concepts related to lactation education to be translated into many contexts around the world.

This second edition has several updates, including in-depth case studies for each chapter, identifying core curriculum objectives met in the case, pedagogical suggestions for teaching/learning, discussion questions, and reflection prompts. All chapter objectives were closely examined, and the material was reorganized, especially where new guidance and standards were relevant.

Scientific advances and information in the field of lactation happen daily. All chapters were updated according to the most recent published research, policy, and practice guidelines regarding lactation and the care of breastfeeding mothers/chestfeeding parents. Additionally, contributors continue to be interdisciplinary experts in the field from several countries worldwide, providing substantial benefits to students, teachers, practitioners, and policymakers.

As a professor of lactation courses, I have seen the beneficial impact this book has had on my students, increasing their knowledge in the field and allowing for deeper reflection on the issues concerning lactation management today. My career as a public health professional has taught me the importance of including discussions around diversity, equity, disparities, and social implications in family health-related fields, all of which are present in this book.

I am confident the updates made in this second edition will have an even deeper impact on the lactation consultant profession, furthering professionals' understanding of the interdisciplinary and diverse implications involved in the populations they serve. Without a doubt, this book is a vital addition to the library of every lactation clinician, student of the field, and academic teacher.

*Ana M. Parrilla-Rodríguez, MD, MPH, FABM, IBCLC, FACCE
Director and Professor of the Department of Human Development
and Coordinator of the Maternal and Child Health Program,
School of Public Health, University of Puerto Rico
Director - "Certificado Profesional en Educador en Lactancia" - Academia Edupro*

Introduction



We are very excited to introduce the second edition of the *Core Curriculum for Interdisciplinary Lactation Care*. The work behind this text began more than 14 years ago when the International Lactation Consultant Association (ILCA) and the International Board of Lactation Consultant Examiners (IBLCE) collaborated to establish and sponsor an organization with the purpose of developing standards for lactation education. The Lactation Education Accreditation and Approval Review Committee (LEAARC) published the *Curriculum for Programs in Human Lactation* in 2010 (with updates in 2014 and 2016), which defines the educational preparation for entry-level lactation consultants. The lactation education curriculum comprises the following topic areas: Communication and Counseling, Documentation and Communication, History Taking and Assessment, Prenatal and Perinatal Breastfeeding/Chestfeeding Support, Extended Breastfeeding/Chestfeeding Support, Problem Solving Infant–Child Breastfeeding/Chestfeeding Challenges, Parental Breastfeeding/Chestfeeding Challenges, Public Health, Research Legislation and Policy, Professional Responsibilities and Practice, and Leadership and Teaching. Each topic area has defined core competencies, learning objectives, suggested content, and suggested skills and behaviors.

LEAARC's *Curriculum for Programs in Human Lactation* has served as the foundation for the development and review of lactation education programs worldwide. Lactation education programs that provide 90 or more hours of didactic education can apply to LEAARC for approval designation, and lactation education programs that provide 40–89 hours of didactic education can apply to LEAARC for recognized designation. LEAARC now also reviews and endorses clinical lactation internships that provide 500 or more hours of clinical education, and clinical instructors who provide 100 or more hours of clinical instruction can also apply for recognition. Lactation education programs that are sponsored by an accredited postsecondary education institution can apply for accreditation by the Commission on Accreditation of Allied Health Education Programs (CAAHEP). LEAARC provides program evaluations and recommendations for accrediting lactation education programs to CAAHEP. The IBLCE requires that all applicants for the certification exam through Pathway 2 show evidence of completion of a comprehensive accredited lactation education program within 5 years prior to applying for the exam. The *Curriculum for Programs in Human Lactation* and *The Standards and Guidelines for the Accreditation of Lactation Consultant Education Programs* guide the comprehensive review and evaluation of all lactation education programs seeking approval, recognition, or accreditation.

To fully enact LEAARC's mission to “establish standards for and recognize quality in lactation education,” board members recognized the need to further develop lactation education materials and resources. The second edition of *Core Curriculum for Interdisciplinary Lactation Care* exemplifies the LEAARC *Curriculum for Programs in Human Lactation*. The LEAARC board of directors

commissioned this team of editors and an interdisciplinary team of clinical lactation experts from several countries around the world to serve as authors to develop this text. The text serves as a trustworthy source for lactation-specific information and education for students, interns, certification candidates, instructors, and clinicians—in any discipline or specialty—who provide care to breastfeeding/chestfeeding families. We want to emphasize that the LEAARC *Curriculum for Programs in Human Lactation* and the content presented in this text are intended to provide the basic knowledge required to practice as a beginning lactation consultant. The breadth and depth of specialty lactation practice is outside the scope of this text.

Core Curriculum for Interdisciplinary Lactation Care is organized into three main sections. The *Science* section, Chapters 1–9, presents the science and biology of breastfeeding/chestfeeding. Breast anatomy, infant anatomy related to feeding, infant behavior related to feeding, and production and biochemistry of human milk are presented with a focus on expectations within the norm and variations from those expectations. Nutritional requirements and nutrition assessments for breastfeeding/chestfeeding parents and infants are also presented. Discussions related to substances that enter human milk, such as medications and supplements, with a focus on how to minimize infant exposure are outlined. Methods to appraise, interpret, and apply research are examined. The *Management* section, Chapters 10–24, examines specific areas related to the breastfeeding/chestfeeding family that may impact breastfeeding/chestfeeding and describes best practices, up-to-date research, and protocols, where available. The information in this section describes the lactation consultant's role in supporting and promoting breastfeeding/chestfeeding and family health as part of the interprofessional team. The *Professional* section, Chapters 25–32, addresses professional aspects of working in the lactation field. The interdisciplinary nature of lactation care involves working with a team of healthcare professionals, community organizations, and governmental agencies. It involves applying communication, education, advocacy, and professional standards to improve the environment for breastfeeding/chestfeeding outcomes. Throughout the text, the chapters feature inclusive language to represent families from diverse backgrounds and cultures, key points, and clinical tips to guide learning.

In this second edition, chapter objectives and content were closely examined, and material was reorganized and revised especially where new guidance and standards were relevant. For example, Chapter 30, *Lactation Education for Health Professionals*, incorporated innovative teaching pedagogies, and Chapter 22, *Low Milk Production and Infant Weight*, incorporated updated assessment rubrics, while Chapter 14, *The Preterm Infant*, incorporated updates from The Baby-Friendly Hospital Initiative for Neonatal Wards by restructuring the flow of the chapter to capture practice and policy changes. Where appropriate, the impact of the COVID-19 pandemic was incorporated. All chapters include updates from the most recent published research, policy, and practice guidelines regarding lactation and the care of breastfeeding mothers/chestfeeding parents. In response to reviewer feedback, the second edition also includes expanded case studies for all chapters to stimulate discussions among colleagues and in classrooms, allowing application of the theoretical and clinical information to a live situation and increasing the opportunity for experiential learning. A teaching notes companion reference is also available to instructors of lactation courses and programs with suggestions for implementation of the case studies, reference to specific elements of the LEAARC core curriculum competencies, and example responses to case study discussion and reflection questions.

In the second edition of this text, we continued in the effort to use gender-inclusive language to provide a model for learning how to use language to signal that families who identify with diverse sexual and gender minorities receive evidence-informed, safe, and welcoming lactation care. Our definition of gender-inclusive language is the incorporation of more words to represent multiple ways that parents identify. Readers will see breastfeeding/chestfeeding, mother/birthing parent, mother/chestfeeding parent, mother/nurser, and she/they, her/theirs to represent the diversity of the experience of providing human milk. Gender-inclusive language is not used in the text when authors refer to research findings that are exclusive to participants who identified as women. To help ease confusion, a statement explaining any exclusive use of mother, maternal, or breastfeeding is included at the beginning of each chapter. Gender inclusivity in academic texts is a work in progress, and our text is no exception. We welcome reader feedback regarding ways to use language to promote safe and inclusive care in future editions of this textbook.

Lastly, we chose to include the term *interdisciplinary* in the title of this text to highlight the strength of having many disciplines represented within the lactation care specialty. Leading global health authorities—including, but not limited to, the World Health Organization, the U.S. Institute of Medicine, and the Interdisciplinary Association for Population Health Science—have identified the need for collaboration among teams of multidisciplinary healthcare specialists, patients, and community health workers to address the world's most pressing health concerns. This focus on interdisciplinary collaboration is a relatively new phenomenon in global health care, with an increased emphasis noted over the past 15 years. Lactation consulting has been interdisciplinary in nature from its inception as a healthcare specialty in 1985. Although the discipline has many subspecialties, we all share the same lactation knowledge base, presented in this text, that enables us to provide comprehensive care for breastfeeding/chestfeeding families. We thoroughly enjoyed the collaborative experience with our diverse team of authors and reviewers, and we hope that you will appreciate the variety of perspectives they present within their shared expertise in lactation.

Becky Spencer
Suzanne Hetzel Campbell
Kristina Chamberlain

Acknowledgments



The Lactation Education Accreditation and Approval Review Committee's (LEAARC's) *Core Curriculum for Interdisciplinary Lactation Care, Second Edition*, represents the work of scores of clinicians, researchers, and educators who have advanced the field of lactation consulting over the past three decades. We honor those accomplishments and recognize our peers and colleagues for inspiring us to accept the challenge of guiding the revisions of this second edition. It was a pleasure being part of such a collaboration among numerous experts throughout the world who generously shared their talents and insights into clinical practice.

Our editorial team extends our sincere gratitude to all the chapter authors whose diligence helped maintain high standards and integrity and ensured that this important resource would be relevant to clinicians, educators, and students. We acknowledge Jones & Bartlett Learning staff members Tina Chen, Paula-Yuan Gregory, Robin Landry, Lindsay White, Carolyn Pershouse, Samantha Gillespie, Kristen Rogers, Jennifer Risdén, Rachel Di Maggio, Troy Liston, Briana Yates, Matt Kane, and Wendy Kilborn for their patience and support throughout the project. We appreciate the expert editing and guidance from our copy editor, from our S4 Carlisle project manager Manjusha Chandrasekaran, as well as Sabrina Ramesh and Latha Padmaraj in shepherding us through the writing and editing of such an extensive text. Thank you as well to the LEAARC Board of Directors for their vision and action to ensure the lactation profession will continue to be guided by a core curriculum and for placing their trust in our editorial team to manage the process. None of us would have had the privilege to be part of this process without the mentors and guides who came before and nurtured us, the students who challenged our perspectives and rationales, and the many parents, babies, and families who taught us along the way. Finally, we thank our families for their encouragement, support, and understanding that allowed us to devote the time and focus needed to steer this text through to publication.

Becky Spencer
Suzanne Hetzel Campbell
Kristina Chamberlain

Contributors



We would like to thank all our contributors for their hard work on the second edition of this title:

Jonathan C. Allen, PhD, CNS, FACN

North Carolina State University
Raleigh, North Carolina, USA

Teresa M. Baker, MD, FACOG

Department of Obstetrics and Gynecology
Texas Tech University Health Sciences Center
Amarillo, Texas, USA

Jennifer Bañuelos, MAS

Institute for Global Nutrition
University of California, Davis
Davis, California, USA

Jean Benedict, RN, BSN, IBCLC

South Lyon, Michigan, USA

Cheryl Benn, RM, RCpN, MCur, DCur, IBCLC

New Zealand College of Midwives member
ILCA member
Palmerston North, New Zealand

Kirra Brandon, MD, FAAD, CBS

Lactation Education Resources
Annapolis, Maryland, USA

Elizabeth C. Brooks, JD, IBCLC, FILCA

Elizabeth C Brooks JD IBCLC (LLC)
Wyndmoor, Pennsylvania, USA

Suzanne Hetzel Campbell, PhD, RN, FCNEI, IBCLC, CCSNE

Faculty of Applied Science/School of Nursing
The University of British Columbia
Vancouver, British Columbia, Canada

Virginia H. Carney, MPH, RDN, LDN, IBCLC, RLC, FILCA, FAND

St. Jude Children's Research Hospital
Memphis, Tennessee, USA

Cathy Carothers, BLA, IBCLC, FILCA

Every Mother, Inc.
Pass Christian, Mississippi, USA

Gemma Cazorla-Ortiz, Midwife/PhD

Institut Català de la Salut
Universitat de Barcelona
Barcelona, Spain

Kristina Chamberlain, CNM, ARNP, IBCLC

Lactation Program, Division of Extended Studies
University of California, San Diego
La Jolla, California, USA

Elizabeth Choi, MS, CCC-SLP

Mrs. T. H. Chan Division of Occupational Science
and Occupational Therapy
University of Southern California
Los Angeles, California, USA

Rebecca Costello, MPH, IBCLC

North Carolina State University
Raleigh, North Carolina, USA

Sarah Coutts, RN, BSN, MPH, IBCLC

BC Women's Hospital and Health Centre
Vancouver, British Columbia, Canada

Debi Ferrarello, MSN, MS, RN, IBCLC, NE-BC

Philadelphia, Pennsylvania, USA

April Fogleman, PhD, RD, LDN, IBCLC

North Carolina State University
Raleigh, North Carolina, USA

Kelli R. Fornow, RN, MSN, IBCLC

St. Charles Health System
Bend, Oregon, USA

Susan Fuchs, MS, IBCLC

Drexel University
Philadelphia, Pennsylvania, USA
Jefferson Health NJ
Washington Township, New Jersey, USA

Catherine Watson Genna, BS, IBCLC

Woodhaven, New York, USA

Jane Grassley, PhD, RN, IBCLC

Professor Emeritus
Boise State University
Boise, Idaho, USA

M. Karen Kerkhoff Gromada, MSN, RN, IBCLC, FILCA

United States Lactation Consultant Association
International Lactation Consultant Association
Cincinnati, Ohio, USA

Laura N. Haiek, MD, MSc

Direction générale de la santé publique
Ministère de la Santé et des Services sociaux du Québec
Department of Family Medicine
McGill University
Montréal, Québec, Canada

Thomas W. Hale, RPh, PhD

Texas Tech University School of Medicine
InfantRisk Center
Amarillo, Texas, USA

M. Jane Heinig, PhD, IBCLC

Department of Nutrition
University of California, Davis
Davis, California, USA

Kathleen L. Hoover, MEd, IBCLC

Northborough, Massachusetts, USA

Nina Isaac, MS, CCC-SLP, IBCLC

Milk and Honey, Specialized Breastfeeding
and Postpartum Support Center
Tucson, Arizona, USA

Frances Jones, RN, MSN, IBCLC

Lactation Service & BC Women's Provincial
Milk Bank
Vancouver, British Columbia, Canada

Kathleen Kendall-Tackett, PhD, IBCLC, FAPA

Texas Tech University Health Sciences Center
Amarillo, Texas, USA

Nekisha L. Killings, MPH, IBCLC

Lioness Lactation LLC
Palm Bay, Florida, USA

Claudia Krebs, MD, PhD, FAAA

Faculty of Medicine
The University of British Columbia
Vancouver, British Columbia, Canada

Kaytlin Krutsch, PharmD, MBA, BCPS

Department of Obstetrics and Gynecology,
InfantRisk Center
Texas Tech University Health Sciences Center
Amarillo, Texas, USA

Rachelle Lessen, MS, RDN, IBCLC

The Children's Hospital of Philadelphia
Philadelphia, Pennsylvania, USA

Sekeita L. Lewis-Johnson, DNP, FNP-BC, IBCLC

Lactation Education Resources, Annapolis,
Maryland, USA
Southeast Michigan IBCLCs of Color, Farmington
Hills, Michigan, USA
Mommy & Me Lactation Consulting, LLC.,
Farmington Hills, Michigan, USA
United States Breastfeeding Committee
United States Lactation Consultant Association
Michigan Breastfeeding Network, Lansing,
Michigan, USA

Sahira Long, MD, IBCLC, FAAP, FABM

Children's National Hospital
George Washington University School of Medicine
and Health Sciences
Washington, D.C., USA

Angela Love-Zaranka, BA, IBCLC, RLC

Program Director
Lactation Education Resources
Annapolis, Maryland, USA
Lactation Connections, LLC
Alexandria, Virginia, USA

Rebecca Mannel, MPH, IBCLC

Oklahoma Breastfeeding Resource Center
Department of OB/GYN
University of Oklahoma Health Sciences Center
Oklahoma City, Oklahoma, USA

Lisa A. Marasco, MA, IBCLC, FILCA

Santa Barbara County Public Health Department/
Nutrition Services/WIC
Santa Maria, California, USA

Joan Younger Meek, MD, MS, RD, FAAP, FABM, IBCLC

Department of Clinical Sciences
Florida State University College of Medicine
Tallahassee, Florida, USA

Katrina B. Mitchell, MD, IBCLC, FACS

Ridley Tree Cancer Center at Sansum Clinic
Santa Barbara, California, USA

Jessica Nash, MD, IBCLC, FAAP

Children's National Hospital
George Washington University School of Medicine
and Health Sciences
Washington, D.C., USA

Tina Revai, RN, MN, IBCLC

Director
British Columbia Lactation Consultants Association
Prince George, British Columbia, Canada

Karman Romero, PhD, RN, IBCLC

Park University
Parkville, Missouri, USA

Laurie K. Scherer, MS, LCPC-S

Salisbury, Maryland, USA

Alicia C. Simpson, MS, RD, IBCLC, LD

Pea Pod Nutrition and Lactation Support
Atlanta, Georgia, USA
Union Institute and University
Cincinnati, Ohio, USA

Nicola Singletary, MAT, PhD, IBCLC

North Carolina State University
Raleigh, North Carolina, USA

**Becky Spencer, PhD, APRN, PMHNP-BC,
IBCLC, FILCA**

Texas Woman's University
Connections Wellness Group
Denton, Texas, USA

Kathryn Stagg, IBCLC

Harrow, Greater London, UK

Elizabeth K. Stehel, MD, IBCLC

The University of Texas Southwestern
Medical Center
Texas A&M University College of Medicine
Dallas, Texas, USA

Virginia Thorley, PhD, IBCLC, FILCA GC Counseling

Honorary Research Fellow
School of Historical and Philosophical Inquiry
University of Queensland
St. Lucia, Queensland, Australia

Karen A. Wambach, PhD, RN, IBCLC, FAAN, FILCA

Professor Emerita
University of Kansas School of Nursing
Kansas City, Kansas, USA

Amanda L. Watkins, PhD, MS, LDN, IBCLC

Global Lactation Education Associates, LLC
Raleigh, North Carolina, USA

Gillian Weaver, BSc (Hons) Nutrition, RD

Co-Founder, Human Milk Foundation
Past President, European Milk Bank Association
Past Chair, UK Association for Milk Banking
Dover, Kent, UK

Elaine Webber, DNP, PPCNP-BC, IBCLC

McAuley School of Nursing
University of Detroit Mercy
Detroit, Michigan, USA

Michal A. Young, MD, FAAP, FABM

Howard University College of Medicine
Washington, D.C., USA